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EVALUATION OF THE ECONOMIC IMPACT OF THE TRADE PILLAR OF THE EU-CHILE ASSOCIATION AGREEMENT

FINAL REPORT

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EXECUTIVE SUMMARY

Chile and the European Union (EU) signed an Association Agreement on November 18, 2002. While the Agreement came fully into force on March 1, 2005, the provisions regarding trade in goods were enforced on a provisional basis as of February 1, 2003. More than eight years down the road, this report presents an ex-post assessment of the economic, social and environmental impacts of the trade pillar of the Agreement.

Even considering only the trade aspects, the Agreement includes a wide-ranging set of provisions, several of which had not been integrated into other Free Trade Agreements (hereafter FTAs) signed by both parties before. This is illustrated in the Agreement's inclusion of a high level of mutual protection for names used in appellations of origin, provisions in the sanitary and phytosanitary fields that go beyond World Trade Organization (hereafter WTO) rules, comprehensive liberalisation commitments for trade in services and the right of establishment, and innovative institutional provisions. Special attention was paid to institutional factors that are designed to facilitate trade, including managerial, technical and legal aspects. Particular provisions of the Agreement intend to encourage foreign investment with the liberalisation of capital flows. The Agreement also provides access to government procurements, protects intellectual property rights and implements strong rules regarding trade facilitation.

Even by present standards, this can be deemed an ambitious agreement. Although the phase-in period of the Agreement is still on-going, a number of conclusions can be drawn as to its consequences. In order to do so, this report considers in turn a number of different aspects of the Agreement, combining a variety of sources of information and of evaluation techniques. The objective is both to deepen our understanding of the bearing of such trade agreements and to help improve the formulation of future agreements.

Tariffs and trade

Despite the variety of areas covered, tariff provisions still play a central role. They are decisive in determining the trade effects of the Agreement. Taking advantage of the most detailed information available for protection and trade, this report sheds light on the nature of tariff concessions and on their potential trade impacts. The contrast across partners is stark not only as far as economic size is concerned, but also in the areas of protection and trade patterns.

The EU tariff elimination schedules include full liberalisation for manufactured products, either immediately or within 3 years. This is potentially a very large benefit for Chilean exporters. However, European protection under the Most Favoured Nation (MFN) regime is low for these products and Chile's export potential has remained limited so far. Ores and copper products, important in Chile's exports, are almost not protected at all in the EU market. For agricultural, food and fisheries products, more exemptions from the principle of complete liberalisation are made, and a significant part of the liberalisation commitments were delayed by 7 to 10 years. This is, however, where the main stakes seem to lie for Chilean exporters. Their export potential is strong for some of these products, in particular fruits, wines and fishery products, where EU's protection is significant. The comparative analysis of bilateral trade flows suggests that significant trade creation is likely to have occurred in these products, where Chile's export performance seems to be meaningfully related to tariff cuts.

Chilean protection is very different, with an almost-uniform MFN rate of 6%, and a multiplication of bilateral trade agreements, many of which are still being phased in. Chile's tariff elimination schedules are comprehensive and for the most part, they were implemented early after the entry into force of the FTA. Still, the benefits for the EU's exporters are difficult to ascertain based on descriptive statistics, especially for two reasons. The lack of contrast across products makes it difficult to draw conclusions out of the comparison of outcomes between sectors more or less liberalised and the changing market access conditions offered to the EU's competitors in Chile's market blur the comparison across countries. The EU's market shares in Chilean imports tended to decline since the Agreement was enforced, but this was a period where EU exports were outpaced by a large margin by exports from more economically dynamic regions, and several agreements were being phased-in by Chile. The Agreement is likely to have prevented the EU's market shares in the Chilean market from falling substantially further. But more advanced techniques are needed to reach better established conclusions about the Agreement's impact on bilateral trade.

Econometric analysis

A transformed version of a gravity equation is used to build a meaningful benchmark against which bilateral trade outcomes can be assessed. Trade impacts are then identified through comparisons across products for import changes, in relation to tariff cuts. Proper estimation requires controlling for several potential competing effects, such as the trends in Chile and the EU's supply and demand, product by product. This is achieved by studying the difference-in-differences of imports (expressed in logarithms). For instance, instead of considering EU imports from Chile properly speaking, econometric estimates are based upon changes in these imports, beyond what could be expected given trends in Chile's exports to other markets, and trends in EU imports from other providers. This specification implies that estimates cannot be directly interpreted as giving the assessed Agreement impact, but rather the impact of tariff provision upon relative sales, across products and providers. Initial trade levels must be taken into account, as must be the potential consequences on prices, incomes and supplies.

Combining these techniques with the most detailed information available (at the tariff-line level) proves useful: robust estimates of the trade impact of tariff cuts are

obtained. The results suggest that tariff cuts granted by the EU to Chile had a significant impact on the level of EU imports from Chile, compared to other suppliers. The elasticity of substitution between imports from Chile and from other providers is estimated to be approximately 10 on average, suggesting that a 1% tariff cut might result in a 10% increase in imports, relative to other providers. Simplified simulations, not taking into account effects on prices, incomes and outputs, and more generally disregarding general equilibrium effects, suggest that EU imports from Chile would be 15% lower in 2009, if Chile was granted the Generalised System of Preferences (GSP) regime. If the MFN regime was applied to EU imports from Chile, their level would fall by 20%, or €665 million. Put differently, this means that the Agreement is estimated to have increased EU imports from Chile by a quarter. Wines and fruits are the sectors which benefited most.

The estimated elasticities of substitution between imports from different providers are larger for Chilean imports from the EU, with an average of 13. This is a high level for elasticities, but it is not inconsistent with the few estimates carried out in other contexts at a comparable level of detail. These large elasticities must also be put in perspective within a context where Chile's initial protection was low and exhibited limited variability across products.

These estimates also mean that bilateral imports are found to be more price sensitive on the Chilean side than on the EU's side. This may sound surprising to the extent that Chile mainly export agricultural products, while the EU's exports are mainly manufactured. However, Chilean exports tend to be concentrated in specific products, such as fresh grapes, apples and kiwifruits. In such cases, there is little room for substitution across products when prices change. In addition, most Chilean competitors in the EU market (EU producers, to begin with) are in the Northern hemisphere, meaning that their seasonal cycle is different from the Chilean one. All these elements may explain the relative price insensitivity of Chilean exports in the EU, in particular for fruits and for other agricultural products. In contrast, the diversified nature of EU exports to Chile implies that cross-product substitution is easy. The competition with other manufacturing exporters is also intense in this rather open market, where the competitiveness of domestic producers is often low in the heavy-industry sectors.

Simulations based on these estimates suggest that, would Chile apply MFN tariffs to its imports from the EU, the level of these imports in 2010 would be lower by at least 40%, i.e. by more than US$ 3 billion. In other words, compared to a counterfactual scenario without the Agreement, the Agreement results in EU exports to Chile being higher by at least two thirds. Given the high degree of substitution between suppliers to the Chilean market, those exports would have been provided by third countries if the Agreement would not have been in place.

This finding might seem at odds with the downward trend observed in the EU's share in Chile's total imports over the 2000s. However it is not. Rather, it suggests that, absent an agreement, EU exports to Chile might well have dropped significantly in relative terms, in a context where Chile was phasing in trade agreements with a large number of partners. The fear of Chile's FTA with the US crowding out EU exporters from the Chilean market has been considered by many as an important motivation for the EU to sign an agreement with Chile; our results suggest this may well have been a meaningful motivation.

The econometric analysis also allows the impact of non-tariff provisions to be assessed. The principle is, in this case, to investigate whether the Agreement's enforcement was accompanied by changes in bilateral trade –possibly uneven across sectors– over and above what can be explained by tariff cuts. However, our estimates failed to find significant effects. In the qualitative analysis in Chapter 5, the role of the institutional framework and the provisions of the Agreement designed to facilitate trade is underlined in the interviews, but we found little statistical evidence of the impact of non-tariff provisions upon bilateral trade. One reason is that these measures have a rather diffuse impact on all sectors, and that the number of agreements signed by Chile, combined with the recent global economic crisis, make changes over time difficult to interpret.

General equilibrium assessment

A preferential trade agreement not only influences trade flows, it also involves interrelationships with incomes, factor and goods prices, as well as aggregate variables. This is why a general equilibrium approach is useful for a comprehensive assessment. In the present case, however, the Agreement studied exhibits strong asymmetry. Chile ranked 34th as one of the EU's trading partners in 2010, accounting for 0.6% of imports and 0.4% of exports. It is unlikely in this context that general equilibrium relationships are very important for the EU. In contrast, the EU was the destination for almost 18% of Chile's exports in 2010, making it the second leading Chilean export market at that time (ranking second to China), and it supplied 14% of its imports (next to China and the US). This is why the analysis presented in this chapter relies on a single-country, Computable General Equilibrium (hereafter CGE) model of the Chilean economy.

The model built for this purpose presents several peculiarities compared to the literature. First, it includes detailed modelling of trade flows, at the 6-digit level for products of interest for EU-Chile relationship. Second, it relies on – and therefore is coherent with - the econometric estimates carried out previously. Third, it is used for an ex-post assessment while the standard use of such models is ex-ante. The approach followed allows the contribution of the Agreement to observed changes, to be assessed in a comprehensive way.

The simulations allow the most heavily impacted sectors to be identified, and it is no surprise to find among the main winners fruit growing, wine making, fisheries and fish processing on the Chilean side, and machinery, transport equipment and the chemical industries in the EU. At the aggregate level, comparing the situation under the Agreement with a counterfactual state of the economy without the Agreement, Chilean exports to the EU are assessed to be higher by around 20%, and the EU's exports to Chile by more than 60%. Several reasons explain this difference in trade impacts. First, Chilean exports to the EU are heavily composed of non-dutiable products, mainly copper and its products, but also ores and wood products. Second, the bilateral trade balance exhibits a surplus in favour of Chile throughout the period, so that this increased rate actually applies to a larger base level for Chile than for the EU. Third, our econometric estimates suggest that the sensitivity of bilateral trade flows to tariffs is significantly larger for the EU's bilateral exports than for Chilean ones. Lastly, the significant difference in EU's exports to Chile relative to the counterfactual (no agreement) scenario is linked to the strong substitutability across providers in the Chilean markets. It is accompanied by substantially lower levels of Chilean imports from third countries, in particular the US (approximately -15%).

At first glance, such results can be interpreted as evidence of diversion effects. However, to the extent that similar agreements were signed by Chile with most other partners, these results suggest on the contrary that the EU-Chile FTA maintained a level playing field, preventing the EU's exporters from facing the significant diversion effects that might have resulted from competing agreements. In other words, these impacts must not only be compared to observed trends since the Agreement enforcement; they also assess, implicitly, how trade flows between the EU and Chile might have evolved without an agreement. In this case, it is likely that the enforcement of several FTAs signed by Chile, amongst others with the US, could have significantly crowded out European exporters from the Chilean market, and to a lesser extent diverted Chilean exporters from the EU market.

The Agreement is found to trigger an aggregate economic gain for the Chilean economy. The assessed real income gain (+0.23% in equivalent variation of income in the base case) is small, but it should be kept in mind that the impact measured here is limited to the direct, so-to-say "mechanical" consequences of tariff cuts in the Agreement. Such a shock may also initiate a virtuous circle by allowing export sectors to gain renewed dynamism, with possible indirect effects *inter alia* on technology, competitive structure, demography of firms and information or access to markets. The so-called new and "new new" theories of trade have identified a wealth of such possible effects. In any case, trade policy is only one element of a country's policy mix, the benefits of which are only fully felt to the extent that it is combined suitably with other policies, allowing such virtuous circles to get under way, and preventing possible undesired effects to materialise.

In this context, the direction of changes and the comparisons across industries and across shocks are to be thought of as the most meaningful results. In addition, non-tariff aspects of the Agreement are not taken into account in these simulations, by lack of a tangible basis to quantify them, thus limiting the scope of this quantitative assessment.

Compared to the simulations carried out in 2002 for the ex-ante Sustainability Impact Assessment (SIA) of the EU-Chile FTA, the results found here are consistent at the aggregate level. However, their distribution across sectors and across production factors differ significantly, outlining the benefits reaped from the more detailed analysis carried out in the present case.

Trade in services and foreign direct investment

Bilateral trade in services between the EU and Chile has been increasing steeply during the last decade, despite the recent decline linked to the financial crisis. The surge in the EU's exports is especially spectacular, with European sales of services in Chile increasing fivefold between 2001 and 2007. As a result, bilateral trade in services has been producing a significant surplus for the EU during the most recent years of close to €1.5 billion in 2007 and still close to €1 billion in 2009.

To assess the extent to which these trends have been influenced by the FTA provisions related to trade in services, our analysis relies upon a thorough assessment of the signing parties' commitments under the FTA, by type of service and by mode. Taking into account the level of commitment already made under the General Agreement on Trade in Services (GATS), this analysis allows the degree of liberalisation actually mandated by the FTA's commitments to be compared across service sectors.

The starting point was a high level of commitments under the GATS for the EU, and a relatively low level for Chile (although the domestic market of services was largely liberalised in practice). For the EU, the additional commitments made under the FTA resulted in a very high level of commitments, concerning most types of services in all sectors, outside health related, cultural or recreational, and transport services. As far as Chile is concerned, commitments remained limited in several sectors (construction, educational, environmental, health related services), and intermediate in communication and financial services. Still, the FTA brought significant additional commitments from Chile in distribution, recreational, tourism, business and transport services.

Quantitative analysis faces severe limitations in this case, linked to the quality of statistics available and to the difficulty in accounting for the variety of commitments and obstacles to trade. Still, analysing to what extent this degree of liberalisation is correlated across service sectors to trade performance (excluding commercial presence, dealt with through foreign direct investment) shows that the EU's exports of services to Chile tended to increase more, following the entry into force of the FTA in those sectors where commitments brought a higher degree of (consolidation of) liberalisation. Whether this reflects a causal relationship is questionable, though. Appropriately taking into account trends which are not specific to the EU-Chile bilateral relationship suggests that this relationship may also reflect the fact that priority was given in the FTA provisions to commitments in those service sectors with higher trade potential.

Concerning Chile's exports to the EU, an analysis directly based upon trade values fails to point out any relationship with EU's commitments in the FTA. However, taking into account exogenous trends suggests that these commitments may have actually spurred Chilean exports. The limitations of this analysis have already been mentioned. It remains that Chile's exports of services to the EU performed relatively well in several sectors where the EU's FTA commitments significantly improved those made in the GATS.

As regards foreign direct investment, the EU remains the most important investor in Chile. Its investments are almost double those of the second most important source (the US), and come primarily from two countries, Spain and the UK, and are funnelled mainly toward the service sector. Fiscal and institutional conditions surrounding EU FDI in Chile are fairly favourable, especially when domestic legislation and the articulation with investment-related bilateral agreements are taken into account. For EU FDI in Chile as for Chilean investments in the EU, investment decisions seem strictly related to business opportunities, and recent changes probably have more to do with the economic dynamism of investing countries than with the Agreement. In this context, the Association Agreement did not significantly change the legal framework or the guarantees for European investors. Its benefits essentially lie in additional security associated with consolidation of the conditions prevailing before the Agreement. Even though such benefits do not necessarily manifest in significant changes in investment behaviours, they are not negligible, especially in the long run.

Institutional and Regulatory Issues

The wide-ranging set of rules regarding a variety of trade-related issues is an important part of the EU-Chile FTA. Even though the blueprint of the EU's agreements has evolved since 2002, the ambition of these rules deserves emphasis. The provisions regarding

sanitary and phytosanitary (herafter SPS) measures, technical standards and wines and spirits required, in particular, substantial adjustment on the Chilean side, given the stringency of the EU's requirements in these respects. More generally, arriving at the rules set out in the Agreement required an efficient dialogue between both parties, and putting them into practice demanded significant effort. The review carried out in this chapter suggests that practice kept up with commitments in most respects.

The institutional structure set up by the Agreement has been put effectively into practice, apparently at the satisfaction of the contracting parties. Many technical issues have been raised (in particular regarding SPS measures and technical standards), but all were solved through dialogue, as a result of mutual efforts. Using the planned dispute settlement mechanism never proved necessary.

The practical consequences are far-reaching. The improvement of SPS standards in Chile's agriculture is widely recognised, and it is partially related to the Agreement requirements. Initially felt by Chilean producers as mere constraints, these requirements are now also seen as having spurred an upgrade in production practices, easing access to a wider range of foreign markets. This is also true for the discipline imposed by the Agreement on wines and spirits related to the use of geographical designations.

These achievements are corroborated by the survey of stakeholders. While a series of factors unrelated to the Agreement are of prominent importance in bilateral trade flows, like exchange rates for example, the feedback collected is generally positive. The institutional framework surrounding EU-Chile trade is widely recognised as supportive. While the trade impact of non-tariff measures was not found to be statistically significant in the econometric analysis, the qualitative assessment suggests that this impact has been positive and possibly substantial.

Environmental impacts

Case studies and correlation analyses can provide convincing evidence of a possible negative or positive effect of trade liberalisation on the environment. However a more coherent conceptual framework is useful to distinguish the different phenomena at play in a country like Chile, which has experienced a high level of growth, and changes in production patterns and technology in the 2000s. It is useful to distinguish the various potential effects, i.e. the scale effect, the composition effect and the technique effect. The scale effect relates the degree of pollution and consumption of natural resources to the growth in production *ceteris paribus*. The composition effect focuses on changes in specialisation following a free trade agreement. The technique effect, i.e. changes in the intensity of pollution from production, can results from access to new technology, pressures from foreign customers for more corporate responsibility and higher standards, local pressure of higher income consumers for a cleaner environment, in particular. The impact of a trade Agreement on the environment is the sum of such that can add to or offset each other.

The statistical analysis and econometric analyses (from Chapter 1 and Chapter 2) are used to highlight some particular sectors where the EU-Chile FTA has resulted in increased trade and investment. These sectors are matched with those that are of particular interest when looking at environmental impacts. For that purpose, a list of major environmental issues in Chile was established. Background information is provided on the current environmental challenges, and the possible role of trade liberalisation.

The combination of simulations with the CGE model and econometric estimates of trade elasticities are used to gauge the importance of the scale and composition effects. Focus on particular sectors using input/output analysis shows that the growth in economic activity, in particular through exports to the EU, which has been induced by the Agreement, only has a very marginal impact on Chilean energy consumption and greenhouse gases emissions. The impact on water quality is more difficult to quantify, given the very uneven distribution of the resource in Chile.

The EU-Chile FTA has had a limited impact on the growth of the sectors that pollute most. Among the EU imports from Chile that generate the most pollution are the ores and mineral sectors. Most of them entered duty free in the EU, and the Agreement liberalised trade in rather marginal products (e.g. molybdenum based products). Chilean exports of wood products, salmon products, fish, wine, fruits and vegetables to the EU experienced significant growth, resulting at least partly from the Agreement. Given their production externalities, these are the sectors where the Agreement is most likely to have had some negative environmental impact.

The EU imposed no tariff on most forestry and wood products, and the Agreement has had little impact, except for the fall in plywood tariffs. Tariffs have not changed, but EU imports of pulp from Chile have gone up, possibly because of the non-tariff impacts of the Agreement. The role of EU imports in deforestation and biodiversity is hard to judge, given that the products imported to the EU come from plantations and not from primary forests. While biodiversity is much more limited in pine tree and eucalyptus plantations, there is a considerable controversy on whether these plantations are linked with the destruction of the rare ecosystems in native Chilean forests. Some analysts argue that the plantations are located on land degraded from decades of deforestation.

The production of salmon is the source of numerous negative externalities, from pollution to dissemination of genes, parasites and chemicals. The Agreement has played a significant role in the growth of Chilean exports to the EU (note that exports to the EU have not recovered after the 2007 sanitary crisis, due in particular to the demand in third markets). It is noteworthy, however, that Chilean exports to the EU have remained small as a percentage of EU consumption as well as Chilean total exports.

Overall, the Agreement does not appear to have generated significant incentives for Chile to export more overfished species to the EU. The EU imports large quantities of Southern hake from Chile, a fish species whose stocks have been decreasing rapidly. EU imports take place outside of the tariff rate quota set by the Agreement, suggesting that the latter has rather generated rents than trade flows. There has been a general overexploitation of the stocks of jackmackerel in Southern Pacific, i.e. outside Chile's economic zone. The EU fleet, like the Chinese, Peruvian, Russian, Vanuatu and Chilean ones, has contributed to the increase in the catches between 2005 and 2009. EU catches have nevertheless go down in 2010, while some other countries such as Russia and Peru increased their catches. In addition, there is no sign that the Agreement has contributed to this situation. Rather, it emphasizes the difficulty of international coordination in the exploitation of high seas resources.

The Agreement has played a significant role in the growth of Chile's agricultural exports. An input decomposition analysis shows that the Agreement has resulted in a limited but noticeable increase in the use of fertilizers. Larger exports of fruits and wine may have

also lead to an increase in pesticide use, but the strict standards in the EU (in particular regarding pesticide residues) and the fact that the shift towards export agriculture tends to reduce pesticide intensity in production, suggest that the Agreement has had little overall impact in this area.

The degree to which these scale and composition effects are mitigated by the technique effect is uncertain. Interviews suggest that the Agreement has made technology transfer easier, and the exports to the EU, where customers impose higher sanitary, phytosanitary and environmental standards has had some positive impact on the adoption of greener techniques. It is difficult to separate this effect from more global income, as well as institutional and political changes that have been leading Chile to adopt higher standards. However, statistics show a significant increase in the trade of "environmental goods" that were liberalised with the Agreement. This supports the idea, widespread among the interviewees, that the Agreement has contributed to the adoption of both greener technology and stricter domestic environmental standards. On the other hand, the Agreement has also led to an increase in air transportation of goods, namely seafood products and, in a more limited extent, fruits.

Overall, the impact of the EU-Chile FTA on the use of natural resources and the degradation of the environment seems to be marginal. The increased use of fertilizers for fruits, vegetables and wine exports is significant. Chilean exports of molybdenum, salmon, molluscs and wood products also show some connection with the Agreement. Hence the latter can have contributed, albeit in a limited way, to different forms of air and water pollution. By imposing higher environmental standards, trade with the EU (but also with the US, Canada and Japan) has nevertheless contributed to a reduction in the pollution intensity of production in some sectors.

Social impacts

Given the difference in size across contracting parties, social impacts are bound to remain very limited in the EU. The Agreement is unlikely to have caused significant social adjustment costs in the EU. Hence this analysis focuses on the social impacts in Chile (note that following a surge in Chilean exports of molluscs to the EU the mussels sector is identified as one with possible social consequences in the EU).

Based on assessed cross-sector reallocations of production factors, the adjustments needed to accommodate to the new context created by the Agreement are mainly characterised for medium and low skills by an increased demand in several agricultural sectors (fruits and wine in particular) and in fisheries, together with lesser demand in some industrial sectors, machinery in particular. On the whole, CGE based analysis shows that these reallocations are small compared to the rapid structural change undergone by the Chilean economy since the Agreement's enforcement.

In agriculture, however, the export increase spurred by the Agreement is substantial, and it is far from being neutral in terms of size and type of farms. Small subsistence farms are less likely to benefit from new opportunities, while large, consolidated farms are in a position to reap the full benefit from the new context. This might be reflected in larger within-agriculture income inequalities, but also by an increase in average agricultural incomes, resulting in lesser inequality between agriculture and other sectors. Interestingly,

the Agreement's effects are also found to parallel structural trends, and to be consistent with policies' orientation.

Although small, the long-run consequences can be analysed in terms of impacts on real income. The methodology proposed here to do so is fairly general and could be used in other contexts. While confirming that small farm households may lose relative to those in large, more commercial farms, it shows that they globally benefit from the changes brought about by the Agreement, when the consequences for both income and consumption prices are accounted for.

Other social issues relate to the impact of the Agreement on jobs and salaries in those industries that have experienced the largest changes due to the Agreement, i.e. fruits, wine, seafood products and forestry products. It is again difficult to isolate the consequences of the Agreement from those of a more global trade liberalisation movement. It seems that in the fruit, wine, aquaculture and mollusc sectors, the Agreement has led to higher incomes, with visible positive consequences (canning, salmon industry, wine). The Agreement has also contributed to a significant increase in the employment of women in agriculture, even though it is often in seasonal jobs. However, in terms of wage inequality or a decline of traditional agriculture (which affects particularly women) questions persist.

INTRODUCTION

The "Agreement establishing an association between the European Community and its Member States, of the one part, and the Republic of Chile, of the other part" was signed on November 18, 2002 (Official Journal of the European Communities, L 352/45). This Association Agreement came fully into force on 1 March 2005 after ratification by all European Union (EU) Member States and Chile. It establishes a political and economic association between the Parties, based on reciprocity, common interest and on the deepening of the relationship in all areas of application. Its three main components are political dialogue, cooperation and trade. Articles governing the institutional framework, trade in goods and cooperation were applied on a provisional basis from February 1, 2003.[1] The present report focuses on provisions regarding "Trade and trade-related matters" (Part IV of the Agreement), hereafter referred to as the EU-Chile FTA. These provisions include establishment of a free-trade area in goods and services, as well as a number of important rules-related measures.

The EU-Chile FTA is peculiar both for the EU and for Chile, relative to the main orientations of the trade policy of both parties. Historically, EU trade policy has been characterized by three priorities. The first one has been a strong commitment to multilateral negotiations. The second one has been association agreements with EU neighbours, in which trade was only a component of a broader agenda. Many of the countries that concluded such agreements have eventually joined the EU as full members. The third priority has been the preferential access granted to developing countries through a variety of non-reciprocal schemes, and through bilateral agreements with Southern Mediterranean countries. The EU has remained committed to these priorities. It is still a major driving force in World Trade Organization (WTO) negotiations. The EU has redesigned its non-reciprocal trade preferences with African, Caribbean and Pacific countries on a reciprocal basis, and has expanded its generous "GSP+" regime (Generalised System of Preferences) to a number of developing countries. Its neighbouring policy now encompasses countries around the Mediterranean and at the Eastern periphery of the EU. Additionally, since the mid-1990s the EU has entered into a new set of bilateral agreements, in particular with Mexico, South Africa and Chile, followed by intense negotiations with other entities.

[1] This provisional application concerns Articles 3 to 11, Article 18, Articles 24 to 27, Articles 48 to 54, Article 55(a), (b), (f), (h), (i), Articles 56 to 93, Articles 136 to 162 and Articles 172 to 206.

Among these bilateral agreements, the EU-Chile association stood out due to its ambition. While relying on a similar framework, its coverage was broader than the EU-Mexico or EU-South Africa agreements. The EU-Chile agreement has long been presented as an illustration of a new EU trade policy. Today, the EU-Chile Free Trade Agreement (hereafter EU-Chile FTA) is sometimes considered to belong to an "older" generation of agreements, compared, for example, to the EU-Korea Agreement. In the most recent Agreements, the EU negotiators introduced more ambitious clauses in the areas of intellectual property and Technical Barriers to Trade issues, for example. However, the EU-Chile FTA remains a benchmark in EU bilateral policy.[2] The Agreement is based on a concept of "association" that is broader and deeper than most agreements (e.g. the EU-Mexico one). It covers not only trade in goods and services, which are the focus of this report, but also a larger cooperation policy and a political dialogue.

Even considering only the trade aspects, the Agreement includes new provisions which had not been integrated in other FTAs signed by both parties before. This is illustrated in the Agreement's inclusion of a high level of mutual protection of names used in appellations of origin; provisions in the sanitary and phytosanitary field that go beyond WTO rules; comprehensive liberalisation commitments for trade in services and the right of establishment; and innovative institutional provisions. Special attention was paid to institutional factors that are designed to facilitate trade, including managerial, technical and legal aspects. Particular provisions of the Agreement intend to favour investment flows with the liberalisation of capital flows. The Agreement also provides access to government procurements, protects intellectual property rights and implements strong rules regarding trade facilitation. The issue of how successful these features have been goes beyond the EU-Chile case in the sense that this approach was followed and deepened in subsequent agreements concluded by the EU (e.g. the EU-Korea Agreement, and the regional agreements with Central America, Columbia and Peru), as well as those under negotiation (e.g. with Ukraine, Malaysia, India, Singapore, etc.).

From the Chilean side, the EU-Chile FTA also stands out. Chile has had a very active trade liberalisation policy, pushing for agreements both in the multilateral arena and the regional/bilateral arena. In October 2011, Chile had 21 trade agreements in force, with 58 partners, including South Korea, Japan, New Zealand, Singapore, China, India, Canada, Australia, the United States, EFTA and most Latin American countries.[3] However, the scope of the EU-Chile FTA goes far beyond those of most of Chile's other FTAs. The trade component is also very comprehensive on the Chilean side, and the Agreement has a political and cooperation component that makes it different from all other agreements signed by Chile (Leiva 2003; Maia 2008).

[2] Former Chilean Deputy Foreign Affairs minister Alberto Van Klaveren described the EU-Chile FTA as a breakthrough given that it covered so many areas in addition to the fundamental political and cooperation provisions. The EU Trade Commissioner Pascal Lamy called the EU-Chile FTA the most "ambitious and innovative bilateral agreement" the EU ever concluded, stressing that it went far beyond the WTO provisions. The EU-Chile FTA was often portrayed as an illustration of the "WTO++" policy, under which the EU attempted to address trade, cooperation and dialogue in bilateral and regional negotiations in a broader, deeper and overall more comprehensive way than the strict trade framework that characterizes multilateral negotiations under the auspices of the WTO.

[3] In 2005, Chile was called by *The Economist* the "largest collection of FTAs" in the world. See Direcon's website (www.direcon.gob.cl) for an exhaustive list.

AN OVERVIEW OF THE AGREEMENT'S PROVISIONS

The provisions included in this 1437-page long agreement (in the original English version, dated 30 December 2002) are varied and wide-ranging. The EU-Chile Association Agreement includes five different parts, themselves divided into Titles. This analysis focuses on the trade component of the EU-Chile Association Agreement. The relevant provisions are included in Part IV of the Agreement "Trade and Trade related matters", which includes Articles 55 to 196. However, when analyzing trade, some other provisions such as the institutional framework are also of great importance (Title II in Part I "General and Institutional provisions"); this is also true in the case of the cooperation on standards, technical regulations and conformity assessment procedures (Part III "Cooperation").

The trade component of the Agreement combines tariff concessions and a set of transparent rules intended to facilitate their utilisation. A discussion of the salient points that make the EU-Chile FTA particularly ambitious as far as trade is concerned follows here.

Tariff concessions

The Agreement includes progressive and reciprocal liberalisation of trade in goods over a transitional period of 10 years.[4] Tariff concessions eventually cover what is expected to be 97% of bilateral trade, including 100% of industrial trade, 80% of agricultural trade and 90% of trade in fishery products. The Agreement establishes precise schedules for the elimination or reduction of tariffs in Annex I and Annex II, with categories of products for which trade is liberalised either when the Agreement entered into force or within a three- to ten-year period. For most products, tariffs will have been fully dismantled by 2013. In the EU schedule (Annex I), for most non-agricultural and food products, liberalisation has taken place either in 2003 or in 2006. In the case of some other products (e.g. many sea products) it will take place only in 2013. For a significant number of agricultural products, however, liberalisation is only partial. A significant number of tariff lines are excluded from trade liberalisation; for some other lines, liberalisation is only partial, with some tariffs and entry prices remaining; and for other products tariff reduction or elimination takes place only up to particular ceilings, under tariff rate quotas. While the size of these quotas varies a great deal, some of the quantities liberalised seem particularly small, *de facto* providing only limited preferential access.[5] The Chilean schedule (Annex II) shows a larger percentage of products that have been liberalised immediately after the entry into force of the Agreement, and a smaller number of tariff lines covered with a tariff rate quota.

[4] Article 60, together with Articles 65 and 66 govern industrial goods, Article 68 and 69 pertain to fisheries, and Articles 71 and 72 deal with agricultural products. Article numbers refer to the text of the Agreement dated 30.12.2002. Annex I includes precise schedules for the elimination of EU tariffs while Annex II focuses on Chilean tariffs.

[5] Meat quotas in the EU, and cheese and olive oil in Chile are examples.

Agreements on trade in wines, spirit drinks and aromatised drinks [6]

An Agreement on trade in wines and an Agreement on trade in spirits grants reciprocal protection of protected origin appellations and, in the case of wine, recognition of oenological practices. These agreements include mutual recognition of names and appellations, and a very long and detailed list of protected names and appellations is attached. The wine and spirits agreements are comprehensive. They include their own provisions regarding disputes, with consultations which can lead to cases being brought to the dispute settlement procedure set out in the Agreement (Part IV of the Association Agreement).

An agreement on sanitary and phytosanitary (SPS) measures

The Agreement on sanitary and phytosanitary (SPS) measures covers trade in animals, animal products, plant products and some other goods, as well as the well-being of animals (referred to in Article 89 and detailed in Annex IV). This Agreement clearly reaffirms the Parties' rights and obligations under the WTO Agreement and, in particular, the WTO SPS Agreement, and the WTO standards and technical regulations remain the relevant references. However, the EU-Chile SPS agreement includes clauses that go beyond those in the WTO, in particular in the areas of regionalization, recognition of disease-free status and equivalence (mutual recognition of measures) and information exchange. It also includes its own consultation procedure, i.e. outside the multilateral framework.

Regulatory provisions

Customs procedures, standards, technical regulations and conformity assessment procedures are important components of the trade agreement. Articles 79 to 82, in particular, set out some ambitious provisions for collaboration and working methods in customs and related matters (customs clearance, valuation, classification, simplification of procedure, etc.). Trade practitioners know that such technical issues can indeed considerably reduce costs and delays for firms engaged in trade.

The establishment of a free-trade area for services

Title III of the Agreement (Article 95 and those following) contains provisions regarding the liberalisation of trade in services and the improvement of the investment environment. Article 97 lists a series of restrictions to trade that the Parties commit not to maintain or adopt. Other articles set rules in terms of transparency, mutual recognition and national treatment. A review of the provisions, including those on the movement of natural persons (mode 4) is also scheduled with the goal of reducing remaining restrictions (Articles 100 and 101). A specific section of the Agreement is devoted to financial services (Article 116 to 129). Here too, provisions include clauses on market access, national treatment, transparency of regulations and recognition. A specific procedure of consultations and dispute settlement is also included. In Article 99 and in Annex VII, a schedule of specific commitments on services includes both horizontal provisions and provisions specific to a

[6] The Agreement on Trade in Wines is referred to in Article 90 and is detailed in Annex V. The Agreement on Trade in Spirit Drinks and Aromatised Drinks is detailed in Annex VI.

variety of sectors (e.g. legal, accounting, engineering, veterinary, medical, engineering, environmental services, transportation, etc.). It is noteworthy that, in the EU schedule, individual Member States have their own restrictions to liberalisation. Article 120 and Annex VIII detail the schedule that is specific to financial services, with a designated section on insurance.

Investment

Liberalisation of investment is stated as an objective, respecting the principles of national treatment and non-discrimination and is addressed throughout the Agreement (Article 21). Provisions regarding establishment of persons, companies and branches for the purpose of performing an economic activity are addressed in Chapter III of Title III and Annex IX. A few sectoral restrictions are stated for some EU Member States and for Chile, in particular regarding establishment in the fisheries sector, which is the subject of a particular protocol.

Mutual opening of procurement of both parties

Title IV, Article 139 and Annexes XI, XII and XIII detail provisions on administration coverage. Even though the list of administrations varies across Member States, reflecting differences in government structures, the list of entities covered is broad. The Agreement guarantees respect for principles such as national treatment, non-discrimination and transparency, and an important set of rules that apply to central entities, regional entities and public enterprises.

Capital movements

Liberalisation of current payments and capital movements is addressed in Title V (Articles 164 and 165; additional restrictions on the Chilean side are listed in Annex XIV). The goal is the liberalisation of current payments and capital movement, in accordance with commitments made under international financial institutions and with regard to the currency for each party.

Intellectual property

Effective protection of intellectual property rights is an objective stated in several articles of the Agreement (Article 32, Title II on “technology and information society”), and is detailed in Title VI (Articles 168 and those following). In Article 170 the Parties commit to respect international agreements and conventions on issues related to the protection of intellectual property.

Competition

A mechanism to deal with competition issues is included in Title VII (Article 172 and those subsequent). It includes measures of cooperation and directions for consultation and the exchange of information between competition authorities in both parties. A system of consultations will take place but the competition authorities of each Party remain

competent and the two parties cannot settle disputes under the Agreement related to competition issues.

Dialogue and dispute settlement

A bilateral mechanism for settling disputes is nevertheless included in the Agreement and applies to all cases that are not explicit exceptions. The provisions are included in Title VIII. They involve consultations and a well-established procedure under the auspices of the Association Committee. An arbitration panel can be set up. The whole procedure is intended to be fast and efficient without departing from the general WTO rules in this area. The consultation mechanism is designed to avoid that disagreements reach the level of a dispute that needs to be formally arbitrated.

The Agreement includes the establishment of a Council allowing the parties to meet at the ministerial level and oversee the implementation of the agreement. This Council is assisted by an Association Committee responsible for the overall implementation of the Association Agreement, and by special Committees (e.g. SPS, wine and spirits, barriers to trade, customs and rules of origin, etc.). The Agreement also provides for regular meetings with representatives of civil societies within Chile and the EU –non-governmental representatives from academia, economic actors and social partners– to keep them informed of the implementation of the Agreement and allow for suggestions to improve it.

An evolution clause makes it possible to expand the provisions regarding tariff concessions beyond the original agreement (Article 74).

SOME QUESTIONS AND A NEED FOR EX-POST ASSESSMENT

A number of authors who looked at the EU-Chile FTA after the completion of the negotiations underlined that many obstacles to free trade persisted (e.g. Rudloff and Simmons 2004). They pointed out that a number of sensitive products had been excluded from the tariff concessions. The latter are progressive, limited, and, on the EU side, do not contribute much to the simplification and transparency of a schedule that is extremely complex. Indeed, on the EU side, some mechanisms such as entry prices for fruits and vegetables persist in spite of the tariff concessions. For some agricultural products, only a share of the tariff was cut (e.g. the small ad valorem component of some EU tariffs on agricultural products). On both sides, trade in some products was only liberalised up to quantitative ceilings. Some services were excluded from the Agreement. Complaints from industries regarding enforcement of intellectual property rights by Chile (in particular through the International Intellectual Property Alliance, IIPA) also question the effectiveness of the Agreement.

This makes it particularly relevant to investigate in detail the ex-post consequences of the Agreement on market access, trade flows and investment. The following sections aim to provide a thorough assessment of the Agreement. The implementation of the Agreement also raised concerns regarding social and environmental impacts. These questions were explored in the ex-ante Sustainable Impact Assessment (hereafter SIA, see Planistat 2002). They refer to the possible environmental effects that could have resulted from increased exports following the Agreement, especially in some specific sectors in Chile (intensification

of commercial agriculture, exports of mineral ores, possible overexploitation of renewable resources in the fisheries and/or forest sectors, etc.). They also refer to social issues, with the risk that some products result in large declines in the partner's local production in some particular sector; or the risk that only a fringe of the population takes advantages of export opportunities; or that the increased use of particular resources (e.g. forest, fisheries) might lead to the marginalization of local users. Because of the role of women in some particular sectors, concerns have also been expressed regarding the gender equality impact of the Agreement.

Whether these concerns are relevant or misplaced is a key question. While the 2002 ex-ante analysis emphasised the possible negative social and environmental effects of the Agreement, it also showed that, in most cases, positive effects were also possible (e.g. adoption of more severe standards to meet the other party's market requirements, easier access to pollution treatment technology, expansion of employment in sectors where women were a majority, etc.). An ex-post assessment of the social and environmental issues is thus useful. This is the purpose of the last chapters of this report.

This study is the first wide-ranging, ex-post assessment of a specific bilateral trade agreement carried out at the request of the European Commission. Beyond the conclusions drawn for this particular agreement, its objective thus also includes proposing a methodology, or set of methodologies, which could subsequently be used to evaluate the impact of other agreements. A cross-cutting challenge throughout this analysis is to disentangle, among the changes that have taken place since 2003 in both the EU and Chile, which can be attributed to the Agreement. Indeed, the EU has experienced considerable changes, including two enlargements and a major economic crisis. Meanwhile, Chile has been experienced considerable structural change (as witnessed by its sustained growth pace), as well as the enforcement of a number of new trade agreements, including one with the US in 2004. This challenge cannot be addressed using a single methodology, given the diversity of issues at stake here. Nevertheless, area by area, special attention has been paid in this assessment to propose up-to-date methodologies suitable not only to evaluate this Agreement in particular, but also the impact of other bilateral agreements.

STRUCTURE OF THE REPORT

The report includes eight chapters. Chapter 1 ("*Tariffs and trade in the EU-Chile FTA*") analyses in detail the tariff provisions of the Agreement, as well as bilateral trade relationships between contracting parties before and since the Agreement. The most detailed information on border protection and trade is used to shed light on the significance of the Agreement’s provisions and on their potential trade impacts.

Chapter 2 ("*Econometric analysis of the impact of the EU-Chile FTA on trade in goods*") uses statistical and econometric techniques to identify and distinguish from other possible explanations, the extent to which the provisions in the EU-Chile FTA have contributed to increase trade. An objective is to estimate the magnitude of trade creation, trade expansion and trade diversion.

Chapter 3 ("*General equilibrium assessment of the impact of the Agreement on the Chilean economy* ") relies on the development of a structural model, in order to assess the actual impact of the Agreement in contrast to other factors that have affected trade and

growth in the Chilean economy. A structural decomposition makes it possible to distinguish structural and macroeconomic effects from those resulting from the Agreement over the recent period and to gauge the consequences of the agreement for the Chilean economy using counterfactual scenarios without the agreement.

Chapter 4 ("*Provisions related to trade in services and foreign direct investment*") includes an assessment of the evolution of trade in services and on cross-investment between the EU and Chile. Services and sectors that have shown the largest changes, as well as those where presumably important provisions were not followed by significant evolutions are identified. The way the Agreement has modified the flows of foreign investment between the EU and Chile is analysed.

Chapter 5 ("*Institutional and regulatory issues*") includes an assessment of how the agreement has been successful in facilitating trade. The way in which the institutional framework and cooperation on non-tariff issues, set up by the agreement, have made it possible to remove some of the traditional obstacles to trade, as well as direct investment and market openness is assessed. Additionally, the evolution of regulations, standards, administrative procedures and intellectual property protection following the agreement is discussed. The extent to which cooperation on non-tariff market access issues has actually facilitated trade and helped solve potential disputes is analysed.

Chapter 6 ("*Environmental impact*") focuses on the environmental aspects of the Agreement, as far as both global and sector-specific impacts are concerned.

Chapter 7 ("*Social impacts* ") focuses on the social consequences of the Agreement, i.e. its impact on incomes, poverty, wage inequality and working conditions. Particular attention is paid to the consequences for specific segments of the populations (e.g. rural households) and to the condition of women working in certain sectors affected by the agreement.

The general conclusion provides a synthesis of the findings and some general concluding remarks.

Chapter 1 - Tariffs and trade in the EU-Chile Association Agreement

Despite the variety of areas covered, tariff provisions still play a central role, and are decisive in determining the trade effect of the EU-Chile FTA. In this chapter the tariff elimination schedules of the EU-Chile FTA are analysed in detail. A statistical analysis of commitments at the tariff-line level is a first step in better understanding what is at stake for the involved parties. Putting commitments in context with initial tariffs and trade patterns is necessary to gain further insights about their likely consequences. In the present case, this is rendered especially useful given the complexity of tariff structure in the EU, and given the increasingly large number of free-trade agreements (FTAs) signed by Chile with its main trading partners. An in-depth statistical analysis is thus carried out, combining the EU-Chile FTA's detailed commitments together with trade statistics and *ad valorem* equivalents (AVEs) of tariff duties at the tariff-line level.

The objective of this Chapter is also to provide suggestive evidence about possible trade consequences. A defining characteristic of this EU-Chile FTA is the asymmetry among partners. Chile is a country of 15 million people while the EU is an entity of 500 million people. This explains to a large extent why Chile is the 32nd largest source of imports for the EU, while the EU is Chile's second largest source. The partners' trade patterns also differ significantly. Chile is well endowed in mineral resources of which it is a major exporter, while the EU imports most of its needs in this area. Mining products are therefore a considerable part of Chilean exports to the EU. More generally, Chile's exports to the EU are concentrated in a few sectors, in contrast to flows in the opposite direction. Even protection patterns strongly differ across parties. Taking this asymmetry into account, the analysis below tailors the statistical treatment to the characteristics of each partner. In each case, based upon the most detailed trade and protection data from the importing country, the analysis tries to take advantage of relevant comparisons, across both products and partners. However, it is adapted to each country's context so as to identify what the EU-Chile FTA might have changed in terms of bilateral trade relationships.

While these descriptive statistics do not replace an econometric assessment, they are useful in understanding the EU-Chile FTA's nature, its trade context and its likely trade impacts.

1.1 TARIFF CONCESSIONS

The patterns of tariff concessions differ significantly between the two Parties. The overall picture of tariff changes is characterised by a full and immediate liberalisation of a large majority of products on the Chilean side. On the European side, the Agreement provides for an early, unrestricted liberalisation of market access for industrial products. For agricultural products, the schedule of trade liberalisation is more progressive and its coverage is more limited.

The structure of Chilean exports to the EU is relatively concentrated in few sectors. Against this background, a general-purpose classification would be ill-suited to illustrate the importance of EU concessions, because important small sectors would be mixed with larger but less important sectors. A sectoral classification tailored to the structure of Chilean exports is thus used here, where copper and its products, wood and its products, ores, fruits and fish are considered separately. For EU exports to Chile, a specific classification is used, where important sectors such as machinery, transport equipment (referred to as "vehicles" below) and precision instruments are singled out.

1.1.1 TARIFF CONCESSIONS AND QUOTAS ON THE EU SIDE

Industrial products

On the EU side, the schedule of progressive liberalisation for industrial products[7] is straightforward. Among the 74% of tariff lines which were dutiable (i.e., for which the MFN duty rate was not zero), 85% were fully liberalised immediately, while the remaining 15% were fully liberalized within 3 years (Table 1).

Agricultural products

For agricultural products (including processed agricultural products, fish and fisheries products), the European schedule of tariff concessions is more complex, although as a general rule the complete elimination of tariffs is achieved after a transitional period.

Among the 84% of tariff lines which were dutiable for these categories of products, 9% were fully liberalised at the entry into force of the FTA. The elimination of tariff was scheduled over a transitional period of 4 years for 23% of tariff lines, and of 7 or 10 years for 22%. This is the case for fisheries products, vegetables, preparations of meat and fish, preparations of vegetables and fruits, and beverages. When a transitional period is planned, on either side, it is always based on equal yearly cuts, from the entry into force onward.

For yet another group, the Agreement does not schedule a complete removal of tariff duties. The principle of partial liberalisation specific for agricultural products is generally applied by the EU in its preferential agreements, with limited exceptions for those with the Mediterranean countries and with Korea.

[7] Industrial products are defined in the EU-Chile FTA as non-agricultural products of HS chapters 25 to 97. As such, they include mining products.

TABLE 1: THE EUROPEAN COMMUNITY'S TARIFF CONCESSION SCHEDULE BY MAIN SECTOR (NUMBER OF PRODUCTS BY CATEGORY OF CONCESSION)

Panel A: By main sector

	Scheduled liberalisation							
Sector	**Non dutiable**	**Im-mediate**	**3-4 years**	**7-10 years**	**Partial**	**TQ**	**Ex-cluded**	**All categ.**
Alcoholic beverages	44	3	89	1	4	0	25	166
Fruits	16	48	28	10	20	1	5	128
Fish, crustaceans & prod.	45	37	146	131	0	10	2	371
Other agric. & food prod.	264	95	199	303	86	272	470	1,689
Ores	53	0	0	0	0	0	0	53
Wood & its products	155	273	19	0	0	0	0	447
Copper & its products	18	21	31	0	0	0	0	70
Other manufactured products	1,867	4,759	825	0	1	0	24	7,476
All products	**2,462**	**5,236**	**1,337**	**445**	**111**	**283**	**526**	**10,400**

Note: When subdivisions of a given product are treated differently, the most restricted schedule is retained (columns are ordered rightward by rank of increasing restrictiveness). "Non dutiable" refers to products for which the MFN duty is zero.
Source: Authors' calculations based on the EU-Chile FTA's text.

The following categories, jointly accounting for 6% of agricultural tariff lines, are grouped under "partial" in Table 1 (when they are not associated with a tariff quota – see below):[8]

- For 9 products, the tariff concession amounts to only 50% of the basic customs duty (category "R" in the agreement schedule; includes pectic substances, yeasts, liquorice extract, peanut butter, containing added sugar or other sweetening matter or flavoured)
- For some other products for which a compound duty is applied, liberalisation concerns the *ad valorem* component only, while the specific component is maintained ("SP"). This group contains 113 tariff lines, related mostly to dairy products, to some sugar and cocoa products as well as some preparations based on agricultural products. In many cases, the duty concerned includes an agricultural component and/or an additional duty linked to sugar or flour content.
- For 33 products (fruits and vegetables) the access to the European market is based both on a tariff and on an entry price system ("EP"). The liberalisation concerns exclusively the *ad valorem* component duty, maintaining the specific duty linked to the entry price.

Tariff quotas

Almost 300 tariff lines are also liberalised only within a tariff quota in the EU (Annex I, Section I of the Agreement). Meat, fish, sugar, flour and transformed agricultural products are well represented among these. Most of these quotas are progressively increased each year and they have been raised over time to take into account EU enlargements.

[8] Products are counted in this column only if the product (or any of its subdivisions) is not subject to either tariff quota or exclusion. This is why the total is inferior to the sum of the numbers indicated by category. Another category, "PN", is not accounted for in this statistical analysis since it only concerns products covered by denominations protected in the Community.

The level of imports under quotas varies across products. Under tariff quota TQ1, some 1,000 tonnes of beef, 2,000 tonnes of pork and processed meat, 7,500 tonnes of poultry meat could be imported duty free as of 2003. Because these ceilings are increased annually by 10%, the quantities eligible were more than doubled in 2011. Under TQ2, some 1,500 tonnes of cheese, 500 tonnes of onions, 1,000 tonnes of processed cereals, 500 tonnes of mushrooms, 1,000 tonnes of prepared cherries can also be imported duty free (these amounts have been increased by 5% every year). Tariff rate quota TQ3 includes a 400 ton quota for sugar confectionary, a 400 ton quota for cocoa preparation and a 500 ton quota for bread and pastry. A large quota was opened for imports of fresh grapes duty free, over a period that ranged from November 1 and July 14 (40,000 tonnes, with an annual increase of 5%) but these imports were liberalised in 2007. Since 2004, a quota of kiwis and a quota of garlic were also opened. Other significant quotas include a 5,000 ton quota for particular kind of fish (fresh hake) while small duty-free quotas are open for salmon and processed tuna.

Imports of the various types of meats and fish as well as garlic have exceeded the ceiling of the tariff rate quota over the recent period, and the out of quota duty has been applied to some imports.

Products excluded from liberalisation

In the EU schedule of concessions, more than 500 tariff lines (26% of agricultural tariff lines) are excluded from EU tariff concessions, in particular in the meat, dairy, cereals and sugar sectors.

1.1.2 Tariff concessions on the Chilean side

Industrial products

The removal of customs duties on imports into Chile of industrial products originating in the EU is scheduled over 0, 5 or 7 years. 94% of products were fully liberalised when the EU-Chile FTA was implemented (Table 2), 3% within 5 years (mainly products of the glass and ceramic industry and components for the automotive industry) and 3% within 7 years (mainly products related to the chemical industry).

Agricultural products

For agricultural products (including as before processed agricultural products, fish and fisheries products), the removal of customs duties on imports into Chile of products originating in the EU is scheduled over 0, 5 or 10 years, with the exceptions listed below. 80% of products were immediately and fully liberalised; 5%, mainly wheat-based products, red wine, spirits, and oil-cakes were applied a transitional period of 5 years; 6% were applied a 10-year transitional period, mainly meat products, vegetables (peas), cereals and flours.

Tariff quotas

For a 28 agricultural products (2% of agricultural tariff lines), Chile grants duty free access to EU products only under a tariff quota. This is the case for some 1,500 tonnes of cheese (under tariff rate quota TQ1, with an increase by 5% each year of the original quantity), 3,000 tonnes of olive oil under tariff rate quota TQ2 (with the same annual increase). Chile also set tariff quotas for fishery products (5,000 tonnes of hake, 40 tonnes of salmon, and 150 tonnes of processed tuna, with zero tariffs by 2013).

TABLE 2: CHILE'S TARIFF CONCESSION SCHEDULE (NUMBER OF PRODUCTS BY CATEGORY OF CONCESSION)

	Scheduled liberalisation						
	Im-mediate	**Year 5**	**Year 7**	**Year 10**	**TQ**	**Ex-cluded**	**All categ.**
Agric. & food	1,142	72	0	81	28	105	1,428
Mineral prod.	170	20	1	0	0	0	191
Chemical prod.	1,314	30	152	1	0	0	1,497
Machinery	1,207	38	21	0	0	0	1,266
Vehicles	289	44	10	0	0	0	343
Precision instr.	286	0	4	0	0	0	290
Other	2,801	71	18	0	0	0	2,890
All products	**7,209**	**275**	**206**	**82**	**28**	**105**	**7,905**

Note: When subdivisions of a given products are treated differently, the most restricted schedule is retained (columns are ordered rightward by ranked of increasing restrictiveness).
Source: Authors' calculations based on the EU-Chile FTA's text.

Products excluded from liberalisation

105 products (7% of agricultural tariff lines) are excluded from tariff concessions, mainly milk and dairy products, vegetable oils, sugar, wheat flour and specific fish fillets. These products actually receive special treatment in most of Chile's FTAs. Tariff quotas (with duty free imports in the quota) are scheduled for a total of 28 products, corresponding to cheese, fish (salmon and hake, the most important one quantitatively), and some vegetable oils.

1.2 CONCESSIONS IN LIGHT OF TRADE PATTERNS BEFORE THE AGREEMENT

Further light can be shed on the nature of these concessions by cross-comparing these schedules with trade data. This matching between commitments and bilateral trade flows was made for both contracting parties based on tariff-line level data from national sources. The weight of each sector and each type of concession in bilateral imports is first analysed. The most important features in terms of trade value can thus be identified. Market shares are then computed, to assess how concessions are related to each partner's revealed comparative advantages.

1.2.1 EU CONCESSIONS AND TRADE PATTERNS

The commercial importance for Chile of the EU's tariff concession is illustrated by computing the share of each category of concession within each sector in total EU-15 imports from Chile in 2002 (Table 3, Panel A). The first salient feature is the overwhelming importance of copper and its products (HS Chapter 74) including ferro-molybdenum (HS code 720270), its most important co-product. This sector, almost entirely non-dutiable in the EU, accounted for 38.2% of imports from Chile in 2002. Ores (HS Chapter 26) are also of significant importance (9.3% of bilateral imports), some of them also linked to copper production, in particular silver, and molybdenum oxides and hydroxides, and none of these products is dutiable in the EU. Wood and its products, also essentially non-dutiable in the EU, make up a significant share of Chile's exports to the EU (8.8%) as well. Mainly due to these sectors, non-dutiable products accounted for two-thirds of the total exports to the EU.

Among dutiable products, those products immediately liberalised and products liberalised within 3 to 4 years each accounted for approximately one third of EU imports from Chile in 2002. As a result, products for which concessions can be considered substantially restricted accounted for a limited part of bilateral imports, 11.8% of EU imports from Chile in 2002. Among these, products with a relatively long liberalisation delay (7 to 10 years) account for 3.1% of Chilean exports to the EU, those with partial planned liberalisation for 4.5%, those with a tariff quota for 4.1%, and products excluded altogether from concessions schedules for 0.1%. More than three quarters of these categories of products taken together belong to the fruit sector, and one sixth to the fish sector. These two sectors are the most concerned with restrictions in EU tariff concessions, and the most important restriction actually corresponds to the entry price system for fruits and vegetables. While the EU-Chile FTA schedules the removal of the *ad valorem* component of protection for these products, it does not concern the entry price system. The actual impact of the restrictions placed on the access to the European market for specific products by the entry price system is probably limited for Chilean exports of fresh fruits and vegetables, due to the inverted seasonality of the production between Chile and the EU.

To investigate the impact of the competitive position of Chilean exporters on each category, Table 3 (Panel B) presents the share of imports from Chile over total extra-EU imports in 2002, by sector and by category of concession.[9] Considering all products, the share of EU imports from Chile is 0.6%. It is substantially higher for copper and its products (18.8%), fruits (8.5%), ores (5.4%) and alcoholic beverages (2.9%).

The tariff lines excluded from liberalisation by the EU correspond to products where Chile's position is not strong on the EU market, with an average share in extra-EU imports of only 0.1% in 2002.

The Chilean market shares differ markedly across liberalisation schedules. It reaches 2.0% for products with a 7 or 10-year transition period, 7.8% for products where only partial liberalisation is planned, and 3.9% for products covered by a tariff quota. This reflects the strong competitive positions of Chilean exporters in the agricultural sectors. The fruits sector is especially important in this respect.

[9] This definition is used to avoid interference with the EU's enlargements occurring during the period under study.

TABLE 3: SUMMARY ANALYSIS OF THE EUROPEAN COMMUNITY'S TARIFF CONCESSION SCHEDULE (NUMBER OF PRODUCTS BY HS CHAPTER AND CATEGORY OF CONCESSION)

Panel A: Share of each category of concession within each sector in total EU-15 imports from Chile in 2002 (%)

	Scheduled liberalisation							
Sector	**Non dutiable**	**Im-mediate**	**3-4 years**	**7-10 years**	**Partial**	**TQ**	**Ex-cluded**	**All categ.**
Alcoholic beverages	0.0	0.0	8.0	0.0	0.0	0.0	0.0	8.0
Fruits	0.0	1.2	0.3	1.7	4.5	2.6	0.0	10.2
Fish, crustaceans & prod.	0.0	1.6	2.7	1.1	0.0	0.8	0.0	6.3
Other agric. & food prod.	2.4	0.6	0.4	0.3	0.0	0.6	0.1	4.3
Ores	9.3	0.0	0.0	0.0	0.0	0.0	0.0	9.3
Wood & its products	7.8	1.0	0.0	0.0	0.0	0.0	0.0	8.8
Copper & its products	37.7	0.5	0.0	0.0	0.0	0.0	0.0	38.2
Other manufactured products	9.7	5.1	0.1	0.0	0.0	0.0	0.0	14.9
All products	**66.9**	**10.0**	**11.4**	**3.1**	**4.5**	**4.1**	**0.1**	**100.0**

Panel B: Market share of Chilean products in extra-EU imports in 2002, by sector and category of concession (%)

	Scheduled liberalisation							
Sector	**Non dutiable**	**Im-mediate**	**3-4 years**	**7-10 years**	**Partial**	**TQ**	**Ex-cluded**	**All categ.**
Alcoholic beverages	0.4	0.0	17.2	0.0	0.0		0.0	2.9
Fruits	0.1	2.1	2.2	23.0	11.9	20.2	0.0	8.5
Fish, crustaceans & prod.	0.0	3.1	2.6	1.9		3.9	0.0	1.9
Other agric. & food prod.	0.6	1.3	0.5	0.3	0.0	0.9	0.1	0.5
Ores	5.4							5.4
Wood & its products	2.6	0.7	0.1					1.1
Copper & its products	50.8	5.5	0.0					18.8
Other manufactured products	0.1	0.1	0.0		0.0		0.0	0.0
All products	**0.7**	**0.2**	**0.7**	**2.0**	**7.8**	**3.9**	**0.0**	**0.6**

Note: A blank means that the cell does not contain any product. See text for the definition of categories of scheduled liberalisation. Data refer to EU-15 imports. Chile's market shares in Panel A refer to extra-EU27 imports only. "Fish crustaceans and their products" includes HS chapter 03 and headings 1603-1605. "Wood & its products" includes HS sections IX and X (i.e., chapters 44 to 49), thus including pulp of wood, paper and printed material. "Copper & its products" includes chapter 74 and subheading 720270 (ferro-molybdenum). Agricultural and food products definition is limited to chapters 1 to 24.

Source: Authors' calculations based on the EU-Chile FTA's text, on TARIC (DG Taxud) for protection data and on Comext (Eurostat) for trade data.

1.2.2 Chile concessions and trade patterns

Table 4 provides a summary description of the scheduled liberalisation in Chile, similar to the one presented in Table 3 for the EU's concessions. The most important sectors in Chilean imports from the EU in 2002 were machinery (39.0% of import value), chemical products (21.7%) and vehicles (12.7%) (Table 4, Panel A). In contrast, agricultural and fisheries products accounted for a limited share (3.2%). 89.3% of Chilean imports from the EU in 2002 were concerning products fully and immediately liberalised by the EU-Chile FTA. Products with a transitional period of 5 and 10 years each represented approximately 5% of imports, mainly in the machinery and chemical sectors. Products with a 10-year transitional period and tariff quota products represented a negligible share of imports (0.1% each), and products excluded from liberalisation accounted for 0.4% of imports.

EU products represented 16.1% of total Chilean imports in 2002, and 18.2% of non-mineral imports. The strongest competitive positions for the EU are found in machinery and precision instruments, where the EU's market share was approximately 31%, in "other industrial products" (23.4%), in chemical products (19.8%) and in vehicles (15.0%). In machinery, chemical products and precision instruments, products with a 7-year transitional period exhibited an above-average market share (34.0%, 30.4% and 34.2%, respectively). This was not the case for vehicles, where products immediately liberalised exhibited the highest market share (26.9%). The same holds for agricultural and food products, with the exception of tariff quota products, even though the volume of imports concerned is very small in the latter case.

Table 4: Summary analysis of the Chile's tariff concession schedule (number of products by HS chapter and category of concession)

Panel A: Share of each category of concession within each sector in total Chilean imports from the EU in 2002 (%)

	Scheduled liberalisation						
	Im-mediate	**Year 5**	**Year 7**	**Year 10**	**TQ**	**Ex-cluded**	**All categ.**
Agric. & food	1.9	0.8	0.0	0.1	0.1	0.4	3.2
Mineral prod.	0.3	0.2	0.0	0.0	0.0	0.0	0.5
Chemical prod.	17.7	1.4	2.6	0.0	0.0	0.0	21.7
Machinery	36.1	1.8	1.2	0.0	0.0	0.0	39.0
Vehicles	11.8	0.7	0.1	0.0	0.0	0.0	12.7
Precision instr.	3.0	0.0	0.1	0.0	0.0	0.0	3.1
Other	18.6	0.5	0.7	0.0	0.0	0.0	19.8
All non-mineral products	**89.1**	**5.2**	**4.7**	**0.1**	**0.1**	**0.4**	**99.5**
All products	**89.3**	**5.4**	**4.7**	**0.1**	**0.1**	**0.4**	**100.0**

Panel B: Market share of EU products in Chilean imports in 2002, by sector and category of concession (%)

	Scheduled liberalisation						
	Im-mediate	**Year 5**	**Year 7**	**Year 10**	**TQ**	**Ex-cluded**	**All categ.**
Agric. & food	13.2	7.3		1.2	37.3	3.9	12.5
Mineral prod.	1.3	0.3	0.0				0.5
Chemical prod.	25.4	18.0	30.4	5.2			19.8
Machinery	29.4	30.0	34.0				31.1
Vehicles	25.8	16.3	3.0				15.0
Precision instr.	26.9		34.2				30.6
Other	18.9	20.8	30.6				23.4
All non-mineral products	**24.6**	**16.7**	**25.8**	**1.2**	**37.3**	**3.9**	**18.2**
All products	**23.3**	**5.3**	**25.5**	**1.2**	**37.3**	**3.9**	**16.1**

Note: A blank means that the cell does not contain any product. See text for the definition of categories of scheduled liberalisation. “Fish crustaceans and their products” includes HS chapter 03 and headings 1603-1605. "Wood & its products" includes HS sections IX and X (i.e., chapters 44 to 49), thus including pulp of wood, paper and printed material. "Copper & its products" includes chapter 74 and subheading 7202709 (ferro-molybdenum). The agricultural and food products definition is limited to chapters 1 to 24.
Source: Authors’ calculations based on the EU-Chile FTA’s text, on Chilean customs national data.

1.3 An assessment of preferential margins granted under the EU-Chile FTA

The assessment of the preferential margins mutually granted by the parties of the FTA is a necessary step to measure the impact of the reciprocal liberalisation on the trade flows. However, a simple comparison of the EU and Chilean tariff concessions is not enough to describe in a detailed and consistent way the degree of reciprocal liberalisation, and then to relate it to the trade flow.

1.3.1 Access to the EU market

The approach followed here to estimate the impact of reciprocal liberalisation on trade flows is based on the comparison between the actual preferential tariff system under the FTA – as a measure of the protection –, and the alternative tariff regime that would be of application without the FTA – the MFN tariff. As Chile was eligible for another EU preferential regime (the GSP), the comparison is extended to this regime.[10] The methodological issues rose by measurement and aggregation of protection are discussed in Appendix 1.2.

Because of the structure of the EU imports from Chile, and the structure of the EU tariffs, the measure of the protection of the EU market under the three regimes varies across products.

[10] In 2007 Chile autonomously decided to renounce to the GSP preference.

Industrial products

Under the MFN regime, the EU protection for manufacturing and mining products is low (Table 5, Panel A). At the higher range, using non-weighted duties, in 2003 protection was 0% for ores, 1.5% for wood, 3.2% for copper and its products, and 3.6% for other manufactured products. At the lower range, i.e. when duties are weighted against the value of the EU imports from Chile, estimated protection is 0% for ores, 0.5% for wood, 0.1% for copper and its products, and 2.4% for other manufactured products. Against such levels of protection, the preferential margin granted under the FTA is very limited. Even so, the FTA resulted in the immediate liberalisation of Chilean exports to the EU for manufactured products, with an import-weighted mean duty driven down to zero as of 2003.

TABLE 5: EU AVE TARIFF APPLIED TO CHILE AND IN SELECTED OTHER REGIMES

Panel A: 2003 (%)

	Import-weighted mean			Unweighted mean		
	Chile	GSP	MFN	Chile	GSP	MFN
Alcoholic beverages	5.0	6.2	6.2	4.2	4.4	5.1
Fruits	6.7	7.1	8.1	6.3	6.6	8.8
Fish, crustaceans & prod.	6.8	7.5	10.6	7.4	8.2	10.7
Other agric. & food prod.	11.2	11.7	12.5	19.5	20.0	21.8
Ores	0.0	0.0	0.0	0.0	0.0	0.0
Wood & its products	0.0	0.2	0.5	0.1	0.3	1.5
Copper & its products	0.0	0.0	0.1	0.0	0.7	3.2
Other manufactured products	0.0	0.8	2.4	0.4	1.7	3.6
All products	**2.1**	**2.4**	**3.0**	**3.9**	**4.9**	**6.8**

Panel B: 2009 (%)

	Import-weighted mean			Unweighted mean		
	Chile	GSP	MFN	Chile	GSP	MFN
Alcoholic beverages	0.0	6.2	6.2	3.5	4.5	5.0
Fruits	2.7	7.0	8.1	1.6	6.3	8.5
Fish, crustaceans & prod.	2.0	5.2	10.3	2.4	6.8	10.8
Other agric. & food prod.	10.9	17.3	18.1	16.7	19.8	21.7
Ores	0.0	0.0	0.0	0.0	0.0	0.0
Wood & its products	0.0	0.5	1.0	0.0	0.3	1.1
Copper & its products	0.0	0.0	0.1	0.0	0.7	3.1
Other manufactured products	0.0	0.7	2.5	0.1	1.7	3.6
All products	**1.3**	**3.1**	**3.8**	**3.0**	**4.9**	**6.8**

Note: "Import-weighted mean" refers to the mean of AVE duties across tariff lines (CN, 8-digit level), weighted by EU imports from Chile.
Source: Authors' computations based on Comext (Eurostat) and TARIC.

Agricultural products

As regards agricultural products (including processed agricultural products, fish and fisheries products), the degree of protection of the EU market is higher, and the progressive liberalisation under the FTA occurs over a longer period of 7/10 years, exception made for products excluded from any commitment, and those for which only partial liberalisation applies.

At the higher range (see above), the average MFN tariff for the group of "other agricultural and food products" is 21.8%. At the lower range (see above), the MFN protection is estimated at 12.5%. The large difference is explained by the relatively small share highly protected products such as meat and dairy products and cereals represent in Chile's exports to the EU.

Taking into account the pace of tariff dismantlement in the EU schedule, the preferential margins granted by the EU to Chile for agricultural products were relatively low at the entry into force of the FTA: based on import-weighted means, the assessed preferential margin in 2003 was 1.2 percentage points for alcoholic beverages, 1.4 points for fruits, 3.8% for fish, crustaceans and their products, and 0.7% for other agricultural and food products. However, the margin increases significantly as the FTA approaches the end of the implementation period, granting what can be considered an important competitive advantage compared to the MFN regime. In 2009, the import-weighted preferential margin of 6.2 percentage points for alcoholic beverages, 5.4 points for fruits, 8.3 for fisheries products, and 7.2 points for other agricultural and food products (Table 5, Panel B). Even compared to the GSP regime, the preferential margins remain significant: 6.2 points for alcoholic beverages, 4.3 points for fruits, 3.2 for fisheries products, and 6.4 points for other agricultural products.

1.3.2 Access to Chile's market

The dichotomy between agricultural and industrial products is not relevant on the Chilean side, where no significant asymmetry across sectors is observed. Chile bound its tariff at 25% after the Uruguay Round, except for tariffs on certain products like wheat, wheat flour, sugar and vegetable oils. With limited exception (less than 2% of tariff lines), however, applied MFN protection has been uniformly equal to 6% since 2003.[11] The exceptions are sugar, wheat and wheat flour, which are under a price band (being subject to a specific tariff), and chicken meat, for which specific measures apply. A limited number of products have zero tariffs, including planes and ships.

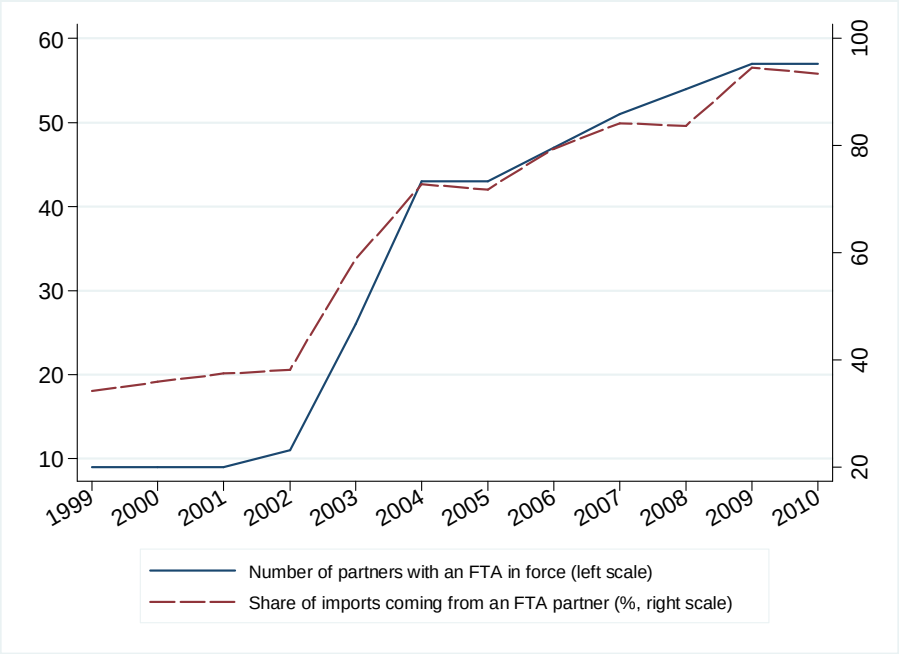
For EU exporters, the duty rate that would be faced absent the EU-Chile FTA is thus easily identified. This falls short of fully describing the context and likely trade impacts of the EU-Chile FTA, though, because of the growing importance of preferential agreements in Chile's foreign trade. While Chile had PTAs with 9 partners in 1999, it had 20 agreements in force in 2010, which included 57 partners (Figure 1).[12] In parallel, the share of Chilean imports coming from a country with which Chile has a bilateral trade agreement in force

[11] Between 1998 and 2003, this almost-uniform applied MFN duty rate was cut, on a unilateral basis, by one percentage point each year.

[12] As already mentioned, 21 agreements with 58 partners were in force in October 2011.

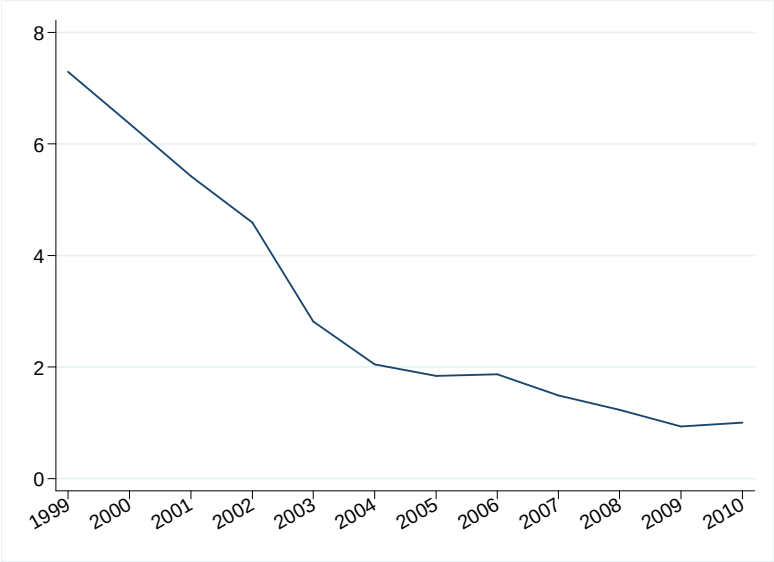
increased steadily, from 34% in 1999 (38% in 2002) to as much as 93% in 2010, probably a world record. As a matter of fact, while the MFN rate remains stable at 6% for almost all products since 2003, custom duties actually collected on imports fall from 2.8% in 2003 to only 1.0% in 2010 (Figure 2).

FIGURE 1: CHILE FTAS, NUMBER AND SHARE IN IMPORTS (%)



Source: Authors' calculations based Chile's National Customs administration data.
Scope: All products, all partners.

FIGURE 2: AVERAGE CUSTOM DUTIES COLLECTED BY CHILE ON ITS IMPORTS (ALL PRODUCTS AND PARTNERS, %)



Source: Authors' calculations based Chile's National Customs administration data.
Scope: All products, all partners.

Against this background, while the MFN is the would-be alternative for European exporters, it is not the only relevant benchmark against which the EU-Chile FTA must be assessed. The market access conditions facing the EU's main competitors are also worth documenting. Latin American countries and the US are the most important trading partners in this respect.

TABLE 6: CHILE AVE TARIFF APPLIED TO THE EU AND TO SELECTED OTHER PARTNERS

Panel A: 2003 (%)

	Import-weighted mean				Unweighted mean			
	EU-15	US	Lat. Am.	Others	EU-15	US	Lat. Am.	Others
Agric. & food	2.8	6.0	2.3	4.4	3.2	6.0	1.8	5.3
Mineral prod.	2.9	6.0	0.8	5.7	2.7	6.0	1.5	5.3
Chemical prod.	2.2	6.0	0.6	5.7	2.4	6.0	1.6	5.5
Machinery	1.4	4.7	0.8	4.5	2.2	5.9	2.1	5.3
Vehicles	1.0	6.1	0.4	5.4	3.0	6.2	1.7	5.6
Precision instr.	2.1	6.1	1.6	5.8	2.7	6.0	3.3	5.7
Other	1.5	6.0	0.9	5.7	2.2	6.0	1.9	5.6
All products	**1.6**	**5.4**	**1.0**	**5.3**	**2.4**	**6.0**	**1.9**	**5.5**

Panel B: 2010 (%)

	Import-weighted mean				Unweighted mean			
	EU-15	US	Lat. Am.	Others	EU-15	US	Lat. Am.	Others
Agric. & food	0.9	1.8	0.7	3.4	1.9	2.1	1.1	3.8
Mineral prod.	0.0	0.1	0.0	1.9	1.3	0.9	1.2	3.2
Chemical prod.	0.8	0.4	0.5	2.3	1.2	1.4	1.5	3.1
Machinery	0.6	0.7	0.4	1.7	1.0	1.1	1.8	2.2
Vehicles	0.2	0.2	0.4	1.2	1.2	1.2	1.4	2.0
Precision instr.	1.1	0.8	2.1	2.8	1.8	1.8	3.0	3.1
Other	0.3	0.6	0.3	2.6	1.2	2.3	1.4	3.0
All products	**0.5**	**0.5**	**0.3**	**2.0**	**1.3**	**1.7**	**1.5**	**2.9**

Source: Authors' calculations based Chile's National Customs administration data.

In 2003, EU exports to Chile faced an average tariff of 2.4% at the higher range (non-weighted mean) and of 1.6% at the lower range (import-weighted mean) (Table 6, Panel A). Compared to the MFN regime, this corresponds to a preferential margin of 3.6 and 4.4 percentage points, respectively. The variability across sectors is limited, with a minimum import-weighted mean tariff of 1.0% for vehicles, and a maximum of 2.9% for mineral products. This also represented a trade-weighted preference margin of almost four percentage points over the US. Already at that time, market access conditions offered to EU exporters were close to those offered to Latin American countries (1.0%).

By 2010, the average duty faced by the EU's exporters had fallen further to 1.3% in the higher range and 0.5% in the lower range, corresponding to 4.7 and 5.5 points preferential margins compared to the MFN regime (Table 6, Panel B). This protection level is

equivalent the one offered to US exporters under the US-Chile FTA, enforced in 2004, and it is slightly larger than the one offered to Latin American competitors. For other countries, the average rate does not exceed 2.0% in 2010.

1.4 Linking tariffs with bilateral trade

To look for further evidence about the consequences of the EU-Chile FTA, tariff elimination schedules must be put in parallel with bilateral imports. This is done in this section based on detailed trade and tariff data, from the perspective of each importing party. The approach is slightly adapted in each case to take into account the specificities of the EU and Chile.

1.4.1 EU imports from Chile

The period under study overlaps with two EU enlargements. For the new member countries, the impact of the EU-Chile FTA is thus blurred by the major influence EU accession had upon their foreign trade patterns. This is why only EU-15 trade data are considered for the analysis in what follows. It should be noted that overall EU-27 imports data and EU-15 data differ only marginally, as illustrated in Figure 43 in Appendix 1.1.

1.4.1.1 Trends in total and preferential imports

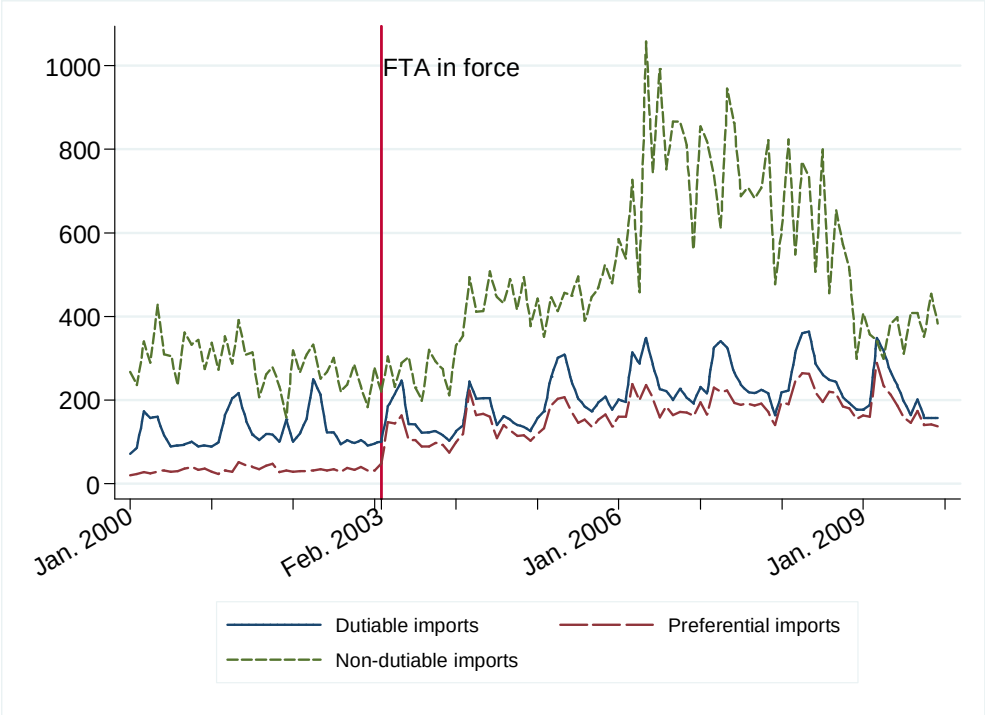
The pattern of trade over time shows that non-dutiable imports (mostly copper and ores), hide most of the effects of the Agreement. This is due to the large share of such products in the total Chilean exports to the EU, and to the fact that their value varied over time, increasing after the entry into force of the FTA, and declining afterwards. In effect, most of the variability of total EU imports from Chile is unrelated to the FTA (Figure 3).

Consistent with the results already found for 2002, breaking down the flows across sectors shows that imports in the two largest sectors, copper and ores, are almost exclusively comprised of non-dutiable products (exclusively in the case of ores). This is also the case of wood products, among which the main Chile export products (in particular pulp of wood) are not dutiable in the EU.

Focusing on dutiable preferential imports (i.e. those that face non-zero MFN tariffs and for which the importer requests to benefit from the EU-Chile FTA's tariff concessions) gives a very different picture, dominated by the importance of Chilean exports in the fruit sector. Figure 4 also shows the considerable seasonality of fruits exports, caused mostly by the harvesting period, but also perhaps by the seasonality of EU tariffs.

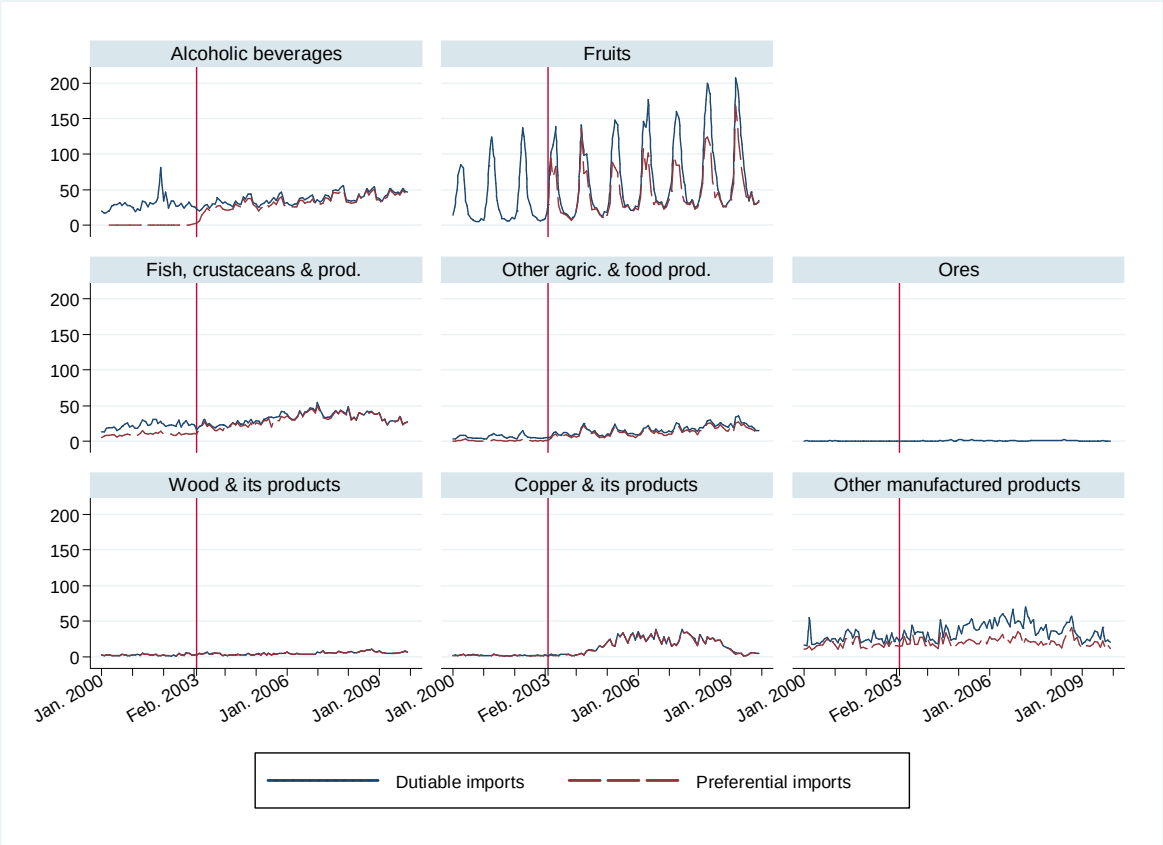
Three other significant sectors are alcoholic beverages; fish, crustaceans and their products; and other manufactured products. In all these cases, the trend following the entry into force of the agreement is clearly upward, at least until the year 2007.

FIGURE 3: EU15 NON-DUTIABLE, DUTIABLE AND PREFERENTIAL MONTHLY IMPORTS FROM CHILE (MILLION EUROS)



Source: Authors' computations based on Comext (Eurostat), Single Administrative Declarations and TARIC.

FIGURE 4: DUTIABLE AND PREFERENTIAL EU MONTHLY IMPORTS FROM CHILE, BY MAIN SECTOR (MILLION EUROS)

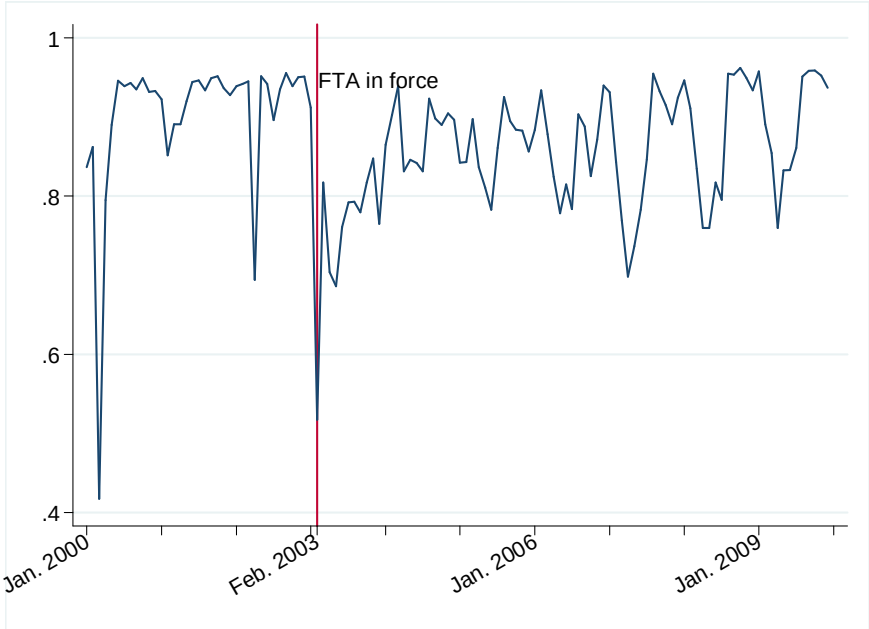


Source: Authors' computations based on Comext (Eurostat), Single Administrative Declarations and TARIC.

1.4.1.2 Coverage and utilisation of preferences

Examining the coverage rate (i.e. the share of dutiable imports from Chile that are eligible for preferential treatment) shows that virtually all imports are covered by the EU-Chile FTA, since its entry into force. Since conditions are attached to the use of the preferential regime (rules of origin, specific documentation), it is interesting to assess to what extent it was used in practice. If we define the rate of utilisation of preferences as the share of imports eligible for preferential treatment which actually request its use, this rate was rather low in the year following the entry into force of the EU-Chile FTA (lower than 80% during most of the year), presumably reflecting the need to adapt to the new regime. Later on, utilisation fluctuated most of the time between 75% and 95% (Figure 5). Underutilisation is mainly linked to fruits, where it is seasonally recurrent,[13] and to other manufactured products, mainly between 2005 and 2007.

Figure 5: Monthly utilisation rate of EU preferences granted to Chilean imports



Source: Authors' computations based on Comext (Eurostat), Single Administrative Declarations and TARIC.

Given the significant concentration of Chilean exports, focusing on the top products adds insights. Focusing on preferential imports (see Table 58, Appendix 1.1), the most important products are co-products of copper (ferro-molybdenum, and molybdenum oxides and hydroxides for which the EU's MFN duty is respectively 2.70% and 5.30%[14]). Other important preferential imports are fruits and in a lesser proportion wine, salmon fillets, plywood and meat.

[13] When tariffs are seasonal, commitments are defined separately for each period considered in the tariff schedule. For several fruits and vegetables, tariffs are liberalised for most, but not all, periods. In this case, the product is considered as eligible to a preferential treatment, but it is actually logical that imports enters under the MFN regime in those periods for which the FTA does not include a liberalisation commitment. As a matter of fact, underutilisation of preferences is actually limited to some fresh fruits (grapes, kiwifruits, apples, pears, plums, nectarines).

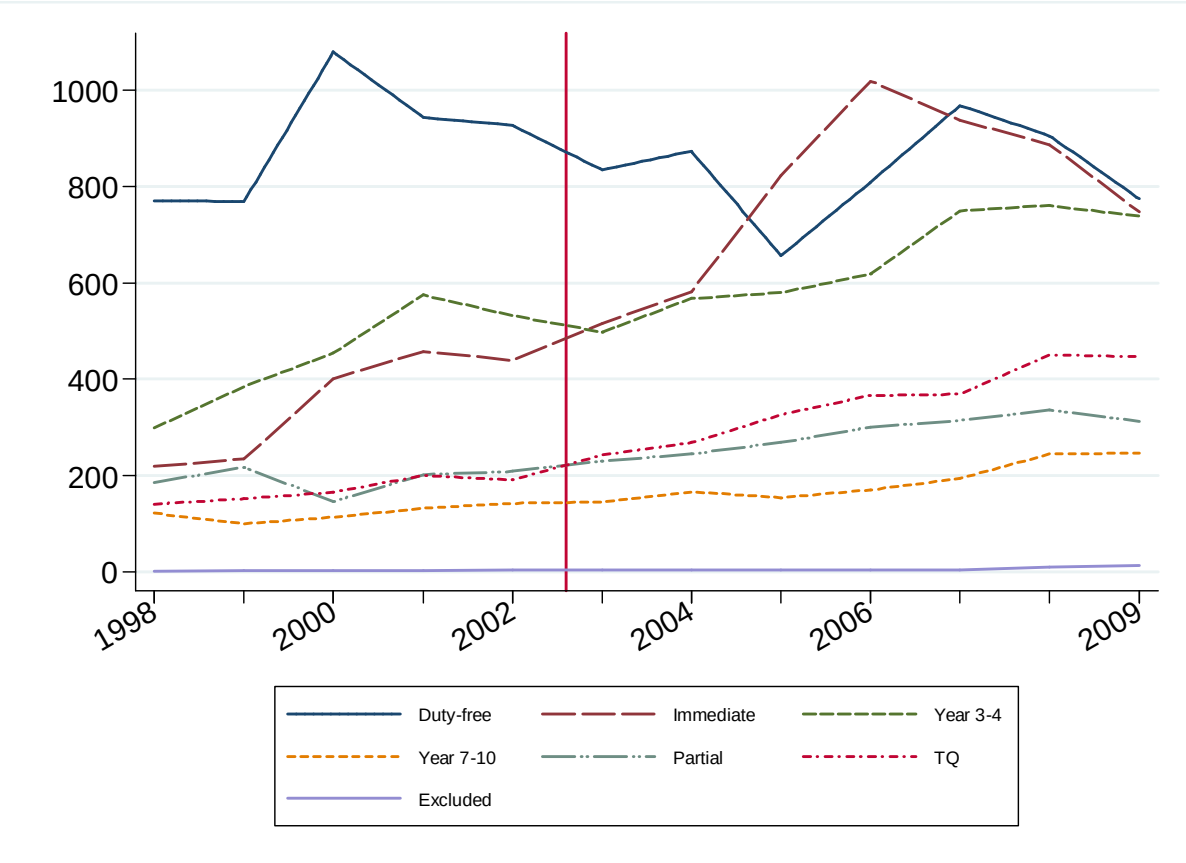
[14] Except for products intended to be used by the aeronautic industry, which are not dutiable, following the so-called "airworthiness tariff suspension"

Most of these products were already exported by Chile to the EU in 2002, despite the absence for most of them of a preferential regime. However, the growth in total exports has been significant for almost all of them, and spectacular in relative terms in many cases.

1.4.1.3 Link between trade growth and EU tariff concessions

Analysing EU imports from Chile by patterns of liberalisation shows a substantial increase following the entry into force of the agreement for products where liberalisation is immediate (+132% between 2002 and 2006, see Figure 6). The products covered by a tariff quota are the category for which the upward trend is most significant between 2002 and 2009 (+133%), while imports of products fully liberalised by 2006 or 2007 (category "Year 3-4"), already increased by 39% over the same period. Meanwhile, imports of products which are not dutiable in the EU(excluding copper and ores) declined by 16%

Figure 6: EU15 yearly imports from Chile by tariff concession schedule, excluding copper and its products and ores (million euros)

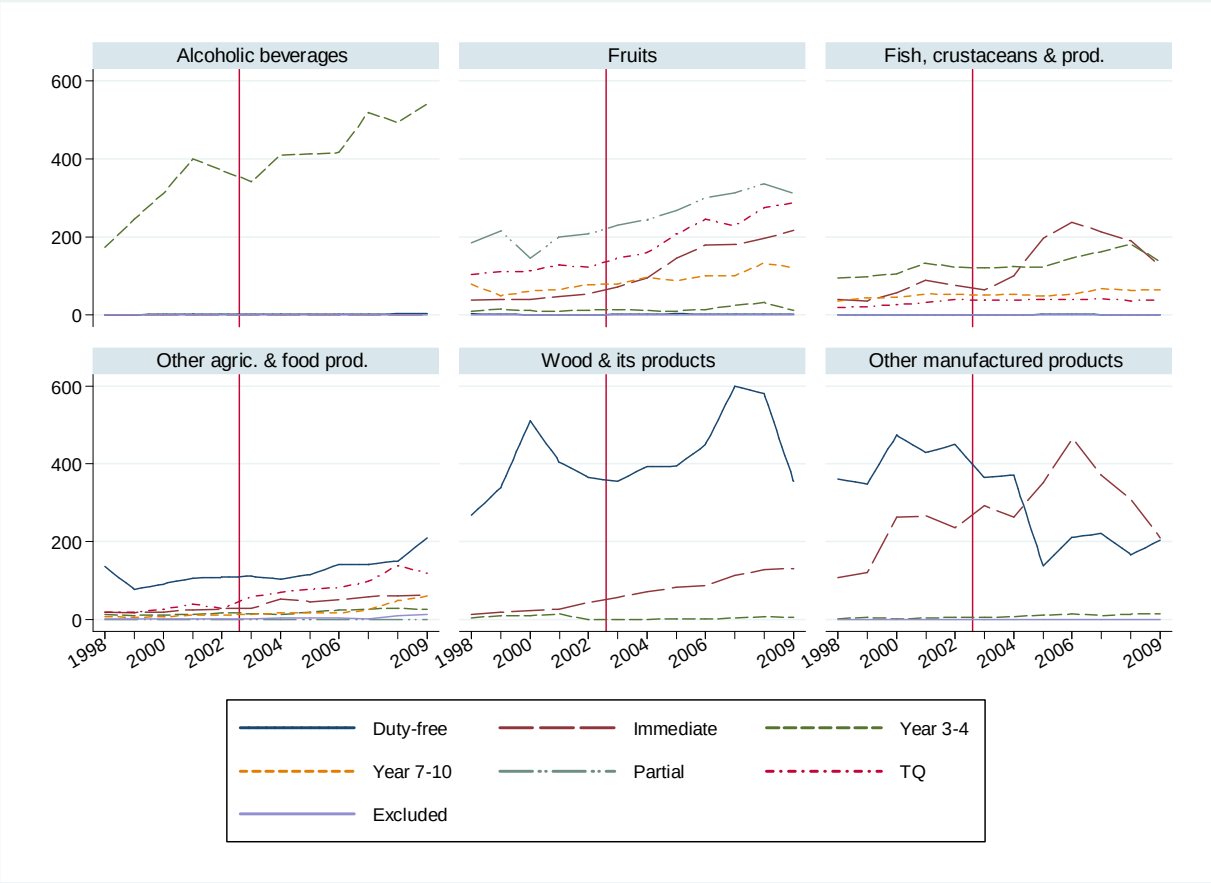


Source: Authors' calculations based on the EU-Chile FTA's text, on TARIC (DG Taxud) for protection data and on Comext (Eurostat) for trade data.

The disaggregation by category can be usefully crossed with disaggregation by sector, which shows that upward changes are linked to several sectors (Figure 7). In the fruit sector, products with immediate liberalisation, products under tariff quota and products with partial liberalisation (i.e., under an entry price system, in this case) experience a clear upward trend. For other agricultural and food products, this trend is clearly observed for products under a tariff quota. Alcoholic beverages, where products of interest for Chilean exporters (mainly

wines) were liberalised by 2007, also increased substantially both in absolute and relative terms. The outcome is less clear-cut for fish products, bilateral imports of which increased sharply after the EU-Chile FTA, but declined from 2007 onward. For wood products, while non-dutiable products still account for most of Chilean exports to the EU, those dutiable products that were immediately liberalised have experienced a robust upward trend since the entry into force of the EU-Chile FTA. For other manufactured products, exports do not show a clear pattern over time, perhaps due to the indirect influence of the copper sector.

FIGURE 7: EU15 YEARLY IMPORTS FROM CHILE BY TARIFF CONCESSION SCHEDULE AND BY SECTOR, EXCLUDING COPPER AND ITS PRODUCTS AND ORES (MILLION EUROS)



Source: Authors' calculations based on the EU-Chile FTA's text, on TARIC (DG Taxud) for protection data and on Comext (Eurostat) for trade data.

Part of these changes may be due to the EU's domestic demand potentially blurring the evolution of Chile's competitive position. Analysing the share of Chilean products in EU15's extra-EU imports, with base 100 in 2002, allows taking such effects into account (Figure 8). The positive trend observed for liberalised products in fruits and other agricultural and food products remains very clear in this case, suggesting that the products liberalised did benefit directly and substantially from the tariff concessions granted under the EU-Chile FTA. In fruits immediately liberalised, Chile's market share tripled between 2002 and 2009. Almost the same pattern is observed for wood products that were immediately liberalised. The same upward trend is observed in the beginning of the period for products immediately liberalised in the fish sector, but it is followed by a subsequent decline, linked to the sanitary crisis faced by this sector in Chile. For alcoholic beverages, expressing the change in market

share gives a more balanced assessment than previously, although the increase from 2007 onward is substantial.

FIGURE 8: MARKET SHARE OF CHILE IN EU15 EXTRA-EU IMPORTS, BY TARIFF CONCESSION SCHEDULE AND BY SECTOR, EXCLUDING COPPER AND ITS PRODUCTS AND ORES (2002=100)

Note: The scale is different for sector "Other agricultural and food products".
Source: Authors' calculations based on the EU-Chile FTA's text, on TARIC (DG Taxud) for protection data and on Comext (Eurostat) for trade data.

1.4.2 CHILE IMPORTS FROM THE EU

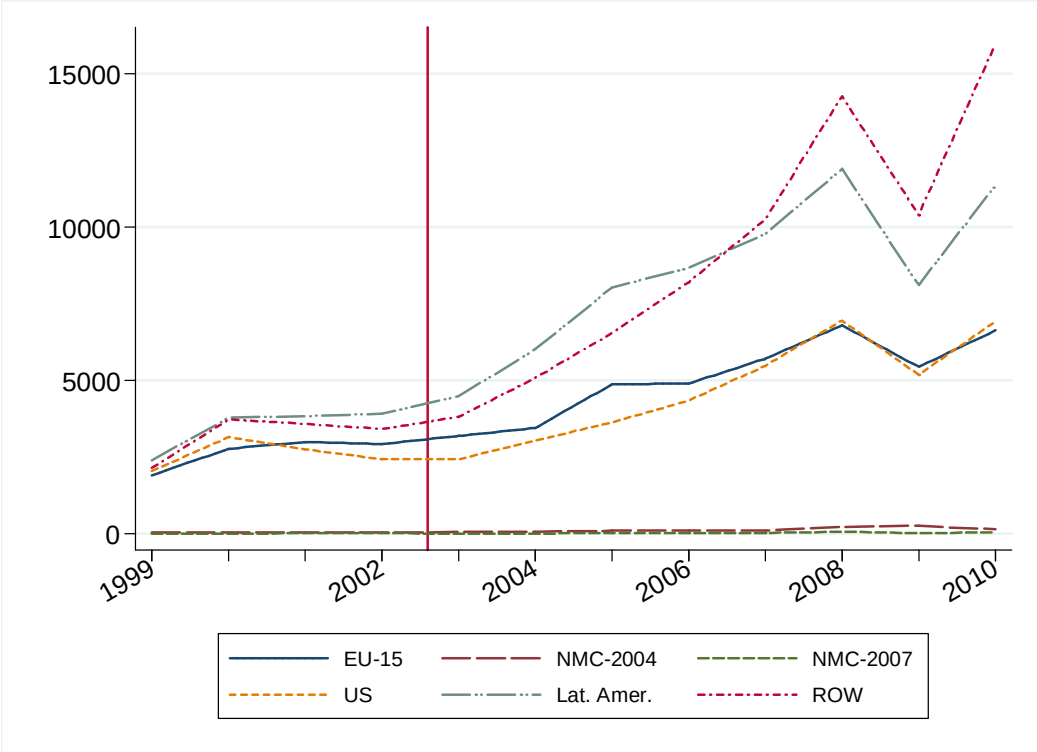
Chile's protection differs from the EU's, as it varies less across products. For this reason, the cross-product analysis is less indicative than when applied to the commitments of the EU. In contrast, given the number of bilateral agreements established by Chile with different partners, and the variability of the commitments, cross-country comparisons are especially interesting. The analysis is thus adapted to take advantage of the specific context for Chile.

1.4.2.1 TRENDS IN TOTAL IMPORTS

To evaluate the performance of EU exports to Chile since the entry into force of the EU-Chile FTA, it is worth putting them into the context of Chile's imports by main region of origin. Such analysis can be blurred by oil and gas imports, however. Indeed, these imports accounted for 22% of total Chilean imports in 2010, and they changed substantially over the

period studied (see Figure 44, Appendix 1.1). While the EU did not used to be a significant provider for Chile in this area, imports of crude oil from the UK reached US$ 711 million in 2009 and US$ 574 million in 2010, an order of magnitude far from negligible at the scale of EU-Chile trade. Indeed, crude oil and gas, for which the MFN tariff duty is 6% since 2003, were liberalised within 5 years by the EU-Chile FTA.[15]

FIGURE 9: TOTAL CHILE NON-OIL IMPORTS BY REGION OF ORIGIN (M US$, YEARLY DATA)



Source: Authors' calculations based Chile's Customs administration data.

Focusing now on non-oil products (i.e., excluding HS Chapter 27 from the scope of the analysis) Chilean imports from all partner regions have grown steadily between 2002 and 2008, and the sharp drop following the global financial crisis had already been more or less recovered by the end of 2010 (Figure 9). In terms of orders of magnitude, the EU is a provider of importance similar to the US, each accounting for about one sixth of Chile's imports. Less than one third originates from Latin America, and the rest of the world (mainly Asia) provided the remaining portion in 2010. Imports from the EU's new member countries are small in comparison. The most significant change in these orders of magnitude over the period studied is the increase in the share of imports sourced from the rest of the world, from 26.8% in 2002 to 38.9% in 2010. This trend, linked to the dynamism of Asian countries, and in particular China, is not specific to Chile. Meanwhile, the share of the EU15 in Chile's imports declined from 23.0% in 2002 to 16.1% in 2010

Taking year 2002 as a basis also shows that Chile imports from the EU grew less compared to other main regions: imports from the EU grew by a factor of approximately 2.3,

[15] This impact on oil exports was even stronger in the case of the US, for which the bilateral FTA with Chile involved a liberalisation within two years, spurring Chilean imports from the US to rise very significantly.

compared to about 2.9 for imports from the US and Latin America, and 4.7 for imports from the rest of the world.

1.4.2.2 Link between trade growth and tariff concessions

To gain more insights about the potential trade impact of the Agreement, the growth in trade is linked to the liberalisation schedule. As already mentioned, the products liberalised at the entry into force of the FTA account for the bulk of Chilean imports, followed by products for which a 5-year transition period is planned. Still, the trends can be compared across these categories of products using 2002 as the base year (Figure 10). In almost each case, imports from the EU grew less rapidly than those from other partner regions. The only exception is products liberalised by 2008 (Year 5), where EU imports perform as well as US ones, and better than Latin American ones, which dominates the corresponding markets.

Figure 10: Total Chile non-oil imports by region of origin and by type of concession in the EU-Chile FTA, base 2002=100

Source: Authors' calculations based Chile's Customs administration data.
Note: To ease readability, scale differs across graphs.

1.5 Concluding remarks

This chapter reviews the tariff provisions of the Trade Pillar of the EU-Chile EU-Chile FTA. Taking advantage of the most detailed information available for protection and trade, it sheds light on the nature of these provisions and on their potential trade impacts. The contrast between partners is stark not only as far as the size of the economy is concerned, but also in the area of protection and trade patterns.

The EU's tariff elimination schedules include total and front-loaded (i.e., early) liberalisation for manufactured products. This is potentially a huge benefit for Chilean exporters. However, European protection under the MFN regime is low for these products and Chile's export potential has remained limited so far. Ores and copper products, important in Chile's exports, are almost not protected at all in the EU market. For agricultural, food and fisheries products, a significant share of products were partially or completely excluded from liberalisation commitments, or benefited from a 7 to 10-year phase-in period. This is however where the main stakes seem to lie for Chilean exporters: their potential is strong for some of these products, in particular fruits, wines and fisheries products, where EU's protection is significant under the MFN regime. The comparative analysis of bilateral trade flows suggests that significant trade creation is likely to have occurred in these products, where Chile's export performances seem to be meaningfully related to tariff cuts.

Chilean protection is very different, with an almost-uniform MFN rate of 6%, and a multiplication of bilateral trade agreements, many of which are still being phased in. Chile's tariff elimination schedules are comprehensive and for the most part, front-loaded. The FTA may have prevented the shares of the EU in the Chilean market from falling further, but the lack of contrast across products does not allow strong conclusions to be drawn out of the comparison of outcomes between products more or less liberalised. The econometric analysis presented in the next Chapter will shed clearer light on this provisional conclusion.

Chapter 2 - Econometric analysis of the impact of the EU-Chile FTA on trade in goods

The statistical analysis of trade and tariff data presented so far provides some evidence about the trade effects of the FTA between the EU and Chile. However, a more structured approach is needed to establish causality.

The econometric analysis developed in this Chapter is largely about finding a suitable benchmark against which observed trade flows can be meaningfully compared. While most of the literature has dealt with the analysis of the trade impact of FTAs in general, we focus here on a single Agreement. Moreover, to avoid the bias derived from aggregate trade data, we focus on a product-level analysis. The econometric assessment is then based on the comparison of trade outcomes across products, investigating whether they are meaningfully linked to tariff cuts.

In so doing, it is important to disentangle tariffs from other potential determinants of trade flows, linked to product-specific trends in supply and demand in the EU and in Chile. These trends are controlled for by studying, instead of bilateral export flows *per se*, their trend over and above what could have been expected based on exports to and imports from third countries. This "difference-in-differences" approach, applied at the product level, allows an accurate assessment of the link between tariff cuts and bilateral trade between the contracting parties. The details of the methodology, and its challenges, are presented in Appendix 2.1.

2.1 Estimation results

The methodology described in Appendix 2.1 is used to identify the trade impact of the EU-Chile FTA based on product-level information on trade and tariffs. Similarly to the approach followed in the previous chapter, the analysis is carried out from the point of view of the importing party (the EU or Chile), adapting it to the specificities of each country.

2.1.1 EU imports from Chile

Following the approach described in Appendix 2.1, we first provide estimates of the elasticity of substitution, on average and sector by sector. Subsequently we attempt an estimation of the effects of non-tariff clauses.

Following the estimation strategy and the mode of implementation described in Appendix 2.1, we obtain a consistent first set of estimates of the average elasticity of substitution across providers for EU imports from Chile (Table 7). The base estimating equation, used for estimates (1) to (3), is equation (11):[16] $\ln(BR_{CXUMkt}) = \alpha_k + \beta_t + \sigma_g \ln\left(\frac{\tau_{CUkt}}{\tau_{XUkt}}\right) + u_{kt}$. The parameter of interest, σ, is assumed constant in the present case, but it will be assumed variable across good categories (indexed by g) in subsequent estimates. σ is the elasticity of substitution between the products provided by different suppliers. It measures the sensitivity of imports from different providers to their relative prices, which has direct implications for the assessed impact of the EU-Chile FTA.

TABLE 7: ESTIMATES OF THE AVERAGE ELASTICITY OF SUBSTITUTION FOR EU15 IMPORTS FROM CHILE

	Panel of difference-in-differences				Panel of differences
	(1)	(2)	(3)	(4)	(5)
Sigma (all products)	-6.16 **	-9.02 ***	-5.96 ***	-4.76 ***	-3.52 **
	(-2.01)	(-24.18)	(-2.71)	(-2.67)	(-2.37)
Estimation method	OLS	FGLS	Tobit	Negative binomial	OLS
Product fixed effects	x	x	x	x	x
Year fixed effects	x	x	x	x	x
Observations	6,256	6,256	6,256	9,004	14,789

Scope: All products of the Combined Nomenclature, 8-digit level, years 2001 to 2009, excluding copper and copper products (HS Chapter 74) and ores (HS Chapter 26). Salmon and trout products are also excluded after 2006. Products covered by a tariff-rate quota, either within the EU-Chile FTA or on a non-preferential basis, are excluded.

Notes: OLS estimates based on CIF imports as declared by the importer. Row "Sigma" refers to the estimated value of σ. Estimates (1) to (3) are based on equation (11), estimate (4) on equation (12), and estimate (5) on equation (13). (Cluster-)robust t-statistics reported in parentheses (clustering is assumed at the HS6 level for estimates 1 and 2, and the 8-digit level for estimate 5).[17] Bootstrapped standard-errors used for estimate (3). *, ** and *** denote significance at the 10%, 5% and 1% statistical level.

The estimated elasticity of substitution is significantly different from zero at the 5% or 1% level in each case, with values close to -6 for OLS and Tobit estimates, and to -5 for the negative binomial estimate. The FGLS estimate gives a higher value (-9) while, as expected, estimates based on simple differences give a somewhat lower estimated elasticity.

[16] All equations referred to in this Chapter are presented in Appendix 2.1.

[17] Clustering of standard errors refers to the situation where error terms are correlated over subsets of observations. Not taking this pattern into account typically leads to an overstatement of the precision of the results, hence non-conservative conclusions about the statistical significance of the results. The cluster-robust statistics used here are a standard way to correct for this bias. It accounts for the fact that the error term is likely to be correlated across observations for a given product. Because observations for the control groups are made at the HS6 level for estimates 1 and 2, this is the level at which the correction is applied. Such a correction is not needed when bootstrapped standard errors are used.

An elasticity of -6 means that, if the FTA cuts the tariff applied by the EU to Chilean exporters for a given product by 1%,[18] the econometric model predicts that the value of EU imports from Chile would increase by 6%, relative to the value of imports from the control group of importers. Note that this relative increase may be obtained as a result of a combination of increased imports from Chile and/or decreased imports from other providers. And, obviously, that this percentage may apply to very low initial flows.

The most direct benchmark for our estimates is Romalis (2007), since the methodology used here is partly based on this work. His estimates range between -6.3 and -9.4 for US imports from Canada, between -9.6 and -10.9 for US imports from Mexico, between -2.8 and -5.5 for Canadian imports from the US, between -6.6 and -8.1 for Canadian imports from Mexico, between -2.0 and -2.5 for Mexican imports from the US, and between -0.5 and -0.7, although insignificant, for Mexican imports from Canada. Against these benchmarks, our estimates appear to be consistent, although in the lower range of comparable estimates available.

TABLE 8: ESTIMATES OF THE ELASTICITY OF SUBSTITUTION FOR EU15 IMPORTS FROM CHILE, BY SECTOR

	Panel of difference-in-differences				Panel of differences	Average (1)-(3)
	(1)	(2)	(3)	(4)	(5)	
Alcoholic beverages	-14.68 *	-17.43 ***	-13.67 ***	-3.08	-4.24	-15.3
	(-1.83)	(-8.64)	(-3.66)	(-0.50)	(-0.98)	
Fruits	-9.48 **	-1.79 ***	-8.52 **	0.25	-7.91 **	-6.6
	(-2.25)	(-17.65)	(-2.02)	(0.07)	(-2.24)	
Fish, crustaceans & prod.	-8.68	-13.06 ***	-8.39 *	3.43	-3.84	-10.0
	(-1.41)	(-5.64)	(-1.70)	(0.50)	(-1.17)	
Other agric. & food prod.	-0.71	-8.01 ***	-1.46	-3.70	-3.83	-3.4
	(-0.16)	(-38.80)	(-0.46)	(-1.51)	(-1.39)	
Wood & its products	-21.88	-11.24 ***	-16.69 *	-28.57 ***	-12.47	-16.6
	(-1.59)	(-2.59)	(-1.81)	(-2.65)	(-1.42)	
Other manufactured products	-11.87 ***	-9.55 ***	-9.87 ***	-13.67 ***	-0.46	-10.4
	(-2.70)	(-25.06)	(-3.20)	(-3.40)	(-0.22)	
Estimation method	OLS	FGLS	Tobit	Negative binomial	OLS	
Product fixed effects	x	x	x	x	x	
Year fixed effects	x	x	x	x	x	
Observations	6,256	6,256	6,256	9,004	14,789	

Scope: All products of the Combined Nomenclature, 8-digit level, years 2001 to 2009, excluding copper and copper products (HS Chapter 74) and ores (HS Chapter 26). Products covered by a tariff-rate quota, either within the EU-Chile FTA or on a non-preferential basis, are excluded.

Notes: Estimates based on CIF imports as declared by the importer. Rows refer to the estimated value of σ by sector. Estimates (1) to (3) are based on equation (11), estimate (4) on equation (12), and estimate (5) on equation (13). (Cluster-)robust t-statistics reported in parentheses (clustering is assumed at the HS6 level for estimates 1 and 2, and the 8-digit level for estimate 5). Bootstrapped standard-errors used for estimate (3). *, ** and *** denote significance at the 10%, 5% and 1% statistical level.

[18] This interpretation assumes that a 1% tariff cut implies a 1% decrease in the relative consumer price of Chilean imports in the EU. This is an approximation. If the tariff is cut from τ_0 to τ_1, and assuming the tariff applied to other partners is unchanged, the relative price of imports from Chile is actually cut by $(\tau_0 - \tau_1)/\tau_0$. The logarithm of relative imports values would then be increased by a factor $\sigma \ln(\tau_1/\tau_0)$.

To gain further insight about the sensitivity of imports to tariffs, the same estimates are carried out allowing the elasticity of substitution to vary across sectors. This is done based on the classification used in Chapter 1, tailored to the pattern of EU imports from Chile. The estimated elasticities of substitution, reported in Table 8, exhibit stronger variability at this level. In particular, the negative binomial estimate and the estimate based on the panel of simple differences fail to provide significant estimates in most sectors. However, the three other estimates provide a rather consistent set of estimates, with a larger estimated elasticity of substitution for alcoholic beverages and for wood and its products, and a smaller elasticity for the sector of other agricultural products. The average of these three estimates, reported in the last column, can be deemed a suitable synthesis of these results.

The relatively low price-sensitivity of bilateral imports for fruits and other agricultural products may seem surprising. However, Chilean exports tend to be concentrated on specific products, like fresh grapes, apples or kiwifruits. In such cases, there is little room for substitution across products when prices change. In addition, most Chilean competitors in the EU market (EU producers, to begin with) are in the Northern hemisphere, meaning that their seasonal cycle is different from the Chilean one. All these elements may explain the relative price insensitivity of Chilean exports in the EU, in particular for fruits and for other agricultural products.

2.1.2 Chilean imports from the EU

Data on Chilean imports were available up to 2010 when this analysis was carried out, so the analysis covers the period from 2001 to 2010. Based on customs declarations at the 8-digit level, we report for the EU the estimated elasticity of substitution between imports from different providers, and subsequently the estimated trade impact of non-tariff clauses.

Table 9: Estimates of the average elasticity of substitution for Chilean imports from the EU15

	Panel of difference-in-differences			Panel of differences
	(1)	(2)	(3)	(4)
Sigma (all products)	-14.19 ***	-16.31 ***	-15.64 ***	-14.25 ***
	(-10.62)	(-49.79)	(-11.50)	(-12.33)
Estimation method	OLS	FGLS	Tobit	OLS
Product fixed effects	x	x	x	x
Year fixed effects	x	x	x	x
Observations	22,578	22,578	22,578	28,201

Scope: All products of the SACH Nomenclature, 8-digit level, years 2001 to 2010. Products covered by a tariff-rate quota are excluded.

Notes: Estimates based on CIF imports as declared by the importer. Row "Sigma" refers to the estimated value of σ. Estimates (1) to (3) are based on equation (11), and estimate (4) on equation (13). (Cluster-)robust t-statistics reported in parenthesis (clustering is assumed at the HS6 level for estimates 1 and 2, and the 8-digit level for estimate 4). Bootstrapped standard-errors used for estimate (3). *, ** and *** denote significance at the 10%, 5% and 1% statistical level.

Based on the same equation and estimation techniques as those used for EU's imports in Table 7, the EU-Chile FTA's trade impact can be assessed by estimating the elasticity of substitution between imports from the EU and from the control group of importers (Table 9). Since EU exports are far more diversified than those from Chile, far more observations are available when applying the same methodology to Chilean imports from the EU. The results obtained at the aggregate level are very similar across estimation methods. They consistently suggest that the elasticity of substitution faced by EU exports on the Chilean market is very high, with estimated values ranging from -14.2 to -16.3.[19]

TABLE 10: ESTIMATES OF THE ELASTICITY OF SUBSTITUTION FOR CHILEAN IMPORTS FROM THE EU15, BY SECTOR

	Panel of difference-in-differences			Panel of differences	Average (1)-(3)
	(1)	(2)	(3)	(4)	
Agric. & food	-3.43	-8.72 ***	-9.39 ***	-10.28 ***	-7.2
	(-0.84)	(-9.33)	(-3.82)	(-2.94)	
Mineral prod.	0.06	-15.57 ***	-7.94	-1.86	-7.8
	(0.00)	(-12.33)	(-0.86)	(-0.21)	
Chemical prod.	-15.45 ***	-16.83 ***	-16.67 ***	-14.70 ***	-16.3
	(-6.18)	(-31.46)	(-8.17)	(-7.03)	
Machinery	-16.43 ***	-19.97 ***	-17.79 ***	-15.48 ***	-18.1
	(-9.34)	(-42.81)	(-10.16)	(-10.71)	
Vehicles	-17.27 ***	-15.16 ***	-18.10 ***	-23.60 ***	-16.8
	(-3.39)	(-20.19)	(-5.05)	(-6.33)	
Precision instr.	-10.81 ***	-14.08 ***	-11.91 ***	-11.91 ***	-12.3
	(-4.27)	(-17.52)	(-5.23)	(-5.31)	
Other products	-14.27 ***	-14.74 ***	-15.18 ***	-13.74 ***	-14.7
	(-8.77)	(-34.02)	(-10.62)	(-9.72)	
Estimation method	OLS	FGLS	Tobit	OLS	
Product fixed effects	x	x	x	x	
Year fixed effects	x	x	x	x	
Observations	22,578	22,578	22,578	28,201	

Scope: All products of the SACH Nomenclature, 8-digit level, years 2001 to 2010. Products covered by a tariff-rate quota are excluded.

Notes: Estimates based on CIF imports as declared by the importer. Rows refer to the estimated value of σ by sector. Estimates (1) to (3) are based on equation (11), and estimate (4) on equation (13). (Cluster-)robust t-statistics reported in parentheses (clustering is assumed at the HS6 level for estimates 1 and 2, and the 8-digit level for estimate 4). Bootstrapped standard-errors used for estimate (3). *, ** and *** denote significance at the 10%, 5% and 1% statistical level.

[19] Negative binomial estimates could not be carried out in this case, for computational reasons. This method is computationally very burdensome, and the method requires using around 4,000 dummy variables, making the estimation intractable despite our best efforts.

Sector-level estimates also give fairly precisely estimated elasticities of substitution (Table 10). Mineral products are the only sector where most estimates are not statistically significant, but this is a sector where few observations are available. The estimated elasticity of substitution is comparatively small in agriculture (-7.2), but this sector does not represent a large share of EU exports to Chile. In all other sectors, the estimated elasticity of substitution is very high. This suggests that, although the preferential margin granted to EU exporters was small, as a result of the rather low level of protection in Chile, the trade impacts may have been substantial.

This conclusion may not seem natural based on the face value summary described in Chapter 1. What this suggests is actually that, absent an agreement, EU exports to Chile might well have dropped significantly in relative terms, in a context where Chile signed trade agreements with a large number of other partners.

2.2 Simulating the trade impact of the EU-Chile FTA

Once elasticities of substitution of bilateral imports between the EU and Chile are estimated, simple counterfactual simulations can be carried out to identify and quantify the trade impact of the FTA. The calculations presented here are first-order approximations, based upon the own-price elasticity of demand for imports from Chile, estimated based on observed import levels. They also assume (tax exclusive) producer prices expressed in the importing country currency to remain constant. The budget allocated to each product in total imports is in addition assumed to remain constant (see Appendix 2.3 for details). The CGE exercise presented in Chapter 3 will allow less simplistic simulations, but this is a useful way to illustrate the implications of the estimations.

2.2.1 Simulated impact of the EU-Chile FTA on EU imports from Chile

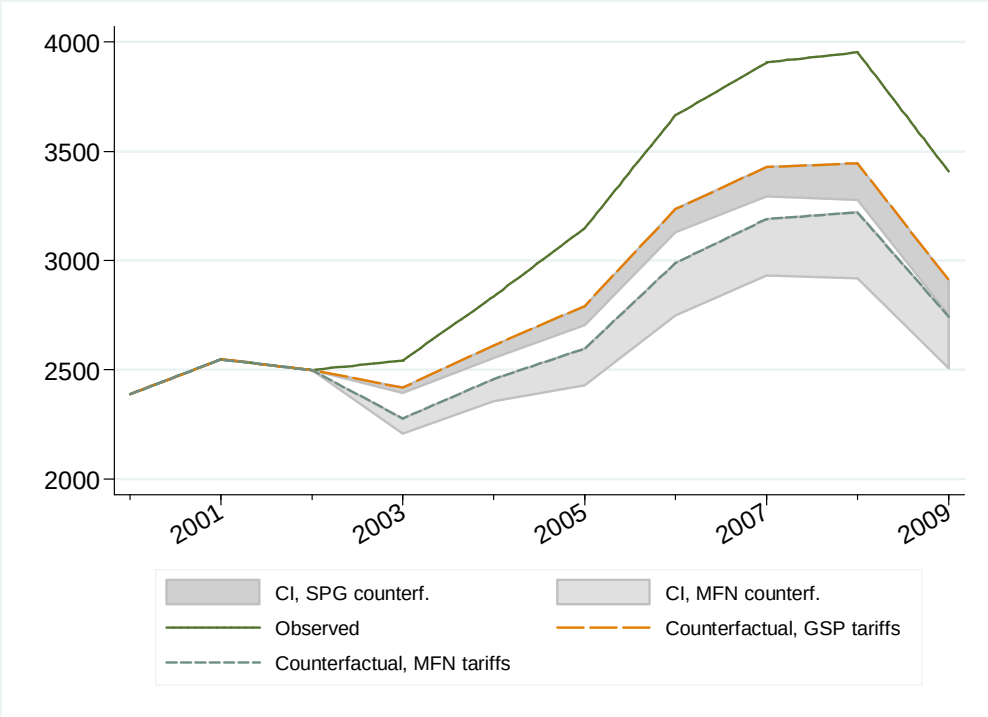
Similarly to the approach followed in Chapter 1, where a comparison between the schedules of the FTA and alternative tariff regimes allowed the preferential margins granted under the FTA to be defined, the trade impact of the FTA is simulated here based on the comparison against the MFN and the GSP regimes.[20]

The results suggest that the EU-Chile FTA had a significant impact on bilateral trade (Figure 11, Panel A). In 2009, EU imports from Chile would be lower by approximately 500M€ if Chile were applied to the GSP regime instead of the EU-Chile FTA, a decline of about 15% compared to the observed level for non-copper, non-ores products. Switching to the MFN regime would involve a decrease by 665M€, or about 20%. Based on the lower-bound of the confidence interval, the difference with counterfactual imports under the MFN regime reaches 900M€, more than a quarter of observed imports.

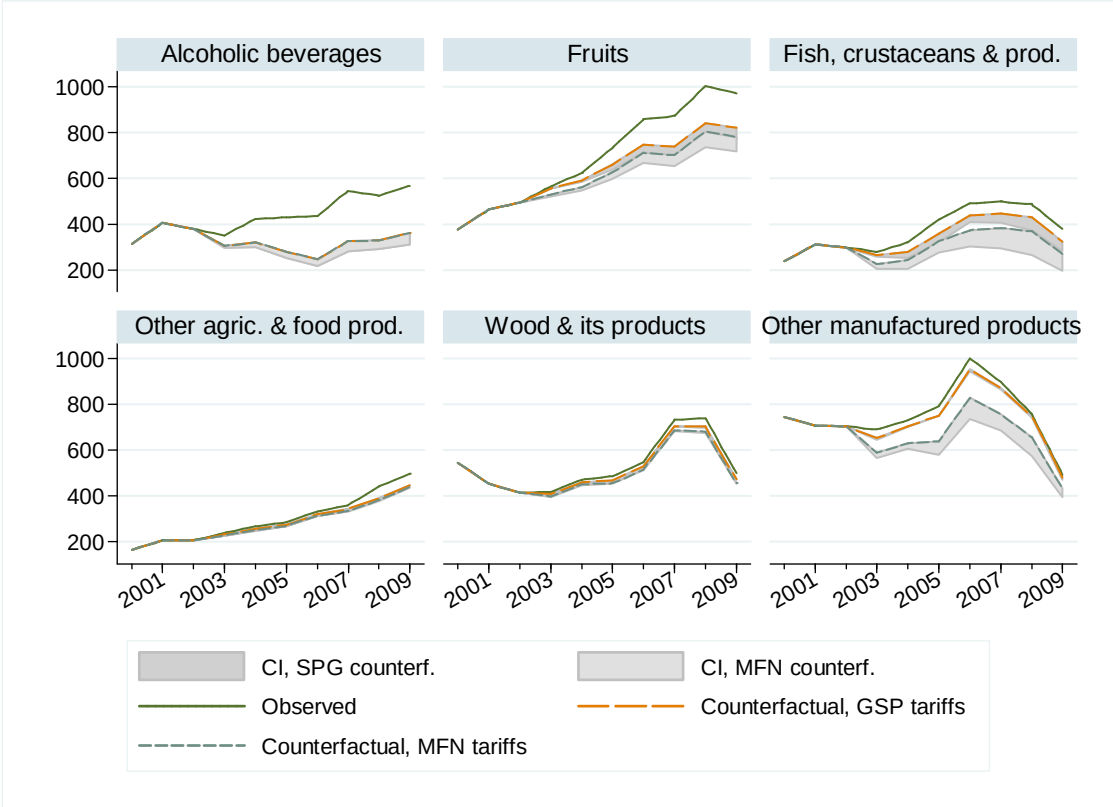
[20] As before, copper and ores are excluded from these calculations, because the tariff clauses of the EU-Chile FTA are not expected to have an impact on imports of these non-dutiable products. Including them would not change the estimated differences across counterfactual scenarios. For TRQ products, the IQTR is retained as the measure of protection within the EU-Chile FTA when the quota is not filled, while the OQTR is used when the quota is filled (i.e., for meat products and for hake).

FIGURE 11: ESTIMATED COUNTERFACTUAL LEVELS OF EU27 IMPORTS FROM CHILE (IN MILLION EUROS)

Panel A: All products, excluding copper and ores



Panel B: By sector



Notes: Counterfactual levels are computed based on equation (16). Confidence intervals, represented as shaded areas, are built with a lower-bound computed using the price elasticity of demand as expressed in (17), instead of (15) in the base case. Copper (HS Chapter 72) and ores (HS Chapter 26) are excluded.

The estimated trade impact of the EU-Chile FTA, in comparison to the GSP, is strongest for alcoholic beverages (in practice, wines), at 206 M€ or 36% of actual imports (switching to the MFN would have the same impact in this case). The increase is also substantial for fruits (151 M€, or 15%, and 191 M€, or 20% in comparison to the MFN regime). The EU-Chile FTA's estimated impact is also substantial for fish (55 M€, 15% in comparison to the GSP, 107M€ or28% in comparison to the MFN), even though it declined after 2006, due the sanitary crisis in salmon cultures. In other sectors, estimated impacts are comparatively small, even though the estimated impact was substantial in 2006-2007 for other manufactured products, due to dutiable copper co-products (in 2006, imports would have been lower by 47M€, or 5%, under the GSP, and by 172M€, or 17%, under the MFN).

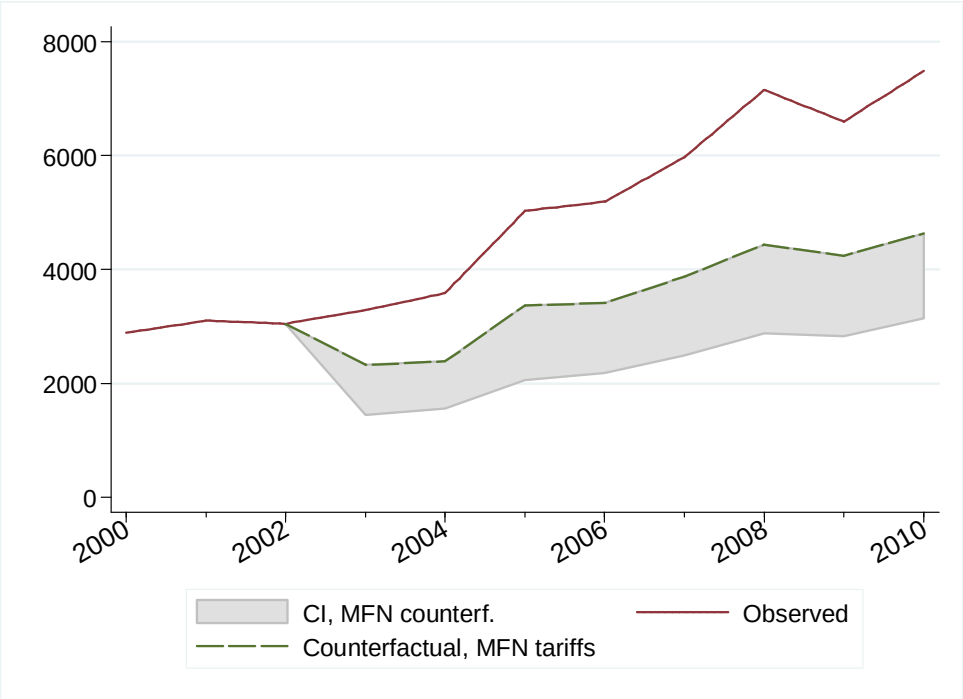
2.2.2 Simulated impact of the EU-Chile FTA on Chile imports from the EU

As regards Chilean imports from the EU, the relevant counterfactual is the MFN regime. According to our estimates, this would make a powerful difference compared to imports actually registered. Imports would be US$2,850 million lower, or fall by 38% of their observed level (Figure 12). Based on the lower-bound of our confidence interval, the estimates suggest that switching to the MFN regime would cut imports by more than US$4,300 million, or 57% of actual levels.

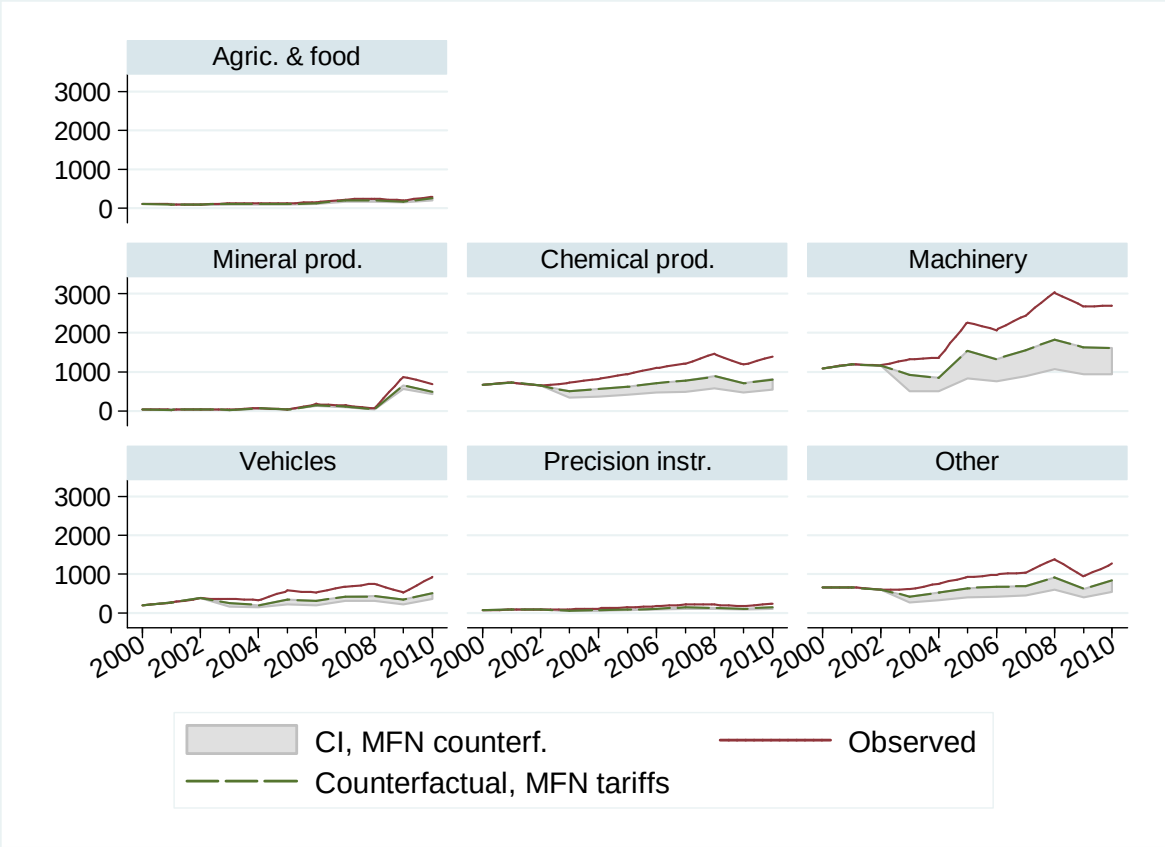
At the sector level, the highest estimated impacts of the EU-Chile FTA are registered for machinery (US$ 1,080 million, 40%), chemical products (US$ 580 million, 42%) and vehicles (US$ 420 million, 45%). The associated confidence interval, linked to the market share of European imports, is especially large for machinery products.

Figure 12: Estimated counterfactual levels of Chilean imports from the EU27 (in millions US$)

Panel A: All products, excluding copper and ores



Panel B: By sector



Notes: Counterfactual levels are computed based on equation (16). Confidence intervals, represented as shaded areas, are built with a lower-bound computed using the price elasticity of demand as expressed in (17), instead of (15) in the base case.

2.3 Concluding remarks

The comparison across products suggests that a significant positive impact on EU imports from Chile has taken place in specific sectors. As for Chilean imports, the EU's market shares tended to decline since the Agreement was enforced, but this was a period where EU exports were outpaced by a large margin by exports from other regions, and several agreements were being phased-in by Chile.

To assess econometrically the role played by the EU-Chile FTA in these trends, we rely here on a transformed version of the gravity equation. In order to carry out an assessment specific to this agreement, trade impacts are identified out of comparisons across products of import changes, in relation to tariff cuts. Proper estimation requires controlling for several potential competing effects, such as the trends in Chile and the EU's supply and demand, product by product. This is achieved by studying the difference-in-differences of imports, expressed in logarithms. For instance, instead of considering EU imports from Chile properly speaking, econometric estimates are based upon changes in these imports, beyond what could be expected given trends in Chile's exports to other markets, and trends in EU imports from other providers. This specification implies that estimates cannot be directly interpreted as giving the assessed EU-Chile FTA impact. Initial trade levels must be taken into account, as must be the potential consequences on prices,

incomes and supplies. Simplified simulations are presented in this Chapter, but fully consistent simulations can only be obtained in a general equilibrium framework, as will be done in Chapter 3.

Combining these techniques with the most detailed information available (at the tariff-line level) proves useful: robust estimates of the trade impact of tariff cuts are obtained. The results suggest that tariff cuts granted by the EU to Chile had a significant impact on the level of EU imports from Chile, compared to other suppliers. The elasticity of substitution between imports from Chile and from other providers is estimated to be approximately 6 on average, but estimated elasticities larger than 10 are found in several sectors, suggesting that even a 1% tariff cut might result in a more-than-10% increase in imports. The simulations carried out based on these estimates suggest that EU imports from Chile would be 15% lower in 2009, were Chile granted the GSP regime; if the MFN regime were applied to EU imports from Chile, their level would fall by 20%, or 665 M€. Put differently, this means that the EU-Chile FTA is estimated to have increased EU imports from Chile by a quarter. Wines and fruits are the sectors which benefited most.

The estimated elasticities of substitution between imports from different providers are larger for Chilean imports from the EU. The order of magnitude of the average is 15, with estimated elasticities even slightly larger than this in some manufacturing sectors. These are very high levels for elasticities, but they are not inconsistent with the few estimates carried out in other contexts at a comparable level of detail in the product classification. These elasticities must also be put in perspective against a context where Chile's initial protection was low and exhibited variability across products. Simulations based on these estimates suggest that, would Chile apply MFN tariffs to its imports from the EU, their level in 2010 would be lower by 40% to 60%, i.e. by between approximately US$ 3 billion and 4 billion. In other words, the EU-Chile FTA is estimated to have increased EU exports to Chile by between two thirds and four thirds.

This finding might seem at odds with the downward trend observed in the EU's share in Chile's total imports over the 2000s. In fact, it suggests that, absent an agreement, EU exports to Chile might well have dropped significantly in relative terms, in a context where Chile was phasing in trade agreements with a large number of partners.

Chapter 3 - General equilibrium assessment of the impact of the Agreement on the Chilean economy

While the econometric analysis presented in Chapter 2 allowed trade mechanisms to be assessed, the actual impact of the EU-Chile FTA on each partner economy involves interrelationships with incomes, factor and good prices, and aggregate variables. In the present case, however, the EU-Chile FTA studied exhibits strong asymmetry. Chile ranked 35th as the EU's trading partner in 2008, accounting for 0.7% of imports and 0.4% of exports. It is unlikely in this context that general equilibrium relationships are very important for the EU. In contrast, the EU was the destination of more than 22% of Chile's exports in 2008, making it the leading Chilean export market at that time,[21] and it supplied almost 13% of its imports (ranking second to the US). Add to this the very high trade-to-GDP ratio in Chile (75% in 2008), and it becomes clear from the outset that the stakes of the EU-Chile FTA are far larger in relative terms for Chile than for the EU, and that general equilibrium relationships may be worth taking into account.

This is why the analysis presented in this chapter relies on a single-country, CGE model of the Chilean economy, with a detailed modelling of its trade relationships, singling out its main trading partners and the EU countries. The benefit of this approach is to be able to use a detailed, tailor-made modelling approach. In particular, the model used involves a detailed breakdown of products of interest for Chile-EU bilateral trade, which are singled out at the HS6 level. This is consistent with the econometric estimates presented in the previous Chapter, which are used to parameterise the price-elasticities of import demands.

An uncommon feature of these CGE simulations is that they concern an already enforced agreement. CGE models are usually used to answer counterfactual experiments, i.e. prospective, "what if" questions, whereby the impact of a hypothetical shock is evaluated *ceteris paribus*. A different approach is proposed here, taking advantage of information available about observed changes in tastes and technologies in Chile since the EU-Chile FTA. The approach followed, inspired from so-called structural decomposition analysis methods (see e.g. Jean and Bontout 2002; Abrego and Whalley 2003; Dixon and Rimmer 2004, 2008), involves a double calibration of the model. Because of the financial crisis, 2009, the latest for which relevant data is available, might be misleading. The method is thus applied here to changes observed in the Chilean economy between 2002 and 2008. It

[21] The EU was overtaken in 2010 by China as Chile's leading export market.

allows an assessment of the FTA with the EU, thus resulting in a theoretically-consistent assessment of the impact of this FTA on product-level output and trade, on incomes and prices, as well as on welfare.

This methodology requires building two fully consistent datasets, one for 2002 and another for 2008, describing the Chilean economy and its foreign trade relationships. These datasets include sector-level data on production factors, intermediate inputs, resources and uses. In addition to national accounts data, these data were put together using the LA-KLEMS database of the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) for Chile.[22] Product-level data on trade and tariffs, by partner, were drawn from the datasets described in Chapter 1. A great effort was needed to put these datasets together given the level of detail requested to make the simulations policy-relevant.

In sum, the modelling framework and the experiment design are tailored to fit the needs of this assessment. The model's main features are described in Section 1, while Section 2 presents the experiment design. Results of the simulation are presented in Section 3, while sensitivity analyses and alternative scenarios are discussed in Section 4.

3.1 Model's main features

The model built for this study is a multi-sector, multi-agent, multi-factor, single region, comparative static CGE model. Consistent with Chilean national accounts, sectors are assumed to produce multiple goods. The "small-country" assumption describes Chile as a price taker on all export markets, and trade and market access are described at the detailed, HS6 level for products of interest.[23] The base assumption used for macroeconomic closure is that the current account balance constraint is met by endogenous adjustment of the real exchange rate. Since this reflects a long-run adjustment, simulations are also carried out assuming the real exchange rate to be exogenous. This is a more realistic way to simulate the short-run impact, and the impact on the current balance is endogenous in this case. The model's main features are briefly described in this section. Details about the database are given in Appendix 3.1. A technical description of the model is available in Appendix 3.2.

3.1.1 Modelling trade and market access at the HS6 level

CGE models generally include between 20 and 40 sectors – in the present case, 37 sectors are considered. This order of magnitude reflects the constraints inherent to the general equilibrium approach, both from a theoretical and empirical point of view. Clearly such an aggregation level limits the insights gained from a CGE assessment considerably, especially when trade is rather concentrated at the product level, and when a specific pattern of concession schedules is of interest.

[22] We are especially grateful to ECLAC's LA-KLEMS team for making these data available to us. For more details on the LA-KLEMS database, see www.eclac.cl.

[23] This assumption may be questionable in the case of copper, but this product is not covered by the tariff provisions of the Agreement, as most of its products and co-products are not dutiable in the EU (see Chapter 1). Thus, the corresponding sector is not at the centre of the assessment presented here.

This is why the model used here describes trade flows and market access concessions at the HS6 level. Using this level of detail for the whole economy would render the model almost intractable, and without much gained, since the number of products of interest to bilateral trade between Chilean and the EU are actually far less than the 5,000+ products of the HS6 classification. Minimum import levels were thus set as conditions for products to be singled out in the model classification, namely a minimum import level of US$ 20 million for Chilean imports from the EU, or US$ 10 million for EU imports from Chile.[24] Products not singled out based on this criterion are bundled by sectors of the input-output matrix. The resulting classification includes 199 products.[25] No input-output matrix is available at this level, nor do we have any reliable data about domestic consumption. The model thus combines a sectoral breakdown in 37 sectors, for which production, input-output relationships and consumption are fully modelled, and a further breakdown of 199 HS6-level products, for which only trade and market access are fully modelled. In 2008, HS6 products singled out in this further breakdown accounted for 52% of EU exports to Chile, and for 96% of Chilean exports to the EU.

This detailed modelling involves describing each sector, as defined in the input-output table, as a bundle of HS6 products. On the demand side, the subutility function associated with each sector is modelled as a constant-elasticity of substitution (CES) function. On the supply side, a constant-elasticity of transformation (CET) function describes the determinants and consequences of changes in the product mix.

An important additional benefit from this modelling approach is that it relies on functional forms consistent with the ones used in the econometric analysis: CES functions across HS6 products, within each sector. This allows connecting the econometric and the modelling parts of the project in a fully consistent way, since both functional forms and product breakdown are defined consistently. The elasticities of substitution across providers at the product level used in the model are those estimated in the above-described econometric analysis. The estimated elasticities by large sector, averaged across the three base estimation techniques (see Chapter 2, Table 2 and 4, last column), are thus used to parameterise the model. Such an integrated, consistent approach has no precedent at this level of detail, to the best of our knowledge. Of course, trade and tariff data are also drawn from the dataset built for the statistical and econometric analysis presented in the previous chapters, once they are made compatible with the national accounts data.

For service sectors, the data available do not allow sector-level trade flows to be broken down by partner. In addition, as will be made clear in Chapter 4, obstacles to trade in service sectors cannot be meaningfully represented in a simple, quantifiable manner, suitable for modelling purposes. The model thus relies on national accounts data; trade flows are not broken down by partner and trade barriers are not explicitly represented. Accordingly, the model does not takes into account any direct effect the FTA might have on trade in services, in relation to the service provisions analysed in Chapter 4; the model's simulations thus only reflect the indirect effects of the FTA on trade in services.

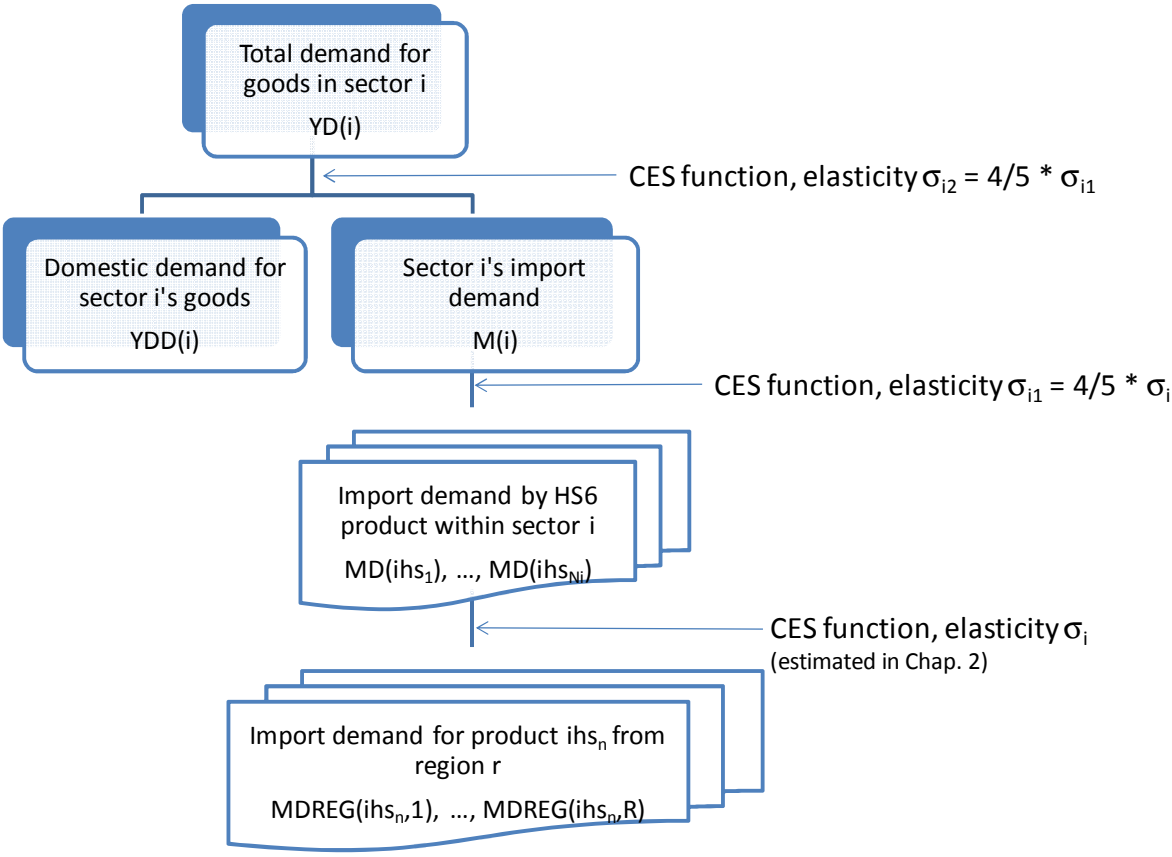
[24] Since EU imports from Chile are less diversified than flows in the opposite direction, a lower threshold is retained in the former case, so that the number of products of interest is comparable in both directions.

[25] 162 HS6 products are singled out in this classification. For each of the 37 sectors of the macroeconomic dataset, the remaining products are then aggregated in one single products, hence the 37 additional products. The list of products is given in Appendix 3.2.

3.1.2 Demand side

Total demand of each product encompasses four different uses: final consumption by households, final demand by the government, intermediate consumption and investment. In each case, demand behaviour is described by a nested function describing either utility of consumers or government, or the bundle of intermediate consumption or investments. This nesting can be illustrated focusing on consumer demand (Figure 13). Assuming sector shares in total expenditure remain constant in value, cross-sectoral nesting is represented by a Cobb-Douglas function (in intermediate consumption, however, input coefficients are assumed constant).[26]

Figure 13: Consumer Demand Tree in the CGE model



Source: Authors' elaboration.
Note: The number of HS6 products within each sector (N_i) varies across sectors. The number of regions, R, is assumed equal to four in the model: EU27, United States, Latin America, rest of the world. Symbols refer to model's variables and parameters. See Appendix 3.2 for details. The ratio 4/5 applied to elasticities by sector reflects the fact that substitutability is lower at a more aggregate level. It is consistent with the results found by Imbs and Méjean (2009).

[26] In other words, consumer preferences are represented as a bundle of consumptions by sector. The Cobb-Douglas function used to model this bundle ensures that the value share of each sector in total consumption remains constant. The sector distribution of intermediate consumptions, subject to technical constraints, is in contrast assumed to remain unchanged in quantity.

Within each sector, the elasticity of substitution between demand for domestic and imported products is assumed constant, as represented by a CES function. Within each sector, import demand is composed of various HS6-level products, among which the elasticity of substitution is also assumed constant, hence another CES function. Finally, for each of these HS6-level products, the elasticity of substitution between varieties provided by different suppliers is assumed to be constant, equal to the value estimated in Chapter 2's econometric analysis.

Foreign demand for Chilean exports by sector is assumed to face constant own-price elasticity. The composition of this demand across HS6-level products, and subsequently across regions, is then described in a way similar to domestic demand, with elasticities parameterised based on Chapter 2's estimated elasticities of substitution among EU imports from various origins.

Consumers are assumed to have a fixed average propensity to save.

3.1.3 Supply side

Production techniques involve a mix of intermediate inputs and value added activities, with fixed proportions. Value added is a CES function of five production factors, namely capital, independent labour, and three skill levels of salaried labour (high, medium, low). All production factors are generic: they can be used in any sector, at the same unit price. All sectors are assumed to be perfectly competitive, with constant returns to scale.

Consistent with the national accounts, each sector is assumed to produce multiple goods. In other words, even though the number of activities is the same as the number of goods (37), the correspondence is only partial, in the sense that each activity corresponds to a good that is its main, but not exclusive, output. The classification is described in Appendix 3.1.

Each sector produces goods for both domestic and foreign consumption, with a constant elasticity of transformation between these two types of output.

3.1.4 Closure rules and other issues

Production, consumption and investment taxes are explicitly represented in the model, together with import duties (in Chile and in foreign markets). Transfers between governments and households are also modelled, as well as transfers to and from the rest of the world.

Production factors, in fixed supply, are assumed to be fully employed. Each good market also clears, with producers being price takers, and profits equal to zero.

Investment equals the sum of domestic savings and of the current account deficit. In the base case simulation, the current account balance is assumed to remain unchanged, meaning that investment is savings-driven. The current account balance constraint is met by endogenous adjustment of the real exchange rate. Assuming otherwise is possible, and would allow the impact of the agreement on the current account to be assessed, assuming the real exchange rate remains constant. In the medium to long run, however, assuming the real exchange rate adjusts is more consistent. The fixed-real exchange rate assumption is thus used as an alternative closure, representing short-term behaviours. It will be used as a robustness check.

3.2 Simulated impact of the EU-Chile FTA enforcement

The main focus here is on the long-run assessment of the impact of the EU-Chile FTA. This section presents the results of the simulations following the methodology described in Appendix 3.3, i.e. assessing the contribution that the EU-Chile FTA enforcement may have made to changes observed in the Chilean economy between 2002 and 2008. The main features of the initial and final situations are first described, to set the background of these simulations. We then present the trade impacts, their consequences for output per sector, and the corresponding macroeconomic impacts. These changes are evaluated based on the base case assumption that the current account balance is fixed, while the real exchange rate is endogenous.

3.2.1 Trade impacts

Preliminary assessments are presented in Chapter 2, based on the econometric analysis of the EU-Chile FTA. As noted there, they rely on simplifying assumptions, ignoring indirect impacts through *inter alia* income, demand, as well as product and factor prices. All these elements are accounted for in this model, making a more consistent assessment possible. In this medium- to long-run assessment, the real exchange rate adjusts, given the assumption that the current account balance remains unchanged. This adjustment is very small in the present case, implying a real depreciation of the Chilean peso by 0.06%. This can be interpreted as a sign that the ex-ante trade impacts of the EU-Chile FTA are actually fairly balanced between both partners, notwithstanding what could have been anticipated based on the econometric estimates.

The most important impacts on Chilean exports to the EU are concentrated in agricultural and food products. The largest export gains are registered in wines (+128%), a sector accounting for approximately one tenth of Chilean exports to the EU (Table 11, column i). Processed seafood (+82%), fish and crustaceans (+69%), fruits (+59%), and canned fruits and vegetables (+41%) are the other products where substantial gains are registered. Outside agriculture and food products, textiles and leather (+37%) and wood products (+7%) are the only products with significant gains. In most cases (fish and crustaceans being an exception, due to a sanitary crisis), the share of these products indeed increased during the period (columns e and f). As a whole, goods exports to the EU increased by 21% (aggregate results are reported below in Table 15).

Such a significant boost to exports to one particular partner has contrasting effects on third markets: by spurring production, it increases export potential; by making the EU market more attractive comparatively, it may divert trade from other destinations. Increased export potential dominates for fruits and fish products, while trade diversion originates declines in exports to third markets for wines and for textiles and leather products (column j). On the whole, trade diversion effects dominate slightly: Chilean exports are decreased by almost 3% toward other Latin American countries, and by 1% toward the US and the rest of the world (Table 15).

TABLE 11: ASSESSED IMPACT OF THE EU-CHILE FTA ENFORCEMENT ON CHILE EXPORTS, BY PRODUCT

	Initial level								Assessed impact (%)		
	Output (% of total)		Exports, all partners (% of total)		Exports to the EU (% of total)		Tariff duties faced in the EU (%)		Exports to the EU	Exports to the ROW	Total exports
Product	2002	2008	2002	2008	2002	2008	2002	2008			
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
P01 - Other ag. products	1.0	1.1	0.8	0.8	1.3	2.0	4.0	1.7	7.3	0.2	1.7
P02 - Fruits	1.2	1.5	5.0	5.4	7.4	12.3	8.0	2.8	59.0	10.0	19.5
P03 - Livestock	1.1	1.2	0.2	0.2	0.4	0.2	0.4	0.1	1.5	0.3	0.6
P04 - Forestry products	0.8	0.8	0.1	0.1	0.0	0.0	0.0	0.0	-4.8	-4.8	-4.8
P05 - Fish & crustaceans	1.4	1.4	4.7	4.1	4.7	3.7	7.2	1.7	69.3	6.2	13.4
P06 - Minerals	7.1	4.1	34.3	32.2	42.6	24.6	0.0	0.0	-0.3	-0.4	-0.4
P07 - Meat	1.2	1.2	1.0	1.2	1.0	2.2	36.6	32.9	0.9	0.2	0.5
P08 - Processed seafood	0.8	1.0	3.5	3.5	6.0	13.8	5.1	0.0	82.2	-0.9	18.4
P09 - Canned fruits & veg.	0.5	0.6	1.9	1.9	0.6	0.5	12.1	1.9	41.3	-0.4	1.0
P10 - Liquors & spirits	0.1	0.1	0.0	0.0	0.1	0.3	0.1	0.1	-4.0	-5.0	-4.5
P11 - Wines	0.7	0.7	2.6	2.4	8.4	10.1	6.0	0.0	128.5	-8.3	41.7
P12 - Other foods & beverages	5.2	4.9	1.5	1.7	1.1	1.3	2.3	0.2	6.5	0.8	1.2
P13 - Textiles & leather	1.2	1.3	1.4	1.7	1.0	3.4	1.4	0.0	37.2	-2.2	2.9
P14 - Wood & its products	1.6	1.8	5.1	4.8	1.7	4.8	0.5	0.0	6.6	-7.7	-6.7
P15 - Pulp, paper, printing	2.3	2.8	4.9	4.7	8.0	8.9	0.0	0.0	-4.8	-5.3	-5.2
P16 - Refined petroleum & coke	2.1	2.8	2.3	2.5	0.0	0.0	0.0	0.0	-0.5	-0.5	-0.5
P17 - Chemicals & products	2.8	1.8	3.9	4.1	6.2	5.2	1.7	0.0	2.4	-6.2	-4.3
P18 - Rubber & plastic	0.9	0.7	1.0	1.0	0.2	0.1	0.1	0.0	-3.2	-4.4	-4.4
P19 - Other non-metallic min.	0.8	0.9	0.2	0.2	0.1	0.1	0.3	0.0	2.3	-1.3	-1.2
P20 - Metal products	1.8	1.5	2.8	2.8	7.4	4.3	0.0	0.0	-4.1	-4.1	-4.1
P21 - Other machinery	0.5	0.5	0.8	1.0	0.9	0.4	0.0	0.0	-15.3	-15.5	-15.5
P22 - Electronic & optical eq't	0.5	0.4	0.8	1.0	0.2	0.1	0.1	0.0	-2.0	-4.3	-4.3
P23 - Transport equipment	0.4	0.3	1.0	1.1	0.1	0.6	0.1	0.0	0.9	-5.3	-5.2
P24 - Other manufactured	0.1	0.1	0.4	0.4	0.5	1.1	0.0	0.0	-4.3	-4.3	-4.3
P25 - Electricity, gas, water	3.0	2.0	0.0	0.0	0.0	0.0				-0.7	-0.7
P26 - Buildings	8.2	7.8	0.0	0.0	0.0	0.0					
P27 - Trade sales services	8.2	9.2	3.3	4.3	0.0	0.0				-0.5	-0.5
P28 - Hotels & restaurants	1.5	1.5	0.0	0.1	0.0	0.0				-0.3	-0.3
P29 - Transportation	9.9	10.6	12.7	13.1	0.0	0.0				-0.5	-0.5
P30 - Post & telecoms	3.7	3.7	0.6	0.7	0.0	0.0				-0.4	-0.4
P31 - Financial services	3.1	4.1	0.8	1.0	0.0	0.0				-0.3	-0.3
P32 - Real estate services	3.8	4.0	0.0	0.0	0.0	0.0					
P33 - Equipment rental	10.4	11.6	1.8	1.7	0.0	0.0				-0.4	-0.4
P34 - Public services	3.4	3.3	0.1	0.1	0.0	0.0				-1.2	-1.2
P35 - Education services	3.6	3.2	0.0	0.0	0.0	0.0					
P36 - Health & social work	2.8	3.4	0.0	0.0	0.0	0.0					
P37 - Other services	2.3	2.2	0.3	0.4	0.0	0.0				-0.5	-0.5
Total	100.0	100.0	100.0	100.0	100.0	100.0					1.7
Goods only	36.0	33.5	80.4	78.7					21.4	-1.2	2.3

Source: Authors' simulations based on the CGE model described above.

Note: "2002" refers to the equilibrium of the economy after the pre-experiment simulation, which takes into account the lowering of Chile's MFN duty rate from 7% in 2002 to 6% in 2003. "% of total" means that each figure refers to the share in % of the product in the total for all products. Duties are measured as trade-weighted averages. Column (i) is blank for services because foreign trade in services is not broken down by partner in the model, due to lack of data.

In sectors where the EU-Chile FTA does not entail any substantial tariff cut in the EU because the initial level is negligible, exports to the EU generally fall slightly. Indeed, for these sectors, increased competition from EU imports may reduce profitability, while

increased demand from competing sectors where tariff cuts are significant in the EU may increase the cost of production factors (mainly unskilled labour in the present case, see below). As a result, output tends to decline, resulting in a lower export capacity. Chilean exports of these products to third markets also fall. This is the case for instance for other machinery products or for liquors and spirits.

The EU-Chile FTA's impacts on Chilean imports are far smaller across sectors, as a result of far less heterogeneity in Chilean tariff protection (Table 12, column i). In most cases, the EU-Chile FTA enforcement meant a cut in tariff duty from 6%, the level that would have been applied in 2002 without the EU-Chile FTA, to an average level below 1%, and often close to zero by 2008 (columns g and h). Consistent with the simplified simulations presented in Chapter 2, the resulting impact on the EU's exports to Chile is assessed to be strong: +30% to +55% in agricultural and food sectors, the importance of which is very limited in the EU's exports to Chile, and 40% to 105% in industrial sectors. Overall, Chilean imports from the EU increase by 65%, which corresponds to an annual average growth rate of almost 9%.

In manufacturing sectors, where the market share of European products is often large, this implies significant trade diversion effects. The most important sector in this respect is machinery (P21), having a weight of 14% of total Chilean imports, where the EU-Chile FTA is assessed to increase imports from the EU by 75%, inducing a decline in imports from third countries by more than one quarter. Consistent with this strong impact, the share of this sector in EU exports to Chile increased from 30% in 2002 to 41% in 2008. At the same time smaller, significant negative impacts on imports from the rest of the world are also found, in particular in wood and derivatives (-19%), transport equipment (-17%), chemical products (-16%), wood pulp (-15%), rubber and plastic (-14%) and electronic products (-13%). On the whole, trade diversion effects are significant. Imports from other Latin American countries fall by 6%, those from the rest of the world by 8%. Imports from the US, with a structure closer to those from the EU, are even more strongly affected (-16%).

Chile initially exhibits a surplus in its trade relations with the EU. As a result, a lower relative growth in bilateral exports may match in absolute term the growth in imports. This is not the case here, since the growth rate of total bilateral imports exceeds that of bilateral exports by a rather large amount. The stronger diversion effects on the import side than on the export side explain why this is compatible with an unchanged current account balance: the decline in the bilateral trade balance of Chile with the EU is balanced by its increase with respect to third countries.

The detailed product disaggregation of the model allows the assessment of which products have been more strongly affected by the EU-Chile FTA. Linking this information to changes actually observed in product shares in bilateral trade, shows that Chile's export products that have most benefitted from the Agreement indeed saw their share in exports to the EU increase between 2002 and 2008 (here again, fish products are exceptions, understandably given the sanitary crisis faced during this period; Table 13, Panel A). This is the case in particular for wine of fresh grapes, fresh peaches, dried prunes and molluscs, as well as some particular products of the garment industry.

TABLE 12: ASSESSED IMPACT OF THE EU-CHILE FTA ENFORCEMENT ON CHILEAN IMPORTS

	Initial level								Assessed impact (%)		
	Final cons. (% of total)		Imports, all partners (% of total)		Imports from the EU (% of total)		Tariff duties on imp. from EU (%)		Imp., EU	Imp., ROW	Total imports
Product	2002	2008	2002	2008	2002	2008	2002	2008			
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
P01 - Other ag. products	1.3	1.3	2.3	2.2	0.8	0.3	6.0	0.6	42.9	-1.0	1.0
P02 - Fruits	0.8	0.3	2.1	1.8	0.0	0.0	6.0	0.0	60.9	8.2	8.2
P03 - Livestock	0.3	0.2	0.0	0.1	0.0	0.5	6.0	0.1	45.9	-3.6	5.7
P04 - Forestry products	0.3	0.1	0.0	0.1	0.0	0.1	6.0	0.1	17.6	-3.7	-0.9
P05 - Fish & crustaceans	0.2	0.4	0.0	1.3	0.0	0.7	6.0	0.2	57.0	4.7	9.1
P06 - Minerals	0.1	0.0	17.0	13.3	0.2	0.3	6.0	0.1	51.6	-0.9	-0.7
P07 - Meat	3.0	3.2	1.7	1.6	0.1	0.1	6.0	0.0	51.4	-0.4	-0.2
P08 - Processed seafood	0.2	0.2	0.3	0.3	0.0	0.1	6.0	1.1	37.8	-1.6	-1.0
P09 - Canned fruits & veg.	0.3	0.2	0.2	0.2	0.1	0.3	6.0	0.4	41.8	-3.8	1.3
P10 - Liquors & spirits	0.2	0.3	0.2	0.3	0.7	0.5	6.0	0.0	31.8	-10.5	5.8
P11 - Wines	0.3	0.6	0.1	0.6	0.1	1.9	6.0	0.5	35.7	-7.1	5.2
P12 - Other foods & beverages	10.4	10.5	2.4	3.9	1.1	2.1	6.0	1.3	36.7	-1.0	1.7
P13 - Textiles & leather	5.6	7.2	7.7	7.2	4.5	3.8	6.2	0.7	105.1	-6.6	1.0
P14 - Wood & its products	0.7	0.3	1.0	1.9	2.6	6.4	6.0	0.1	76.8	-19.3	13.7
P15 - Pulp, paper, printing	1.0	0.8	2.8	3.3	5.1	8.1	4.6	0.1	81.2	-14.7	8.3
P16 - Refined petroleum & coke	2.2	2.1	6.5	5.6	2.3	0.2	6.0	0.5	49.3	-1.0	0.9
P17 - Chemical products	3.9	2.1	10.6	10.9	16.8	10.0	6.0	0.9	86.4	-15.6	4.6
P18 - Rubber & plastic	0.6	0.3	2.9	2.9	3.2	4.8	6.0	0.5	102.8	-14.4	5.9
P19 - Other non-metallic min.	0.2	0.1	0.7	0.9	0.8	1.1	6.0	0.3	46.0	-4.8	3.5
P20 - Metal products	0.5	0.3	4.9	4.2	6.4	3.8	6.0	0.4	39.8	-8.4	1.7
P21 - Other machinery	0.5	0.5	14.0	13.8	29.7	40.6	5.5	0.5	75.4	-26.3	1.8
P22 - Electronic & optical eq't	1.9	1.8	8.9	8.8	11.0	7.8	5.7	0.7	55.9	-12.5	0.8
P23 - Transport equipment	1.7	1.8	8.8	8.4	13.0	6.0	5.2	0.4	90.7	-16.9	1.0
P24 - Other manufactured	0.7	0.6	1.7	1.3	1.3	0.4	6.0	0.7	88.8	-9.1	0.9
P25 - Electricity, gas, water	1.6	0.9	0.2	0.2	0.0	0.0				-1.0	-1.0
P26 - Buildings	10.0	9.7	0.0	0.0	0.0	0.0				-1.2	-1.2
P27 - Trade sales services	8.7	8.0	0.0	0.2	0.0	0.0				-0.7	-0.7
P28 - Hotels & restaurants	2.8	3.0	0.1	0.1	0.0	0.0				-1.4	-1.4
P29 - Transportation	8.1	7.0	0.4	1.7	0.0	0.0				-0.9	-0.9
P30 - Post & telecoms	3.6	3.2	0.1	0.2	0.0	0.0				-0.6	-0.6
P31 - Financial services	4.4	5.2	2.2	2.0	0.0	0.0				-0.4	-0.4
P32 - Real estate services	11.2	12.5	0.0	0.0	0.0	0.0					
P33 - Equipment rental	1.2	1.0	0.1	0.3	0.0	0.0				-1.0	-1.0
P34 - Public services	0.1	0.2	0.1	0.0	0.0	0.0				-2.5	-2.5
P35 - Education services	4.1	4.7	0.0	0.0	0.0	0.0				-0.7	-0.7
P36 - Health & social work	3.4	5.3	0.0	0.0	0.0	0.0				-0.6	-0.6
P37 - Other services	4.2	4.0	0.1	0.4	0.0	0.0				-0.6	-0.6
Total	100.0	100.0	100.0	100.0	100.0	100.0					1.0
Goods only	36.7	35.2	96.7	94.9					64.7	-8.4	1.1

Source: Authors' simulations based on the CGE model described above.

Note: "2002" refers to the equilibrium of the economy after the pre-experiment simulation, which takes into account the lowering of Chile's MFN duty rate from 7% in 2002 to 6% in 2003. "% of total" means that each figure refers to the share in % of the product in the total for all products. Duties are measured as trade-weighted averages. Column (i) is blank for services because foreign trade in services is not broken down by partner in the model, due to lack of data.

On the import side, the link between simulated impacts and changes in bilateral import shares is less clear, probably because tariff cuts were most often matched by those granted to US products (Table 13, Panel B). The main impact may thus have been preventing the EU's exporters from losing ground relative to US exporters. The most affected products are parts of transport equipment (HS Chapter 87), chemicals (Chapter 31 in particular) and machinery (Chapter 84).

TABLE 13: SALIENT PRODUCTS IN TERMS OF ESTIMATED TRADE IMPACT OF THE FTA

Panel A: Products with highest proportional estimated impact of the FTA on Chilean exports to the EU

		Share in Chile exports to the EU (%)		Impact on exports to the EU (%)
		2002 (a)	2008 (b)	(c)
220429	Wine of fresh grapes, incl. fortified wines, and grape must whose fermentation has been arrested by the addition of alcohol, in containers of > 2 l (excl. sparkling wine)	0.8	1.2	568
30378	Frozen hake 'Merluccius spp., Urophycis spp.'	0.5	0.4	182
80930	Fresh peaches, incl. nectarines	0.1	0.3	163
620342	Men's or boys' trousers, bib and brace overalls, breeches and shorts, of cotton (excl. knitted or crocheted, underpants and swimwear)	0.0	1.6	154
620462	Women's or girls' trousers, bib and brace overalls, breeches and shorts of cotton (excl. knitted or crocheted, panties and swimwear)	0.0	0.6	155
80920	Fresh cherries	0.1	0.5	142
870421	Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine 'diesel or semi-diesel' of a gross vehicle weight <= 5 tonnes (excl. dumpers for off-highway use of subheading 8704.10 and special purpose mo	0.0	0.0	136
irP11	Rest of Wines	0.0	0.1	131
81120	Frozen raspberries, blackberries, mulberries, loganberries, black-, white- or red- currants and gooseberries, uncooked or cooked by steaming or boiling in water, whether or not sweetened	0.6	0.6	119
81190	Frozen fruit and nuts, uncooked or cooked by steaming or boiling in water, whether or not sweetened (excl. strawberries, raspberries, blackberries, mulberries, loganberries, black, white or red currants and gooseberries)	0.1	0.1	118
160590	Molluscs and aquatic invertebrates, prepared or preserved	3.7	12.3	98
220421	Wine of fresh grapes, incl. fortified wines, and grape must whose fermentation has been arrested by the addition of alcohol, in containers of <= 2 l (excl. sparkling wine)	6.7	8.8	93
81320	Dried prunes	0.4	0.7	99
30490	Frozen fish meat, whether or not minced (excl. fillets)	0.8	1.0	92
81050	Fresh kiwifruit	1.1	1.2	88
irP02	Rest of Fruits	0.2	0.2	89
irP08	Rest of Seafood	0.9	0.5	87
80610	Fresh grapes	2.2	3.5	82
870322	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.000 cm³ but <= 1.500 cm	0.0	0.0	86
870323	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.500 cm³ but <= 3.000 cm	0.0	0.0	85
870333	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with compression-ignition internal combustion piston engine 'diesel or semi-diesel' of a cylinder capacity > 2.500 cm³	0.0	0.0	84

Panel B: Products with highest proportional estimated impact of the FTA on Chilean imports from the EU

		Share in Chile imp. from the EU (%)		Impact on imports from the EU (%)
		2002 (a)	2008 (b)	(c)
870421	Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine 'diesel or semi-diesel' of a gross vehicle weight <= 5 tonnes (excl. dumpers for off-highway use of subheading 8704.10 and special purpose mo	0.4	0.4	133
870322	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.000 cm³ but <= 1.500 cm	0.5	0.1	128
310210	Urea, whether or not in aqueous solution (excl. that in pellet or similar forms, or in packages with a gross weight of <= 10 kg)	0.0	0.4	124
870120	Road tractors for semi-trailers	0.1	0.2	122
870323	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.500 cm³ but <= 3.000 cm	2.4	1.5	121
282570	Molybdenum oxides and hydroxides	0.0	0.0	121
870423	Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine 'diesel or semi-diesel' of a gross vehicle weight > 20 tonnes (excl. dumpers for off-highway use of subheading 8704.10 and special purpose mo	0.5	0.4	119
870324	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station	0.2	0.3	117
870332	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with compression-ignition internal combustion piston engine 'diesel or semi-diesel' of a cylinder capacity > 1.500 cm³	0.4	0.3	116
280120	Iodine	0.0	0.0	115
842951	Self-propelled front-end shovel loaders	0.3	0.7	115
310420	Potassium chloride for use as fertilizer (excl. that in pellet or similar forms, or in packages with a gross weight of <= 10 kg)	0.0	0.0	115
290511	Methanol 'methyl alcohol'	0.0	0.0	114
842959	Self-propelled mechanical shovels, excavators and shovel loaders (excl. self-propelled mechanical shovels with a 360Â° revolving superstructure and front-end shovel loaders)	0.2	0.4	114
842691	Cranes designed for mounting on road vehicles	0.1	0.3	110
300610	Sterile surgical catgut, similar sterile suture materials, incl. sterile absorbable surgical or dental	0.6	0.3	110
950430	Games with screens, flipper and other games, operated by coins, banknotes 'paper currency', discs	0.0	0.1	111
281000	Oxides of boron; boric acids	0.0	0.0	108
842720	Self-propelled trucks fitted with lifting or handling equipment, not powered by an electric motor	0.3	0.4	106
842230	Machinery for filling, closing, sealing or labelling bottles, cans, boxes, bags or other containers; machinery for capsuling bottles, jars, tubes and similar containers; machinery for aerating beverages	0.3	0.5	106
401011	Conveyor belts or belting, of vulcanised rubber, reinforced only with metal	0.1	0.3	105

Source: Author's simulations and database described in Appendix 3.1.

3.2.2 Impacts on output and on macroeconomic aggregates

The EU-Chile FTA's impacts on output per sector result from the above-described impacts on trade, combined with the relative importance of exports and imports with respect to domestic production (Table 14). The balance is clearly positive for agricultural and food products in general, and in particular for those products which for exports to the EU most benefited from the EU-Chile FTA. Output rises 22% in fruit growing, 34% in wine making, 17% in seafood processing and 12% in extractive fishing. Indeed, these four sectors concentrate the bulk of Chile's output gains, which remain limited in other sectors.

In contrast, increased import competition is more strongly felt in industrial sectors, with negative consequences for output: -18% for other machinery products (a small sector accounting for only 0.8% of Chilean output in 2002 and for 0.6% in 2008, though), -7% for timber and furniture, -6% for the chemical industry, -5% for paper and printing, -5% for

transport equipment, -4% for the basic metal and plastic industries.[27] In services, output falls marginally in most sectors.

Once factor intensities are taken into account, as documented in Table 14 through factor shares (columns a to e), these impacts per sector shed light on the impact upon factors' relative rewards (Table 15). High-skilled and medium-skilled wages slightly decline (by 0.3 and 0.4%), mainly because of the contraction in several manufacturing sectors where these factors are intensively used compared to other sectors. In contrast, low-skilled workers benefit from the EU-Chile FTA (+0.3%), mainly as a result of their intensive use in agricultural sectors where output expands. The rate of return to capital remains constant, while the income of own account workers slightly increases (+0.1%). All these impacts remain small, meaning that the distributive impacts of the EU-Chile FTA are rather limited.

At the macroeconomic level, the EU-Chile FTA represents a small gain for Chile's economy as GDP increases by 0.05%. But the best measure of this economic impact is welfare, as measured through the equivalent variation of income. According to this metric, the gains for the Chilean economy amount to 0.23%. This is also a small figure, but it should be kept in mind that the impact measured here is limited to the direct consequences of tariff cuts in the EU-Chile FTA. Such a shock might originate a variety of indirect effects linked to the development of new perspectives for several sectors. The new trade theories have in particular identified pro-competitive effects, and gains linked to economies of scale. As emphasised in the so-called "new new" trade theories, the reshuffling of market shares across firms, as well as the entry and exit of some of them, often originate substantial efficiency gains, which are not taken into account here. Finally, additional effects might come though impacts on technology, information or organisation of industries. In this context, the direction of changes and the comparisons across industries and shocks are the most meaningful results.

In addition, non-tariff aspects of the EU-Chile FTA are not taken into account in these simulations, because the analysis carried out so far led us to conclude that no tangible basis is available to quantify them, so that any inclusion in the model would rest on artificial, *ad hoc* assumptions. This focus on tariff clauses limits the scope of this quantitative assessment, and this should be kept in mind when interpreting the results.

One aspect which can be directly quantified, though, is the magnitude of rents linked to filled quotas. Based on the AVE computed for the inside- and outside-quota tariff rates and on the volume of each quota, we assessed the global value of these rents in 2008 to be €21 million (US$ 31 million, or almost 0.02% of GDP). Since who may earn these rents is not clear in practice, they are not included in the model, but they may be an additional source of gains for the Chilean economy.

[27] Output increases in electronics and optics (+13%), because firms in this sector benefit from the lesser competition of firms specialising exclusively in other machinery, the output of which includes a significant share of electronic and optic products, in addition to other machinery per se. The interaction between the two sectors is strongly felt in electronics and optics because this sector is comparatively small. On the contrary, output shrinks in liquors and spirits due to the increased competition of firms from the winemaking sector.

TABLE 14: ASSESSED IMPACT ON OUTPUT PER SECTOR IN CHILE

	Factor share in VA in 2008 (%)					Share in total output (%)		Change (%)
	Salaried lab., by skill			Indep.				
	Low	Med	High	labour	Capital	2002	2008	Output
Sector	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
S01 - Other agriculture	48	9	7	13	23	1.0	1.1	0.9
S02 - Fruit growing	49	9	7	13	22	1.1	1.2	21.7
S03 - Animal husbandry	46	9	7	12	27	1.1	1.2	0.5
S04 - Forestry	51	10	7	13	19	0.8	0.8	-4.2
S05 - Extractive fishing	45	9	7	12	28	1.4	1.5	11.9
S06 - Mining	11	7	5	0	78	7.4	6.7	-0.3
S07 - Meat production	22	7	9	25	37	1.2	1.0	0.4
S08 - Seafood processing	24	8	10	28	31	0.8	0.9	16.9
S09 - Canning	23	7	9	27	34	0.5	0.5	0.8
S10 - Liquors & spirits	27	9	11	31	22	0.1	0.1	-4.6
S11 - Winemaking	18	6	7	21	48	0.6	0.7	34.0
S12 - Other agro-industrial	23	7	9	26	34	4.1	3.2	1.3
S13 - Textiles & leather	30	16	11	28	15	1.1	0.9	0.8
S14 - Timber & furniture	23	8	8	26	35	1.6	1.3	-6.9
S15 - Paper & printing	25	10	8	17	41	2.2	1.9	-5.1
S16 - Fuel industry	12	5	7	0	76	2.1	2.1	-0.2
S17 - Chemical industry	36	12	11	0	40	2.5	2.3	-5.6
S18 - Plastic industry	18	13	10	29	31	0.9	0.9	-4.0
S19 - Other non-metallic min.	20	12	7	16	45	0.9	0.8	-0.9
S20 - Basic metal industry	40	13	10	5	31	1.8	2.0	-4.0
S21 - Other machinery	30	16	14	19	22	0.8	0.6	-17.8
S22 - Electronics & optics	31	10	7	21	30	0.2	0.2	13.2
S23 - Transport equipment	14	6	4	52	24	0.4	0.3	-5.2
S24 - Other manufacturing	17	13	7	46	18	0.1	0.1	-3.2
S25 - Electricity, gas, water	17	5	4	4	70	3.0	3.5	-0.3
S26 - Construction	22	8	7	49	14	7.9	7.5	0.1
S27 - Trade	26	14	11	42	8	11.4	11.6	-0.2
S28 - Hotel & catering	10	5	4	71	10	1.5	1.6	0.1
S29 - Logistics	23	12	7	38	20	9.7	9.0	-0.3
S30 - Communications	13	5	4	35	43	4.7	5.3	0.0
S31 - Financial activities	34	17	9	17	23	3.1	3.9	0.1
S32 - Real estate	2	1	0	0	97	2.9	3.2	0.4
S33 - Leasing	37	13	9	0	41	7.7	8.5	0.1
S34 - Public administration	20	10	6	47	17	3.9	4.4	-0.9
S35 - Education	26	12	8	37	16	3.8	3.9	-0.5
S36 - Health & social	18	7	6	48	21	3.1	3.2	-0.5
S37 - Other services	32	12	9	44	3	2.4	2.3	-0.1

Source: Authors' simulations based on the CGE model described above.
Note: Output changes are measured in volume.

TABLE 15: MACROECONOMIC IMPACTS (CHANGES IN %)

	Assessed impact (%)						
	EU-Chile Trade Agreement				Alternative scenarios		
	Elasticities of substitution			Short run closure	Back to MFN	EU-Chile DFQF	Full implem-entation
	Base	Lower	Homo geneo us				
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
Exports, total	1.7	1.5	1.9	2.0	-0.5	-0.4	-0.4
Good exports	2.3	2.0	2.4	2.6	-1.0	0.1	0.1
Service exports	-0.6	-0.1	0.2	-0.1	1.4	-2.2	-2.2
Exports to the EU	21.4	17.2	17.0	22.0	-13.1	20.6	20.5
Exports to Latin America	-2.6	-1.9	-1.8	-2.3	2.7	-2.3	-2.3
Exports to the US	-1.1	-0.7	0.1	-0.7	1.4	-2.5	-2.5
Exports to the rest of the world	-1.0	-0.5	0.1	-0.6	1.5	-2.3	-2.3
Imports, total	1.0	0.9	1.2	0.9	-0.3	-0.5	-0.5
Goods Imports	1.1	0.9	1.3	0.9	-0.4	-0.4	-0.4
Services Imports	-0.6	0.0	0.4	0.0	1.4	-2.3	-2.2
Imports from the EU	64.7	53.3	67.5	64.1	-44.5	6.2	6.0
Imports from Latin America	-6.4	-5.3	-7.2	-6.4	4.9	-1.5	-1.5
Imports from the US	-15.6	-13.5	-14.6	-15.7	10.2	-1.6	-1.6
Imp. from the rest of the world	-8.3	-6.9	-8.7	-8.3	6.8	-1.6	-1.6
Price of capital	0.02	0.13	0.08	0.16	0.32	-0.59	-0.59
High-skilled wage	-0.30	-0.20	-0.25	-0.28	0.19	-0.06	-0.06
Low-skilled wage	0.33	0.30	0.35	0.36	-0.52	0.42	0.41
Med-skilled wage	-0.36	-0.27	-0.32	-0.32	0.30	-0.26	-0.26
Non-salaried workers income	0.14	0.10	0.13	0.11	0.12	-0.18	-0.18
Real effective exchange rate	0.06	0.00	-0.05	0.00	-0.16	0.29	0.29
Trade balance	0.00	0.00	0.00	-11.50	0.00	0.00	0.00
GDP	0.05	0.08	0.07	0.10	0.05	-0.16	-0.16
Welfare	0.23	0.27	0.28	0.29	-0.07	-0.01	-0.01

Source: Authors' simulations based on the CGE model described above. Notes: column (a) corresponds to the impact evaluation of the EU-Chile FTA with the elasticities of substitution estimated in Chapter 2; column (b) presents the same scenario as (a) but all elasticities of substitution at the HS level are lower by 2 points; column (c) presents the same scenario as (a) but assumes homogeneous elasticities of substitution across sectors; column (d) presents results from the same scenario in (a) but assumes a short-run closure. Alternative scenarios in columns (e), (f), (g) are simulated assuming base elasticities of substitution and the long-run closure as in the base case (a).

3.3 Robustness checks and alternative scenarios

To complement the base case simulations presented above, a series of other simulations have been conducted. A first series is designed to check the robustness of the results, with respect to the macroeconomic closure and to the values of elasticities. Alternative scenarios are then assessed.

3.3.1 Robustness checks

Trade elasticities are key variables in robustness checks, because the trade-offs across providers and products are the most direct mechanisms through which a trade policy shock is transmitted to the economy. To investigate this sensitivity in the present case, two simulations are considered. The first one is based on lower elasticity values: compared to the base case, where elasticities were directly inferred from Chapter 2 econometric estimates, each value is reduced by two points.[28] Since the elasticities have been estimated at an even more detailed level than the one used to model trade flows in the model (8-digit tariff line, instead of 6-digit products in the model), it cannot be excluded that they overestimate somewhat the price sensitivity of trade flows in the model, hence this downward shifting analysis of elasticities.

Table 16: Assessed impact on Chilean imports in various scenarios

	Chile imports from the EU - Change (%)							Chile imports from the ROW - Change (%)						
	EU-Chile Trade Agreement				Alternative Scenarios			EU-Chile Trade Agreement				Alternative Scenarios		
	Elasticities of Substitution			Short Run Closure	Back to MFN	EU-Chile DFQF	Full Impl'n	Elasticities of Substitution			Short Run Closure	Back to MFN	EU-Chile DFQF	Full Impl'n
	Base	Lower	Hom.					Base	Lower	Hom.				
Products	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)
P01 - Other ag. products	42.9	29.8	108.8	43.1	-30.2	6.6	6.7	-1.0	-0.4	-2.9	-0.8	0.5	3.0	3.1
P02 - Fruits	60.9	42.6	135.7	61.6	-69.3	-1.3	-1.3	8.2	7.0	3.4	8.7	-5.1	-1.6	-1.6
P03 - Livestock	45.9	31.7	120.7	46.4	-30.3	23.0	23.0	-3.6	-2.4	-6.9	-3.3	5.4	22.4	22.4
P04 - Forestry products	17.6	12.1	43.8	18.2	-27.8	-3.0	-3.0	-3.7	-3.0	-5.4	-3.2	7.8	-3.0	-3.0
P05 - Fish and crustaceans	57.0	39.7	134.6	57.5	-36.8	0.0	0.0	4.7	4.2	1.0	5.0	-6.0	-1.7	-1.7
P06 - Minerals	51.6	36.5	123.7	51.7	-34.6	-0.3	-0.3	-0.9	-0.5	-1.2	-0.8	1.0	-1.1	-1.1
P07 - Meat	51.4	35.4	138.7	51.8	-33.7	-15.2	-15.2	-0.4	-0.1	-0.4	-0.2	0.7	-15.3	-15.3
P08 - Processed seafood	37.8	26.8	88.0	38.1	-28.6	8.8	0.3	-1.6	-0.6	-6.8	-1.4	-0.1	0.2	0.3
P09 - Canned fruits & veg.	41.8	29.1	104.7	42.0	-29.3	2.8	2.8	-3.8	-2.5	-8.8	-3.7	4.2	-0.4	-0.4
P10 - Liquors and spirits	31.8	22.6	76.3	32.0	-27.4	-0.5	-0.5	-10.5	-7.3	-21.6	-10.4	7.8	-0.8	-0.8
P11 - Wines	35.7	26.4	74.3	36.2	-28.4	2.1	2.1	-7.1	-3.9	-19.8	-6.7	4.4	-1.7	-1.7
P12 - Other foods and beverages	36.7	25.8	89.9	36.9	-27.2	9.8	2.7	-1.0	-0.3	-2.7	-0.7	0.8	0.6	0.9
P13 - Textiles & leather	105.1	86.7	108.7	105.4	-51.0	9.7	9.7	-6.6	-5.3	-6.4	-6.4	3.5	-1.4	-1.4
P14 - Wood & its products	76.8	64.4	78.8	76.4	-45.9	0.1	0.1	-19.3	-16.6	-19.7	-19.5	18.0	-2.1	-2.1
P15 - Pulp, paper, printing	81.2	67.8	83.9	81.5	-49.8	-0.2	-0.2	-14.7	-12.4	-14.7	-14.5	13.7	-1.3	-1.3
P16 - Refined petroleum & coke	49.3	34.9	114.7	49.5	-33.7	3.5	3.4	-1.0	-0.6	-2.6	-0.9	0.3	-0.5	-0.5
P17 - Chemicals and products	86.4	73.5	78.2	86.6	-49.7	12.5	12.5	-15.6	-13.4	-14.1	-15.6	10.2	-2.7	-2.7
P18 - Rubber and plastic	102.8	87.0	93.4	102.8	-53.3	6.2	6.2	-14.4	-12.2	-12.6	-14.4	10.5	-1.9	-1.9
P19 - Other non-metallic min.	46.0	32.9	107.3	45.4	-32.3	1.4	1.4	-4.8	-3.3	-8.9	-5.2	3.7	-1.3	-1.3
P20 - Metal products	39.8	28.5	90.0	39.2	-30.3	1.5	1.5	-8.4	-6.1	-15.6	-8.7	6.0	-1.2	-1.2
P21 - other equipment	75.4	65.4	60.1	73.8	-52.7	6.5	6.5	-26.3	-23.5	-21.9	-26.9	22.3	-3.5	-3.5
P22 - Electronic & optical eqt	55.9	45.4	71.5	55.1	-40.0	6.3	6.3	-12.5	-10.3	-15.2	-13.0	10.2	-2.0	-2.0
P23 - Transport equipment	90.7	77.5	78.5	89.5	-55.4	5.7	5.7	-16.9	-14.6	-15.0	-17.4	9.3	-1.6	-1.6
P24 - Other manufactured	88.8	73.6	91.4	88.5	-49.3	8.7	8.7	-9.1	-7.7	-9.2	-9.2	7.5	-1.7	-1.7

Source: Authors' simulations based on the CGE model described above.

[28] This value of two, arbitrary, corresponds to a significant difference, well above the confidence interval of Chapter 2's estimates, deemed large enough to carry out meaningful robustness checks.

Under this assumption of lower elasticities, bilateral trade flows with the EU would increase by smaller amounts than in the base case: Chile's exports to the EU would increase by 17% instead of 21%, imports by 53% instead of 65% (Table 15, column b). This remains a small difference. The aggregate impacts are very general, however with a slightly higher impact on welfare (+0.27% instead of +0.23%). At the sector level, this alternative assumption is logically reflected in differentiated impacts across sectors (Table 17 and Table 16, columns b and i).

The second sensitivity analysis ("Homogenous elasticities") assumes away the cross-sector variance in substitution elasticities across providers obtained from Chapter 2's estimates. Instead, the elasticity of substitution is assumed for all products to be equal to the average of sector-specific estimates: 14 for imports and 7.5 for exports. This is done to assess how sensitive the simulation results are to estimation errors.

TABLE 17: ASSESSED IMPACT ON CHILEAN EXPORTS IN VARIOUS SCENARIOS

	Chile Exports to the EU - Change (%)							Chile Exports to the ROW - Change (%)						
	EU-Chile Trade Agreement				Alternative Scenarios			EU-Chile Trade Agreement				Alternative Scenarios		
	Elasticities of Substitution			Short Run closure	Back to MFN	EU-Chile DFQF	Full Impl'n	Elasticities of Substitution			Short Run closure	Back to MFN	EU-Chile DFQF	Full Impl'n
	Base	Lower	Hom.					Base	Lower	Hom.				
Products	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)
P01 - Other ag. products	7.3	3.4	15.7	7.4	-7.3	9.7	5.3	0.2	0.5	-0.7	0.2	-0.2	3.0	3.3
P02 - Fruits	59.0	40.2	68.7	59.9	-32.8	17.4	17.3	10.0	8.5	10.9	10.6	-5.7	-1.7	-1.7
P03 - Livestock	1.5	0.9	3.0	1.6	-1.0	23.2	23.2	0.3	0.4	0.5	0.5	-0.2	23.0	23.0
P04 - Forestry products	-4.8	-3.4	-4.2	-4.3	6.8	-4.8	-4.8	-4.8	-3.4	-4.2	-4.3	6.8	-4.8	-4.8
P05 - Fish and crustaceans	69.3	52.9	52.9	70.2	-38.0	17.2	17.3	6.2	5.4	7.8	6.8	-6.9	-2.7	-2.7
P06 - Minerals	-0.3	0.0	0.9	-0.3	1.0	-1.7	-1.7	-0.4	0.0	0.9	-0.3	1.0	-1.7	-1.7
P07 - Meat	0.9	0.6	2.4	1.0	-0.3	583.0	582.9	0.2	0.3	0.7	0.4	0.0	-12.8	-12.8
P08 - Processed seafood	82.2	62.1	64.7	83.4	-46.1	-1.5	-1.4	-0.9	-0.3	4.4	-0.2	-0.3	-1.5	-1.4
P09 - Canned fruits & veg.	41.3	15.6	114.4	41.7	-28.8	5.7	5.2	-0.4	0.1	-0.8	-0.1	0.9	-0.7	-0.7
P10 - Liquors and spirits	-4.0	-2.2	-9.3	-3.5	4.1	-2.0	-2.6	-5.0	-3.1	-9.8	-4.5	4.4	-2.7	-2.6
P11 - Wines	128.5	105.3	56.4	130.9	-52.2	-3.7	-3.7	-8.3	-6.7	0.8	-7.4	6.3	-3.8	-3.8
P12 - Other foods and beverages	6.5	3.2	14.3	6.7	-5.3	2.5	1.9	0.8	0.9	0.8	1.0	-0.6	1.4	1.5
P13 - Textiles & leather	37.2	30.1	26.5	37.5	-41.5	-1.1	-1.1	-2.2	-1.5	-1.6	-2.0	1.0	-1.1	-1.1
P14 - Wood & its products	6.6	6.6	-1.2	6.9	-9.7	-4.3	-4.3	-7.7	-6.1	-7.5	-7.5	9.4	-4.3	-4.3
P15 - Pulp, paper, printing	-4.8	-3.6	-4.8	-4.2	5.7	-2.9	-2.9	-5.3	-4.1	-5.0	-4.8	6.0	-2.9	-2.9
P16 - Refined petroleum & coke	-0.5	0.1	-0.2	0.1	0.9	-2.1	-2.1	-0.5	0.1	-0.2	0.1	0.9	-2.1	-2.1
P17 - Chemicals and products	2.4	1.7	0.6	2.6	3.5	-1.9	-1.9	-6.2	-5.2	-5.4	-6.0	3.9	-2.0	-2.0
P18 - Rubber and plastic	-3.2	-2.6	-2.9	-3.0	1.3	-1.3	-1.3	-4.4	-3.6	-3.8	-4.2	2.9	-1.3	-1.3
P19 - Other non-metallic min.	2.3	2.2	0.9	2.0	-1.9	-1.8	-1.8	-1.3	-0.7	-1.6	-1.6	1.6	-1.8	-1.8
P20 - Metal products	-4.1	-2.9	-6.6	-4.3	3.4	-2.1	-2.1	-4.1	-2.9	-6.6	-4.4	3.4	-2.1	-2.1
P21 - other equipment	-15.3	-13.6	-12.7	-16.3	10.9	-2.0	-2.0	-15.5	-13.8	-12.8	-16.5	11.2	-2.0	-2.0
P22 - Electronic & optical eqt	-2.0	-1.4	-3.4	-2.3	1.9	-2.4	-2.4	-4.3	-3.3	-5.1	-4.6	4.8	-2.4	-2.4
P23 - Transport equipment	0.9	0.6	0.1	0.7	0.5	-2.4	-2.4	-5.3	-4.3	-4.2	-5.5	3.3	-2.4	-2.4
P24 - Other manufactured	-4.3	-3.4	-4.0	-4.1	4.1	-1.7	-1.7	-4.3	-3.4	-4.0	-4.1	4.1	-1.7	-1.7

Source: Authors' simulations based on the CGE model described above.

Even though aggregate impacts are only marginally affected by this alternative assumption, it is noteworthy that while exports to the EU increase less than in the base case (+17% instead of +21%), imports rise slightly more (+68%, compared to +65%) (Table 15, column c). However, diversion effects on exports are also far smaller in this case. The impact on the real exchange rate, still insignificant, is reversed here, with an appreciation of the Chilean peso by 0.05%. At the sector level, the assessed impact on export is found to be significantly lower than in the base case for wine (+56%, instead of +129%), while it is on the

contrary larger for fruits and vegetables, either transformed or not (Table 17, columns c and j). Although some differences are also noted in terms of impacts on imports, they remain of limited significance (Table 16, columns c and j).

TABLE 18: ASSESSED IMPACT ON OUTPUT PER SECTOR IN CHILE IN VARIOUS SCENARIOS (CHANGES IN %)

	EU-Chile Trade Agreement				Alternative Scenarios		
	Elasticities of Substitution			Short Run Closure	Back to MFN	EU-Chile DFQF	Full Impl'n
Sectors	Base	Lower	Hom.				
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
S01 - Other agriculture	0.9	0.7	0.8	0.9	-1.2	4.3	4.0
S02 - Fruit growing	21.7	16.2	24.8	22.5	-15.8	3.7	3.7
S03 - Animal husbandry	0.5	0.5	0.5	0.6	-0.5	23.7	23.7
S04 - Forestry	-4.2	-3.3	-4.4	-4.3	5.2	-2.1	-2.1
S05 - Extractive fishing	11.9	9.6	11.7	12.5	-10.7	-0.1	-0.1
S06 - Mining	-0.3	0.0	0.9	-0.3	0.8	-1.4	-1.4
S07 - Meat production	0.4	0.3	0.5	0.4	-0.5	33.0	33.0
S08 - Seafood processing	16.9	13.3	17.8	17.7	-16.6	-1.4	-1.4
S09 - Canning	0.8	0.4	2.2	1.1	-0.2	-0.6	-0.6
S10 - Liquors & spirits	-4.6	-3.1	-10.4	-4.5	3.3	-0.3	-0.4
S11 - Winemaking	34.0	28.5	19.1	35.6	-18.5	-3.4	-3.5
S12 - Other agro-industrial	1.3	1.1	1.2	1.4	-1.2	2.4	2.4
S13 - Textiles & leather	0.8	0.8	0.3	0.8	-4.4	0.1	0.1
S14 - Timber & furniture	-6.9	-5.5	-7.4	-6.7	7.6	-3.7	-3.7
S15 - Paper & printing	-5.1	-4.2	-5.4	-4.9	5.3	-1.5	-1.5
S16 - Fuel industry	-0.2	0.1	-0.5	0.1	0.2	-0.8	-0.8
S17 - Chemical industry	-5.6	-4.9	-5.6	-5.6	3.5	-0.8	-0.8
S18 - Plastic industry	-4.0	-3.5	-3.8	-4.1	2.1	0.0	0.0
S19 - Other non-metallic min.	-0.9	-0.6	-1.8	-1.5	0.6	-0.1	-0.1
S20 - Basic metal industry	-4.0	-3.0	-7.4	-4.5	2.8	-0.8	-0.8
S21 - Other machinery	-17.8	-16.1	-14.6	-19.2	12.6	-1.0	-1.0
S22 - Electronics & optics	13.2	13.6	7.1	14.2	-9.0	-2.9	-2.9
S23 - Transport equipment	-5.2	-4.3	-4.4	-5.4	2.8	-1.9	-1.9
S24 - Other manufacturing	-3.2	-2.5	-2.5	-2.7	3.3	-1.3	-1.3
S25 - Electricity, gas, water	-0.3	-0.2	0.0	-0.3	0.4	-0.1	-0.1
S26 - Construction	0.1	0.2	0.1	-0.5	-0.1	-0.2	-0.2
S27 - Trade	-0.2	-0.1	-0.1	-0.1	0.3	-0.3	-0.3
S28 - Hotel & catering	0.1	0.1	0.1	0.2	0.0	0.1	0.1
S29 - Logistics	-0.3	-0.1	-0.1	-0.1	0.7	-0.9	-0.9
S30 - Communications	0.0	0.0	0.0	0.0	0.1	-0.1	-0.1
S31 - Financial activities	0.1	0.1	0.1	0.0	-0.1	0.0	0.0
S32 - Real estate	0.4	0.3	0.4	0.3	-0.3	0.3	0.3
S33 - Leasing	0.1	0.1	0.1	0.1	0.1	-0.1	-0.1
S34 - Public administration	-0.9	-0.9	-1.0	-0.8	0.4	-0.2	-0.2
S35 - Education	-0.5	-0.5	-0.6	-0.5	0.2	-0.1	-0.1
S36 - Health & social	-0.5	-0.4	-0.5	-0.4	0.1	0.0	0.0
S37 - Other services	-0.1	0.0	0.0	0.0	0.1	-0.1	-0.1

Source: Authors' simulations based on the CGE model described above.

In the short-run, it is highly uncertain that the real exchange rate would adjust. It is thus worthwhile to carry out a shorter-term assessment based on the assumption that the real exchange rate is exogenous, while the current account balance adjusts to the shock. However, given the very small size of the EU-Chile FTA's impact on Chile's real exchange rate (a depreciation by 0.06%) this alternative closure does not substantially alter the estimated impact. This is confirmed, especially in terms of welfare (+0.29%), and the production factors' relative rewards (Table 15, column d). In this case, the trade balance deteriorates by approximately US$ 230 million (11.5% of its initial value). Even the impacts on foreign trade are hardly changed (Table 17 and Table 16, columns d and k).

On the whole, the simulation results are fairly robust to these sensitivity analyses (see also Table 18 for impacts on output per sector). Larger deviations from the base case could of course be tested, but these checks already suggest that the general pattern of results is rather robust.

3.3.2 Alternative scenarios

As a complement to assessing of the impact the EU-Chile FTA enforcement, three additional scenarios have been simulated, based on the 2008 equilibrium of the economy. In the first scenario, "Back to MFN", both the EU and Chile are assumed to apply to each other the MFN duty rates. This could be thought of as a dismantling of the tariff clauses of the EU-Chile FTA, given that Chile has now opted out of the EU's GSP.

Logically, the assessed impact of such a shock is close to being the opposite of the EU-Chile FTA's implementation, even though a significant difference is that the initial equilibrium is now year 2008 (Table 15, column e). Chilean exports to the EU would be substantially reduced in this case (-13%), but the negative impact would be far stronger on EU exports to Chile (-45%), with the EU losing market share at the benefit of other exporters. For example, Chilean imports from the US would increase by more than 10%. The distributive effects would be more or less the opposite of those of the EU-Chile FTA enforcement, with, in particular, a fall in unskilled real wages of 0.5%. This shock would originate a slight real appreciation of the Chilean peso (by 0.16%), and it would cost the Chilean economy an income decline of 0.07%, in equivalent variation. Not surprisingly, the most significant sectoral impacts are found where the EU-Chile FTA was assessed to matter most, with an output decrease of 19% in winemaking, 17% in seafood processing, 16% in fruit growing, and an output increase of 13% in machinery (Table 18, column e).

Finally, since the EU-Chile FTA is still in its phase-in period, the consequences of further liberalization was simulated through two additional scenarios: one assumes quota-free, duty-free trade between Chile and the EU (EU-Chile DFQF), the other one simply assumes that the EU-Chile FTA is fully enforced, as will be the case at the end of the implementation period. An open question in the latter case is how products covered by a TRQ should be considered. Since most quotas were not filled in 2008 (Chilean exports of meat to the EU being the most notable exception), and since annual increases of their size are planned in most cases, quotas are assumed to not be binding in this scenario, meaning that the IQTR is applied.

In practice, the impacts of both scenarios are almost identical, not only at the aggregate level, but even at the sectoral level (Chilean exports of other agricultural products, P01, being the only exception). The bulk of the trade impact of such further liberalization

scenarios is actually concentrated in the meat sectors, as the Chilean exports to the EU would increase sevenfold (Table 17, columns f and g). As this sector accounted for 2.2% of Chilean goods exports to the EU in 2008, this effect is far from trivial. As a matter of fact, while significant effects are also registered in Chilean exports of fruits and fish to the EU (+17%), the impact on the meat sector is the main reason why Chilean goods exports to the EU increase by 21% (Table 15, columns f and g). In parallel, Chilean imports from the EU grow significantly in several industrial sectors, in particular chemicals (+13%) and textiles and clothing (+10%). However, such further liberalisation will not generate additional welfare gains.

3.4 Consistency with econometric simulations

Table 19 and Table 20 compare the estimates of bilateral trade between EU and Chile that has been induced by the EU-Chile FTA, using the two different approaches developed in the present study. Here, Chapter 2's simplified simulations of the trade impact of the EU-Chile FTA, reflecting tariff-line level calculations based on econometric estimates, are aggregated in the same classification as the one used for the CGE model. The counterfactual situation taken as a reference assumes that the EU applies the GSP regime to Chilean exports; this maximises comparability, since the GSP regime was applied to Chile in 2002, the initial year of CGE simulations. In both tables, column (a) shows lower-bound estimates from Chapter 2, obtained for year 2008, considering that the value of imports is constant for a given sector. Column (b) provides upper bound estimates, assuming the import own-price elasticity to equal the elasticity of substitution. Assessed impacts in the base CGE simulation are presented in column (c).[29]

Broadly speaking, the results are consistent across the three methods. The orders of magnitude found with the simplified econometric simulations are similar to the one obtained from CGE simulations. For Chile imports from the EU, CGE results almost always lie between the lower and upper bound of econometric estimates. The differences are more significant concerning the EU imports from Chile, with significantly higher estimated increases in those sectors benefiting most from the Agreement, fruits, fish and crustaceans and wines in particular. They are linked to the fact that CGE simulation results are Fisher indexes computed based on simulations of the FTA impact in 2002 and in 2008, while changes are computed for year 2008 in econometric simulations.[30] Products which strongly benefited from the Agreement account for a larger share of the total in 2008 than in 2002. Using 2008 as a reference year thus tend to result in a higher total, especially in sectors where the Agreement's impact is significant.

[29] This column thus reproduces results presented in the last column of Table 11 and Table 12.

[30] Another source of difference is the level of detail, since econometric simulations are carried out at the 8-digit level of the product classification, while CGE simulations are at the 6-digit level at most. In most cases, however, protection does not differ much across tariff lines within an HS6 subheading, so this is not a significant source of bias.

TABLE 19: ASSESSED IMPACT OF THE FTA ON EU IMPORTS FROM CHILE (PERCENTAGE CHANGE RELATIVE TO A COUNTERFACTUAL SITUATION WITHOUT FTA)

	Econometric estimates, low bound *(a)*	Econometric estimates, high bound *(b)*	CGE simulations *(c)*
P01 - Other ag. products	5.6	6.0	7.3
P02 - Fruits	19.2	28.0	59.0
P03 - Livestock	0.5	0.5	1.5
P04 - Forestry products	6.4	7.7	-4.8
P05 - Fish & crustaceans	12.2	18.7	69.3
P07 - Meat	27.0	28.8	0.9
P08 - Processed seafood	17.0	82.4	82.2
P09 - Canned fruits & veg.	21.7	26.1	41.3
P10 - Liquors & spirits	0.0	0.0	-4.0
P11 - Wines	60.4	82.0	128.5
P12 - Other foods & beverages	4.4	4.9	6.5
P13 - Textiles & leather	24.7	25.5	37.2
P14 - Wood & its products	34.0	40.9	6.6
P15 - Pulp, paper, printing	0.3	0.4	-4.8
P16 - Refined petroleum & coke	0.0	0.0	-0.5
P17 - Chemicals & products	0.8	0.9	2.4
P18 - Rubber & plastic	1.3	1.3	-3.2
P19 - Other non-metallic min.	1.7	1.7	2.3
P20 - Metal products	0.2	0.3	-4.1
P21 - Other equipment	0.1	0.1	-15.3
P22 - Electronic & optical eq't	0.2	0.2	-2.0
P23 - Transport equipment	1.9	1.9	0.9
P24 - Other manufactured	0.0	0.0	-4.3

Source: Econometric estimates, methodology described in Chapter 2 for (a) and (b) (minerals are excluded because simulations do not cover copper and ores), applied to year 2008. CGE simulations for column (c).

TABLE 20: ASSESSED IMPACT OF THE FTA ON CHILE IMPORTS FROM THE EU (PERCENTAGE CHANGE RELATIVE TO A COUNTERFACTUAL SITUATION WITHOUT FTA)

	Econometric estimates, low bound *(a)*	Econometric estimates, high bound *(b)*	CGE simulations *(c)*
P01 - Other ag. products	29.1	56.6	42.9
P02 - Fruits	34.8	52.1	60.9
P03 - Livestock	25.8	52.1	45.9
P04 - Forestry products	4.1	52.1	17.6
P05 - Fish & crustaceans	2.1	52.1	57.0
P07 - Meat	5.2	52.1	51.4
P08 - Processed seafood	6.3	18.5	37.8
P09 - Canned fruits & veg.	24.1	51.3	41.8
P10 - Liquors & spirits	8.4	51.8	31.8
P11 - Wines	21.4	51.8	35.7
P12 - Other foods & beverages	23.3	38.6	36.7
P13 - Textiles & leather	74.5	134.4	105.1
P14 - Wood & its products	23.5	135.5	76.8
P15 - Pulp, paper, printing	38.9	124.3	81.2
P16 - Refined petroleum & coke	52.3	88.7	49.3
P17 - Chemicals & products	62.1	151.9	86.4
P18 - Rubber & plastic	83.5	155.5	102.8
P19 - Other non-metallic min.	66.2	136.7	46.0
P20 - Metal products	56.3	136.3	39.8
P21 - Other equipment	69.2	182.7	75.4
P22 - Electronic & optical eq't	59.4	182.6	55.9
P23 - Transport equipment	70.7	129.3	90.7
P24 - Other manufactured	85.5	143.6	88.8

Source: Econometric estimates, methodology described in Chapter 2 for (a) and (b) (minerals are excluded because simulations do not cover copper and ores). CGE simulations for column (c).

3.5 COMPARISON WITH THE EX-ANTE SIA

The ex-ante "Sustainable Impact Assessment (SIA) of the trade aspects of negotiations for an Association Agreement" carried out in 2002, provided a comprehensive analysis of the impacts of the main trade provisions of the EU-Chile FTA (Planistat 2002). It used a CGE framework to identify the long term effects of the future agreement. Counterfactual simulations compared a situation where the provisions of the EU-Chile FTA to be signed (the FTA negotiations were already well advanced) were implemented to a baseline where the there would be no agreement.

The comparability of the present study's results with those of the 2002 SIA is limited by differences in methodology. Simulations for the ex-ante SIA did not rely on a specific model of the Chilean economy, they were carried out using a standard, multicountry CGE model, the GTAP model (Global Trade Analysis Project). Sectoral aggregation was different, with 26 sectors in the SIA simulations, based on the GTAP classification (Planistat 2002,

Table 8.5, p. 56). So was the time horizon of the simulations, the ex-ante assessment referring to a longer-term concept than the one used here, where the structural decomposition used the situation in 2002 and 2008. The elasticities in the GTAP model are also different from the ones used in the current report.

A major additional source of discrepancy is the representation of trade and tariffs: in the present analysis, they are modelled at the HS6 level, based on detailed data and on a careful assessment of AVE protection under alternative trading regimes at the tariff-line level; the SIA, instead, relies on the GTAP database for measurement of trade and tariffs, together with assumptions about tariff reductions by sector (see Planistat 2002, Table 8.3, p. 54). In contrast to the present study, SIA simulations also factored in assumptions regarding the impact of non-tariff measures, considering each of them "as equivalent to a reduction in total barriers to completely open trade" (ibid., p. 53). Thus SPS-related provisions were assumed, in sectors concerned, to be equivalent to cutting initial tariffs by 10%; market access commitments in services were assumed equivalent to a 5% tariff cut;[31] rules-related provisions were assumed to cut initial protection by 75% to 100% in sectors concerned (mining, forestry, wood industry and services; see ibid., Table 8.3, p. 54).

The ex-ante SIA simulations found that the EU-Chile FTA would result in a 0.4% increase in Chile's real income (i.e., 300 million 1997 US$; see ibid., Table 9.1, p. 62). While the gains for the EU were assessed to be higher in absolute value, they were barely discernable when expressed as a percentage of the EU real income (percentage increase rounded up to 0.0%). Our ex-post simulations find a rather comparable macroeconomic impact of the EU-Chile FTA on the Chilean economy.[32] In comparison to the expected 0.4% in the SIA, our ex-post estimate of the real income impact of the FTA on the Chilean economy ranges between 0.23% and 0.29% (Table 15). These results are consistent, given that the impact of non-tariff provisions is included in the ex-ante simulations but not in ours.

In the ex-ante SIA simulations, real wages in Chile were expected to be increased by 0.2% for skilled labour and 0.6% for unskilled labour as a result of the EU-Chile FTA. Our ex-post assessment also concludes that the Agreement has participated to the raise in low-skilled wages, with figures (+0.30% to +0.36%) that are lower but consistent with the ex-ante SIA simulations. However, we find a negative impact on high-skilled wages, reflecting the fact that the FTA tends to benefit more low-skill sectors (mostly in agriculture) than high-skill sectors (where competition from EU exporters is strong).

The ex-ante SIA simulations found that the Agreement would increase the value of Chile's exports by 3.2%, and of imports by 3.0%. Since the ex-ante SIA does not provide results regarding bilateral trade flows, the comparison can only be made regarding the assessed impact on Chile's total imports and exports, by sector. In addition, because of differences in classification, comparison with our ex-post assessments results is only possible based on an approximate correspondence between comparable sectors (Table 21).

This comparison shows that assessed trade impacts differ substantially between the two simulation exercises. In the ex-ante SIA simulations, the largest export increases were found for meat and for grains. Our simulations, acknowledging the fact that tariff quotas

[31] The source of data on trade protection in service sectors is not mentioned.

[32] The concept of "real income" used in the ex-ante assessment presumably corresponds to the equivalent variation income in the GTAP model, reported under item "Welfare" in our ex-post assessment.

remain binding in this sector, do not find a comparable impact for meat products. Grains are not singled out in our sector classification, because Chilean exports to the EU are limited for these products. However, detailed trade results from our simulations do not find comparable increase in Chile's grain exports, mainly because the most important grains exported by Chile to the EU (maize hybrid seeds, soybeans, "cascarilla"—medicinal plant) are not dutiable. An aggregation bias (whereby average grains protection is applied to imports actually focused on specific grains) probably explains the ex-ante SIA's results.

TABLE 21. COMPARISON OF EX-ANTE AND EX-POST SIMULATIONS OF THE IMPACT OF THE EU-CHILE FTA: CHANGES IN CHILEAN EXPORTS (ALL DESTINATIONS, PERCENTAGE CHANGE RELATIVE TO A COUNTERFACTUAL SITUATION WITHOUT FTA)

***Ex-post* CGE simulations (this study)**		***Ex-ante* CGE simulations (SIA, Planistat, 2002)**	
P01 - Other ag. products	1.7	Grains	24.3
P02 - Fruits	19.5	Other agriculture	6.3
P03 - Livestock	0.6	Cattle	1.8
		Dairy	9.2
P04 - Forestry products	-4.8	Forestry	-0.5
P05 - Fish & crustaceans	13.4	Fisheries	-2.9
P06 - Minerals	-0.4	Mining	-0.3
P07 - Meat	0.5	Meat	50.5
P08 - Processed seafood	18.4	Processed food	12.8
P09 - Canned fruits & veg.	1.0		
P10 - Liquors & spirits	-4.5	Beverages and tobacco	8.4
P11 - Wines	41.7		
P12 - Other foods & beverages	1.2		
P13 - Textiles & leather	2.9	Textiles	3.7
		Clothing	21.9
		Leather	15.9
P14 - Wood & its products	-6.7	Wood, pulp and paper	1.9
P15 - Pulp, paper, printing	-5.2		
P16 - Refined petroleum & coke	-0.5	Refineries	0.9
P17 - Chemicals & products	-4.3	Chemicals	9.7
P18 - Rubber & plastic	-4.4		
P19 - Other non-metallic min.	-1.2	Non ferrous metals	2.3
P20 - Metal products	-4.1	Steel	5.3
P21 - Other equipment	-15.5		
P22 - Electronic & optical eq't	-4.3	Electronics	9.5
P23 - Transport equipment	-5.2	Motor vehicles	4.3
P24 - Other manufactured	-4.3	Other manchinery	4.3

Sources: For ex-post simulations, our CGE model simulations. For ex-ante simulations, Planistat (2002, Table 9.3, p. 64). The percentages are expressed compared to a baseline without the EU-Chile Agreement. Note that in the ex-ante simulations, the scenario and the reference period are different.

Conversely, the strong positive impact on Chile's exports of wines, fruits, fish and processed seafood found in our estimation has no equivalent in ex-ante SIA simulations, presumably due to the different underlying assessment of trade and tariffs, blurred by aggregation biases in the 2002 SIA.

Finally, ex-ante simulations predicted a positive impact on Chile's exports of manufactured products, while we assess this impact to have been negative in manufacturing sectors unrelated to agriculture and food, except in textiles and clothing. More generally, the assessed impact of the FTA on Chile's trade specialization is significantly stronger in our simulations than in the SIA.

3.6 Conclusion

The simulations presented in this Chapter make a consistent assessment of the tariff clauses of the EU-Chile FTA. Unlike the simulations presented in Chapter 2 based on econometric estimates, these simulations take into account the impacts of the EU-Chile FTA on factor prices, incomes, trade with third countries and aggregate variables, *inter alia*. By making use of the previously estimated elasticities, the model is additionally consistent with the econometric estimates carried out specifically based on the analysis of trade flows between the EU and Chile following the EU-Chile FTA's enforcement.

These simulations allow the most heavily impacted sectors to be identified, and it is no surprise to find among the main winners fruit growing, wine making, fisheries and fish processing on the Chilean side, and machinery, transport equipment and the chemical industries in the EU. These impacts must not only be compared to observed trends since the EU-Chile FTA enforcement; they also assess, implicitly, how trade flows between the EU and Chile might have evolved without an agreement. In this case, it is likely that the enforcement of several FTAs signed by Chile, with the US among others, might have significantly influenced bilateral trade relations.

The EU-Chile FTA is found to trigger an aggregate economic gain for the Chilean economy. The assessed real income gain (+0.23% in equivalent variation of income in the base case) is small, but it should be kept in mind that the impact measured here is limited to the direct, so-to-say "mechanical" consequences of tariff cuts in the EU-Chile FTA. Such a shock may also initiate a virtuous circle by allowing export sectors to gain renewed dynamism, with possible indirect effects *inter alia* on technology, competitive structure, demography of firms, information or access to markets. The so-called new and "new new" theories of trade have identified a wealth of such possible effects. And in any case, trade policy is only one element of a country's policy mix, the benefits of which are only fully felt to the extent that it is combined suitably with other policies, allowing such virtuous circles to get under way, and preventing possible undesired effects to materialise.

In this context, the direction of changes and the comparisons across industries and across shocks are to be thought of as the most meaningful results. In addition, non-tariff aspects of the EU-Chile FTA are not taken into account in these simulations, by lack of tangible basis to quantify them, thus limiting the scope of this quantitative assessment. In particular, the lack of suitable data on both trade flows and obstacles to trade prevented the service provisions of the FTA to be taken into account in the model. The general, qualitative assessment should nevertheless take them into account.

Chapter 4 - Provisions related to trade in services and foreign direct investment

The trade pillar of the EU-Chile Association Agreement includes provisions related to trade in services and establishment under Title III of Part IV, which entered into force on March 1, 2005. As in the General Agreement on Trade in Services (GATS), the four modes of trade in services are covered. This includes commercial presence and therefore direct investment in service sectors, through a combination of horizontal commitments, applying across the board to all sectors, with sector-specific commitments, following a positive list principle. FDI in non-service sectors, in contrast, is covered by the chapter on establishment.

Assessing the importance of these provisions first requires analysing their scope and nature. This is especially challenging for provisions regarding trade in services, where commitments are sector-specific for the most part. Even though the nature of commitments is difficult to compare across sectors and countries, they can be classified into broad categories, and their scope can be characterised based on standard classifications. This analysis is carried out not only for each trading partner's commitments in the FTA, but also in the GATS, the background against which the FTA's commitments must be assessed. A summary analysis of provisions related to trade in services can then be conducted, by partner and by main sector.

To assess how the FTA may have influenced trade in services between the contracting parties, this chapter also analyses the recent trends in these areas. Carrying out a quantitative analysis is challenging given the qualitative nature of commitments and the relatively high aggregation level of the data. Still, the analysis presented below for trade in services follows an approach comparable to the one used for trade in goods, to the extent possible.

Although the analysis of commitments deals with all modes of trade in services, the statistical and econometric analyses do not cover trade in services through commercial presence (mode 3). Indeed, the corresponding statistical sources, related to direct investment, are different from those used for other modes of trade in services. These aspects are dealt with in the second section of this chapter, devoted to FDI in both manufacturing and services.

4.1 IMPACT OF THE AGREEMENT ON TRADE IN SERVICES

A brief statistical analysis of bilateral trade in services between the EU and Chile is useful to clarify the importance of these exchanges, and the nature of recent trends. Once this is completed, this section will present a detailed assessment of the EU-Chile FTA commitments in this area. A methodology to assess the impact of these commitments is then developed and applied.

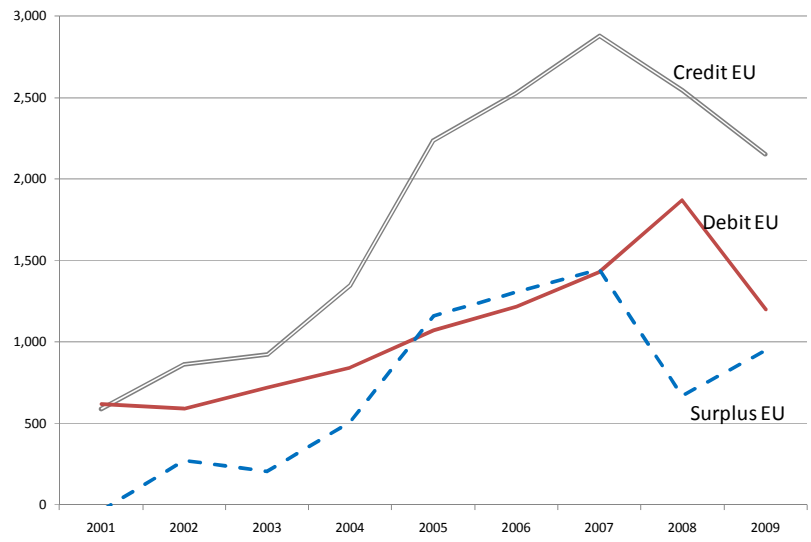
4.1.1 EU-CHILE TRADE IN SERVICES: FACTS AND RECENT TRENDS

The Eurostat database on international trade in services allows bilateral trade in services between the EU and Chile, jointly under either mode 1 (cross-border supply), 2 (consumption abroad) or 4 (presence of natural persons) to be analysed in some detail, starting from 2001. This is done below for aggregate figures, and then by sector.

4.1.1.1 AGGREGATE TRENDS

The general pattern of EU-Chile bilateral trade in services since 2001[33] is marked by a steady growth in both directions, together with a widening surplus for the EU (Figure 14). The orders of magnitude are rather spectacular, since the EU's export of services to Chile increased almost fivefold between 2001 and their peak in 2007, from 588 to €2,843 million. By 2009, they had declined to €2,143 million. These are substantial amounts as compared to goods exports (€4,767 million in 2007, almost €6 billion in 2010). Chilean exports to the EU also surged, from €621 million in 2001 to €1,870 million in 2008, and almost €1,200 million in 2009.

FIGURE 14: EU-CHILE AGGREGATE TRADE IN SERVICES (MILLION EUROS)



Source: Eurostat.
Note: Statistics refer to all modes of supply, except mode 3. "EU" refers to the EU15 until 2003, to the EU25 plus Romania and Bulgaria from 2004 to 2006, and to the EU27 from 2007 onward. "Credit EU" refers to

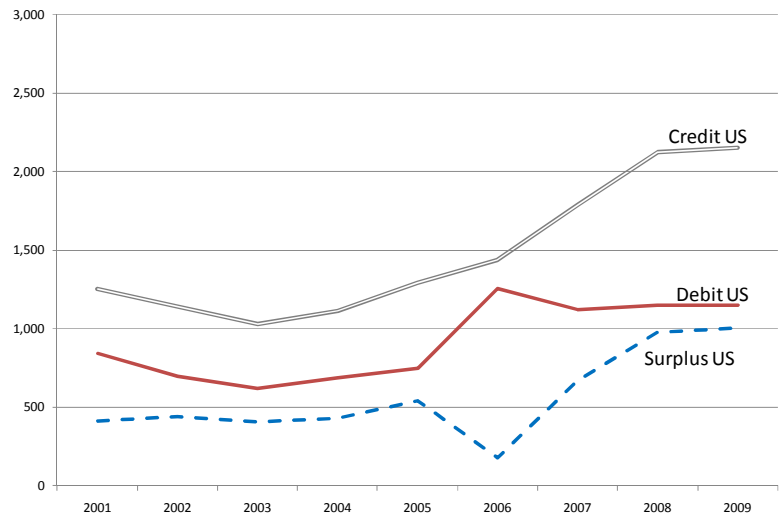
[33] Separate figures for exchanges of services of EU countries with Chile are only available as of 2001.

services trade flows recorded as credits for the EU, i.e. exports from the EU to Chile. "Debit EU" refers to Chile's exports to the EU. "Surplus EU" refers to the surplus from the EU point of view.

Trade in services thus thrived during the years following the EU-Chile FTA. However, this development has been asymmetrical. While exchanges were more or less balanced in 2001, EU bilateral exports have regularly been about two times larger than bilateral imports, starting from 2004. The result has been a substantial surplus in recent years, amounting to €1,445 million in 2007 and still €950 million in 2009. This is both substantial in absolute value and in stark contrast with the deficits recorded by the EU in trade in goods with Chile.

By way of comparison, Chile's bilateral trade in services with the US since 2001 also exhibited a sustained upward trend, and widening deficits (approximately US$ 1 billion in 2009; Figure 15). However, trends are less pronounced than for the EU until 2007, and no such fall as the one for the EU is observed in 2008 and 2009. During the last decade, many US companies have moved non-core activities such as customer service to countries like Chile. This is compounded by companies from third countries such as India, who have installed service centres in Chile taking advantage of the fact that it shares the same time zone as the US East Coast.

FIGURE 15: US-CHILE AGGREGATE TRADE IN SERVICES (M US$)



Source: US Department of Commerce.

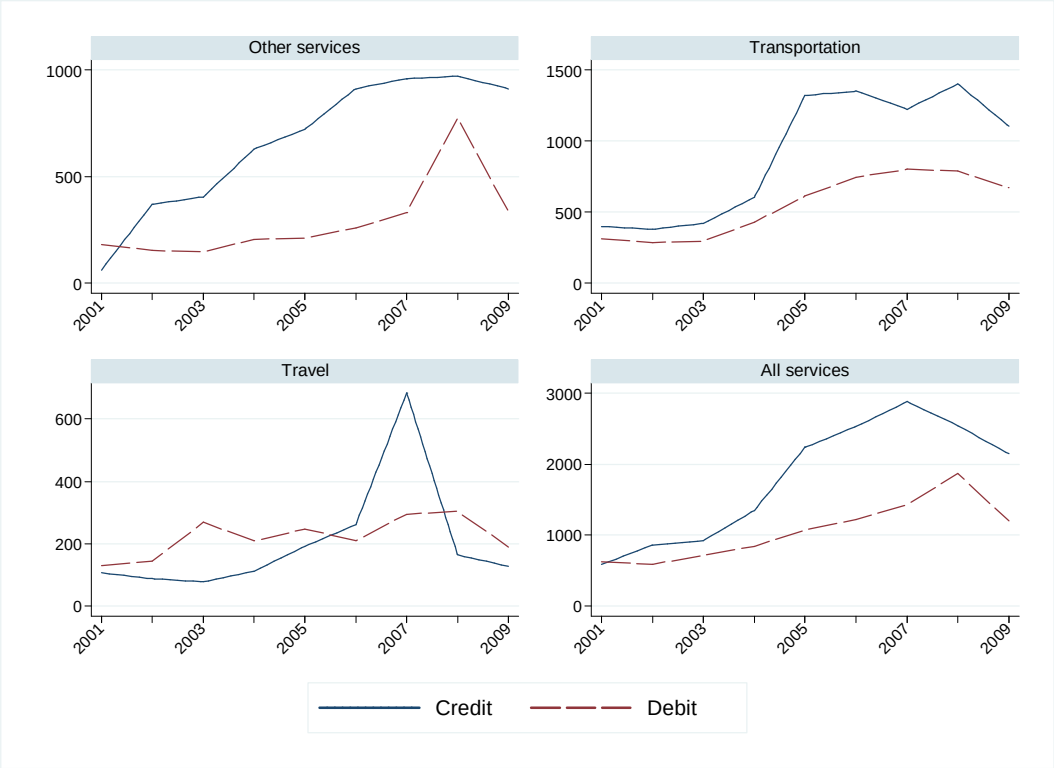
4.1.1.2 TRENDS BY SECTOR

Breaking down the figures by main service sector shows that exchanges in travel services tend to be more or less balanced on average, with a peak in the EU's exports in 2007, and no clear trend on the whole (Figure 16). In any case, this is not a sector where the EU-Chile FTA is expected to deeply modify the context of bilateral exchanges.

While bilateral exchanges were almost balanced in transportation services until 2004, the EU's exports significantly outpaced imports afterwards, following a qualitative increase in 2005. Exchanges in this sector are generally closely linked to trade in goods, and this

increase may have more to do with the nature of good exchanges than with the EU-Chile FTA provisions on services themselves.

FIGURE 16 : EU IMPORTS FROM AND EXPORTS TO CHILE, BY MAIN SERVICE SECTOR (IN MILLION EUROS)



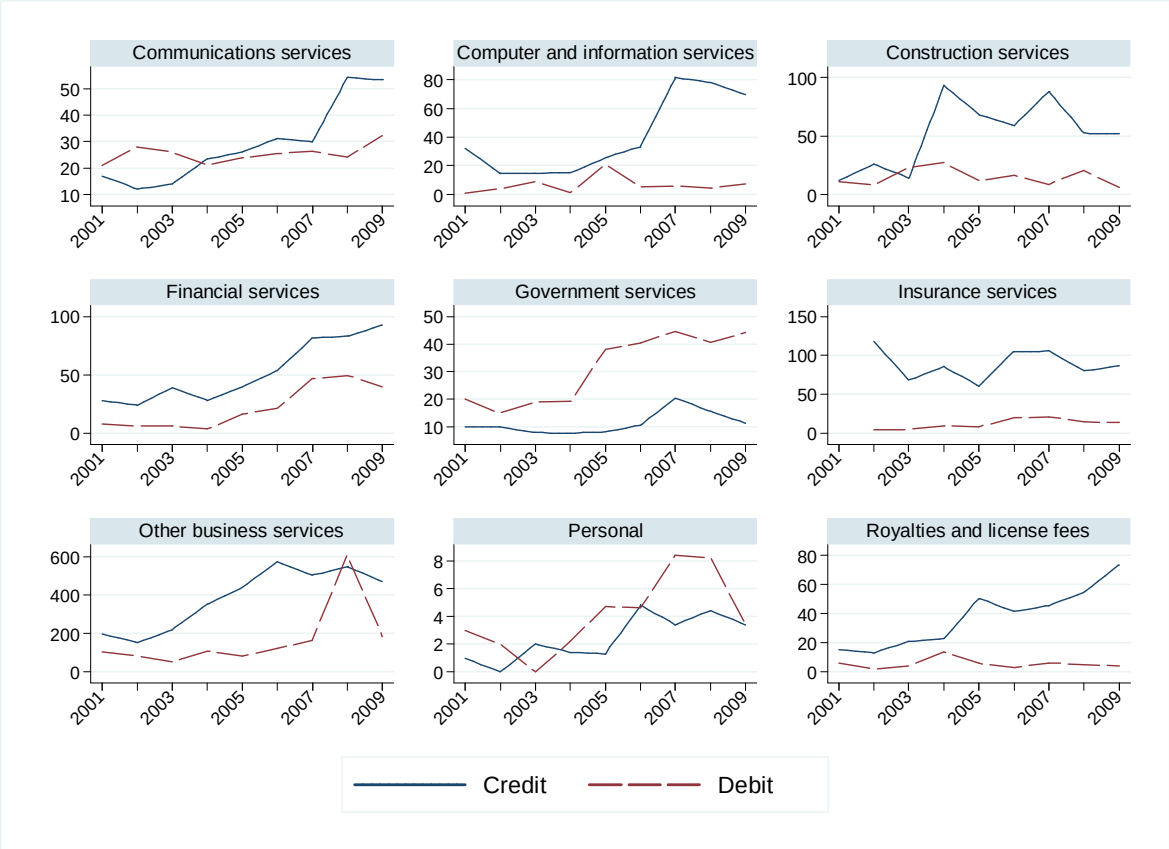
Note: Scale varies across graphs. Statistics refer to all modes of supply, except mode 3. "EU" refers to the EU15 until 2003, to the EU25 plus Romania and Bulgaria from 2004 to 2006, and to the EU27 from 2007 onward. "Credit" (blue solid line) refers to EU expors to Chile, "debit" (red dashed line) to EU imports from Chile.
Source: Authors' calculations based on Eurostat.

In services unrelated to transportation and travel, where the EU was registering a bilateral deficit in 2001, EU exports surged over the period. They largely outpaced bilateral imports, quickly giving rise to a substantial surplus. This sector, which includes business services, is of special interest in the context of the EU-Chile FTA, since this is the type of activity where bilateral commitments might be most relevant.

Breaking down these "other services" not related to transport or travel shows that the upward trend in exports has been widespread over the period for business services (i.e., excluding government and personal services). In most cases, an almost-balanced initial situation gives rise to a significant surplus at the end of the period (Figure 17). This trend may have to do with the significant direct investment made by European firms in the 1990s, but in any case it is rather striking. While the figure uses sector-specific scales to allow trends to be clearly identified, the subsector "other business services" actually accounts for more than half the total.

The most detailed categorization of Eurostat data shows that two types of services account for the bulk of these "other business services". The first one is merchanting,[34] presumably in relation to copper and ores. The second one is professional and technical services. However, over the last few years, the latter has been constantly outpacing the former. While merchanting peaked in 2006 at €327 million, and declined afterwards to €36 million in 2009 (part of this change is likely to be cyclical), professional and technical services have trended upward regularly, increasing from €178 million in 2004, to €217 million in 2007 and €314 million in 2009. Combined with the sustained increase in communication, financial, construction and computer services, these figures are suggestive of a substantial growth in business services. Many of them are related to trade in goods, either directly or through maintenance or post-sale services. Still, these trends undoubtedly reflect a real dynamism in service exports.

FIGURE 17 : EU IMPORTS FROM AND EXPORTS TO CHILE, BY SUBSECTOR OF OTHER SERVICES, NOT RELATED TO TRANSPORT OR TRAVEL (IN MILLION EUROS)



Note: Scale varies across graphs. Statistics refer to all modes of supply, except mode 3. "EU" refers to the EU15 until 2003, to the EU25 plus Romania and Bulgaria from 2004 to 2006, and to the EU27 from 2007 onward. "Credit" (blue solid line) refers to EU exports to Chile, "debit" (red dashed line) to EU imports from Chile. "Personal" refers to personal, cultural and recreational services.
Source: Authors' calculations based on Eurostat.

[34] Merchanting is defined in the IMF Balance of Payments Manual (fifth edition) as "the purchase of a good by a resident (of the compiling economy) from a non-resident and the subsequent resale of the good to another non-resident; during the process, the good does not enter or leave the compiling economy."

4.1.2 Assessing the nature and coverage of commitments

Chapter I of Part IV, Title III of the Association EU-Chile FTA includes key provisions in the field of services. Chapter II is concerned in particular with financial services, Chapter III with right of establishment, and Chapter IV with exceptions. Other sections of the EU-Chile FTA make explicit reference to services and some sub-sectors in particular, like in Part III which deals with cooperation between Chile and the Community.

The first general observations that arise when analysing the provisions related to trade in service in the EU-Chile FTA are, on one hand, that their structure is similar to the EU-Mexico agreement, and on the other hand that their scope is broad, with disciplines covering the four modes of supply of trade in services defined in the GATS. This means, as already mentioned, that investments in companies that perform services in the territory of the other party are governed by the service chapter, not by the establishment chapter.

Audio-visual services, maritime cabotage and air transport services (except repair and aircraft maintenance, computer reservation systems and sales and marketing of air transport services) were specifically excluded from the Agreement. Moreover, it was established that the Agreement does not apply to subsidies granted by the Parties, but left the possibility open to incorporate this aspect into future multilateral agreements if a need would exist.

The EU-Chile FTA contains provisions similar to those in the GATS, with a positive list of liberalization.[35] The commitments taken by the Parties are those stipulated in the list, for the listed sectors. It also sets rules on domestic regulation, mutual recognition of professional qualifications, national treatment and market access. No MFN clause is included. Article 100 of the Treaty includes a provision for revision of the services chapter three years after the entry into force, with the potential to further deepen liberalization.

Commitments in mode 4 differ from those in other modes of supply due to the importance of horizontal restrictions. Chile actually left this mode of supply unbound across the board, except for the case of intra-firm transfers of senior and specialized personnel, under restrictive conditions, and notwithstanding the limitation to 15% on the share of foreign personnel in companies with more than 25 workers. For the EU, restrictions are unbound, “except for measures concerning the entry into and temporary stay within a Member State”, of specified categories of natural persons providing services. In addition, sector-specific restrictions, as specified on a case-by-case basis, may apply.

Limited horizontal restrictions are also stated for modes 1, 2 and 3, like the “public services carve out”, as well as some restrictions related to real estate purchases, investments in services, and specified general-purpose regulations. Still, the most substantive restrictions to market access and the principle of national treatment stated in the FTA are sector-specific. A detailed analysis of these sector-specific provisions is needed to provide a meaningful assessment of the Agreement’s commitments. While the statistical analysis of FDI is only carried out in the next section, commitments under mode 3 of trade in services are analysed here, to ease comparison across modes.

[35] This is the first agreement signed by Chile on services liberalization based on positive lists. Subsequently, Chile signed an agreement with MERCOSUR using a similar format.

4.1.2.1 Chile's commitments

Our analysis of Chile's commitments in the service sectors is carried out at the most detailed level of the WTO "Services Sectoral Classification List" (WTO, MTN.GNS/W/120, 1991, hereafter referred to as "W/120 classification"), generally subsector, for modes 1, 2 and 3. Within each subsector, the coverage of commitments is calculated in terms of subclasses of the provisional CPC classification within each W/120 subsector, based on the official definition of the classification. Some commitments cannot be mapped to any given CPC code. In this case, they are considered as non-classified, and considered as one CPC subclass.

Commitments for each item, under each mode, can be classified into three categories: "unbound" (no commitment), "bound" (partial commitment), or "unrestricted" (full commitment, no restriction). When an unrestricted commitment is made on only part of the CPC subclass, it is considered as a partial commitment ("bound"). Mode 4 is not considered, since only horizontal restrictions are scheduled in the Agreement. This analysis is carried out separately for commitments made under the GATS and under the EU-Chile FTA.

A first way to summarize this information is to compute, within each W/120 sector, the share of CPC subclasses covered by each type of commitment (Table 22). The results show that Chile's commitments under the GATS are limited and focused on tourism and travel related services, communication services and financial services, with a few additional commitments in business services and transport services.

Table 22: Coverage of Chile's commitments under the GATS and the EU-Chile FTA, by service sector

	Mode 1				Mode 2				Mode 3			
	Bound		Unrestricted		Bound		Unrestricted		Bound		Unrestricted	
	GATS	FTA	GATS	FTA	GATS	FTA	GATS	FTA	GATS	FTA	GATS	FTA
1. Business services	0	0.13	0	0.45	0	0	0	0.58	0.02	0.16	0.06	0.44
2. Communication services	0.38	0.48	0	0.12	0.27	0.45	0	0.12	0.38	0.48	0	0.12
3. Construction and rel. engineering serv.	0	0	0	0	0	0	0	1	0	0	0	0
4. Distribution services	0	0	0	1	0	0	0	1	0	0	0	1
5. Educational services	0	0	0	0	0	0	0	0	0	0	0	0
6. Environmental services	0	0	0	0	0	0	0	0.75	0	0	0	0
7. Financial services	0.01	0.03	0.03	0.03	0	0	0	0.03	0.43	0.85	0.14	0
8. Health related and social services	0	0	0	0	0	0	0	0	0	0	0	0
9. Tourism and travel related services	0	0	0	0.94	0	0	0.61	0.94	0	0	0.61	0.94
10. Recreational, cultural and sporting s.	0	0.23	0	0.69	0	0.23	0	0.69	0	0.23	0	0.69
11. Transport services	0	0.12	0	0.43	0	0.12	0	0.46	0.04	0.44	0	0.11

Source: Authors' calculations based on official texts.

Note: Sectors are defined according to the W/120 classification. Coverage is defined as the share of CPC subclasses for which a commitment is made. For each mode and each framework (GATS or FTA), the difference between one and the sum of bound and unrestricted commitments is the share of CPC subclasses for which no commitment was made.

Commitments made under the EU-FTA are more wide-ranging. Except for health-related, social and educational services, commitments are made for all service sectors, most often without restriction. With some exceptions (construction and environmental services are only committed under mode 2, financial services are mostly committed under mode 3), commitments are not significantly differentiated across modes (putting aside mode 4). The coverage rate is very high in tourism, distribution and recreational services. It also exceeds

one half in business services, communication services and transport services. For financial services, the high coverage rate of bound commitments in mode 3 contrasts with limited commitments in other modes.

A liberalisation index can be built to summarize this information. Following the method proposed in Hoekman (1996) and used for instance in Egger and Lanz (2008), this is done assigning the three commitment types unbound, bound and unrestricted values of 0, 0.5 and 1, respectively. Once this is done for each CPC subclass, index values for more aggregate categories are computed as simple means (both across subclasses and, when relevant, across modes). At the sector level, this methodology results in high indexes of liberalisation (above 80%) in distribution services, tourism and recreational services (Table 23). The index level is intermediate in business services (54%) and transport services (44%), and it is lower than 40% in communication, construction, environmental and financial services.

TABLE 23: CHILE'S SUMMARY COMMITMENT INDEX UNDER THE GATS AND THE EU-CHILE FTA, BY SERVICE SECTOR

	Mode 1		Mode 2		Mode 3		Modes 1, 2 & 3		
	GATS	FTA	GATS	FTA	GATS	FTA	GATS	FTA	Difference
1. Business services	0	0.51	0	0.58	0.07	0.52	0.02	0.54	0.52
2. Communication services	0.19	0.37	0.13	0.35	0.19	0.37	0.17	0.36	0.19
3. Construction and rel. engineering serv.	0	0	0	1	0	0	0	0.33	0.33
4. Distribution services	0	1	0	1	0	1	0	1	1
5. Educational services	0	0	0	0	0	0	0	0	0
6. Environmental services	0	0	0	0.75	0	0	0	0.25	0.25
7. Financial services	0.04	0.04	0	0.03	0.36	0.42	0.13	0.17	0.04
8. Health related and social services	0	0	0	0	0	0	0	0	0
9. Tourism and travel related services	0	0.94	0.61	0.94	0.61	0.94	0.41	0.94	0.53
10. Recreational, cultural and sporting s.	0	0.81	0	0.81	0	0.81	0	0.81	0.81
11. Transport services	0	0.49	0	0.52	0.02	0.33	0.01	0.44	0.43

Source: Authors' calculations based on official texts.
Note: Sectors are defined according to the W/120 classification. The index definition is such that 0 means no commitment and 1 means full commitment on each subclass.

Computing the difference between average indexes for GATS and FTA commitments allows for assessment of the extent to which the FTA introduced additional commitments. We will refer to this differential index as the FTA degree of liberalisation, or of consolidation of liberalisation. The results point out the significant additional commitments made in the FTA in distribution, recreational, tourism, business and transport services. A second group, where additional liberalisation remained more limited, includes communication, construction, environmental and financial services.

Differences with the Chile-US agreement

In contrast to the agreement with the EU, the US-Chile FTA is based on negative lists, i.e. it is assumed that "everything is free" unless explicitly incorporated in the annexes. In the

US case, the agreement was quite auspicious in theory, as the US did not list many restrictions in the annexes (9 sector-specific and 3 horizontal restrictive measures are listed in Annex I; 4 sector-specific and 2 horizontal measures are listed in Annex II). However, difficulties in effective access to the US market actually lie in state-level restrictions, which remain unchanged: restriction number 12 of US-Chile FTA's Annex I, applying to all sectors and affecting national treatment, MFN treatment, local presence, and performance requirements for senior management and directors, covers all existing non-conforming measures of all US states, the District of Columbia and Puerto Rico.[36]

On the Chilean side, a small number of restrictive measures for the service sector were incorporated in Annex I of the Agreement and were therefore consolidated (see their list in Table 63, Appendix 4.1). The main restrictive measures established by Chile in this FTA with the U.S. are also present in the FTA with the EU: the limitation of the proportion of foreign employees to a maximum of 15% for employers with more than 25 workers; and restrictions in the sectors of legal services, auditing services, editorial and printing services, or customs brokers.

4.1.2.2 The EU's commitments

A methodology comparable to the one described above for Chile is applied to assess the EU's commitments for trade in services under modes 1, 2 and 3. However, an additional complexity faced in this case is the variability of commitments across the EU's Member States. Applying a treatment strictly symmetrical to the one applied for Chile would require working at the Member State's level, thus resulting in 27 different assessments. Our analysis relies instead upon the evaluation of the number of Member States making a given type of commitment, by sector and by mode.

This method is applied to the latest version of the EU's commitments under the FTA, listed in the second additional protocol to the EU-Chile FTA (OJEU, L 251/50), reflecting the update of commitments following the EU 2007 enlargement. For GATS commitments, the original EC commitments under the GATS (WTO, GATS/SC/31) only concern the 12 countries member of the EC when the GATS was being negotiated. Other countries now member of the EU made individual commitments, and a consolidated schedule for the EU25 was certified at the end of 2006 (WTO, S/C/W/273), but there has not been any certified consolidated schedule for the EU27 so far. Despite harmonization efforts, differences across country-specific commitments are reflected in the complexity of the consolidated schedule for the EU25, where differences in commitments and in sectors' definitions are widespread. The original EC schedule, reflecting from the outset a collective approach, exhibits far less disparities across Member States.

For the sake of simplicity and clarity, our analysis relies on the original EC commitments under the GATS. Using the EU25 consolidated schedule together with Bulgaria and Romania's commitments would allow commitments for the EU27 to be more fully characterised. However, it would involve a complex codification work and its interpretation would be less clear-cut, given the great variability of commitments across countries; in addition, the consolidation schedule was certified only relatively recently, it was not in force

[36] An illustrative list of these sub-federal restrictions is available at the following address: http://www.chilexportaservicios.cl/ExpoUsa/default.asp.

when the Agreement was implemented. The countries concerned by the original commitments account for an overwhelming share of Chile's exports of services to the EU (in 2009, they absorbed 76% of Chile's exports of services to the EU27, and 94% of exports of services other than transport and travel, according to Eurostat data). We thus consider these commitments as a good, if imperfect, indicator of the nature of the EU's commitments under the GATS.

To summarize this information, we first compute, within each sector, the share of subclasses where at least 10 Member States out of the 12 involved in the EC commitments under the GATS have made bound or unrestricted commitments.[37] An alternative definition is used, taking only unrestricted commitments into account. This index of coverage shows that the EU's commitments in the GATS are wide-ranging (Table 24). With the exception of mode 1 for health related and social services and for transport services, the coverage rate of commitments (either bound or unrestricted) is always above 40%. In most sectors, it exceeds two thirds. Several sectors that are fully or nearly fully committed, with a coverage rate of bound commitments exceeding 90% include construction and related engineering services, distribution services, educational services, environmental services, financial services (except in mode 1), tourism and related services. This is in stark contrast with the results for Chile, meaning that the benchmark against which the FTA must be evaluated differs radically between the two signing parties.

TABLE 24: SUMMARY ANALYSIS OF EU'S COMMITMENTS UNDER THE GATS, BY SECTOR AND BY MODE (COVERAGE RATES AND SUMMARY INDEX)

	Coverage of bound or unrestricted commit.			Coverage of unrestricted commit.			Summary commitment index		
	Mode 1	Mode 2	Mode 3	Mode 1	Mode 2	Mode 3	Mode 1	Mode 2	Mode 3
1. Business services	0.54	0.75	0.75	0.45	0.75	0.50	0.60	0.75	0.69
2. Communication services	0.45	0.45	0.45	0.16	0.45	0.13	0.40	0.45	0.39
3. Construction and rel. engineering serv.	1.00	1.00	1.00	0.00	1.00	0.00	0.50	1.00	0.88
4. Distribution services	0.98	0.98	0.98	0.08	0.98	0.08	0.70	0.98	0.77
5. Educational services	0.90	0.90	0.90	0.90	0.90	0.70	0.84	0.90	0.85
6. Environmental services	n.a.	1.00	1.00	n.a.	1.00	1.00	n.a.	1.00	1.00
7. Financial services	0.64	0.94	0.99	0.00	0.00	0.18	0.46	0.73	0.67
8. Health related and social services	0.00	0.75	0.75	0.00	0.75	0.67	0.00	0.75	0.70
9. Tourism and travel related services	1.00	1.00	1.00	0.12	1.00	0.06	0.55	1.00	0.85
10. Recreational, cultural and sporting s.	0.44	0.68	0.68	0.44	0.68	0.44	0.44	0.68	0.63
11. Transport services	0.17	0.40	0.40	0.12	0.40	0.19	0.14	0.39	0.29

Source: Authors' elaboration based on EC-12 commitments in the GATS (WTO, GATS/SC/31).
Note: The coverage rate is defined as the share of subclasses where at least 10 Member States out of 12 have made bound or unrestricted commitments. The calculations are carried out by subclass of the provisional CPC classification. "n.a." (not applicable) means that a commitment is explicitly deemed not feasible for this mode of supply in this sector. See text for detail on the summary index.

[37] This threshold of 10 out of 12 is chosen arbitrarily as reflecting a commitment on the bulk of the EU's market. Defining coverages based on cases where all Member States are covered without exception would be overly restrictive, since it is frequent for one or two Member States to mention exceptions. However, alternative calculations based on a threshold of 6 out of 12 suggested that the results are not strongly sensitive to this threshold.

Focusing the analysis on unrestricted commitments results in significantly lower coverage rates, illustrating the fact that restrictions are frequently set, at least for some countries. Even under this restrictive definition, however, the coverage rate of commitments remains high in mode 2 in several sectors, in mode 1 for educational services, and in mode 3 for environmental services, and to a lesser extent in educational and health related services.

As for Chile, this information about the nature and coverage of commitments can be summarized using a summary index, built by assigning the three commitment types unbound, bound and unrestricted values of 0, 0.5 and 1, respectively. The simple average index for all EU Member States is then computed to characterise the degree of commitment. As already emphasised, such an index does not account for the huge variety of commitments classified as "'bound". Still, it can be used as an indicative measure of the degree of commitment, allowing the patterns to be compared across sectors. The results confirm the pattern described above, characterised by a high level of commitment in most sectors, outside mode 1 in health related and transport services (Table 24, last three columns). The cross-sector hierarchy in levels of commitments based on this summary index is consistent with the one emerging from coverage rates, most of all those computed including both bound and unrestricted commitments.

Commitments under the FTA's second additional protocol concern the 27 Member States. To analyse their coverage rate, we compute, within each sector, the share of subclasses where at least 20 out of the 27 Member States have taken bound or unrestricted commitments in the FTA.[38] Since GATS commitments apply anyway in the context of bilateral relationships, a coverage rate lower for the FTA than for the GATS does not indicate lesser commitments. Instead, it may just reflect the fact that commitments previously made in the GATS are not repeated in the FTA, or the fact that the new Member States, not concerned by the EC-12 GATS commitments, have made lesser commitments.[39]

Outside health-related and social services and transport services, the coverage rate of FTA commitments is high: bound or unrestricted commitments cover 44% of recreational, cultural and sporting services, 45% of communication services under mode 1, 51% of business services under mode 1, and at least 65% of all other sectors and modes (Table 25). Comparison with GATS commitments, although blurred by the different number of Member States involved, suggests that the most meaningful difference lies in the higher level of unrestricted commitments under the FTA. This is the case in particular in communication, distribution, educational, tourism and travel related services.

[38] This threshold of 20 out of 27 is chosen arbitrarily as reflecting a commitment on the bulk of the EU's market. It does not correspond to the same proportion as "10 out of 12" rule followed for GATS commitments (22 out of 27 would have been the criterion based on this rule). The reason for this choice is that commitment schedules for Romania and Bulgaria differ widely from those for other Member States, with a more limited coverage of commitments. Since these two markets are anecdotal for Chile's exports of services, we did not want them to influence significantly the assessment.

Commitments also frequently differ from others for countries of the 2004 enlargement, but to a lesser extent. The reason However, alternative calculations based on a threshold of 6 out of 12 suggested that the results are not strongly sensitive to this threshold.

[39] Sectors where commitments under mode 1 are explicitly described as infeasible also differs between GATS and FTA commitment schedules.

TABLE 25: SUMMARY ANALYSIS OF EU'S COMMITMENTS UNDER THE EU-CHILE FTA, BY SECTOR AND BY MODE (COVERAGE RATES AND SUMMARY INDEX)

	Coverage of bound or unrestricted commit.			Coverage of unrestricted commit.			Summary commitment index		
	Mode 1	Mode 2	Mode 3	Mode 1	Mode 2	Mode 3	Mode 1	Mode 2	Mode 3
1. Business services	0.51	0.74	0.70	0.43	0.73	0.56	0.62	0.80	0.75
2. Communication services	0.45	0.65	0.65	0.45	0.45	0.45	0.51	0.52	0.52
3. Construction and rel. engineering serv.	0.15	1.00	1.00	0.15	1.00	1.00	0.13	0.90	0.89
4. Distribution services	0.96	0.96	0.96	0.96	0.96	0.56	0.87	0.92	0.84
5. Educational services	0.80	0.80	0.80	0.40	0.80	0.00	0.66	0.71	0.64
6. Environmental services	0.00	1.00	1.00	0.00	1.00	1.00	0.10	0.92	0.92
7. Financial services	1.00	1.00	1.00	0.06	0.77	0.00	0.70	0.79	0.69
8. Health related and social services	0.00	0.08	0.08	0.00	0.08	0.00	0.01	0.50	0.47
9. Tourism and travel related services	0.94	1.00	1.00	0.94	1.00	1.00	0.91	0.98	0.94
10. Recreational, cultural and sporting s.	0.44	0.44	0.44	0.44	0.44	0.44	0.41	0.56	0.54
11. Transport services	0.09	0.15	0.29	0.09	0.15	0.07	0.15	0.41	0.34

Source: Authors' elaboration based on the second additional protocol to the EU-Chile FTA (OJEU, L251/14).
Note: The coverage rate is defined as the share of subclasses where at least 20 Member States out of 27 have made bound or unrestricted commitments. The calculations are carried out by subclass of the provisional CPC classification. "n.a." (not applicable) means that a commitment is explicitly deemed not feasible for this mode of supply in this sector. See text for detail on the summary index.

A summary commitment index can also be built in this case (Table 25, last three columns). Since it does not correspond to the same list of Member States as the one computed for GATS commitments, it is not directly comparable. Still, it remains an interesting index useful in shedding light upon the relative magnitude of commitments across sectors and modes. It also illustrates the very high level of commitment, outside mode 1 in construction, environmental, health and transport services.

4.1.3 ANALYSIS OF THE FTA IMPACTS ON THE EU'S SERVICE EXPORTS TO CHILE

Chile's foreign policy is based on the integration of its economy in the world economy. The liberalization of trade in services has been instrumental in achieving this goal. Chile has promoted liberalization of services using basically three methods: 1) unilateral liberalization; 2) liberalization through FTAs; and 3) multilateral liberalization under the GATS.

Regarding unilateral liberalization, Chile has been developing a profound transformation in the sector since the early 1980s. It liberalized some particular sectors directly related to trade in goods (shipping, insurance and telecommunications), with virtually no discrimination against foreign operators. The opening of the domestic market was then extended to a variety of sectors, resulting in the participation of foreign suppliers in financial services, hotels, entertainment, restaurants, cinemas, etc. Rather few measures in the Chilean service market can be considered as discriminatory or designed with protectionist purposes. The restrictions that Chile has in force, listed in Annex I of the service chapter of the Chile-US FTA (see above), are applied in Chile regardless of the origin of services and investments.

Notwithstanding this context, commitments made under the FTA at least grant additional security and transparency. As such they are likely to have spurred the EU's exports of services to Chile. This subsection proposes a quantitative analysis of this possible impact.

4.1.3.1 METHODOLOGICAL ISSUES

Provisions related to trade in services came into force on March 1, 2005. As for trade in goods, assessing whether these provisions had an impact on trade requires comparing observed trade flows to a counterfactual situation, where the Agreement would not have been enforced. Assessing this counterfactual situation is challenging, as already outlined for trade in goods. While gravity models, generally used to build such a counterfactual, have been developed in reference to trade in goods, they can also be applied to trade in services (Kimura and Lee 2006, is an example). However, the accuracy of such models' predictions is limited. Using them to assess the average trade-creating impact of a large number of trade agreements is already challenging. When it comes to evaluating the impact of a single Agreement entered into force only a few years ago, these estimated counterfactuals could be misleading due to the difficulty in accurately assessing changes in the European supply and the Chilean demand of services. While variables such as GDP, GDP per capita, distance, language, population, remoteness,[40] or contiguity have been shown to be relevant determinants of trade in services, idiosyncratic factors linked to recent developments in Chilean and European service sectors cannot be taken into account in a standard gravity model. This is all the more important given the recent financial and economic crisis. In addition, estimation problems are even more troubling at the sector level, at which the analysis is carried out here, than at the aggregate level, at which estimations for trade in services are usually done.

Against this background, we prefer to apply an approach similar to the one used for trade in goods. Our analysis relies upon two principles. First, it focuses on comparisons across sectors, based on our detailed evaluation of commitments. If provisions related to trade in services had an impact, then it should be the case that the EU's exports to Chile performed better in those sectors where commitments were deep and wide ranging than in sectors where they were not.

Second, the notion of performance is not directly measured based on values of exports. A difference-in-differences (or even a triple difference) is used instead. Idiosyncratic factors are controlled for through three types of differences: (i) across time periods, between 2004 (the last year before enforcement of the Agreement's service provisions) and 2009 (the last year for which complete statistics are available); (ii) across partners, by comparing EU's exports to Chile to EU's exports to a control group, composed of Argentina, Brazil and Uruguay;[41] (iii) across providers, by comparing Chilean imports from the EU to those from other providers.[42] The performance index built as a result of these differences is the following:

[40] Remoteness, or multilateral resistance factors, summarise the condition of access of a given country to markets, and from producers, across the world. Anderson and van Wincoop (2003) have shown the importance of taking these factors into account, as already discussed in Chapter 2 for trade in goods.

[41] This group is composed of neighbouring countries with similar levels of development, with no trade agreement with the EU and with detailed statistics available for EU service exports. These three countries are the only three meeting these criteria.

[42] Chile does not give the geographic detail of its service imports in a systematic manner (outside tourism and travel-related services). Total Chilean imports were thus used to carry out this control. When data were not available at the sector level, the value of imports in all service sectors was used instead.

(1) $$performance_k = ln(BR_{k,2009}) - ln(BR_{k,2004})$$

Where k refers to a service sector, and BR (for bi-ratio) is defined as

(2)
$$BR_{k,t} = \frac{MS_{EU,CL,k,t}}{MS_{EU,control,k,t}} = (\frac{x_{EU,CL,k,t}}{x_{world,CL,k,t}})/(\frac{x_{EU,control,k,t}}{x_{world,control,k,t}})$$

Where, for year t, x refers to exports. "EU" and "CL" refer to the EU and Chile. $MS_{EU,CL,k,t}$ indicates the market share of the EU in Chilean imports of sector k. Note that this definition is consistent with the one used for trade in goods in Chapter 2.

For a given sector, the performance index thus measures the growth of EU exports to Chile, over and above what would have been expected given trends in the EU's exports to comparable markets, and given the trend in Chilean demand for imported services in the sector, compared to the control group's market.

4.1.3.2 Data and implementation

Implementing the approach described above requires consistent data for EU exports and for imports of both Chile and the control group, by service sector. These data are drawn from the UN Service Trade database, built as a result of a multi-agency joint effort (involving United Nations, International Monetary Fund, WTO, United Nations Conference on Trade and Development, World Tourism Organization, OECD and Eurostat) to produce consistent and comparable statistics on trade in services for a number of countries. They are expressed in millions of US dollars and classified using the Extended Balance Of Payments Services (EBOPS) classification. These data do not cover mode 3 of trade in services, for which the reader is referred to the analysis of direct investment.

In order to be able to correlate them with trade, commitments are thus converted to the EBOPS classification, whenever it is possible, at the most detailed level at which trade statistics are available (generally by subsector).[43] For the 23 services sectors for which complete data are available, it is possible to econometrically assess whether the degree of liberalisation brought by the FTA, as assessed through the above-described indexes, did influence exports. Given the limited number of observations, these estimates should be considered as tentative, and they are coupled with graphical illustrations.

Both modes 1 and 2 are included in the statistics (as well as mode 4, but commitments are not differentiated across sectors in this case), so we use the mean of indexes over these two modes as the main index. Since mode 1 is far more important than mode 2 in practice, we also report the analysis with regards to indexes computed for mode 1 alone, which is used for graphical illustration.

The estimating equation in estimations (5) and (6) below (Table 26) is thus:

[43] Commitments by subclass of the provisional CPC classification are converted to the most detailed level of the EBOPS classification using two correspondence tables: from provisional CPC to CPC version 1.0 (available from the UN statistical division website), and from CPC 1.0 to EBOPS (available from United Nations, 2002, Annex III, Table A.III.2).

(3) $$performance_k = \alpha + \beta\ degree_k + u_k$$

Where $degree_k$ is the degree of liberalisation in sector *k*, and *u* is an error term. Alternatively, estimates (1) and (2) use $\ln(x_{EU,CL,k,2009}) - \ln(x_{EU,CL,k,2004})$, the change in the logarithm of exports, as the dependent variable. Estimates (3) and (4) use $\ln(MS_{EU,CL,k,2009}) - \ln(MS_{EU,CL,k,2004})$, the change in the logarithm of the market share of EU exports in Chile.

TABLE 26: ESTIMATED IMPACT OF THE DEGREE OF LIBERALISATION IN THE EU-FTA OVER EU'S EXPORTS OF SERVICES TO CHILE (2004-2009)

Dependent variable	Δ[ln(exports)]		Δ[market share]		Performance index	
	(1)	(2)	(3)	(4)	(5)	(6)
FTA liberalisation degree, modes 1 and 2	0.57 **		0.29		0.17	
	(2.54)		(1.44)		(0.24)	
FTA liberalisation degree, mode 1		0.70 ***		0.46 *		0.79
		(2.89)		(1.72)		(0.93)
Constant	0.23	0.18	0.02	-0.06	-0.39	-0.74
	(0.97)	(0.79)	(0.09)	(-0.27)	(-0.66)	(-1.02)
R-squared	0.18	0.33	0.06	0.18	0.00	0.07
Observations	23	23	23	23	23	23

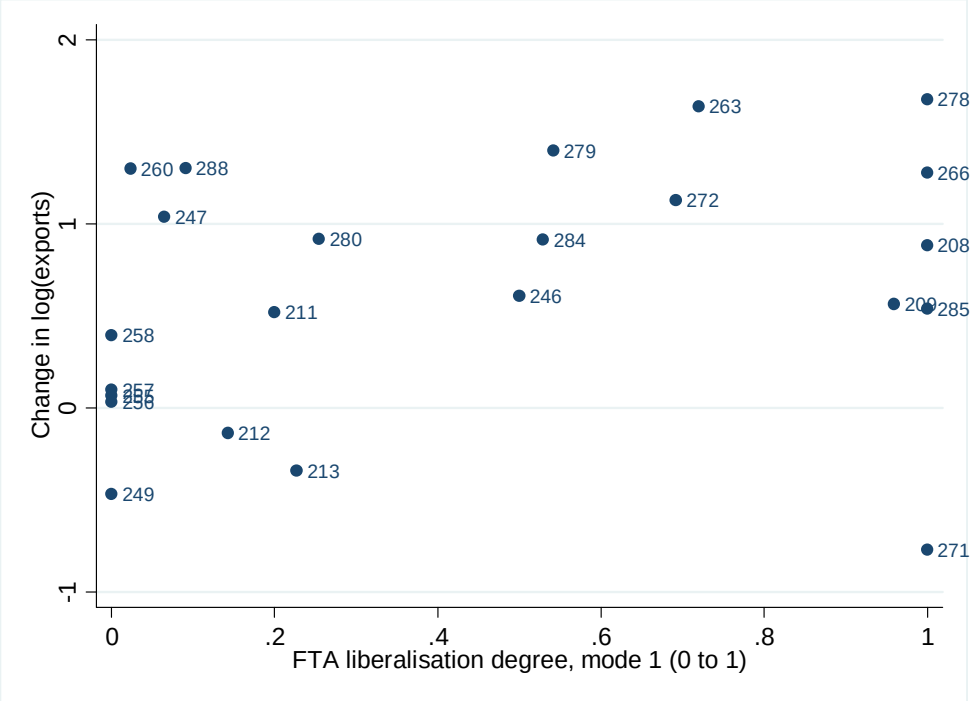
Source: Authors' computation based on official texts and on UN Service Trade.
Note: See text for description of indexes. Indexes are defined between 0 (no liberalisation through the FTA) and 1 (full liberalisation through the FTA). The index for modes 1 and 2 is the simple mean of indexes for mode 1 and for mode 2. Robust t-statistics are in parentheses. Δ refers to changes between 2004 and 2009. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively. All estimations are weighted by initial export value.

Estimates (1) and (2) show that the degree of liberalisation is significantly correlated to the degree of liberalisation in the FTA. According to estimate (2), a 1 percentage point higher liberalisation index is associated with a 0.7% (=exp(0.70/100)-1) higher growth in EU exports to Chile.

Figure 18 illustrates this relationship between changes in the EU's exports to Chile (in log terms) and the degree of liberalisation through the FTA. This figure shows in particular that a group of business services (*inter alia* advertising, leasing, research and development, computer services) where the FTA commitments are deemed to convey significant liberalisation did experience steady growth between 2004 and 2009. "Other trade related services" (code 271) are the only exception in this respect.

While estimate (2) is statistically significant at the 1% level, whether it reflects a causality relationship is questionable. Indeed, it is likely that the Agreement design gave priority to liberalisation in those sectors where the EU's export potential (or Chile's demand potential) was higher. Differencing the dependent variable as described above allows such concerns to be dealt with. Indeed, if a given sector exhibits especially high growth potential for EU exporters, then exports to the control group should also have increased. Similarly, if Chilean demand is strongly rising, it should be reflected in Chile's total imports.

FIGURE 18: CHANGES IN EU EXPORTS OF SERVICES TO CHILE AND DEGREE OF LIBERALISATION BY CHILE UNDER THE EU-CHILE FTA

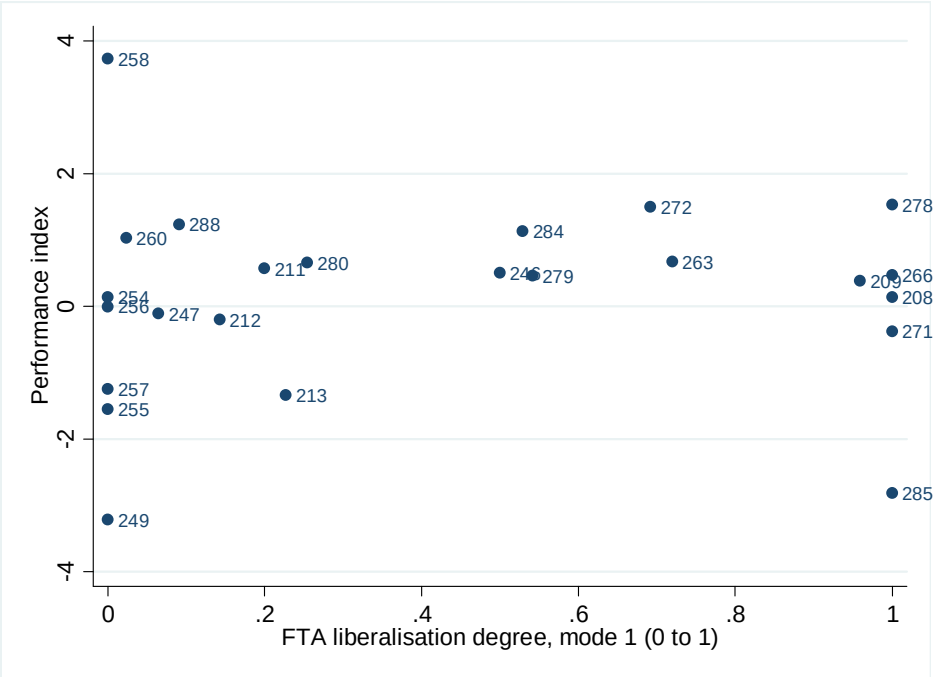


Source: Authors' computation based on official texts and on UN Service Trade.
Note: The FTA liberalisation degree is computed as the difference between the index of liberalisation under the FTA and under GATS. Labels refer to the service code in the Balance of Payments Coding System. The list of service codes and definitions is given in Table 64, Appendix 4.2.

As a matter of fact, when the estimation is carried out based on market shares instead of exports, the relationship with the degree of liberalisation is only significant at the 10% level, focusing on mode 1 commitments. Turning to the performance index (i.e., comparing these changes in market shares in Chile to those in the control group), the relationship, although still positive, is not statistically significant anymore.

Graphically illustrating this relationship between degree of liberalisation and performance index shows in particular that the above-mentioned group of business services, where liberalisation commitments were significant in the FTA, does not exhibit especially strong performance indexes (Figure 19). In these sectors, while growth of EU exports to Chile was sustained, it was not outstanding, when compared to EU exports to comparable markets and to Chile's total imports. The limited number of observations, already mentioned, means that the sensitivity of this statistical analysis is limited. Accordingly, the lack of statistical significance in the latter case cannot be interpreted as dismissing the existence of a relationship.

FIGURE 19: PERFORMANCE INDEX FOR EU EXPORTS OF SERVICES TO CHILE AND DEGREE OF LIBERALISATION BY CHILE UNDER THE EU-CHILE FTA



Source: Authors' computation based on official texts and on UN Service Trade.
Note: The FTA liberalisation degree is computed as the difference between the index of liberalisation under the FTA and under GATS. Labels refer to the service code in the Balance of Payments Coding System. The list of service codes and definitions is given in Appendix (Table 64).

4.1.4 ANALYSIS OF THE FTA IMPACTS ON CHILE'S SERVICE EXPORTS TO THE EU

The methodology described above can also be applied to analyse whether the EU's commitments in the FTA might have influenced Chile's service exports to the EU. In this case, with the same notation, the performance index would compare the following bi-ratio between 2004 and 2009:

(4)

$$BR'_{k,t} = \frac{MS'_{CL,EU,k,t}}{MS'_{control,EU,k,t}} = \left(\frac{x_{CL,EU,k,t}}{x_{CL,world,k,t}}\right) / \left(\frac{x_{control,EU,k,t}}{x_{control,world,k,t}}\right)$$

This variable is thus the ratio between two market shares (MS'), computed respectively for Chile and for the control group. Each of them measures, by service sector, the share of world exports headed towards the EU.

The modalities of implementation are the same as for the EU's exports. As previously, we compute the liberalisation index by sector as the difference between the EU's commitment index in the FTA and in the GATS. As already emphasized, however, the list of Member States is different in these two cases, blurring the direct comparison. For this reason, this index may be negative in some cases, even though the EU commitments under the FTA can only add to its GATS commitments. Still, this liberalisation index is a convenient way to summarise information about the EU's degree of commitment by sector, taking into account not only the FTA provisions, but also those under the GATS.

As for the EU, only a very limited number of sectors can be taken into account in this quantitative analysis (22 when the performance index is used as the dependent variable, 24 with other dependent variables, for which less data are required), meaning that the estimates presented should be considered as tentative only.

TABLE 27: ESTIMATED IMPACT OF THE DEGREE OF LIBERALISATION IN THE EU-FTA OVER CHILE'S EXPORTS OF SERVICES TO THE EU (2004-2009)

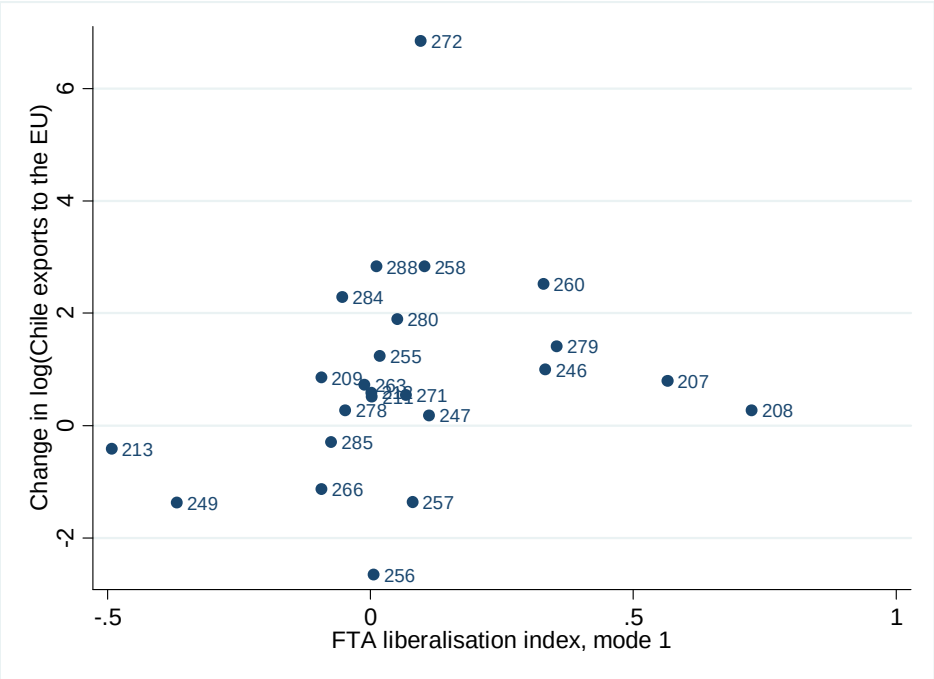
Dependent variable	Δ[ln(exports)]		Δ[market share]		Performance index	
	(1)	(2)	(3)	(4)	(5)	(6)
FTA liberalisation degree, modes 1 and 2	0.37		0.31		1.23 *	
	(1.13)		(0.96)		(1.85)	
FTA liberalisation degree, mode 1		0.33		0.28		1.33 *
		(0.84)		(0.73)		(1.97)
Constant	0.17	0.18	-0.13	-0.12	-0.52	-0.52
	(0.77)	(0.77)	(-0.61)	(-0.52)	(-1.10)	(-1.11)
R-squared	0.05	0.04	0.04	0.03	0.16	0.18
Observations	24	24	24	24	22	22

Source: Authors' computation based on official texts and on UN Service Trade.
Note: See text for description of indexes. Indexes of liberalisation degree are defined as the difference between the commitment index under the GATS and the FTA; they are an increasing function of the additional liberalisation brought through the FTA. The index for modes 1 and 2 is the simple mean of indexes for mode 1 and for mode 2. "Market share" refers to the share of Chile's exports headed to the EU. Robust t-statistics are in parentheses. Δ refers to changes between 2004 and 2009. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively. All estimations are weighted by initial export value.

When exports are measured either directly or through the share of Chile's exports headed towards the EU, their changes between 2004 and 2009 appears positively related to the degree of liberalisation brought by the FTA (Table 27). This relationship is not statistically significant, though. A graphical illustration based on a direct measure of exports corroborates these statistical results, by showing that no clear relationship with the degree of liberalisation can be established across sectors. The significant variability across sectors seems mainly linked to other factors (Figure 20).

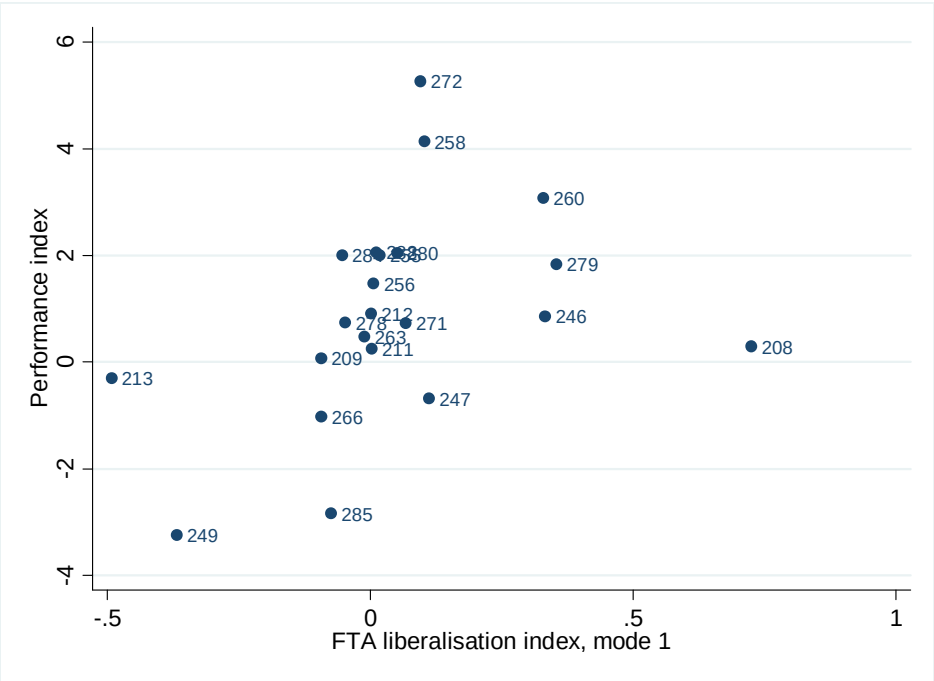
When the performance index is used instead to evaluate changes in Chilean exports of services to the EU, this positive relationship with the FTA liberalisation degree becomes statistically significant at the 10% level. Notwithstanding the tentative nature of these estimations and the very limited number of observations, this result suggests that the FTA provisions might have influenced Chile's exports of services to the EU. The insignificance of previous estimates should be interpreted in this context as reflecting the influence of other factors, more important than commitments, like sector-specific trends in Chilean supply and in European demand. Such influences are controlled for when the performance index is used instead, making the potential influence of FTA commitments more visible, as illustrated in Figure 21).

FIGURE 20: CHANGES IN CHILE EXPORTS OF SERVICES TO THE EU AND DEGREE OF LIBERALISATION BY THE EU UNDER THE EU-CHILE FTA



Source: Authors' computation based on official texts and on UN Service Trade.
Note: The FTA liberalisation degree is computed as the difference between the index of liberalisation under the FTA and under GATS. Labels refer to the service code in the Balance of Payments Coding System. The list of service codes and definition is given in Table 64, Appendix 4.2.

FIGURE 21: PERFORMANCE INDEX FOR CHILE EXPORTS OF SERVICES TO THE EU AND DEGREE OF LIBERALISATION BY THE EU UNDER THE EU-CHILE FTA



Source: Authors' computation based on official texts and on UN Service Trade.
Note: The FTA liberalisation degree is computed as the difference between the index of liberalisation under the FTA and under GATS. Labels refer to the service code in the Balance of Payments Coding System. The list of service codes and definition is given in Appendix (Table 64).

A graphical representation of this cross-sector relationship between performance index and degree of liberalisation shows in particular that Chile's exports performed relatively well in a group of sectors where the FTA brought significant additional commitments, in particular postal and courier services (246), freight insurance (255), research and development (279) and financial services (260).

4.1.5 Conclusions

To assess the extent to which these trends have been influenced by the FTA provisions related to trade in services, our analysis relies upon a thorough assessment of the signing parties' commitments under the FTA, by type of service and by mode. Taking into account the level of commitment already made under the GATS, this analysis allows the degree of liberalisation actually related to the FTA's commitments to be compared across service sectors.

The starting point was a high level of commitments under the GATS for the EU, and a relatively low level for Chile (although the domestic market of services was largely liberalised in practice). For the EU, the additional commitments made under the FTA resulted in a very high level of commitments, concerning most types of services in all sectors, outside health related, cultural or recreational, and transport services. As far as Chile is concerned, commitments remained limited in several sectors (construction, educational, environmental, health related services), and intermediate in communication and financial services. Still, the FTA brought significant additional commitments from Chile in distribution, recreational, tourism, business and transport services.

Analysing to what extent this degree of liberalisation is correlated across service sectors to trade performance sheds light on the influence of commitments upon trade flows. While the methodology proposed here can be used to analyse other agreements, two important limitations are worth emphasising: commitments are classified in broad categories, while the diversity of their actual consequences is large in practice; and statistics on trade in services are only available with limited sector breakdown. Another concern from an analytical point of view is that, while the value of these commitments is potentially large, it is difficult to ascertain, since access to service markets on both sides already faced few restrictions before the Agreement. In the case of the EU, many commitments had already been determined in the GATS. In the case of Chile, although there were not many GATS commitments, the domestic market was already fairly free of restrictions. Against this background, this quantitative analysis should be considered as tentative.

The results show that the EU's exports of services to Chile tended to increase more, following the entry into force of the FTA in those sectors where commitments brought a higher degree of (consolidation of) liberalisation. Whether this reflects a causal relationship is questionable. Appropriately taking into account trends which are not specific to the EU-Chile bilateral relationship suggests that this relationship may also reflect the fact that priority in FTA provisions was given to commitments in those service sectors with higher trade potential. Once exogenous trends are taken into account, our analysis also suggests that the EU's commitments in the FTA may have actually spurred Chilean exports of services to the EU.

4.2 Foreign Direct Investment

The EU did not have the competence until the entry into force of the Lisbon Treaty to negotiate about investment. Cooperation between the EU and Chile in this area has essentially materialised through Agreements of Protection and Promotion of Investments (APPIs) signed bilaterally between individual Member States and Chile, and FDI is not dealt with *per se* in the EU-Chile FTA. Still, FDI is concerned by the Agreement through two different channels. Direct investment in service sectors is covered by provisions related to mode 3 of supply of services, i.e. commercial presence, even though they actually only refer to majority-owned affiliates.[44] In manufacturing sectors, in contrast, the relevant provisions are stated in Chapter III of Part IV, Title III, referring to the right of establishment. To the extent that the measurement of FDI is common to all sectors in most statistical sources, it makes sense to deal with FDI as a whole for analytical purposes.

The type of difficulties faced in assessing the impact of the EU-Chile FTA on trade in services in general is also encountered for FDI: commitments are generally not quantifiable, they come up in an environment which was already largely liberalised before the EU-Chile FTA, and statistical information is less detailed and accurate than for trade in goods. One major additional difficulty arises here: FDI is a lumpy phenomenon by nature, meaning that individual transactions frequently account for a significant part of sector, if not aggregate figures, and this is especially true for a small country like Chile.

Against this background, the EU-Chile FTA is unlikely to have had a discernible direct impact upon FDI between the EU and Chile. Still, assessing what bearing the Agreement might have for bilateral FDI is worthwhile. The assessment presented here combines available statistics, information based *inter alia* on personal interviews and on the workshops, and an analysis of institutional and legal issues.

4.2.1 Bilateral FDI between the EU and Chile: Facts and recent trends

Little detail is available from Eurostat data about the structure of FDI flows between the EU and Chile.[45] Still, this data source is useful to give orders of magnitude, with a broad coverage, and is presumably more exhaustive than the one available from Chilean sources (see below). Three indicators of FDI are useful to give an overview of the situation and of recent trends: FDI stocks (Figure 22), flows (Figure 23), and incomes drawn from these investments (Figure 24).

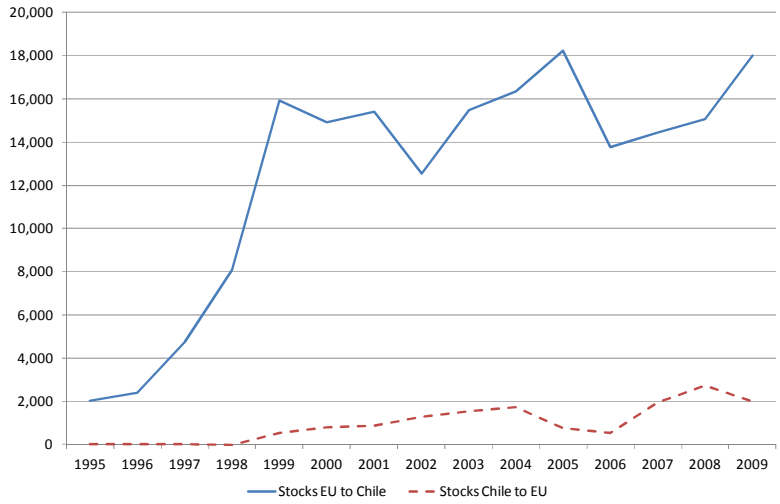
Whatever the dimension studied, the first striking observation is, not surprisingly, the highly asymmetrical pattern of FDI between Chile and the EU. Not that Chile's outward FDI would be negligible. On the contrary, the internationalization of the Chilean economy has materialised not only through trade, but also through the steadily growing process of internationalizing Chilean companies that produce and export goods and services. There is now an accumulated stock of Chilean investment abroad exceeding US$ 50 billion according

[44] Statistics about foreign affiliates trade in services (FATS) are based upon this definition, in contrast to the one followed for FDI, usually including all cases where the foreign investor owns 10 per cent or more of the ordinary shares or voting power. However, the coverage of FATS statistics is too limited to be used in our analysis of EU-Chile relationships.

[45] In addition to total flows per year, the sector detail is available only in a very limited number of cases. It is most often either unavailable or subject to confidentiality.

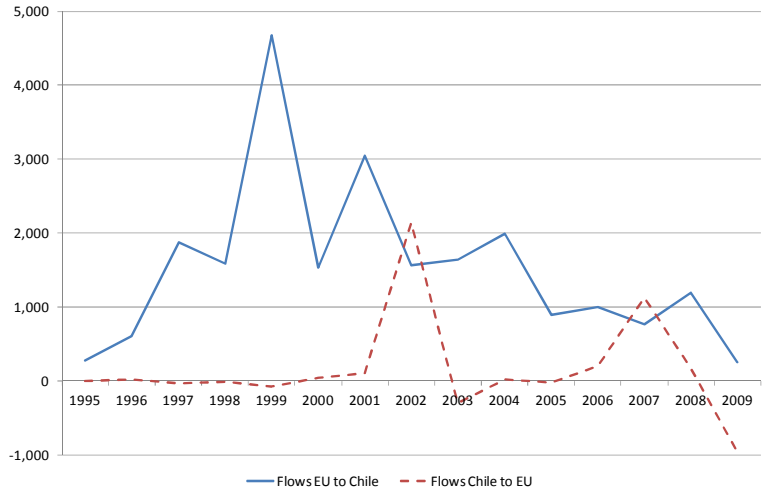
to Chile's Central Bank,[46] i.e. approximately one quarter of GDP. However, the bulk of these investments are concentrated in South American countries, especially Argentina, Brazil, Peru and Colombia. Those four countries jointly account for approximately 80% of Chilean investment abroad. In contrast, Chilean investments in the EU countries remain of limited magnitude, with an accumulated stock assessed by Eurostat of €2 billion in 2009. The principal European recipient countries are Spain and France. Investments are concentrated in the service sector, especially in financial services, transportation and communications.

FIGURE 22: STOCKS OF BILATERAL FDI BETWEEN THE EU AND CHILE (MILLION EUROS)



Source: Authors' calculations based on Eurostat.
Note: "EU" refers to the EU15 until 2003, to the EU25 plus Romania and Bulgaria from 2004 to 2006, and to the EU27 from 2007 onward. However, there is no significant difference, post-2004, to values for the EU15 and for the EU27.

FIGURE 23: FLOWS OF BILATERAL FDI BETWEEN THE EU AND CHILE (MILLION EUROS)



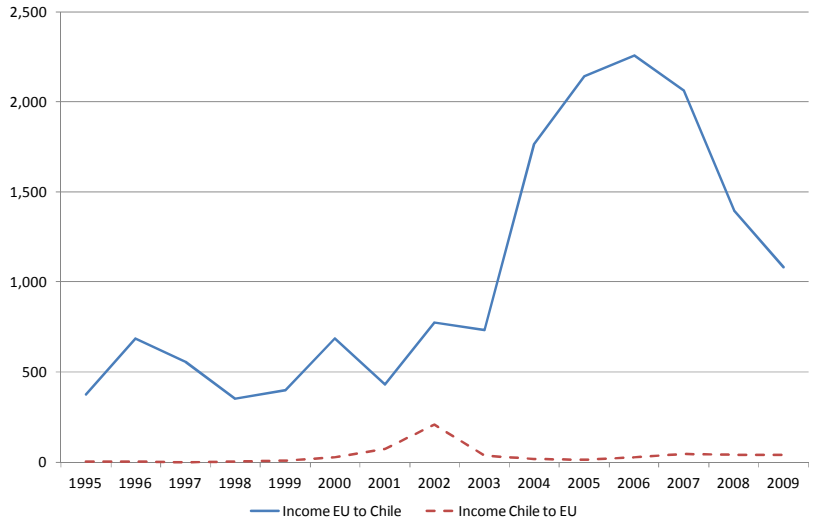
Source: Authors' calculations based on Eurostat.
Note: "EU" refers to the EU15 until 2003, to the EU25 plus Romania and Bulgaria from 2004 to 2006, and to the EU27 from 2007 onward. However, there is no significant difference, post-2004, to values for the EU15 and for the EU27.

[46] According to Direcon, the stock of Chilean FDI abroad amounted at mid-2011 to US$ 53 billion. The stock of inward FDI was assessed at the same time to be US$ 147 billion.

While far from negligible, this is small compared to the stock of FDIs from EU countries in Chile (€18 billion). Given the limited level of Chilean FDI to the EU, the most noticeable changes were so far linked more to individual initiatives than to changes in the institutional framework.[47] This is illustrated by the instability of the corresponding flows, obvious from Figure 23. FDI from Chile to the EU thus remains of limited importance compared to FDI in the opposite direction, on which this section mainly focuses.

Turning to EU FDI in Chile, the very high stock only exceeds the level reached in 1999 by a limited margin. In terms of investment flows, record levels were reached in 1999 and 2001, and the upward trend of the late nineties was replaced by a downward trend in the 2000s. To say the least, it is difficult to see in these figures any sign of a positive impact of the EU-Chile FTA.

FIGURE 24: INCOMES FROM BILATERAL FDI BETWEEN THE EU AND CHILE (MILLION EUROS)



Source: Authors' calculations based on Eurostat.
Note: "EU" refers to the EU15 until 2003, to the EU25 plus Romania and Bulgaria from 2004 to 2006, and to the EU27 from 2007 onward. However, there is no significant difference, post-2004, to values for the EU15 and for the EU27.

Jumping to the conclusion that the EU-Chile FTA had no impact on EU FDI to Chile would be precipitous, though. A large part of European FDI in Chile was composed of acquisitions in the 1990s and early 2000s, and the pace observed in these years would have been difficult to sustain for long, given the weight reached by European affiliates in Chile's economy. As a matter fact, incomes drawn from these investments tell a different story, marked by a surge after 2003 (Figure 24). This is not proof of any impact of the EU-Chile FTA on FDI either, but it shows that the profitability of the EU's investments in Chile has been sustained during this period.

[47] Recently, a Chilean industrial conglomerate finalized the purchase of a major company based in Belgium that specializes in the production of services for mining and industry. The company has operations in Chile, Peru and 30 other countries. This single operation increased the amount of Chilean capital investment in the EU at least by half.

4.2.2 General framework for administering inward FDI in Chile

The deregulation of the Chilean economy and the adoption of a legal framework that guarantee foreign investors conditions similar to those offered to local investors were precursors to the signing of commercial accords and trade agreements and to the creation of a more open Chilean economy. Because Chile had previously negotiated trade-promotion agreements and investment protections with the principal investing nations, by the time the EU-Chile FTA came into effect, there already existed legal and institutional frameworks that encouraged an active exchange of capital.

In Chile, unlike other nations with which the EU had previously negotiated FTAs, there are very few sectors in which investment is limited to residents of the state or must be officially sanctioned. There are no official screening mechanisms to authorize or reject foreign investment projects. The only sectors with some restrictions are those linked to national security such as, for example, the purchase of real estate near national borders, maritime transport, and fishing. Chile's level of openness is reflected in the World Bank's "Investing across Sectors." In the 11 sectors surveyed, Chile attained the maximum index of 100 measuring the level of foreign capital participation permitted in the country.

Rather than having an identifiable investment regime or policy as such, Chile only requires investors in a given sector to comply with the general and non-discriminatory standards that regulate the activities of that sector.

When investing in Chile, foreign investors can choose between two mechanisms for transferring resources to the country. The first is Chapter XIV of the Central Bank's Compendium of Foreign Exchange Regulations, referred to as "Chapter XIV"; and the second is the Foreign Investment Statute, known as "DL600".

4.2.2.1 The Central Bank's "Chapter XIV"

Setting the rules for foreign exchange is among the powers that Chile's Organic Constitutional Law gives to the Central Bank. Currently Chile follows the freedom-of-exchange principle, allowing foreign exchange transactions to be freely performed. However, the Central Bank is allowed to impose some exchange restrictions or limitations if need be.

Capital accounts in Chile have been very open for more than ten years. International exchange only requires that certain transactions, including the movement of capital associated with FDI, be made through the Formal Exchange Market (FEM) and reported to the Central Bank. Regulations are embodied in Chile's Central Bank's Compendium of Foreign Exchange Regulation, Chapter XIV in particular.

Chapter XIV outlines the exchange regulations for loans, deposits, investments and capital contributions from abroad. As noted earlier, these regulations essentially state that foreign investors must report international transactions to the Central Bank and carry them out through an entity of the FEM. In any case, the Central Bank does not have the power to accept or reject investments.

One should note that the concept of investment used by Chapter XIV is not limited only to direct investment, but includes portfolio investments, and the publicly available information is at the aggregate level.

4.2.2.2 The Foreign Investment Statute (DL600)

The Foreign Investment Statute, established in the Decree Law 600 of 1974, is a mechanism that investors can voluntarily subscribe to in order to invest in Chile. When DL600 was enacted, Chile was far off the radar of international investors. The statute sought to attract these investors by providing guarantees from the Chilean government such as tax invariability and guaranteed access to the foreign exchange market.

At present, though the reasons behind the origin of DL600 are not particularly relevant anymore (the nation is well-known for its political stability and open capital accounts), DL600 is still used by foreign investors. In fact, foreign investment authorized in 2010 reached a record high. In previous years, however, the flow of FDI into the country through DL600 almost matched flows carried out under the Central Bank's Chapter XIV.

Essentially, the benefits provided by DL600 have not changed since its establishment in 1974. They are: i) guaranteed access to the foreign exchange market, and ii) tax invariability. With the first, investors are assured that they can transfer their funds to their country of origin and transfer the profits or the proceeds from liquidation of the investment. While at present that is not a benefit with a practical application, it acts as a type of insurance for investors against the possible imposition of exchange restrictions. With the second benefit, investors can opt to consolidate the tax rate that they pay; the evaluation of potential benefits is linked to expectations regarding an eventual increase in the tax rate. Currently, the tax on profit remittances in the common system is 35%, while investors using DL600 can opt for a special program that has a tax rate of 42%, but with the security that it will not vary for 10 years.

To access these benefits, an investor must sign a contract with the Chilean government that has been previously authorized by Chile's Foreign Investment Committee. This committee consists of the Ministers of Economy, Planning, Foreign Affairs and Cooperation, and the President of the Central Bank. It is important to note, however, that even if the committee rejects an investment, investors can always choose to enter capital markets through Chapter XIV.

In addition to the already mentioned benefits, having a contract with the Chilean government may also be advantageous to investors in the event that a dispute occurs.

4.2.3 Bilateral agreements and EU-Chile investments

In addition to the general framework for receiving foreign direct investment in Chile, European investors may benefit from the agreements Chile and the EU have signed bilaterally: the Economic Association Agreement and the APPIs signed with a significant number of EU countries. Both agreements are closely related, as explained below.

4.2.3.1 The EU-Chile Association Agreement

The FTA Chile has signed with the EU does not cover all the areas of investments included in the agreement Chile has signed with the United States, Australia, Japan, Peru, and other countries

The agreement with the EU regulates the right of establishment, which is reflected in both parties' commitment to grant national treatment to legal persons of the other party in the sectors outlined in Annex X of the agreement. This article applies to the right of

establishment in all productive sectors with the exception of all service sectors, including financial services, which are treated separately under the service chapter.

Based on the Association Agreement only, EU investors would actually be less protected than investors from other countries that have signed agreements with Chile to regulate investments, because in some of these other agreements protection is valid from pre-establishment onward and additional matters, such as most favoured nation treatment, have been negotiated.

However, the Association Agreement also states that both parties affirm their existing rights and obligations under bilateral or multilateral agreements to which they belong. This means that existing APPIs will continue to regulate investment.

4.2.3.2 Agreements of Protection and Promotion of Investments

The APPIs seek to promote and protect investments. Although their structure is relatively simple (especially in comparison to that of the investment chapters of FTAs), the negotiated agreements are strong enough to be used in a possible dispute between a state and an investor.

In general, the APPIs incorporate subjects such as fair and equitable treatment, national treatment, most favoured nation treatment, free transfer and settlement of investor-state disputes. The level of detail on these subjects is less than that of the investment chapters of FTAs, but the core principles are the same. In this sense, while a standard APPI is five-pages long, investment chapters can exceed thirty pages mainly because of the comprehensive definitions and the detailed dispute settlement mechanisms. In general terms, a country would be better off with an investment chapter than with an APPI, both as a recipient and as an investor, because it grants more juridical certainty.

From the 1990s onward, Chile signed a significant number of APPIs. Of these agreements, 17 were signed with EU member countries and 15 are still currently enforced, *inter alia* with the EU's largest Member States. The EU countries that have *not* negotiated APPIs with Chile are: Bulgaria, Cyprus, Estonia, Ireland, Latvia, Lithuania, Luxembourg, Malta, Slovakia, and Slovenia. Hungary and the Netherlands have also negotiated agreements, which have yet to be enforced. Also, there was an APPI with Greece that did not go into effect until after the Association Agreement was signed between the EU and Chile.

The approach followed in the Agreement between Chile and the EU in relation to FDI differs from that of Chile's past agreements with other countries. In addition to the above-mentioned differences with regard to the moment at which protection enters into force and to the incorporated disciplines, when negotiations on investments are finalized with a country that has an APPI, the latter is annulled.

Finally, it should be noted that the subjects negotiated in the Agreement with the EU give Chile the liberty to impose exchange controls if deemed necessary. In addition to including an annex that specifically protects the rights conferred to Chile's Central Bank by its Organic Constitutional Law (including the possibility of applying a reserve requirement to short-term capital inflows), Article 166 of the EU-Chile FTA stipulates that both parties may use necessary safeguard measures when payments and movements of capital between parties cause or threaten to cause serious difficulties for the exchange or monetary policies of either party.

Nevertheless, the law of the Central Bank prevents discrimination and the enforcement of rules that discriminate between transactions of the same kind. Therefore, in the event of the imposition of exchange controls, the EU would not be at a disadvantage compared to other countries.

4.2.4 The impact of the EU-Chile FTA on FDI

To figure out what impact the FTA may have had on FDI between the EU and Chile, we first review how incentives changed as a result of the Agreement. We then use available statistics, complement with qualitative assessments.

4.2.4.1 Institutions and incentives

Although the FTA commitments improve the security and transparency of conditions surrounding FDI, there have not been, to date, noteworthy changes to access conditions or the level of protection for European investors. In trade in goods, the reduction or elimination of a tariff on a certain date is a clear and measurable basis to assess the effects of the EU-Chile FTA. No such basis exists for FDI, for the following reasons: i) the system of investment in Chile was already relatively open when the agreement was signed; ii) the absence of additional commitments other than to the consolidation of the existing situation; and iii) the prior existence of investor protection through APPIs.

All the above demonstrates that, from the point of view of legal protection, the FTA does not provide additional benefits to those already party to APPIs prior to the EU-Chile FTA's effective enforcement date of February 1, 2003. Essentially, those countries were already Chile's main sources of FDI.

Analysis of foreign investment flows generated through DL600 shows few significant changes in investing behaviour, with respect to other countries, since the EU-Chile FTA went into effect. Similarly, the sector profile of investments from the EU did not change significantly as a result of the EU-Chile FTA.

Having a regulatory system that provides greater legal certainty and that grants investors the power to sue the state receiving the investment in the event of a dispute are certainly attractive terms that could persuade an investor to choose a particular country. However, these factors seem to have been overshadowed by Chile's track record of economic openness and deregulation, its business climate favourable to foreign investment, its network of bilateral trade agreements[48] and its legal and political stability.

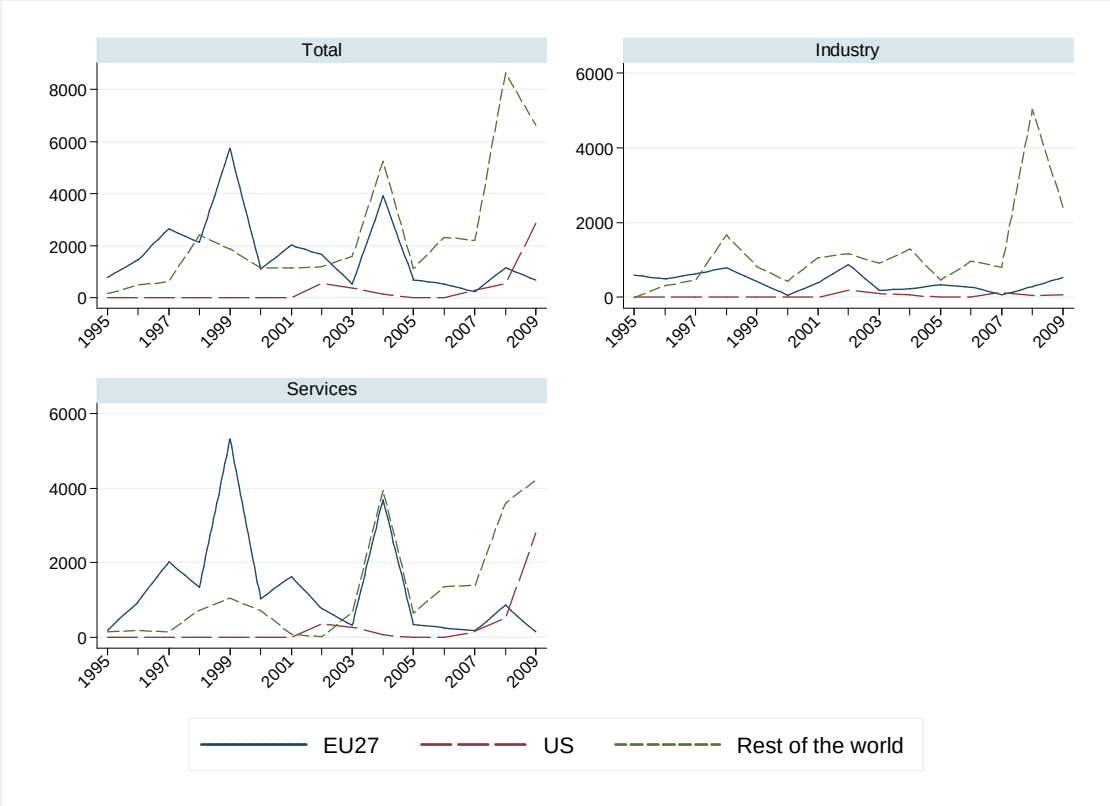
In sum, factors other than the EU-Chile FTA seem overwhelming in determining investment decisions: i) the specific investment opportunities available; ii) economic, legal and political stability; iii) a business climate favourable to foreign investment generally; and iv) an open economy that guarantees preferential access to major world markets. In other words, it is safe to assume that that the behaviour of the flow of investments from the EU has not been largely influenced by the FTA.

[48] A Swedish company recently acquired the leading Chilean producer of consumer goods. In this case, as in other smaller-scale transactions, easy access to third markets (especially in Latin America) offered by the network of bilateral trade agreements signed by Chile was among the main considerations for the acquisition of the company, according to statements made by a representative of the Swedish Trade Office in Chile.

4.2.4.2 Statistical Analysis

Comparing Chile's FDI inflows by sector across investing countries, is only possible based on Chilean data. More specifically, from the two sources available in this respect, corresponding to the above-mentioned two statutes available to foreign investors, only data from the Foreign Investment Committee are available by sector. The analysis below thus makes use of this source, but it should be kept in mind that some FDIs registered under the Central Bank's Chapter XIV are actually not recorded in these data.[49]

Figure 25: Chile's FDI inflows by region of origin, 1995-2009 (million euros)



Source: Authors' calculations based on data from Chile's Foreign Investment Committee.
Note: Scale varies across graphs. "Rest of the world" refers to all countries other than the EU27 and the US.

Breaking down Chile's FDI inflows by region of origin shows that US investments only accounted for a rather small share of the total over the period (Figure 25). Up until 2002, the EU was the main investing region, originating more investment than all other investors taken together. From 2003 onward, EU FDI tended to decline (with the exception of 2004, as a result of large investments made by Spanish firms in telecommunications, electricity, gas and water), while FDI from the "rest of the world" region (excluding the US in the graphs) trended upward. While we have already noted that the EU-Chile FTA's "establishment" clauses do not concern services, FDI in service sectors is shown in the graphs for the sake of completeness. Qualitatively, the general trends described above are common to the industrial and service sectors, but they are more pronounced for services.

[49] Interestingly, in 2008 and 2010, FDI flows from the EU tended to come predominantly through Chapter XVI of the Central Bank, which could indicate a low expectation of changes in the tax structure for investment.

When considered separately by industrial sector, FDI inflows are more difficult to interpret (Appendix 4.3, Figure 45). As already mentioned, the lumpiness of FDI results, for a relatively small economy like Chile, in individual initiatives often taking on an overwhelming importance, and this pattern is naturally accentuated at the sector level. Taking into account the differences in scale across sectors, mining clearly appears to be the most important recipient sector. The EU's FDIs trend downward in this sector, where Canada is the largest investor.

The only other industrial sectors for which EU FDIs are not negligible over the period studied are food, beverages and tobacco, and wood and paper products. Significant FDIs from the US and the rest of the world in the forestry sector are not matched by comparable European investments. In other sectors, total FDI inflows are low.

In services, significant EU FDIs have been recorded over the 1995-2009 period in electricity, gas and water, construction, transport and storage, communication services and financial services (Appendix 4.3, Figure 46). Here also, the lumpiness of FDI is clearly seen in the figures. Still, a striking common feature across sectors is the low level of EU's FDI at the end of the period. No such decline is observed for FDIs from the rest of the world, but this has probably more to do with the financial crisis and relative economic dynamism across regions, than with the EU-Chile FTA.

4.2.4.3 Additional comments

This ambiguity as to the effects of the EU-Chile FTA is also present in the qualitative assessment by the private sector, which can be summarized by the statement of a manager of a telecommunication company who says: "The agreement with the EU as a whole contributes, along with other legal bodies and agreements on double taxation. However, settling in Chile is primarily a decision linked to the stability of the country, clear and stable rules that prevail, the human capital available and responsive to certain needs."[50] For the executive, this was true in the period 2006-2007. However, in recent years Chile has lost competitiveness with respect to countries like Peru and Colombia due mainly to the appreciation of the exchange rate.

The policies encouraging free zones, such as those carried out by Colombia and Costa Rica, are also seen as attractive to European investors. A ten-year exemption from income tax following installation, as is proposed in El Salvador, is another example of attractive policies implemented under third agreements. "More than bilateral treaties, countries generate structures to attract investment" (P. Quezada, see previous footnote). "In this sense Peru is coming to a business model similar to Chile ten years ago. In Colombia and Brazil, elections and government changes do not involve changes in the rules of the game. In Chile it was unique, but not anymore."

In sum the agreement offers an attractive framework, but a handful of micro-level policies may also make a difference, and political stability, exchange rates and labour laws remain key to investment decisions: such a point of view was largely echoed by several stakeholders during the workshops.

[50] Quote of Pablo Quezada, General Manager of the call centre company Teleperformance, founded with Spanish capital.

4.2.5 Conclusions

The EU remains the most important source of foreign investment in Chile. These investments are funnelled mainly toward the service sector. With the exception of UK investments in the mining sector, the share of the natural resource sector in these investments remains limited. In this regard, EU investments differ greatly from other sources of FDI such as the US, Australia, Canada, and Japan.[51]

While the nature of investment-related provisions included in the EU-Chile FTA differs from those in Chile's other FTAs, the analysis above suggests that fiscal and institutional conditions surrounding EU FDI in Chile are fairly favourable, especially when domestic legislation and the articulation with investment-related bilateral agreements are taken into account. For EU FDIs in Chile as for Chilean investment in the EU, investment decisions seem strictly related to business opportunities, and recent evolutions have probably more to see with economic dynamism of investing countries than with the EU-Chile FTA. In this context, the FTA did not significantly change the legal framework or the guarantees for European investors. Its benefits essentially lie in additional security associated to consolidation of the conditions prevailing before the EU-Chile FTA. Even though such benefits do not necessarily materialise in significant changes in investment behaviours, they are not negligible, especially in the long run. As a matter of fact, no specific changes have been mentioned to us as needed improvements to the EU-Chile FTA, in this respect.

[51] Data on Chile's inward FDI by investing country and by sector are available from Chile's Foreign Investment Committee.

Chapter 5 - Institutional and Regulatory Issues

The EU-Chile FTA goes far beyond tariff provisions. It also includes a wide-ranging set of rules regarding trade-related issues, such as sanitary and phytosanitary (SPS) measures, standards and technical regulations, customs procedures, geographical indications and intellectual property rights. The EU-Chile FTA was, at the time of negotiation, a particularly ambitious agreement in these respects. The role played by these provisions depends upon the quality of their enforcement and on the cooperation and dialogue between the parties. This chapter reviews these aspects, analysing the provisions, the underlying institutional structure and the assessed consequences for trade as well as for domestic practices in the areas of interest.

5.1 Institutional structure

The Association Agreement covers the political, commercial, economic, financial, scientific, technological, social, cultural and cooperation fields. The trade pillar is one of the four main components of the agreement, and its provisions are set out in Part IV of the Agreement under "Trade and Trade Related Matters".

The objectives of the trade pillar are the progressive and reciprocal liberalisation of trade in goods (in conformity with WTO Agreements); the facilitation of trade in goods through the agreed provisions regarding customs and related matters, standards, technical regulations and conformity assessment procedures, sanitary and phytosanitary measures and trade in wines, spirit and aromatised drinks; the reciprocal liberalisation of trade in services; the improvement of the investment environment; the effective and reciprocal opening of the government procurement markets of the Parties; the adequate and effective protection of intellectual property rights; the establishment of an effective cooperation mechanism in the field of competition; and the establishment of an effective dispute settlement mechanism.

The Association Agreement outlines specific provisions regarding the administration of the different pillars that shape the agreement, including the trade pillar. The decision-making bodies and administration are the Association Council, the highest political body, and the Association Committee, which is responsible for the general implementation of the Agreement. Special committees were also established under the Agreement, which leaves the possibility for the Association Council to set up any other Special Committee. In the

following sections, we review the functioning of the main institutions that have been dealing with trade issues, i.e. the Association Committee, and six special committees.

5.1.1 The Association council and the Association committee

The Association Council supervises the implementation of the Association Agreements. It meets at least once every two years and is presided over by the Chilean Minister of Foreign Affairs and the President of the EU Council or a representative at the ministerial level. Its main function is to review the progress of the Association Agreement and to examine any major issue arising within the framework of the Agreement, and to consider and decide on proposals and recommendations from both parties to improve the operation of the Agreement. The Council has the power to make decisions in all cases provided for in the Agreement. Its decisions and recommendations are adopted by mutual agreement between the Parties.

The Association Committee is an assisting body to the Association Council. It meets annually and is chaired alternately by senior officials at the Deputy Minister level from both Chile and the EU. In terms of the operation and administration of the Agreement, including its economic and trade aspects, this is the most important institutional body because it receives reports from the Special Committees and is responsible for resolving technical and operational issues to facilitate trade and investment. Moreover, the Association Committee receives regular reports from the following committees:

- The Joint Management Committee on Sanitary and Phytosanitary Measures
- The Committee on Standards, Technical Regulations and Conformity Assessment
- The Special Committee on Customs Cooperation and Rules of Origin
- The Joint Committee for the Administration of the Agreement on Wines and Spirits
- The Special Committee on Financial Services

Without formally establishing a technical committee under the Association Committee, matters related to the protection of intellectual property rights have been discussed in videoconferences and at least one technical meeting of experts from both parties.

5.1.2 The Functioning of the Association Committee

The Association Committee has met annually since 2003, holding nine meetings to date (December 2011). While the topics covered in its meetings go beyond economics and trade, official records and documents show that progress under the Trade Pillar of the Association Agreement has routinely received detailed attention. The main topics discussed in committee meetings with regard to trade are indicated below:

i) Review of trade and investment flows and evaluation of projected future trends.

ii) Dialogue and exchange of information on trade policy and possibilities for joint action on bilateral and multilateral levels.

iii) Detailed examination of reports provided by technical committees, incorporation of the recommendations of such committees as needed and guidelines for the work of the committees for the following period.

iv) Dialogue on potentially controversial matters, especially with relation to the possible use of trade defence measures that could affect bilateral trade.

While each Association Committee meeting has a specific agenda, the main emphasis of bilateral conversations has been on trade and investment flows and the progress in the work of the technical committees. In this regard, by referring to official record and documents, some conclusions about the committee's performance can be drawn:

- The Association Committee has made dialogue possible between senior officers and has provided the technical committees with adequate political and institutional coverage to encourage greater efficiency and consistency in their actions.
- The technical committees have reported their activities regularly, most reports have been approved without major amendments and the Association Committee authorities have supported their work.
- The Association Committee meeting agendas reflect an approach focused more on addressing issues at hand for the period under review rather than setting goals and identifying action plans to enhance and streamline investment and the exchange of goods and services.
- Both parties explicitly ascribe great importance to ensuring that channels and institutional mechanisms for political dialogue and technical work function properly. Additionally, both parties value the contributions developed by the technical committees to gradually resolve non-tariff barriers that hinder trade.

Through bilateral dialog, the Association Committee has avoided any serious trade disputes. In fact, no instances have been reported that required the bilateral mechanisms provided in the Agreement to resolve disputes. This is in itself a significant achievement.

5.2 The Joint Management Committee on Sanitary and Phytosanitary (SPS) Measures

This committee handles animal and plant health in international fresh and processed food trade and addresses the dynamic and growing demands of international trade. Given the complex nature of these issues, which are particularly technical, and their importance for trade, institutional trust and technical dialogue between the agencies and directorates in charge are key elements for an effective functioning of the trade provisions of the Agreement. For this reason, the Association Agreement provides for the creation of the Joint Management Committees to deal with these issues and perform the following functions:

- Monitor the implementation of Annex IV provisions from the Agreement that relate to SPS measures and consider all issues that may arise in connection with their implementation.
- Review the appendices of the EU-Chile FTA on sanitary and phytosanitary measures in light of progress made under consultation and procedures provided therein, and make recommendations for their modifications.

- Establish, when necessary, technical working groups to identify and address scientific and technical issues that result from the implementation of the agreement.

The Committee meets once per year and between those meetings, follow up audioconferences can be also organised. The Committee is composed of senior officials and technical specialists of the respective SPS institutions and agencies responsible for administering the EU-Chile FTA with regard to commercial interests (DIRECON is the Chilean authority and DG SANCO represents the Commission). On the EU side, if the Committee is coordinated by the Commission, Member States participate in the meetings.

The Committee's constitution and overall performance have played a fundamental role in the development of bilateral relations with regard to trade in agricultural and food products.

The EU-Chile FTA states that the basis for procedures, standards and regulations are to be defined in accordance with the agreement on SPS measures of the WTO as well as the standards, recommendations, guidelines put forth by the *Codex Alimentarius* Commission, World Organisations fro Animal Health (OIE) and International Plant Protetion Convention (IPPC). Decisions are also subject to bilateral monitoring and accreditation of compliance for these regulations as well as any future modifications.

Reviewing the official records and documents of all meetings held since 2003, the Committee's systematic approach to addressing specific topics can be highlighted. These topics are outlined as follows:[52]

a) Requests for reviewing rules and regulations that limit trade goods of animal origin, especially cattle, poultry, and pigs.

b) Requests for the establishment of protocols and approval of facilities and plants enabled to trade goods of animal origin.

c) Requests for reviewing rules and regulations that limit trade in goods of vegetable origin, or requests for verification of compliance with these rules.

d) Establishment of regionalization decisions for the control of pests and disease, and definition of import conditions based on these criteria.

e) Identification of measures to improve the reporting of changes in domestic rules that affect international trade.

It is noteworthy that the EU-Chile Sanitary and Phytosanitary Agreement was the first bilateral agreement between the EU and a third country to include provisions on animal welfare within its scope, with the aim of reaching a common understanding between the parties on the matter. In particular, it led to the creation of a technical working group on animal welfare with the objective of improving the exchange of information and expertise between the EU and Chile on animal welfare issues, in order to build a common understanding on agreed animal welfare standards, stunning and slaughtering of animals and animal transport. Besides, several scientific events and seminars were organised, which led to a constructive dialogue on animal welfare issues.

[52] Source: Official records of the meetings of the Joint Management Committee for SPS Measures. Acts I through VII, years 2007 to 2009.

5.2.1 Working Agenda of the Joint Management Committee

The work of the Joint Management Committee is organized through biannual agendas to systematically monitor progress. The contents of these agendas, shown below, demonstrate the seemingly balanced approach the Committee takes in addressing issues of both parties (Table 28).

Table 28: Summary of Key Issues Addressed by the Joint Management Committee for Sanitary and Phytosanitary Measures

Year	EU	Chile
2003	Recognize the status of member nations with relation to various diseases affecting animal production (avian flu, foot and mouth disease, swine flu) Address status of spongiform encephalopathy (mad cow disease). Regionalization for the treatment of avian flu. Definition of model for issuing certificates of plant and animal health.	Clarification of permissible limits for residues of chemicals used in salmon production. Clarification with regard to accepted dioxin residues in food. Definition of models for issuing certificates of plant and animal health.
2004	Recognition of health status with regard to spongiform encephalopathy. Recognition of health status of member nations. Models for issuing certificates of plant and animal health.	Certification to authorize the exportation of sunflower seeds. Authorization of facilities for exporting meat. Acceptance of the national residue control plan for milk production. Models for issuing certificates of plant and animal health.
2005	Recognition of health status with regard to spongiform encephalopathy. Authorization of bovine semen and embryo exportation. Regionalization for duck exportation. Creation of a working group to define accepted levels of chemical residues in food. Working groups in plant and animal health and food safety. Authorization of facilities for dairy export.	Recognition of health status with regard to spongiform encephalopathy. Authorization of facilities for meat exportation. Certification for sunflower seed exportation. Working group on chemical residues in food. Authorization of facilities for dairy exportation. Clarification on regulations for wood packaging.
2006	Regionalization for treating avian flu. Safety status of spongiform encephalopathy. Establishment of regulations for food traceability. Models for issuing certificates. Export of products of plant origin.	Authorization of strawberry plant exportation. Authorization of sunflower seed exportation. Clarifications regarding food traceability requirements. Safety status of spongiform encephalopathy. Authorization of tomato seed exportation.
2007[53]	Information about cases of foot and mouth disease and avian flu. Clarifications regarding Chilean regulations on the treatment of bluetongue disease (in cattle). New regulations for food traceability. Modification of regulations for the exportation of semen and embryos. Authorization for pork exportation. Authorization for live poultry export. Adoption of early warning mechanisms to detect public health risks.	Authorization for strawberry plant exportation. Authorization for Chilean palm (ornamental tree) exportation. Adoption of early warning mechanisms to detect public health risks.
2008	Regulatory equivalency agreements. Requirements for bovine embryo exportation. Requirement changes for food traceability.	Regulatory equivalency agreements. Authorization of importing semen from the EU. Request for sunflower seed exportation authorization. Request for Chilean palm tree exportation authorization. Authorization for avocado and citrus exportation.
2009	Clarification regarding regionalization. Requirements for treatment for bluetongue. Determination of equivalencies.	Authorization of importing bovine embryos. Request for sunflower seed exportation authorization. Determination of equivalencies.

Source: Own elaboration based on official records of the meetings of the Joint Management Committee for SPS Measures.

[53] Meeting held in January 2008

To shed further light on the nature of these issues and on the work of the Committee, a few significant cases are reviewed below.

5.2.2 Case study 1: EU exports of genetic material for cattle and sheep (bovine semen)

In the 5th meeting of the Joint Management Committee, the EU expressed concern over the current Chilean regulation (2374 1997), requiring a status known as "Bluetongue-free Country" for the importation of frozen bovine semen. The provision prevented imports from the EU due to the presence of the disease in its territory. As a result, Chile made an amendment to this resolution and others related to the topic as a means of organizing their health requirements into a single regulation for the importation of semen. Chile also took into account new recommendations on some diseases from the World Organisation for Animal Health (*Organisation Internationale des Epizooties,* OIE). This new regulation (Resolution 5786 of 2008) also included safeguards for diseases not regulated by the OIE and serological tests for various diseases.

Although this new regulation allowed for the recognition of "Premises Free of Bluetongue" rather than enforcing the "Bluetongue-free Country" regulation in the old resolution, the EU requested several other changes in the 6th meeting of the Joint Management Committee. These requests included adding a Q Fever certification (a disease not covered by the OIE) and changing the requirements of specific tests; requesting the removal of some tests and the possibility of using alternative tests as the standard for others.

After reviewing the request presented by the EU, Chile amended Resolution 5786 of 2008 in two sections: resolutions 3162 of 2010 and 7104 of 2010. Despite the fact that there are still some specific requests on the agenda from the EU on this issue, there have been several amendments to allow for the export of animal semen from the EU to Chile.

This issue was first raised at the 5th meeting of the Committee and successfully dealt with in the 6th, 7th, and 8th meetings of the Joint Management Committee. The regulations involved were Resolution 2374 of 1997 and later Resolution 5786 of 2008, which were modified by the resolutions 3162 of 2010 and 7104 of 2010.

From when the issue was first raised in the 5th Joint Management Committee meeting to the final resolution changes that authorized Chilean imports of bovine semen from the EU, it took nine months for the first amendment and two years for the later amendments. Discussions on sheep and goat semen still continue.

Table 29: Chilean imports of bovine semen

Imports (thousands of US$, cif)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
EU	162	291	385	430	590	599	815	695	413	806
Rest of the World	1,518	1,300	1,306	1,604	1,942	2,210	2,737	3,653	1,876	2,919

Note: there are no figures for sheep and goat semen. Source: National statistics, Chile and Trade Map.

Assessing the impact of these regulatory changes in trade flows is not possible in the little time that has elapsed since their enforcement, especially given the significant year on year variability of Chilean imports of bovine semen (Table 29).

5.2.3 Case study 2: Authorization of the exportation of bovine embryos from the EU

In the 5th meeting of the Joint Management Committee, the EU called for a differentiation between the requirements for imports of live bovine embryos and those collected *in vitro*. This is because the risk of transmission of Bovine Spongiform Encephalopathy (BSE) was different in both cases, and the EU believed there was no justification for maintaining the stringent "BSE-free Country" standards as these standards are not in line with the recommendations of the OIE.

Following this request, Chile amended Resolution 1720 of 1995 with Resolution 223 of 2009. This policy change is linked to Resolution 5277 of 2004 that establishes measures for the prevention of BSE and exempts, among other products, live embryos. While the amendment solved the issue, the EU request to exclude regulating imports for live ruminants and pseudo-ruminants is still being discussed. This type of regulation, in practice, prevents the export of sheep and goat embryos. The new proposed regulation was submitted for public consultation through May 12th, 2001 and set sanitary standards for the admission of eggs and embryos of ruminants and pseudo-ruminants (live and *in vitro*) to Chile and repealed the following resolutions: 1688 of 1992; 2434 of 1994; 1465 of 1995; 1720 of 1995 and 2212 of 2004. For this new regulation, the EU has made a series of comments related to the differentiation of species, the requirements for a number of diseases not covered by the OIE and also the requested tests.

The periods of discussion of the issue were, for bovine embryoss the 5th and 6th Joint Management Committee meetings, and for sheep and goat embryos, the 7th Joint Management Committee meeting and onwards. Several regulations needed to be amended to resolve the issue. For bovine embryos, Resolution 1720 of 1995 was modified through Resolution 223 of 2009. For all embryos of ruminants and pseudo-ruminants: the new proposed regulation will establish sanitation standards for the admission of eggs and embryos from all ruminants and pseudo-ruminants (live and *in vitro*) to Chile and repeal the following resolutions: 1688 of 1992; 2434 of 1994; 1465 of 1995; 1720 of 1995 and 2212 of 2004.

The request regarding bovine embryos with respect to Bovine Spongiform Encephalopathy standards for live and *in vitro* embryos was addressed within the past year. The regulatory changes regarding the admission of embryos are still being developed. This is because Chile decided to develop a single regulation for all ruminant and pseudo-ruminant embryos (live and *in vitro*).

Since it has been such a short period of time since the issue was resolved, it is not yet possible to assess its impact on trade flows. In any case, the issue raised involved limited trade.

5.2.4 Case study 3: Authorization of oyster exports from Chile

In the Joint Management Committee's 6th meeting in November 2008, Chile expressed interest in obtaining authorization to export live bivalve molluscs to the EU.

During the meeting, the Parties agreed that the EU would establish a pre-inspection questionnaire to be completed by Chile and that afterwards an inspection visit to Chile would be planned.

In the 7th meeting in 2009, Chile also expressed its desire to immediately resolve the issue of the exportation of chilled oysters to the EU. Because there were only regulations for live and processed products, Chile proposed amending EU provisions with regard to the admission of chilled products.

The mission of the Food and Veterinary Office (FVO) was established in 2010 and resulted in the EU issuing its Decision 2010/725/EU, amending Annex I of Decision 2006/766/EC. This allowed for the inclusion of Chile in the list of third-party countries from which imports of bivalve molluscs, echinoderms, tunicates and marine gastropods, frozen or processed for human consumption, are permitted. Additionally, the regulation authorized the admittance of chilled and gutted bivalve molluscs from the *Pectinidae* family (scallops), wild or gathered in production areas classified as Class A in accordance with Annex II, Chapter II, section A.3 of Regulation (EC) no. 854/2004. Although authorization for the oysters from Chile has been put into effect, steps are still being taken for the rest of the live bivalve molluscs.

The issue was discussed in Joint Management Committee meetings in 2008, 2009, and 2010. The Decision 2006/766/CE was the regulation invoked to resolve the issue.

TABLE 30: CHILEAN EXPORTS OF BIVALVE MOLLUSCS (PRODUCT : 030791 OTHER MOLLUSC AND INVERTEBRATES, LIVE, FRESH OR CHILLED)

Exportations from Chile in thousands of US $, fob

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
World	19,592	18,503	18,640	17,426	14,738	12,509	9,574	9,819	5,623	5,655
EU	0	17	29	17	35	126	6	5	49	0
Rest of World	19,592	18,486	18,611	17,409	14,703	12,383	9,568	9,814	5,574	5,655

Source: National statistics, Chile and Trade Map.

The process lasted for two years. Chile adjusted agreement processes as requested by the EU and the EU was delayed in planning its inspection visits to different countries. In practice, though, the impact is not visible in custom records, and there is little trade with the EU (Table 30). Note that according to a statement by Chilean officials, the agreement essentially normalized an existing situation, given that chilled oysters were already being exported under the previous regulation.

5.2.5 CASE STUDY 4: CHILEAN EXPORTS OF DAIRY PRODUCTS

During the 2nd Joint Management Committee meeting (2004), Chile pledged to send the EU all the information requested about their waste management plan for milk and dairy products. In turn, the EU pledged that the FVO would make a visit to Chile in 2005.

At the 3rd meeting in 2005, Chile reported that all recommendations made by the FVO in its inspection had been put into practice and requested approval of a first list of

facilities for dairy exports to the EU. The EU stated that the facilities would be approved after Chile's action plan had been reviewed. It should be noted that, although Chile complies every year with the waste plan required by the EU, only one facility is authorized to export cheese to the EU.

The issue was addressed during the 2nd and 3rd Joint Management Committee meetings. The issue was resolved in two years. The regulations involved were annually defined requirements and standards of the waste management plan and resolutions identifying authorized facilities.

An indirect impact on trade can been seen to the extent that the adoption of a General Plan for Waste Control for the dairy industry positively impacted trade flows to third-party markets, but not necessarily to the EU, to which Chile's exports of dairy products have remained very limited so far (Table 31)

TABLE 31: CHILEAN DAIRY EXPORTS

Total dairy product exportation (thousands of US$)										
To:	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
EU	6	10	24	18	14	465	28	8	115	16
Rest of World	48,704	38,861	51,532	78,892	108,965	115,165	163,877	214,018	121,083	141,026
Total World	48,710	38,871	51,556	78,910	108,979	115,630	163,905	214,026	121,198	141,042

Source: National statistics, Chile and Trade Map.

5.2.6 THE EU-CHILE FTA AND THE SANITARY AND FOOD SAFETY POLICY IN CHILE

Sanitary and phytosanitary issues in Chile

Chile's participation in international trade through a variety of trade agreements has led both exporters and public institutions to upgrade SPS standards so as to be able to export to particularly demanding countries such as the EU, Japan and the United States. This movement has been accompanied by changes in the regulatory framework and a strengthening of controls.

In the animal sector, for example Chile is now listed by the OIE as in a "good sanitary" situation. It is one of the "Foot-and-mouth disease-free" countries where vaccination is not practised. Chile is also officially free of classical swine fever and presents a negligible risk for Bovine Spongiform Encephalopathy (the lowest risk category). Some diseases still exist in Chile, such as bovine tuberculosis and trichinelosis (which is limited to certain areas), but they are treated in Chile following official EU procedures. In the meat sector, Hazard Analysis Critical Control Points (HACCP) systems are implemented, and they are also in line with the EU requirements (FVO 2009).

Examination of the EU's notifications of border detentions suggests that sanitary problems encountered by Chilean exports to the EU have been mostly limited to the feed sector (several notifications of salmonella in fishmeal for animal feed). In the food sector, cases raised include heavy metal contents in large pelagic fish (a problem by no means

unique to Chilean exports) and four cases of residuals of substances prohibited in the EU, one case in salmon and three cases in apples (Table 32).

TABLE 32: RECENT RAPID ALERT IN THE EU REGARDING GOODS FROM CHILE

Fishmeal for animal feed exported to Spain (Salmonella, too high count of Enterobacteriaceae)
Excessive rate of sorbic acid in plums exported to Poland and Estonia
Rupture of the cold chain, frozen acquatic invertebrates exported to Spain 2011
Parasitic infestation of chilled swordfish (*Xiphias gladius*) exported to Germany 2011
Excessive mercury rates in swordfish exported to Germany, France
Bee pollen with defective packaging exported to the UK
Prohibited substance chloramphenicol (70 µg/kg - ppb) in frozen salmon fillets (Salmon salar) exported to Germany
Lupin from Chile infested with moulds exported to Portugal
Bad hygienic state of southern hake (*Mercluccius australis*) exported to Spain
Unauthorised substance morpholine (1.2-1.5 mg/kg - ppm) in dried apples exported to Germany, Greece and the UK
Bad hygienic state of fish liver and roes exported to Spain
Dried prunes, raw material from Chile infested with mites (*Acaridae*) exported to Poland

Source: Detentions of EU imports from Chile. RASF, cases raised between January 2010 and September 2011.

Significant improvement over time

In spite of the remaining sanitary issues, there is little doubt that the SPS conditions of food and feed production in Chile have improved significantly since the implementation of the EU-Chile FTA. The findings of the EU FVO inspections since 2003 clearly show that major progress has been made.

For example, in the livestock sector, a 2003 inspection report raised a variety of concerns. Among the caveats of the Chilean sanitary control system at the time, inspectors of the EU-FVO questioned the ability of Chile to deal with a potential outbreak of classical swine fever, due to lack of high level equipment and inaccurate testing results. One conclusion was also that a lack of traceability of animals made it difficult to ensure banned anabolic substances were not used in livestock production, and made summer grazing surveillance for foor and mouth disease unreliable. By contrast, more FVO inspection reports between 2008 and 2011 highlight the significant changes in legislation that have taken place over the recent years. They also point out the improvement in terms of scientific equipment and training in public institutions working on food safety.

As far as poultry is concerned, recent inspection reports find some weaknesses regarding inspections in slaughterhouses and the updating of the list of establishments approved for EU export and animal welfare. In the meat sector, some weaknesses were identified in the official controls of the implementation of animal premises certification. In 2011, EU inspectors found some remaining problems regarding the identification and traceability of animals. The FVO also raised concerns regarding the monitoring of the use of veterinary medicine (FVO, Inspection Reports 2009-2011). However, the 2009 inspection on the meat supply chain concluded that "all the establishments visited had structure, layout, equipment, cleaning and disinfection procedures in line with EU requirements. Only minor deficiencies were noticed and in most cases, immediate action was taken. All the establishments visited had traceability systems in place, allowing tracing from individual boxes of meat to individual animals or group of animals".

In the area of bivalve molluscs, some concerns are expressed by EU inspectors regarding classification and monitoring of productions areas, and on the frequency of the monitoring of toxins. However, the 2010 FVO inspection concludes that "the current organization of the Chilean Competent Authority and the control system implemented by the Competent Authority offer appropriate guarantees concerning the sanitary conditions of bivalve molluscs and fishery products for EU export."

In the area of pesticide residues, a 2009 FVO report noticed the lack of special provisions and control plans for pesticide residues in food of plant origin intended for export to the EU, but inspectors stressed the quality of private controls for pesticide residues operated by the well-organised and export-oriented growers, pack-houses and exporters. EU inspectors concluded that there was evidence of satisfactory follow-up of the recent EU Rapid Alert System for Food and Feed notifications on pesticide residues in fruit by the competent authority.

The general conclusions of the recent inspection reports are quite positive regarding the ability of Chile to export safe products to the EU. More generally, recent inspection visits concluded that the Agriculture and Livestock Service (SAG) inspectors (met by the mission team) were "knowledgeable, experienced and regularly trained", and that the structure and power of the competent authority as well as enforcement are "considered satisfactory" (FVO 2009b).

The role of the EU-Chile FTA

The positive evolution of the SPS status of Chile since 2003 cannot be fully attributed to the EU-Chile FTA. The requirements for exporting agricultural and food products in countries such as the United States and Japan have also been significant drivers for better procedures. However, during the interviews conducted in Chile by the authors of this report, there has been a consensus on the role of the EU-Chile FTA as an important factor in the improvement of the veterinary control, inspection, certification and traceability of Chilean production. Box 5.1 summarizes the point of view of the Chilean pork and poultry producers regarding the incentives introduced by the EU-Chile FTA to implement higher standards. This industry also stressed the indirect benefits of the EU-Chile FTA, such as the ability to export more easily to Asian markets.

Box 5.1. Indirect effects of the EU-Chile FTA on the Chilean meat industry.[54]

The Chilean meat sector has benefited from the EU-Chile FTA. Exports of beef to the EU have increased, even though Chilean exporters complain about the quantitative ceiling for duty free imports (tariff rate quota) in the EU. The representative of the the pork and poultry producers association (*Aves y Cerdos*) illustrated some indirect consequences for other types of meat in a workshop organised in May 2011. According to him, one explanation of the competitiveness of the Chilean poultry and pork industry in the Japanese and Korean markets, where Chilean exports have gone up, is the experience in terms of good practices that Chile acquired in exporting to European markets.

[54] Adapted from the presentation by Juan Miguel Ovalle at the workshop on the EU-Chile trade Agreement organised by ITAQA, Hotel Hyatt, Santiago, May 17 2011.

The EU-Chile FTA has led Chilean producers to modify their standards and the methods used in the Chilean supply chain. Chilean producers have implemented a range of quality assurance systems. They include: a set of good practices to be met by companies to guarantee animal health and food safety, worker safety, animal welfare and environmental sustainability; certification of meat packing plants under the Hazard Analysis and Critical Control Point System; a government program designed to ensure and improve health conditions on farms, enforced by the Agriculture and Livestock Service (PABCO for Project of Animal Premises under Official Control); International Standardization Office (ISO) Standards; industry-standard traceability systems compatible with European requirements now implemented by Chilean poultry and pork producers; and disease monitoring, with trans-border control of animal products and by-products.

Chilean producers now acknowledge that these rules, which were seen at first as generating extra costs, have become a factor in competitiveness. In the same way, the EU animal welfare rules, which are still seen as constraints by Chilean producers, will eventually be valued by third countries and also become a factor in competitiveness.

The institutional arrangements of the EU-Chile FTA have played a significant role in this change in perception of the standards. Chilean producers see the benefits of strict standards as well as the bilateral cooperation that has taken place with the EU in 2008. At the time, some Asian countries turned down Chilean exports due to a limited sanitary problem (dioxin). The excellent institutional dialogue with the EU was such that EU authorities trusted the ability of the Chilean government to deal with the problem. The newly developed Chilean control procedures were seen as appropriate by EU authorities, and the trust developed in the institutional dialogue led the EU to keep accepting Chilean exports. This has helped the Chilean industry to convince Korea and Japan that the problem was under control, and helped reopen their market.

5.2.7 Conclusions

The Joint Management Committee on Sanitary and Phytosanitary Measures, held meetings regularly from when the EU-Chile FTA went into effect until the present. These meetings have allowed for a systematic dialogue on issues of bilateral interest and have contributed to the gradual resolution of various issues that limited flows of food trade between the two parties. The adoption of biennial action plans has led to greater consistency in defining the bilateral agendas and facilitated the development and monitoring of the implementation of commitments. The partnership has also established mutual trust between institutions. This is reflected in the various protocols agreed to in past years, covering diverse areas such as regionalization criteria, early warning mechanisms for plant and animal health risks.

Most of the issues of bilateral interest, in regard to both products of animal origin and those of plant origin, have been resolved gradually. Often, this has been the result of decisions linked to revisions in internal regulations of various public agencies. Some of the requested changes and adjustments are related more to issues of the recognition of sanitary status than to the importance of current and future trade flows. Both the EU and Chile have obtained reforms in their partners' regulations on the issues that were resolved through dialogue within the Committee. Both parties highly regard the work performed by the Committee and emphasize the fact that there are no cases in which it was necessary to

resort to a bilateral or multilateral dispute settlement. Making the regulatory changes necessary to resolve cases required two or three Committee meetings (at least two years) and the active participation of relevant government agencies.

5.3 Committee on Standards, Technical Regulations, and Conformity Assessment

5.3.1 Issues addressed by the Committee

The EU-Chile FTA's Chapter II on non-tariff measures has a specific section aimed at establishing criteria for defining norms, standards and technical regulations governing trade of goods. Besides referring to the principal criteria put forth by the WTO's Technical Barriers to Trade (TBT) Agreement, a special committee was formed to address these issues and was assigned the following functions and powers:

- Monitor and supervise the provisions referred to in the agreement.
- Provide a forum for discussion and information exchange on systems established by the parties for the implementation of rules, regulations and conformity assessment procedures.
- Provide the parties with a forum for consultation and a mechanism for rapid solution to problems that unnecessarily hinder trade within the limits of the Agreement.
- Encourage cooperation between public agencies or private parties responsible for metrology, standardization, certification, testing, inspection and accreditation.
- Contribute within its areas of responsibility to the improvement of access to markets for both partners.

The committee is composed of senior officials from the responsible specialized agencies and is to meet, in person or by video conferencing or by another arrangement established by mutual agreement, at least once a year and give their reports to the Association Committee.

The committee has met once a year in accordance with the provisions of the EU-Chile FTA, usually by means of video conference, and has systematically addressed matters related to the establishment of technical standards, regulations that impact bilateral trade and exchange of information, and third-party regulations that impact both parties.

The table below presents the main topics of interest that both the EU and Chile discussed at meetings held from 2003 to present (Table 33).

TABLE 33: SUMMARY OF THE MAIN ISSUES OF BILATERAL INTEREST DISCUSSED BY THE COMMITTEE ON STANDARDS, TECHNICAL REGULATIONS AND CONFORMITY ASSESSMENT

Year	EU	Chile
2003	Request for clarification of regulations on electrical appliances. Request for clarification on emission regulations for diesel engines.	Clarifications regarding the Reach System to be established by the EU.
2004	Clarification on the regulations for the importation of cosmetics. Request for clarification on emission regulations for combustion engines. Information exchange.	Clarification on regulations for the importation of cosmetics. Clarifications on the Reach System. Information exchange.
2005	Request for clarification on regulations for electrical appliances. Request for changes in regulations for the importation of cosmetics.	Request for changes in the provisions of the Reach System. Request for clarification on provisions for shoe labelling. Request for the implementation of *Codex Alimentarius* regulations for the exportation of canned sardines in the EU.
2006	Clarification on rules adopted for the importation of shoes. Request for regulatory changes regarding the importation of cosmetics.	Request for changes in the application of the Reach System. Request for the implementation of *Codex Alimentarius* regulations for the exportation of canned sardines.
2007	Adoption of new regulation for textile product labelling.	Request for changes in the implementation of the Reach System.
2008	Request for changes to the regulations for the importation of cosmetics.	Changes in the implementation of the Reach system.
2009	Request for changes to the regulations for the importation of cosmetics.	Changes in the implementation of the Reach system.

Source: Authors' elaboration.

5.3.2 THE WORKING OF THE COMMITTEE

Through an analysis of the Committee's performance and a review of the topics discussed at its meetings the following conclusions can be reached.

The Committee's work has developed in a regular and systematic manner, in accordance with the provisions of the EU-Chile FTA.Committee meetings have effectively fulfilled the committee's role of providing a forum for exchanging information on OTC initiatives and technical standards to be carried out by both parties.

The discussion of specific issues of bilateral interest, such as Chile's regulations on the importation of cosmetics or the EU's Reach System regulations, has allowed for the gradual reconciliation of issues that have negative impacts, potential and concrete, on bilateral trade.

It has never been necessary to utilize the mechanisms established for bilateral or multilateral dispute settlements.

5.4 Special Committee on Customs Cooperation and Rules of Origin

5.4.1 Role of the Committee and issues addressed

The EU-Chile FTA's Chapter II on non-tariff measures provides for the creation of a Committee on Customs Cooperation and Rules of Origin with the following functions:

- Monitor the implementation and administration of all matters related to customs and market access for both partners.
- Provide a forum for consultation and discussion of customs issues, including rules of origin, customs valuation, tariff regimes, customs nomenclature and general procedures.
- Promote cooperation in the development, implementation and enforcement of rules of origin and general customs procedures.

The Committee is comprised of officials from the relevant Chilean authorities and representatives of DG Taxations and Custom Unions for the European Commission. The meetings are convened once a year, usually preceding the annual meeting of the Association Committee. The EU-Chile FTA also led to the creation of a Technical Cooperation Project for matters related to customs.

In the institutional design for managing the EU-Chile FTA, the regular and efficient performance of the Committee is of the utmost importance since ultimately the operational aspects essential for market access depend on it. Since the entry into force of the EU-Chile FTA, the committee has met on seven occasions (through December 2011).

5.4.2 The working of the committee

The committee has effectively served its function as a forum for information on all customs issues related to the exchange of goods between both parties. The Committee helped to simplify the custom requirements. Decisions were taken on some very technical issues, including transport requirements (exports with a stopover in a third country), tariff classifications for particular goods and certification (e.g. recognition of the EUR1 certificates). All the issues raised were solved without resorting to the dispute settlement procedure. Interviews of representatives of both Parties show that the meetings demonstrated a high degree of collaboration between the two Parties and that the communication and exchange of information were satisfactory.

5.5 Joint Committee for the Agreement on Wine and Spirits

5.5.1 Role and issues addressed

Regulations regarding wine and spirits are outlined in Annexes V and VI, respectively, in Title III of the Association Agreement. This was one of the key issues during the agreement negotiation period, given that both Chile and the EU are producers and exporters of wine. The main topics of the Agreement on Wine and Spirits are outlined below.

Reciprocal Protection for Geographical Indications

The Agreement establishes that, based on the respective lists approved by the counterparty, the exclusive protection of designation of origin geographic indication as defined by the laws of both partners. This means the prohibition of marketing products from third-party partners that use designations protected by the Agreement. Moreover, in the case that generic products that use protected designations of origin already exist in the market of one of the partners, the partner, in this case Chile, commits to gradually phase them out.

Protection for the use of traditional expressions and special acknowledgements of quality

This section details the specific conditions that authorize the use of such expressions in each partner's markets. This is one of the most innovative aspects of the Agreement on Wine and Spirits in that it establishes a precedent for future EU negotiations. Moreover, it extends protection beyond the recognition of geographical indication to topics more linked to the presentation of wines in international markets.

Oenological Practices and Processes

In regard to oenological practices and processes, both parties define the procedures and methods recognized as acceptable for the production of wines in the annexes of the Agreement. Similarly, a commitment has been established to inform the other party of new practices not covered by the original agreement. This allows both parties the opportunity to validate new practices and adopt common approaches.

Sanitary and Phytosanitary Measures

In accordance with the respective chapters on SPS, both parties agree to inform each other, in a timely manner, of the emergence of health risks and any adoption of measures that could affect plant or human health, particularly in regard to admissible limits for contaminants and residues.

To administer the Agreement on Wines and Spirits, which includes a detailed account of a long list of commitments, a Joint Committee on Wines and Spirits was created with the following functions and powers:

- The committee is to consist of representatives from agencies from both parties and is to meet immediately in the EU and Chile at the request of either party according to the needs derived from the implementation of the agreement.
- It should ensure proper functioning and compliance with the provisions of the agreement.
- It has the power to make recommendations that contribute to achieving the objectives of the agreement and report on its progress to the Association Committee, when appropriate.
- It can submit proposals on issues of mutual interest in the wine sector.

The Committee on Wines and Spirits has met five times since the enactment of the agreement. It has a regular structure for the discussion of issues and, according to official

records and documents, the main topics during meetings were as follows: a) Monitoring compliance with the commitments outlined in the agreement, particularly the elimination of brands and generics that were consistent with recognized geographic indications and therefore protected exclusively by the counterparty; b) Updating lists of geographic indications and designation of origin requested for protection; c) Exchanging information on new oenological practices being adopted by either party; d) Providing information regarding changes in rules and regulations governing the wine markets of both partners and general analysis of the evolution of the international wine market.

5.5.2 The working of the Committee

Similar to what was found in the work of other technical groups, the meeting minutes reveal that both parties are satisfied with its compliance with the various commitments in the agreement.

In accordance with the above, there is no record of significant disputes between the two parties, excluding specific requests to streamline procedures or to strengthen supervision related to the protection of some designations of origin possibly under threat in the other party's territory.

In the case of the EU, the agreement was at the time of signature the deepest of all agreements it had negotiated and became a reference for future negotiations. Especially significant was the inclusion of definitions and technical specifications for the use of traditional expressions and special terms of quality. These specifications have been incorporated into new EU free trade agreements since. Similarly, in the case of Chile, the recognition of designations of origin established a precedent and an essential reference for all future negotiations.

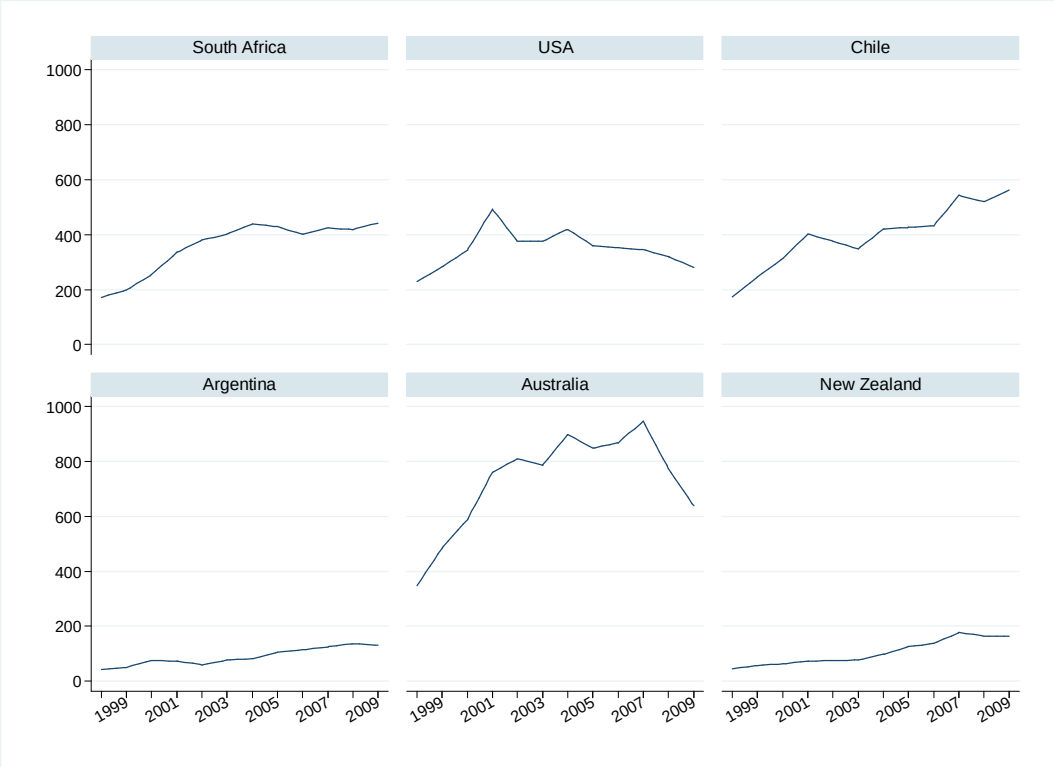
Additionally, the agreement with the EU pushed Chile to establish a higher level of organization in its production of wines and spirits, giving it full legitimacy and encouraging the development of Decree 464, which defines zoning for wine production. Moreover, Chile modified its Decree 78, which sets standards of production, processing and marketing for alcoholic beverages.

Especially relevant for the Chilean industry are the approved amendments to Law No. 18.455 intended to phase out generic brands with names that coincide with protected geographical indications from the EU.

It should be noted that the majority of private agents in the Chilean wine sector hold the Agreement on Wines and Spirits in the FTA between the EU and Chile in high regard. They believe that the regulatory system created through the agreement was instrumental in transforming the industry's capacity to participate in global markets into what it is today.

In fact, as demonstrated in Figure 26, wine exports to the EU have increased more than Chile's largest competitors, such as Australia. Traditionally a major exporter to the EU, Australia has also negotiated a specific agreement on wines and spirits with the EU.

FIGURE 26: EU IMPORTS OF WINES FROM DIFFERENT ORIGINS



Source: Treatment by the authors, data from COMEXT, Eurostat

The significant drop in Australian exports to the EU may be linked to several factors, including: i) the recurring weather problems that have affected production levels in recent years; ii) the strong appreciation of the Australian dollar in relation to the Euro and US dollar, which may have affected their competitiveness; iii) Australia's chosen business and political strategy to strengthen its presence in Asia that has led it to favour developing markets such as Korea, China, and Japan among others.

Since the enactment of the agreement, wine and spirits exports from Chile to the EU have grown from just under US$300 million in 2003 to US$609 million in 2010. Although this implies a doubling of export value, it does not necessarily signify a similar increase in proportion of volumes exported. This is because this increase is also a result of a shift in wine exports toward those with designation of origin and higher unit prices. It should also be noted that in the same period, exports of wine from Chile to the world expanded from figures of around US$600 million to just under US$1,200 million. This is similar in proportion to the verified growth in EU markets.

Box 5.2. The EU-Chile FTA and the wine sector: a private sector point of view

The Chilean wine sector has benefited from the EU-Chile FTA. The Agreement has resulted in lower tariffs for Chilean wine in the EU. However, during a workshop organized under the consultation of stakeholders, Federico Mekis, from *Vinos Chile* explained that tariffs were only one aspect of the EU-Chile FTA. He stressed that the Agreement had led to other factors that have played a significant role in the development of not only the Chilean

sector, but also the EU wine sector. This further development has led the parties to reconsider regulations and strategic approaches, and also the position of both entities in international organisations such as the *Organisation Internationale de la vigne et du Vin* (OIV). In particular, because the EU wanted a global agreement, that encompassed *inter alia* regulations, SPS issues and appellations of origin, the Chilean wine sector entered in contact with EU producer organisations. This has resulted in a fruitful dialogue which has led both parties to change their vision of the future of their production.

The influence of this dialogue can be seen in the way domestic regulations and policies have evolved. For example, the European influence can be seen in Chile through a greater openness to organic production (including biodynamic wine) and a trend towards a reduction in the use of chemical products. The investment of a Spanish company in Chile led the industry to innovate and reconsider grape varieties that were previously thought to be of low quality, offering new potential. In Chile, the EU-Chile FTA has led the private sector to follow closely, and to participate in surrounding institutional arrangements. This has resulted in a public-private dialogue, which is particularly productive.

In Europe, an indirect consequence of the Agreement is the change in the rules imposed to producers of particular denominations of origin, including regulations on the use of particular grape varieties. It has resulted in a simpler system that is more able to foster innovation and adapt to consumer demand. Because Chile and the EU had different approaches regarding oenological practices, the discussion that took place under the OIV has eventually led to the adoption of a more common set of standards which has also greatly influenced European legislation, as well as other actors regarding their attitude, mentality, culture and respect of regulations.[55]

5.6 Intellectual Property

5.6.1 Provisions

The provisions regarding protection of intellectual property rights are established in two chapters of the Agreement: i) the Agreement on Wines and Spirits, by establishing specific measures of mutual recognition and protection of geographical indications at from the moment the agreement was signed and in its subsequent additions; and ii) the provisions contained in Title VI.

These rules recognize that, as a general objective, “The parties are to grant and ensure adequate and effective intellectual property rights in line with the highest international standards, including effective means of enforcing such rights provided for in those international treaties.” The scope of implementation is defined in Article 169, which states that intellectual property rights extend to copyrights, including computer program and database copyrights, and rights relating to patents, industrial design, geographic indications, including designations of origin, registered marks and layout designs (topographies) of integrated circuits, as well as protection of undisclosed information and

[55] Adapted from Federico Mekis's presentation at the workshop on the EU-Chile trade Agreement organised by ITAQA, Hotel Hyatt, Santiago, May 17 2011.

protection against unfair competition as defined in Article 10 of the Paris Convention for the Protection of Industrial Property (Stockholm Act 1967).

To achieve the defined objectives, both parties are to ensure compliance with the provisions of the following agreements:

- Continue meeting the obligations derived from the following conventions in an adequate and effective manner:

i) Agreement on Trade-Related Aspects of Intellectual Property, Annex 1C of the agreement established by the World Trade Organization (the TRIPS Agreement);

ii) The Paris Convention for the Protection of Industrial Property (Stockholm Act 1967);

iii) The Berne Convention for the Protection of Literary and Artistic Works (Paris Act 1971);

iv) The International Convention on the Protection of Performers, Producers of Phonograms and Broadcasting Organizations (Rome, 1961); and

v) The International Convention for the Protection of New Varieties of Plants 1978 ("1978 UPOV Convention") or the International Convention for the Protection of New Varieties of Plants 1991 ("1991 UPOV Convention");

- Agree to and implement, by January 1, 2007, the obligations derived from the following multilateral conventions:

i) The Nice Agreement Concerning the International Classification of Goods and Services for the Purposes of Registration Marks (Geneva Act 1977, amended in 1979);

ii) The treaty concerning copyrights of the World Intellectual Property Organization (Geneva, 1996);

iii) The treaty concerning the interpretation and implementation of phonograms of the World Intellectual Property Organization (Geneva, 1996);

iv) The Patent Cooperation Treaty (Washington 1970, amended in 1979, and modified in 1984); and

v) The Strasbourg Agreement concerning International Patent Classification (Strasbourg 1971, amended 1979);

- Agree to and ensure, by January1, 2009, an adequate and effective implementation of the obligations derived from the following multilateral conventions:

i) The Convention for the Protection of Phonogram Producers Against the Unauthorized Duplication of Their Phonograms (Geneva, 1971);

ii) The Locarno Agreement Establishing an Inernational Classification for Industrila Designs (Locarno Union 1968, amended in 1979);

iii) The Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedures (1977, amended in 1980); and

iv) The Trademark Law Treaty (Geneva, 1994);

- Make every effort to ratify as soon as possible and ensure an adequate and effective implementation of the obligations arising from the following multilateral conventions:

i) The Protocol Relating to the Madrid Agreement Concerning the International Registration of Marks (Madrid 1989);

ii) The Madrid Agreement Concerning the International Registration of Marks (Stockholm Act, 1967 and modified in1979); and

iii) The Vienna Agreement Establishing an International Classification of the Figurative Elements of Marks (Vienna 1973, amended in 1985).

Although there is no established Special Technical Committee to monitor compliance with the obligations outlined in the agreement, the progress in fulfilling these obligations has been noted at several Association Committee meetings.

5.6.2 The impact of the EU-Chile FTA on intellectual property

The numerous agreements Chile signed with its major trading partners have led to a profound transformation of its regulatory and institutional framework for the protection of intellectual property rights. Although this transformation cannot be attributed to a single agreement in particular, changes occurred in three main areas: i) Adherence to the major international treaties and conventions that regulate, strengthen and protect intellectual property rights; ii) Clearer rights granted to innovators in various fields and the owners of intellectual property rights in general, while establishing tougher penalties for the infringement of those rights; iii) Transformation of the institutional structure through the creation of the Intellectual Property Institute, under the Ministry of Economy, responsible for registering trademarks and patents and for the definition of policies and instruments aimed at strengthening the protection of intellectual property rights in the country. Chile also established expedient judicial procedures to guarantee the protection of intellectual property rights and specialized police structures to ensure compliance with legislation.

With regard specifically to the provisions of the agreement between Chile and the EU, they have to this day been met in their entirety. There has been no recorded dispute related to compliance with the Agreement's provisions.

The International Intellectual Property Alliance (IIPA) recommended that Chile remain on its watch list in 2010, reflecting concerns of this federation of private firms over infringements of property rights in Chile. However, most of the concerns seem to originate from US firms in the software and entertainment sectors, and refer to the dissemination of copyrighted material (note that the assessment of intellectual property issues that takes place under the Trade Policy Review of the World Trade Organisation does not indicate significant intellectual property violations in the case of Chile).

Some EU companies have raised the issue of counterfeiting goods and the respect of protected brand names in the garment industry. In interviews carried out for this study, Chilean authorities have argued that it is very difficult to prevent imports of counterfeited textiles goods and their sale in markets near the borders. The EU private sector has also raised some issues regarding the excessive transparency of the Chilean patent system, that tends to conflict with industrial secrecy (in particular in the pharmaceutical sector).

The survey of exporters that was carried out for this study shows that some 20% of Chilean exporters to the EU and some 28% of the exporters to Chile consider intellectual property to be a major obstacle to their trade (in general, not in their exports to the EU in particular). However, two points are noteworthy. First, a more detailed analysis shows that those Chilean exporters who claim that intellectual property is a problem include mostly wine exporters, but also some fruits (grapes and kiwifruits) exporters, which is somewhat surprising and perhaps raises the issue of brand name recognition. The second important point is that when asked whether intellectual property is more or less of a problem for exporting to the EU than to other countries, only 9% respond that it is more a problem in the EU against 23% responding that it is less a problem in the EU than in other countries, suggesting that the EU-Chile FTA helps with the recognition of intellectual property even for sectors where this remains an issue (see section 5.7for details). Because of the limited number of EU investors in Chile who completed the survey, and the even smaller number of Chilean investors in the EU, the findings are not fully conclusive, but it is noteworthy that intellectual property was quoted as a major obstacle to investment or trade in the case of Chile.

5.7 An assessment of the functioning of the institutional issues by stakeholders

A detailed online survey was conducted evaluating of the functioning of the EU-Chile FTA by exporters, importers, and investors. Seventy one respondents have given their opinion on the way the provisions regarding trade facilitation works. Other groups of questions attempted to assess whether, in their opinion the EU-Chile FTA had made it easier to trade and invest and what the remaining obstacles were. A set of questions also looked at their main sources of information regarding the procedures required to export or import, and the functioning of the EU-Chile FTA.

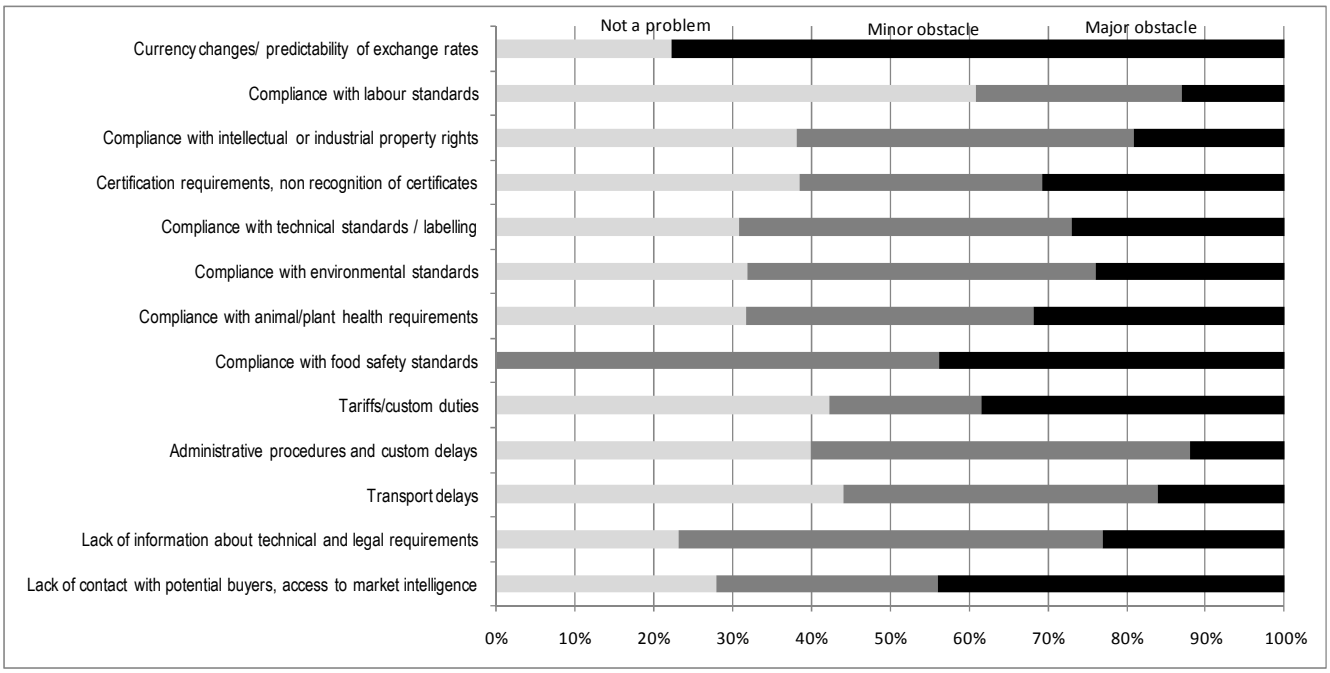
It is worth emphasizing that the responses obtained are not representative of the stakeholders involved in EU-Chile trade. Indeed, the survey was sent to a list of importers and exporters identified from business directories. Because of the interaction with stakeholders that took place during workshops in Chile and because some particular institutions (business associations and chambers of commerce) were particularly active in encouraging their members to respond to the survey, the responses are biased and disproportionately represent the position of exporters in particular sectors. In practice, Chilean exporters are heavily represented, compared to EU exporters, investors and importers. The wine, fruits and seafood sectors are particularly well represented among Chilean exporters, and the mollusc sector among EU investors in Chile (see details in the Annex 5.1). It is also noteworthy that because of the purely voluntary nature of the responses, it is likely that those firms who have no complaints about the EU-Chile FTA, or for which the EU-Chile FTA has limited bearing, are likely those who have not responded, or responded only partially. The following subsections summarize some of the respondent's perceptions of the remaining trade obstacles and of the changes brought about by the EU-Chile FTA.

Drivers of and impediments to EU-Chile trade

The survey emphasizes the role of factors that are outside the EU-Chile FTA. Both EU and Chilean exporters stress the role differentiation of their products and their high quality serve as determinant of exports. This is particularly the case in the wine and fruit sectors, where Chilean exporters see the high quality of their products as their main strength for selling in the EU market (some wine producers complain that the quality of Chilean appellations is still not well recognized in the EU market). The reliability of the export chain is also emphasised from the importers' point of view. It is noteworthy that in Chile, EU products benefit from a reputation of high quality, with good services associated with the products, but the products are perceived as expensive.

The main obstacle to trade raised by those importers and exporters who responded to the survey is the exchange rate, both for Chilean exporters and for those companies who trade EU products (EU exporters to Chile and importers of European goods and services in Chile) (Figure 27, Figure 28). Perhaps because of the timing of the survey, Chilean exporters see the appreciation of the peso as the main limitation to their ability to export to the EU (at the same moment, EU exporters, for example in the mechanical industry, faced the competition of cheap US goods due to the depreciation of the dollar).

FIGURE 27: PERCEPTION OF OBSTACLES MET FOR EXPORTING FROM CHILE TO THE EU

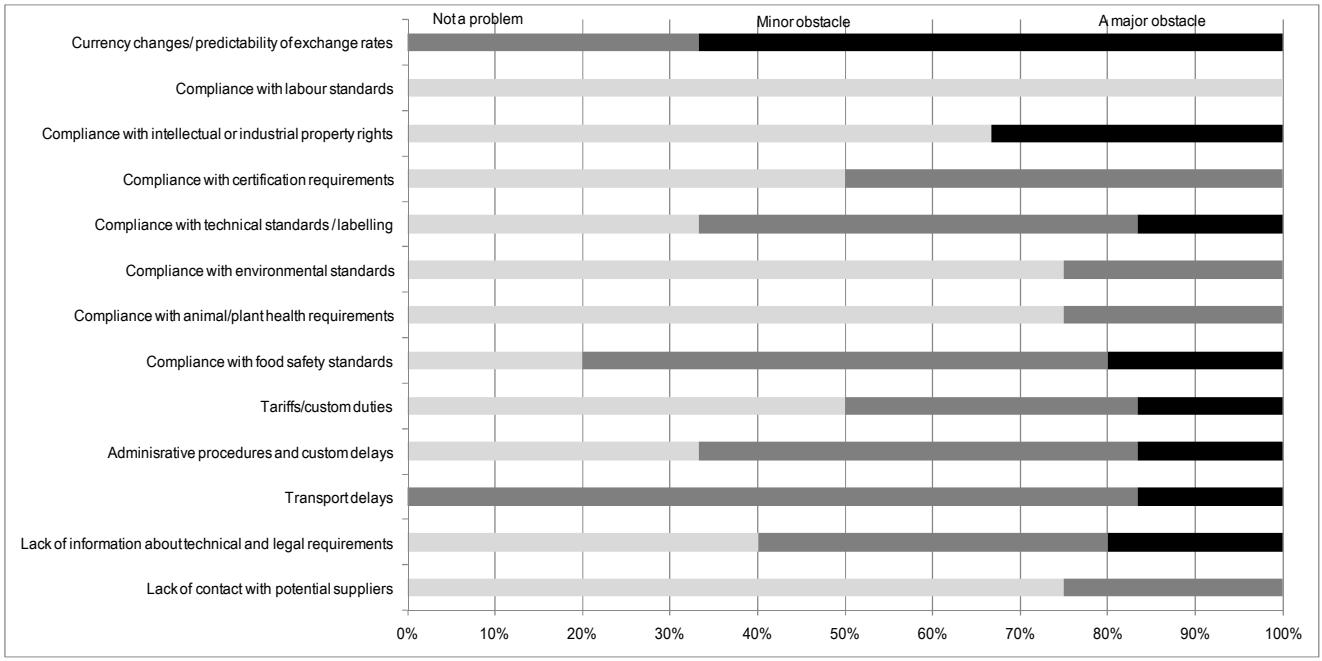


Source: Treatment of surveys of importers and exporters carried out for the study. Note that the questions "compliance with animal/plant health requirement" and the question on food safety standards was only asked to the companies in the agriculture, food and fisheries sectors. Responses such as "not relevant in my sector" are not taken into account in the graph.

More detailed responses to interviews also mention difficulties in accessing the market that are somewhat independent from the EU-Chile FTA. For example, Chilean exporters describe several obstacles in their exports to the EU such as the fact that the market is now mature for some products (wine); the very high degree of competition in EU

markets, especially with EU producers, much more than with third country exports; that the volumes exported often remain too low to benefit from economies of scale, promotion and to justify supply adjustment to specific consumer needs; and the cost of the freight between Chile and the EU. The lack of contacts with potential buyers, and the difficulty to access and mobilize market intelligence was also quoted as a problem for a significant percentage of the respondents.

FIGURE 28: PERCEPTION OF OBSTACLES MET FOR IMPORTING IN CHILE FROM THE EU



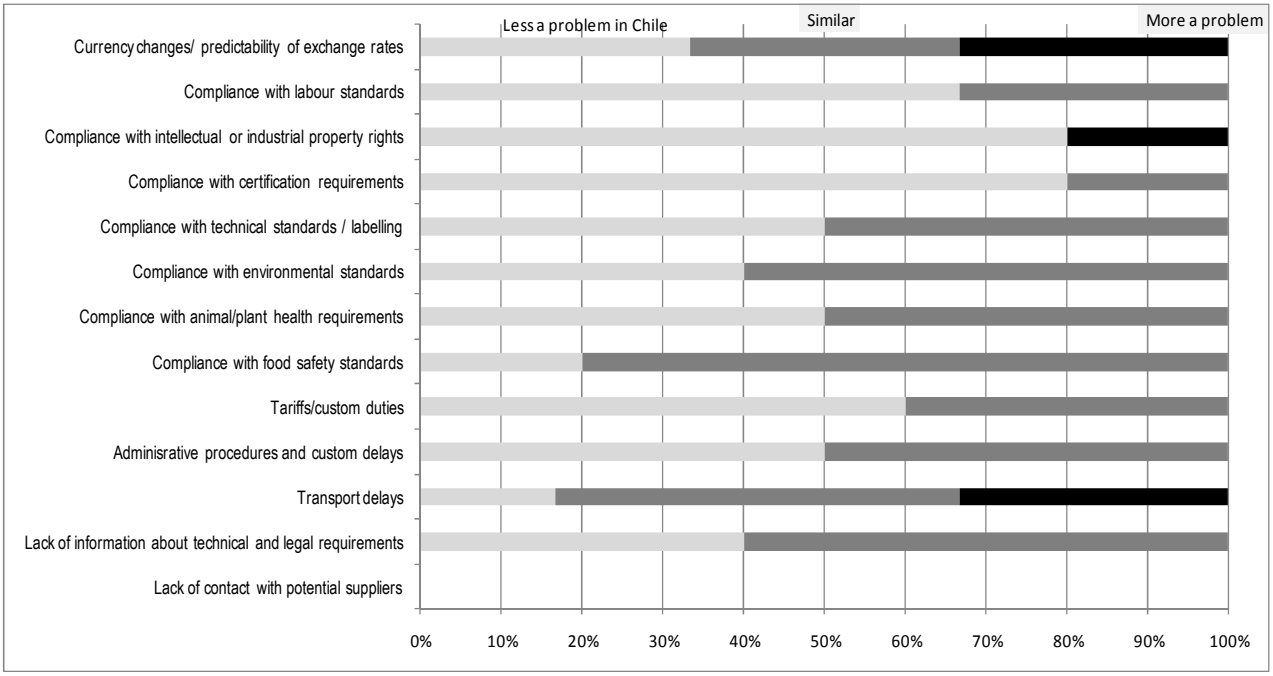
Source: Treatment of surveys of importers and exporters carried out for the study. Note that the questions "compliance with animal: plant health requirement" and the question on food safety standards was only asked to the companies in the agriculture, food and fisheries sectors. Responses such as "not relevant in my sector" are not taken into account in the graph.

Perception of regulatory and technical barriers

Exporters in particular sectors complain about tariff protection granted to the other Party producers and about administrative requirements that they perceive as an obstacle to their export. Chilean exporters of meat mention tariffs and quotas as a limitation to their sales in the EU. The level of excise duties are mentioned by Chilean exporters of alcoholic products, even though there is no excise discrimination in the EU (alcoholic beverages are taxed with excise duties regardless of origin).

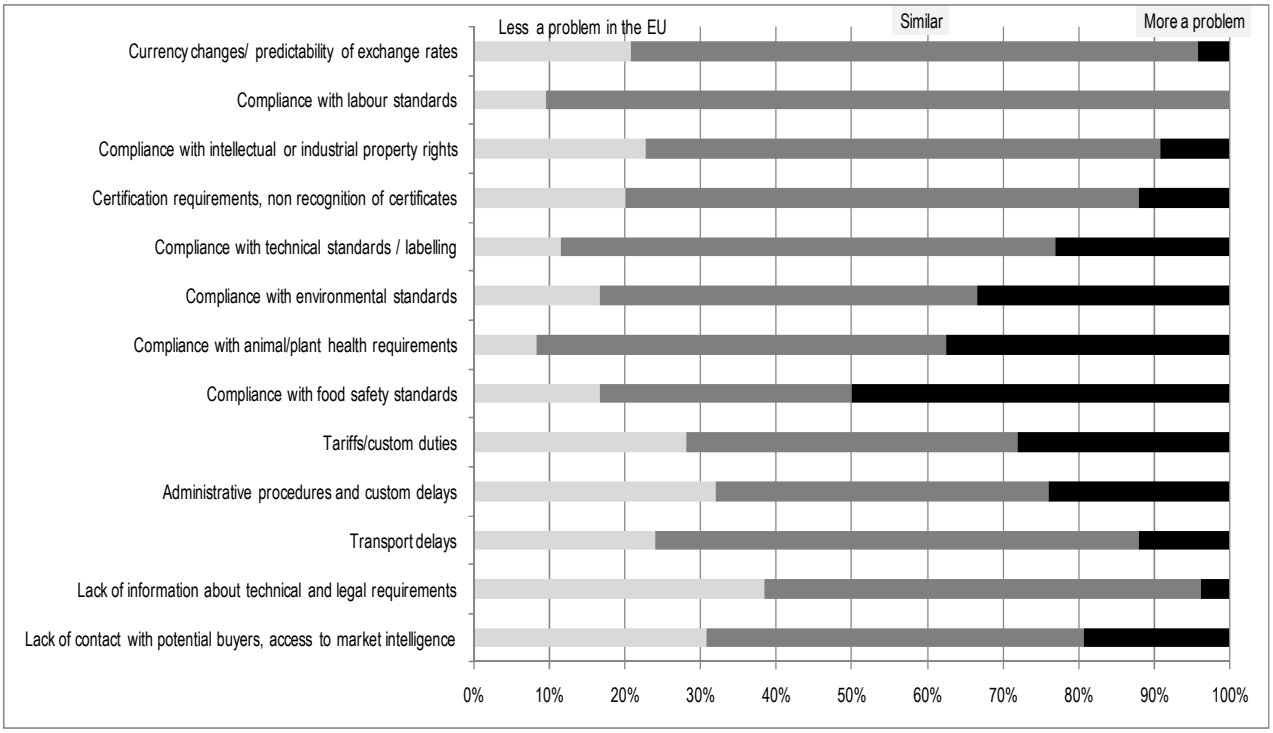
Compared to exchange rate fluctuations, tariffs and difficulties in market penetration because of competition, regulatory issues are not considered to be a problem by most of the exporters and importers surveyed. Figure 29 and Figure 30 nevertheless show that compliance with regulations is often mentioned as being at least "a minor obstacle" to their exports, and in a significant number of cases "a major obstacle". This is particularly the case of food safety standards, but also certification requirements, environmental standards (for Chile exporters) and intellectual property rights.

FIGURE 29: PERCEPTION OF THE EXTRA DIFFICULTY OF EXPORTING TO CHILE COMPARED TO OTHER MARKETS



Source: Treatment of surveys of importers and exporters carried out for the study. Note that the questions "compliance with animal:plant health requirement" and the question on food safety standards was only asked to the companies in the agriculture, food and fisheries sectors. Responses such as "not relevant in my sector" are not taken into account in the graph.

FIGURE 30: PERCEPTION OF THE EXTRA DIFFICULTY OF EXPORTING TO THE EU COMPARED TO OTHER MARKETS



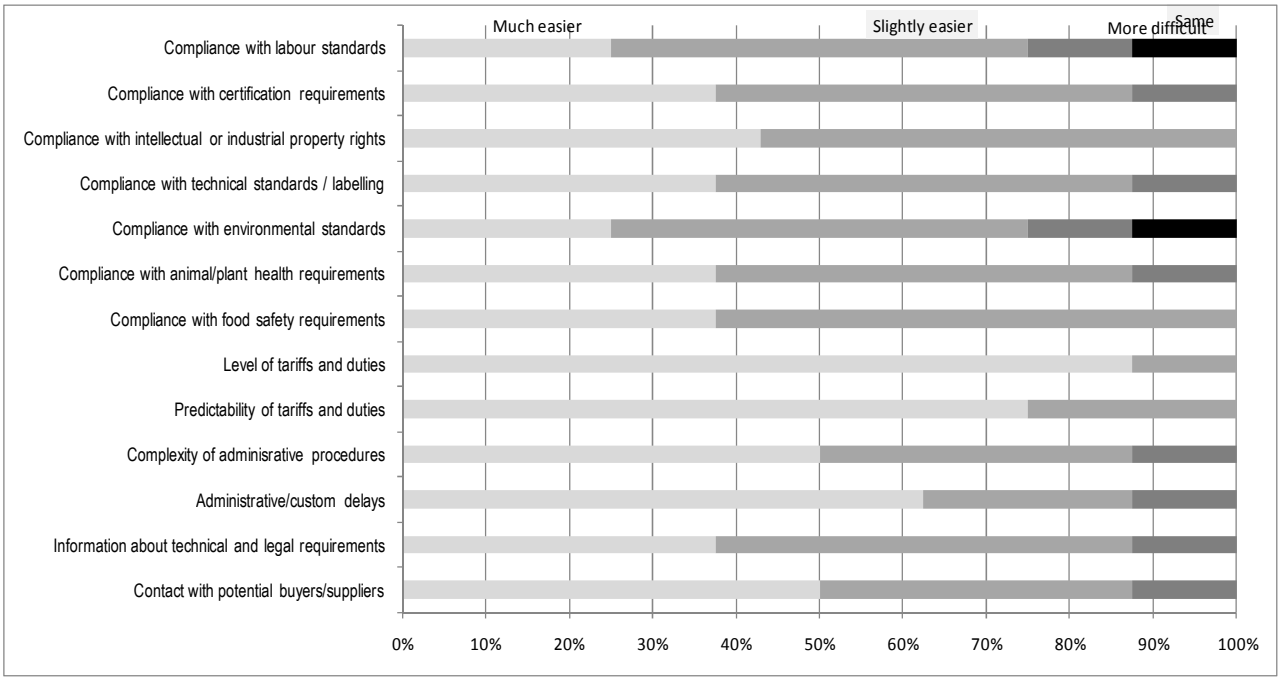
Source: Treatment of surveys of importers and exporters carried out for the study. Note that the questions "compliance with animal/plant health requirement" and the question on food safety standards were only asked to companies in the agriculture, food and fisheries sectors. Responses such as "not relevant in my sector" are not taken into account in the graph.

A more detailed analysis of the responses suggests that many of the non-tariff issues that are mentioned as obstacles to export are private regulations. Indeed, respondents complain about technical requirements from both the public and the private sectors, including labelling requirements and administrative procedures.

It is perhaps not surprising that a significant percentage of respondents declare that regulatory obstacles remain a problem in spite of the agreement, given the voluntary and non representative nature of the survey, together with the over representation of Chilean exporters of fruits, wine and seafood products in the sample of respondents. In a set of extra questions, the respondents were asked whether the obstacles that they faced were more of a problem for them for exporting to the EU (and respectively, Chile) than to third countries.

For most questions, Chilean exporters quote the EU as a destination where it is not more difficult, and indeed often less difficult to export than other countries (Figure 31). The exceptions are in the food sector, where respondents report that compliance with SPS requirements, animal and plant health standards, and food safety standards as makes it more difficult to export to the EU than to other countries. A more detailed examination of the respondents who find it more difficult to export to the EU because of food safety standards show that they are wine exporters, some fruit exporters (grapes, kiwifruits, apples and dried fruits), and two exporters of frozen molluscs and salmon products. All are very specialized companies for which exports account for more than 50% of sales, and for which the EU represents 10% to 25% of exports (the most frequent category) or 50 to 75% of exports (second most frequent category). Their economic size varies. Roughly 40% of them have between 51 to 100 employees, while 15% have a staff of 6 to 20and 25% have 100 to 500 employees.

FIGURE 31: PERCEPTION ON WHETHER THE EU-CHILE HAS MADE IT EASIER OR MORE DIFFICULT TO DO BUSINESS



Source: Treatment of surveys of importers and exporters carried out for the study. Note that the questions "compliance with animal: plant health requirement" and the question on food safety standards was only asked to the companies in the agriculture, food and fisheries sectors. Responses such as "not relevant in my sector" are not taken into account in the graph

By contrast, EU exporters and importers of EU products in Chile do not quote compliance with technical standards as a major issue in Chile. The respondents claiming transport delays and procedures make it more difficult to import from the EU than from other countries are mostly Chilean importers). EU exporters and Chilean importers of EU products tend to stress the role of transport delays and administrative procedures, as trade impediments.

Regarding direct investments, most EU respondents claim that investing in Chile is not more difficult, and often easier than in other countries, but the requirements of local partners is quoted as a difficulty that is greater in Chile than in other countries.

Perception of the EU-Chile FTA

To the question addressing where the Agreement has made it easier or more difficult to do business, a large majority of respondents consider that the EU-Chile FTA has made it easier (slightly easier or much easier) even though the category of respondents claiming that the Agreement has had no effect on their business is particularly high among exporters of industrial products, in particular those from the EU (Figure 31). Interestingly, this contrasts with the results of Chapter 2's econometric analysis, where the impact of non-tariff measures was not found to be significant. As already mentioned, such impacts are by nature difficult to identify and to measure. These responses suggest that, notwithstanding the lack of statistical significance, their impact might have been positive. The few respondents who claim that the EU-Chile FTA has made it more difficult to comply with certification requirements and food safety standards are all importers (in Chile and in the EU), and all in agricultural, food and leather products (wine, dairy products and fruits are among the products traded).

In spite of this limited number of responses that the EU-Chile FTA has made compliance with standards "more difficult", it is in the fisheries and the fruit sectors where most respondents claim that the Agreement has made it much easier or simply "easier" to export to the EU. By contrast, the EU-Chile FTA is quoted as making business much easier among Chilean importers of machinery and services linked to equipment, both for agriculture and minerals.

Most Chilean exporters respond that there are other agreements relevant for their business, including in particular agreement with the US, Japan, Korea, China and the Mercosur. A majority of respondents do not mention significant differences with the EU agreement (a difference that is mentioned by a few respondents is that Chile-China and Chile-US agreements do not impose tariff quotas).

Perceived changes brought about by the EU-Chile FTA

The respondents rank tariff cuts, including those under tariff rate quotas, and predictability of tariffs as the most important provision of the EU-Chile FTA. This is by far the most quoted response, even for a variety of firms importing intermediate products. However, administrative simplification, custom formalities, recognition of practices, transparency and a stable and predictable legal framework also appear frequently in the responses. Consistent with the analysis in Chapter 4, double taxation agreements are also

quoted by investors. In the wine sector, the whole set of regulations, including those relative to labelling and intellectual property are mentioned.

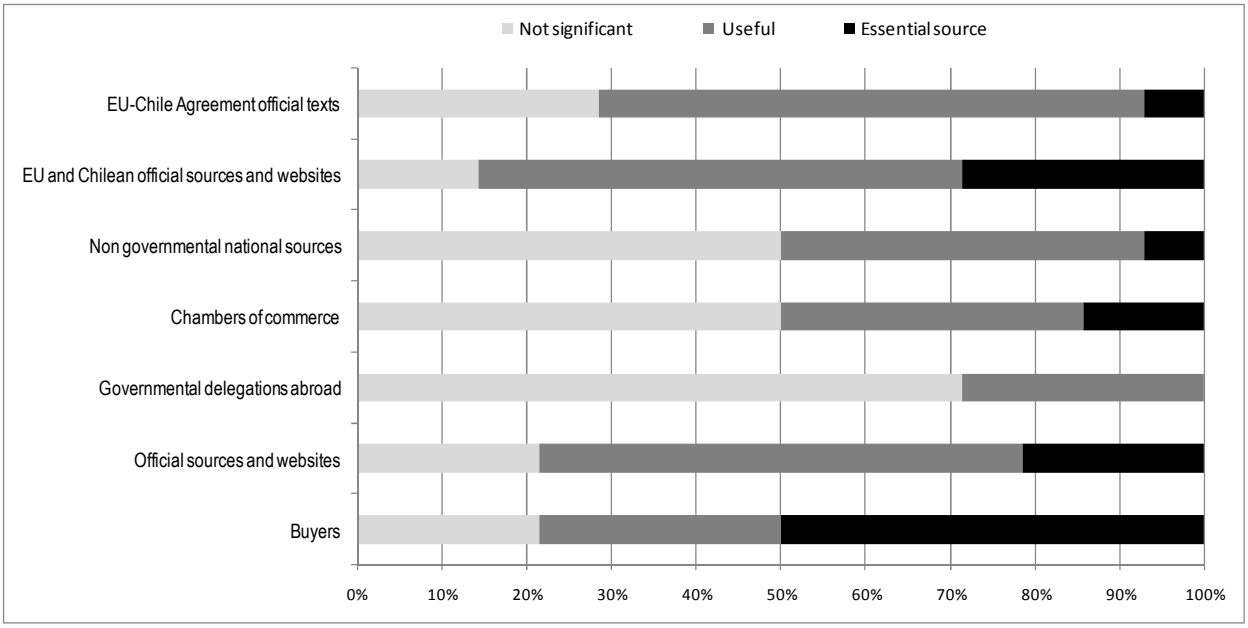
The respondents that claim that the EU-Chile FTA has made it easier to do business because the tariff cuts are evenly distributed among enterprises, with more than 25% of them being small companies with a staff of less than 20 people, while 18% of them have a staff of 500 and more.

For 22% of the respondents, there are still trade obstacles that could be solved by deepening or revising the EU-Chile FTA under the evolution clause. This is a significant percentage, even compared with the 35% of respondents who claim that there are no such obstacles (others did not respond). Among the issues where margins exist for deepening the Agreement, the following are quoted: easier procedures for quarantine and inspection for food products exported by companies that have demonstrated compliance with safety regulations; shorter custom procedures at entry points in Chile; a more complete mutual recognition of standards; management of taxes on services; expansion of tariff quotas; a simpler regulation of organic products, in particular wine; more favourable tax systems on dividends for foreign exporters.

Information on the EU-Chile FTA

Part of the responses to the survey seem driven by a limited knowledge of the provisions of the Agreement, in particular regarding regulatory and certification issues, where a large number of respondents (mostly Chilean exporters) consider access to information on technical requirements to be an issue. Indeed, if all respondents are aware of the existence of the EU-Chile FTA, most of them respond that they do not know its details (only 25% respond that they are well aware of the provisions of the Agreement).

FIGURE 32: SOURCES OF INFORMATION ON THE PROVISIONS OF THE EU-CHILE FTA



Source: Treatment of surveys of importers and exporters carried out for the study.

A question is whether the EU-Chile FTA, which has been particularly ambitious in the area of facilitating trade and removing non-tariff barriers has been well explained to stakeholders.

A series of questions focused on the sources of information on the provisions of the EU-Chile FTA that were most useful to exporters and importers. Open questions suggest that many sources of information are used. Among the most quoted ones are the EU and Chile official web pages. ProChile is quoted as a major source of information for Chilean exporters. Professional organisations are often mentioned in the fisheries sector and in the wine sector and they seem to be a significant source of information for product requirements. Direct information from customers and from the international quarters of the company are also mentioned (Figure 32).

5.8 Conclusion

The wide-ranging set of rules regarding a variety of trade-related issues is an important part of the EU-Chile FTA. Even though the blueprint of the EU's agreements has evolved since 2002, the ambition of these rules deserves emphasis. The provisions regarding SPS measures, technical standards and wines and spirits particularly required substantial adjustment on the Chilean side, given the higher EU standards when the Agreement was implemented. More generally, the rules set out in the EU-Chile FTA required an efficient dialogue between both parties, and putting them into practice demanded significant effort. The review carried out in this chapter suggests that practice kept up with commitments in most respects.

The institutional structure set up by the EU-Chile FTA has been put into practice effectively, apparently at the satisfaction of contracting parties. Many technical issues have been raised (in particular regarding SPS measures and technical standards), but all were solved through dialogue, as a result of mutual efforts. Use of the planned dispute settlement mechanism never proved necessary.

The practical consequences are far-reaching. The improvement of SPS standards in Chile's agriculture is widely recognised, and it is related to a significant extent to the EU-Chile FTA requirements. Initially felt by Chilean producers as mere constraints, these requirements are now also seen as having spurred an upgrade in production practices, easing access to a wider range of foreign markets. This is also true for the discipline imposed by the Agreement on Wines and Spirits on the use of geographical indications.

These achievements are corroborated by the survey of stakeholders. While a series of factors unrelated to the EU-Chile FTA are of prominent importance in bilateral trade flows, like exchange rates for example, the feedback collected is generally positive. The institutional framework surrounding EU-Chile trade is widely recognised as supportive. While the trade impact of non-tariff measures was not found be statistically significant in the econometric analysis, the qualitative assessment suggests that this impact has been positive and possibly substantial.

Chapter 6 - ENVIRONMENTAL IMPACTS

The impact of trade liberalization on the environment is ambiguous and controversial. Some authors stress the possible negative effects of freer trade while others see the potential for convergence towards higher environmental standards.[56] Beyond case studies and correlations, a conceptual framework is needed to analyse meaningfully what the environmental impacts of the EU-Chile FTA might have been. We begin by spelling out this framework by proposing, based on the economic literature, a decomposition of the environmental impacts of the EU-Chile FTA between scale, composition and technique effects.

Before putting this methodology into practice, we review the main environmental issues in Chile. Not all are linked to trade liberalization, let alone to the EU-Chile FTA, but this review helps to focus on problems potentially linked to the Agreement. The analysis of the most relevant issues is then carried out based on the decomposition methodology and on the results of the econometric and modelling assessments carried out in previous chapters.

6.1 CONCEPTUAL ISSUES

On the empirical side, several ex-post assessments of various international agreements suggest that trade liberalisation has had some unwanted effects on the environment (UNEP 1999). Empirical case studies find correlations between trade liberalization, growth in exports of particular products and the development of non sustainable production techniques. While the empirical evidence is sometimes compelling, a weakness of these approaches is that not all the indirect intersectoral, macroeconomic effects and feedbacks are taken into account. In addition, even in the most convincing case studies, environmental degradation is in general linked to poor institutions, poorly defined property rights, or inadequate regulatory and fiscal policies. In most of these case studies, the exact role of trade liberalization is difficult to isolate from other determinants of environmental degradation. At a more aggregated level some studies conclude that during periods of trade liberalization, the share of polluting industry outputs has increased in the

[56] See Bhagwati and Daly (1993); Ulph (1997); Jayadevappa and Chhatre (2000); Copeland and Taylor (2003) for the main elements of the debate.

exports of particular countries (Low and Yeats 1992; Mani and Wheeler 1997). However, even in such cases, causality is seldom fully established.

6.1.1 A METHODOLOGICAL FRAMEWORK

The general framework for the analysis of the way trade affects the environment distinguishes three different components (Grossman and Krueger 1994). Pollution emissions z, depend on the scale of the economy *S*, the importance of the polluting good industry in the economy φ_x, and the emissions intensity of production, e , i.e. $z = S\varphi_x\, e$, so that the changes in percentages can be approximated (by taking logs and differentiating) by $\hat{z} = \hat{S} + \hat{\varphi} + \hat{e}$, which gives the sum of the changes in three separate effects:

- The first component is often called the *scale effect*. It is linked to the fact that trade liberalization enhances growth and that there is *ceteris paribus*, an increase in output and in consumption of inputs, some of them being harmful to the environment.
- The second component is the *composition effect*, which involves a change in the specialisation of the economy and the resulting changes in the relative importance of the polluting industries. This specialisation is often linked to comparative advantages as well as other sectoral expansion caused by factor endowments. But it can also result from the concentration of activity where standards are more lenient and costs of environment protection are lower.[57]
- The third component is the so-called *technique effect*, or pollution intensity. If pollution intensities are unchanged, trade may increase pollution in countries with a comparative advantage in dirty goods, and decrease it in countries with a comparative advantage in clean goods. But the pollution intensity may vary with trade liberalization and offset some of this effect. The willingness to pay for environmental goods increases with income. By generating extra growth, trade may lead to a greater private and public demand for environmental amenities, as well as to greater financial capacities to invest in environmental protection. This may change the per unit environmental impact of domestic production. Freer trade in cleaner goods, easier access to greener technology and to more efficient waste management services, can also play a role. In order to access the foreign market, domestic industries may also have to meet higher environmental standards.

6.1.2 METHODOLOGY USED IN THE STUDY

The distinction of scale, composition and technique effects is a classic way to analyze the impact of a free trade agreement in Chile, even though there are extra determinants, as explained in Appendix 6.1. This framework is useful in a country like Chile, which has combined increased market openness, economic growth and institutional changes. Empirical methods, however, tend to lag behind conceptual developments. The *scale effect* is likely to

[57] Such cases relate to the "pollution haven" hypothesis, whose empirical relevance has been much discussed in the economic literature. A rather well-established result in the literature is that a tightening of environmental regulation in one country leads to a (marginal) relocation of the polluting industries in other countries. By contrast the hypothesis that a reduction in trade barriers leads to a shifting of pollution-intensive industry from countries with stringent regulations to countries with weaker regulations is much less demonstrated (see Copeland and Taylor 2004, on the issue of the "pollution haven hypothesis" versus the "pollution haven effect".

be significant. Estimating how a particular agreement has contributed to extra consumption of raw material and energy, and (possibly) to an increased productive use of primary resources such as land requires constructing counterfactual scenarios. Input-output analysis is used in the sections below. The *composition effect* could also be significant due to the comparative advantages of Chile in some sectors. Here, we use simulations made with the CGE model of the Chilean economy developed in Chapter 3. The *technique effect* can also be large in a country like Chile. In theory, general equilibrium models can capture changes in the technology and reallocation of production between subsectors with different productivity levels, at least with dynamic or recursive models. However, the disaggregation is limited by available data, and the possibility of modelling endogenous changes in environmental policy faces a lot of difficulties. The methodology used in this analysis relies on imports of green technology and equipment, domestic regulatory changes, as well as qualitative analysis of regulation and standards in the sectors of particular interest, based on interviews with stakeholders regarding the way the EU-Chile FTA has led to change in production and export.

On the EU side, the environmental consequences of the EU-Chile FTA are likely to be extremely diluted in most cases, given the small share of EU trade that takes place under the EU-Chile FTA. No assessment of the global effects is carried out, and the analysis focuses on specific issues identified with the statistical analysis.

6.2 Identification of environmental issues in Chile

The statistical analysis in Chapter 1 and Chapter 2 is used to screen some particular sectors where the EU-Chile FTA has resulted in increased trade and investment. These sectors are matched with the ones that were identified as raising particular environmental concerns in the in-depth interviews. For that purpose, a list of significant environmental issues in Chile was established using a combination of literature review, existing environmental data and assessments and consultations and in-depth interviews with stakeholders.[58] The main issues that have been identified are the following.

Air pollution

In some areas, the level of air pollution is a concern raised by environmental and health authorities in Chile. Air pollution also ranks sixth among the top Chilean problems in a recent survey representative of the Chilean population (Nature Conservancy 2010). Urban areas (greater Santiago in particular) and mining areas are most affected. There are also some specific problems with the electricity generation and the combustion of wood for individual houses (CONAMA 2011; Prieto et al. 2007).

[58] Significant data sources are the reports by CONAMA, CORFO (Chilean Economic Development Agency), the joint World Bank-WWF projects on the environment, the environmental assessment of Chile conducted jointly by the OECD and the CEPAL, and a recent survey of the perceived sources of environmental concern in the population carried out by the Nature Conservancy. In the identification of the most important environmental issues, interviews with non-governmental organisations and discussions that took place during the project workshop in Puerto Montt (May 19, 2011) were particularly useful, as well as interviews of scientists at the University of Los Lagos, at CEPAL, and at the Universidad Técnica Federico Santa María. We thank Robert Stead for his help.

Greenhouse gas emission

The Chilean assessment for the Intergovernmental Panel on Climate Change show that greenhouse gases emissions have been mulltiplied by three in CO2 equivalents between 1984 and 2007 (International Panel on Climate Change data; Poch Ambiante 2008). Climate change, and its variety of consequences on human being, fauna and flora, ranks third among the top problems in a recent survey representative of the Chilean population, right after crime and corruption (Nature Conservancy 2010).

Water

Water pollution is considered to be a major environmental problem by the WWF as well as other NGOs such as *Red Agua* and *Chile Sustentenable*. The issue is also flagged by international organisations such as the joint environmental assessment carried out by the OECD and ECLAC (OECD-ECLAC 2005). Water pollution also ranks ninth among the main Chilean problems according to a recent poll (i.e. it is the fourth environmental problem cited, Nature Conservancy 2010). Water scarcity is another important environmental as well as social issue in the Northern part of Chile where demand exceeds the available supply.

Deforestation

Part of Chile is forested with primary and coastal forest that is exceptional in terms of biodiversity and native species (Smith-Ramirez 2004). This type of forest has nevertheless experienced considerable reduction during the five last decades. While the forest cover has increased in Chile over the recent period, according to FAO figures, it is primarily an extension of the plantations of pine trees and eucalyptus, which provide much less ecosystem services than the original forest (Lara et al. 2010; Paz-Ovalle et al. 2002).

Loss of biodiversity

With some 775 known species of amphibians, birds, mammals and reptiles, Chile is particularly diversified fauna and flora (figures from The World Conservation Monitoring Centre). Almost 20% of these species are native and do not exist anywhere else. Chile is home to at least 5,284 species of vascular plants, of which more than half are native. The decline in biodiversity is nevertheless particularly high in Chile according to the International Union for Conservation of Nature (IUCN). Some 268 plant species are also considered as threatened. Out of 91 mammal species, 23% are considered endangered or threatened, including some emblematic ones and some endemic ones in the IUCN 2004 list.[59] In 2009, CONAMA identified 58 fauna and 75 flora species on the verge of extinction. The development of agriculture (with the destruction of predators and habitats), the decline in

[59] The list of endangered animals endemic to Chile includes the Chilean Shrew Opossum (*Rhyncholestes raphanurus*), the Isla Mochu Degu (*Octodon pacificus*), the Juan Fernandez Fur Seal (*Arctocephalus philippii*), the long tailed Chinchilla (*Chinchilla lanigera*). The Short-tailed Chinchilla (*Chinchilla brevicaudata*) is considered to be critically endangered. The Andean Cat (*Oreailurus jacobita*), the Blue Whale (*Balaenoptera musculus*), the Marine Otter (*Lontra felina*), the Sei Whale (Balaenoptera borealis), the South Andean Deer /Chilean Huemul (*Hippocamelus bisulcus*), the Southern River Otter (*Lontra provocax*) and the Humpback Whale (*Megaptera novaeangliae*) are considered endangered. Many other species are considered vulnerable.

native forest and the development of exotic trees plantations are part of the explanations according to CONAMA. Invasive species also play a significant role.

Pertinent to both the deforestation and biodiversity issues, *hydroelectricity* deserves special attention, even though it is seen as a solution to another environmental problem, greenhouse gas emissions, by Chilean authorities. Large scale hydroelectric projects in the Southern part of Chile could have large environmental impacts in a region of particular ecological interest. Because of the size of these projects and the surface that might be flooded, they are becoming major threats to primary forests. Their effect on the natural movement of water and the migration of fauna is unknown. The environmental footprint that would result from electric lines running over thousands of kilometres in order to supply industries and cities in Northern Chile is also pointed out by environmental organizations.[60]

Soil erosion

Soil erosion and land degradation are widespread in Chile (Clay 2004). The issue is not recent and historical work shows that much erosion accompanied deforestation in the first half of the 20th century. However, there are claims that intensive agriculture and tree plantations (which lead to exporting more nutriments than renewed by fertilisation, and leave the soil barren for several years after cutting trees) play a significant role, and contribute to rain erosion (Toledo 2009).

Fish stocks depletion

The depletion of fish stocks is a complex issues and the actual causes of the decrease in fish population are controversial. One reason is that the populations of some species vary dramatically over time under the effect of El Niño, which makes trends difficult to identify (this is typically the case of anchovy *Engraulis ringens* and sardine *Strangomera bentinki*). It nevertheless seems well established that species such as the Chilean jack mackerel (*Trachurus murphyi)* are in a critical state of conservation (Estrada 2011). Chilean catches dropped from 4.4 million tonnes in 1995 to 800 000 tonnes in 2009 and estimates are around 500 000 tonnes in 2010, showing a consistent downward trend. This species is considered to be "fully exploited" by the FAO (The State of World's Fisheries and Aquaculture 2010). The stocks of Hake (*Merluccius gayi* and *Merluccius australis*), Patagonian grenadier (*Macruronus magellanicus*), and Cusk-eel (*Genypterus blacodes*) are also in poor shape and the National Fisheries Council has approved drastic reductions in catch quotas in 2011 (Estreda 2011).

There is a lack of data on the stock of swordfish (*Xiphias gladius*) in the FAO figures for the South East Pacific. However, catches in Chile have collapsed, and swordfish was added to Greenpeace's red list in 2010. Another issue is that, when fished in high seas, swordfish are primarily targeted using longlining (Govender et al. 2005). This technique unintentionally catches and kills significant numbers of turtles, seabirds, sharks and marine mammals. Environmental organizations suggest that these methods of fishing are a serious

[60] See Terram' website and Terram (2010a, b) for an environmental activits' point of view. For an opposite point of view, see the environmental impact presented by Hydroaysen (www.hydroaysen.cl).

threat to turtle populations and seabird populations, particularly to albatrosses in the South Pacific and Atlantic.

Benthic and euthrophic marine impacts

Aquaculture, and in particular salmon production, contributes to accumulation of chemicals and excess nutrients from food and feces. They disturb the flora and fauna on the ocean bottom. Excess food and fish waste in the water contribute to increase the levels of nutrients in the water, causing the growth of oxygen consuming algae that cause euthrophication and remove oxygen for other types of marine life (Bostick et al. 2006).

Clearly, not all of these environmental issues are linked to trade liberalization, let alone to the EU-Chile FTA. However, this list of the main environmental issues helps to narrow potential problems that could be linked to trade or investment with the EU. It also helps in cross-referencing these issues with sectors where statistical analyses provide compelling reasons to believe that the EU-Chile FTA has had an impact on trade or investment.

6.3 Environmental impact of the EU-Chile FTA: Scale effect

6.3.1 Macroeconomic simulations

A comprehensive method to assess the importance of the *scale effect* of trade liberalisation on the environment is the use of a general equilibrium approach (see Appendix 6.1). It also captures some of the *composition* effect. Several studies have made use of such an approach to assess the environmental consequences of trade liberalization in Chile (O'Ryan et al. 2006;. Irarrazabal and Opromolla 2005; O'Ryan et al. 2010). They find that as a result of trade liberalization, the Chilean economy adjusts and expands in sectors that are more intensive in natural resources and environment. This suggests that the scale effect (and its negative environmental impact) of Chilean free trade agreements are significant. This converges with empirical studies showing that, in the past, erosion, mining pollution, overexploitation of fisheries and forests have been linked to the processed of trade liberalization that took place in the 1980s and 1990s (Borregaard and Bradley 2000). However, in the more recent period O'Ryan et al. (2010) suggest that the *technique* effect, i.e. a reduction of the pollution intensity of production has mitigated this phenomenon, but it is unclear whether the changes in environmental standards have been endogenous to trade liberalization.

In order to isolate the possible effects on input use (energy and other resources) and the expansion of land used for agricultural purposes that are linked to the EU trade agreement from other factors, simulations of a counterfactual state of the economy were carried out using the model developed in Chapter 3. The scenario that is used in this section relies on the change between a counterfactual scenario without the EU agreement but with internal changes in Chile as well as other trade agreements, and the current situation. The simulation therefore includes all macroeconomic closure effects. The changes that have taken place in Chilean production and consumption are summarized in Table 34.

The changes in the overall sectoral outputs that can be attributed to the EU-Chile FTA can be put in perspective with global environmental indicator. There is nevertheless no

consensus on the characterization of the polluting potential of the various industries. One approach is to classify industries by looking at the pollution abatement costs (Jafee et al. 2005). For example, a dirty, or pollution-intensive, industry may be designated as one where pollution abatement costs exceed a certain percentage of total costs (e.g. pulp and paper, mining, iron and steel, primary nonferrous metals, and chemicals). This provides the advantage of being able to merge different types of pollution through a single indicator. The data which is most often used for such an approach relies on detailed measures provided by US agencies and the annual OECD's Environmental compendium.

TABLE 34. IMPACT OF THE EU-CHILE FTA ON CHILEAN PRODUCTION AND "DIRTINESS" OF THE INDUSTRY

SECTOR	INITIAL WEIGHT (2008 from SAM In billion 2003 pesos)	Change in value of activity as a result of the Agreement	Degree of dirtiness	Top 10 polluting industries by criterion
Electronics	302	18.6%	++	water
Winemaking	1064	13.9%	+	
Fruit production	1769	13.4%	+	water
Seafood processing	1405	12.6%	+	water
Extractive fishing	2250	8.8%	+	
Other food processing	895	2.5%	+	water
Mining and mineral extraction	15663	2.2%	+++++	air, water, metals
Other agro-industrial	6755	1.4%	+	water
Fuel industry	4002	1.1%	++++	air
Animal husbandry	1740	0.8%	0	
Textiles, leather and footwear	1755	0.8%	+++	water
Other agricultural activities	1610	0.7%	+	water
Meat production and processing	1941	0.7%	+	water
Other manufacturing and recycling	117	0.7%	+	
Electricity	7458	0.6%	+++++	air
Construction	14287	0.5%	++	
Communications	8591	0.4%	+	
Trade	19106	0.1%	+++	
Health and social work	5168	-0.2%	+	
Other non-metallic minerals	1375	-0.6%	+++++	air
Basic metal industry	4056	-3.5%	++++	air, water, metals
Forestry	1265	-3.6%		
Transport equipment industry	683	-3.8%	+++	water, metal
Plastic industry	1651	-4.5%	+++	air, water
Paper and printing industry	3801	-5.3%	++++	water, air
Chemical industry	4451	-6.7%	+++++	air, water
Timber and furniture, cork	2485	-6.8%	+++	water

Source: Simulations from CGE model, authors.

The use of pollution abatement costs is nevertheless not fully satisfactory, in particular because of the technique effect described above and endogenous environmental regulation (Copeland and Taylor 2008). Another approach relies on the level of toxic

pollutants (in particular air pollutants) emitted during the production. Data on US pollution intensity data at the industry level compiled for the US Environmental Protection Agency (EPA)'s Trade and Environmental Assessment Model (TEAM) is often used for that purpose (Abt Associates 2009). The drawback is that industries need to be classified as dirty for a variety of pollutants.

Here we combine the characterizations of the polluting potential of representative industries that have appeared in the literature using these methods, as well as other, more empirical estimates (Mani and Wheeler 1999; Dean and Lovely 2007, Marconi 2011, Broner et al. 2011) to come up with an approximation of the overall pollutant emission level of the industry (column 4 in Table 34). Clearly, this classification is rather *ad hoc.* Using the Mani and Wheeler classification, we also identify (column 5 in Table 34) the type of emission in which a particular industry is seen as significant.

Overall, the sectors where the EU-Chile FTA has had the most impact on Chilean production are not the most polluting ones. The Agreement liberalized trade in some mining products (e.g. molybdenum-based products). While the extraction and production of such minerals is a source of pollution, they can hardly be isolated given that it is a co-product of copper (emissions of greenhouse gases are allocated to copper in the Chilean calculations by the agencies in charge of the calculation, see Poch Ambiante 2008).

The impact of the EU-Chile FTA on petroleum industry and electricity production are limited. The Agreement has induced larger growth in the wine, fruits and seafood sectors. While some particular environmental issues deserve further investigation (pesticides, water, see sections below), these sectors account for a small share of greenhouse gas emissions.

If we consider the greenhouse gases that are particularly linked to the exports that have benefited from the EU-Chile FTA, the alcoholic beverage sector plays a significant role in the emission of organic volatile components, a source of global warming.

6.4 Environmental Impact of the EU-Chile FTA: Composition effect and input use

6.4.1 The effect of the agreement in terms of energy use

Context

The growth in energy demand has considerable environmental impacts in Chile. Assessments of the Chilean energy sector point out that the increase in energy consumption since 1996 has exceeded economic growth in annual rate (OECD 2006; O'Ryan et al. 2008; IAE 2009). It is noteworthy that both the OECD's environmental assessment and the IAE (2009) stress the limited progress in reducing energy waste and energy inefficiency.

Fossil fuels account for almost 80% of the country's total primary energy supply. Chile imports close to 75% of its energy needs in the form of oil (98% is imported), gas and coal. In the case of natural gas, this external dependence was concentrated almost exclusively in one supplier – Argentina – until the arrival of liquefied natural gas in 2009. Supply problems from Argentina led Chile to reverse its energy mix towards a greater use of coal (IAE 2009). The Chilean ministry of energy estimates that coal could represent 26% of Chile's installed

electric capacity by 2020, compared with 16% in 2008. At the end of 2009, 2200 MW of coal-fired power plants were under construction, while an additional 4700 MW under consideration. Although it is unlikely that all of them will eventually be constructed, these numbers illustrate the environmental consequences of the increased energy needs. Willing to participate to the global reduction of greenhouse gas emissions, Chile has looked for renewable energy alternatives. Given the tectonic risks faced by nuclear generation, hydroelectricity has been favoured by Chilean authorities.

Projections predict a doubling of the country's greenhouse gases emissions between 2008 and 2025 (Poch Ambiante 2008). Transport is the sector whose greenhouse gases emissions have increased most over the recent period. Transport now account for more than 25% of total emissions in Chile, ahead of electricity and heat generation (22%) and ahead of construction and manufacturing (13%, IAE 2009). Agriculture is a source of emission due to enteric fermentation and agricultural soils. Land use change by forestry category is an overall net sink, but presents large fluctuations, mainly due to extensive forest fires that have occurred with increasing frequency and intensity.

Ecological consequences of the increased demand for energy also arise from the expansion of hydroelectric power. A number of electricity megaprojects (i.e. larger than 1000 MW) are currently under evaluation in the Environmental Impact Assessment System, including: HydroAysén (2 759 MW, hydro); Castilla (2 350 MW, thermal); Energía Minera (1050 MW, thermal); and Río Cuervo (1 000 MW, hydro). Power projects of this scale potentially cause environmental problems. Several of these large projects rely on the use of water resources in the South of Chile, home to regions of special ecological interest. They would require electric lines running for several thousand kilometres in order to carry power to cities and industries in the North. Such lines would need to be very high tension to reduce the energy losses over such long distances.

The impact of trade liberalization

Empirical estimations of the counterfactual of the Chilean economy without the EU-Chile FTA, using the quantitative approaches developed in the previous chapters, nevertheless suggest that the Agreement only had a limited impact on Chile energy demand. Consider a higher bound in the estimates for the scale effect, i.e. assuming that in the absence of the Agreement Chile would be subject to the MFN regime (rather than the GSP), and ignore feedback effects through a macroeconomic closure and exchange rates as well as production displacements due to imports. Input/output multipliers suggest that the EU-Chile FTA has had a significant impact only in the wine and fruit sector and in the seafood canning sector(Table 35). Changes in energy demand induced by extra exports to the EU only amount to 1% of total energy demand in Chile according to a standard input-output multiplier analysis.

The EU-Chile FTA has also contributed marginally to an increase in income, hence to a demand in energy from households. The role of this particular agreement in Chilean growth is nevertheless limited (see Chapter 2). The induced effects through household demand for more energy is captured through the SAM multiplier effects, which show an increase in energy demand as a result of the Agreement that is slightly higher than the simple input/output multiplier effects (Table 35).

Finally, the lowering of tariffs on energy imports from the EU has not had a visible impact on energy gasoline and diesel price in Chile. Figure 44 in Annex 1.1 shows that if trade agreements have led Chile to lower its actual tariffs on energy, preferential imports have mostly arrived from North and South America. In any case, the Chilean government retains all freedom to set domestic taxes on energy and lower preferential duties cannot be seen as a driver of domestic energy consumption.

TABLE 35 IMPACT OF THE EU-CHILE FTA ON ENERGY CONSUMPTION BY SECTOR (TRADEABLES ONLY) IN PERCENT RELATIVE TO COUNTERFACTUAL 2008 SITUATION.

	Share of production exported to the EU	Change in exports to the EU induced by the Agreement	Change in energy demand induced by EU agreement (input/output analysis)	Change in energy demand induced by EU agreement (full SAM multiplier effects)
Agricultural products	2.5	7.2	0.2	0.9
Fruits	21.3	24.6	4.4	6.2
Livestock and livestock products	0.5	1.6	0.0	1.0
Forestry products	0.9	15.3	0.1	2.3
Seafood	10.9	36.2	3.0	6.1
Minerals	12.4	5.6	0.7	1.1
Meat	5.0	25.7	1.0	1.2
Seafood processing	35.7	51.9	13.9	14.7
Canned fruits and vegetables	4.2	39.6	1.2	1.3
Liquors and spirits	4.8	0	0	0.4
Wine	32.2	57.8	13.4	14.4
Other foods and beverages	0.7	5.9	0.0	0.8
Textiles (fabrics and clothing), leather and footwear	3.1	38.2	0.9	1.2
Wood, furniture, other wood products (including cork)	6.3	75.8	2.8	3.8
Pulp, paper, paper products, printing and publishing	8.6	0.4	0.0	0.8
Coke, refined petroleum and nuclear fuel	0.0	45.5	0.0	0.9
Chemicals and products	4.2	14.2	0.5	2.6
Rubber and plastic	0.3	28.2	0.1	1.6
Other non-metallic mineral products	0.2	19.3	0.0	0.2
Basic metals and fabricated metal products	6.7	9.3	0.6	1.4
Other equipment	0.4	6.9	0.0	1.5
Electronic and optical equipment	0.3	7.9	0.0	2.4
Transport equipment	0.6	59.0	0.2	1.2
Other manufacturing and recycling	6.3	18.1	1.0	1.1

Note: the variations are expressed in percentage change relative to the absence of agreement benchmark (i.e. MFN tariffs imposed by the EU) for the year 2009. Changes in energy demand include multiplier effects.
Source: Authors' calculations using SAM multipliers source national accounts and ECLAC.

6.4.2 THE EFFECT OF THE AGREEMENT ON WATER DEMAND

Context

In spite of spectacular improvements in urban areas during the last several years, poor drinking water and wastewater treatment is a widespread issue in rural areas. Non point source pollution caused in particular by untreated sewage is a problem in many parts

of the country. Other issues are more specific to particular areas. In the North, both access to water and pollution (in the mining industry area) are issues. The intensive use of water for irrigation and for processing of food and beverages generates users' conflicts in the plains. The pulp and paper sectors also generate pollution and have had, in the past, large negative impacts on fauna in the South, even though the industry claims that major progress has been made in this area. Plantations of eucalyptus and other fast growing trees for pulp and woodchips also draw on the water resource. The watershed management by logging companies is also criticized by NGOs. Salmon farming, with the production of smolt in lakes, also creates some local pollution in specific areas in the South. Further South, the concentration of ownership of abundant water resources and their use for large power generating companies is raised as issue by non-governmental organisations.

The impact of trade liberalization

The expansion of exports, together with the economic growth induced by trade liberalization, contribute to a higher demand for water. Such a scale effect is visible in the Santiago area where demand for water has increased more rapidly than local water supply. The composition effect has also led Chile to specialise in sectors that make intensive use of water, such as mining, forestry and agriculture. Pas Aedo (2004) claims the export sectors of apples and grapes account for a significant share of the water use in the agricultural sector, while agriculture consumes more than 80% of net water output in Chile. She also claims that export-led agriculture has increased water pollution by pesticides and fertilizers.

Simulations indeed suggest that the EU-Chile FTA has played a significant role in the expansion of the wine and fruits sectors (see Section 0). Both use large quantities of water and contribute to chemical pollution. By contrast, the expansion of the livestock sector, also a major user of water, has been limited by rather small quotas under the EU-Chile FTA. However, because water scarcity in Chile is a local issue, no quantitative assessment of the actual impact of this expansion could be linked directly to the FTA. For example, the production of wine in the Itata Valley and Bío-Bío Valley – as well as kiwi in Bío-Bío – take place in a region where water is abundant, while the production of grapes in Atacama takes place in a dryer region. The wine production in the Casablanca area, or the kiwi production in the Valparaiso and Santiago regions take place in areas subjects to droughts, in particular because of the water demand from urban areas. The fact that irrigation of vineyards had increased considerably, to a point where it had become detrimental to wine quality in some areas, offsets some of the scale effect and makes the impact of the FTA even less visible.

Another issue is the flow of direct investment and services from the EU to Chile in the water distribution and management sector. The flow of foreign investment has resulted in technology transfers, and extra financial capacity to fund large scale investments. EU investments have contributed to the general improvement of water quality and the reduction of waste. Figures from the *Superintendencia de Servicios Sanitarios* show an impressive increase in the treatment of used water, with the share of used water treated multiplied by five between 1998 and 2008 (SISS 2008).[61] Again, the link with the EU-FTA is nevertheless not well-established, since some of these investments took place before 2003.

[61] Larrain (2010) stresses the large increase in water prices that took place after the privatization of water services and the high financial returns enjoyed by utilities companies. While this may have played a role in reducing waste, this author stresses some negative social consequences.

6.4.3 The effect of the agreement on chemicals use

Context

In Chile, changes took place over time in the levels and composition of production towards a greater emphasis on export-oriented agriculture. There has been increasing technical sophistication in many of what were traditional import-competing products. Land productivity has also increased. The pattern of agricultural growth has had consequences for the demand of various factors of production. More specifically, these changes have had an impact on the use of agrochemicals, pesticides and fertilizers, which generate chemical pollutants and are important factors in linking agriculture to environmental damage.

Estimates of agrochemical demand elasticities with respect to prices paid by farmers and with respect to output levels, of both export-oriented and non-export production provide a basis for the analysis. Estimates derived from the econometric results of Chapter 2 of changes in prices and output levels and composition brought about by the EU-Chile FTA, are used to estimate the changes in the quantity of chemical inputs demanded.

Here, we disaggregate chemical inputs into three categories, considering that the discharge of each might have different potential impacts on the environment: pesticides (all forms of biocides – insecticides, fungicides, herbicides, etc.), nitrate fertilizers (mostly domestically produced potassium and sodium nitrates), and imported fertilizers (phosphates and urea). A coherent system of factor demands is derived by assuming that the aggregate agricultural production technology can be approximated by a multi-output cost function (specifically, the generalized Leontief form with two outputs).

Input intensity equations as functions controlling for other factors (prices, capital, trend) were estimated to assess the consequences of agricultural exports on pesticide use (Lopez and Anriquez 2005). The results are summarized in the following table using the median elasticity estimates. The largest and most robust output effect is the impact on pesticides of changes in import-competing agricultural production. Both the mean and median values of the pesticide elasticity with respect to import-competing output is positive, highly significant and on the order of 1.0. Export-oriented production has a much smaller effect. One implication is that, in place of export-led expansion, a neutral agricultural expansion would have led to greater pesticide use.

Historically, the observed rapid rise in pesticide demand in the 1990s was mostly due to a reduction in the relative price of pesticides and fertilizers which began in the early 1980s, in part as a result of the reduction in border restrictions which were associated with unilateral trade liberalization in Chile (nominal pesticides prices increased by 70% in the decade, but nominal wages increased 300%, and fertilizers and other inputs about 130%). These changes plus the high own-price elasticity of pesticides explain almost 70% of the increase in pesticide use from 1990 to 2000. The observed export-led agricultural expansion contributed only about 25% to the increase in pesticide use. Lopez and Anriquez (2005) note that, if not for the change in relative prices, the pesticide intensity of agriculture would have decreased significantly, and thus the increasing export orientation of Chilean agriculture has reduced the pesticide dependence per value of output.

TABLE 36. MEDIAN ELASTICITY ESTIMATES OF ALTERNATIVE SPECIFICATIONS OF AGGREGATE COST FUNCTIONS. ELASTICITY OF FOUR DEMAND WITH RESPECT TO PRICES AND OUTPUT LEVELS

Factor demand	Agricultural Wages	Imported Fertilizers Price	Pesticide Prices	Domestic Nitrates Prices	Export-oriented	Import-competing output	Annual Autonomous Change
Labor	-0.096	0.001	-0.008	0.104	0.114	0.258	-0.009
Imported fertilizer	-0.016	-0.080	0.236	-0.147	0.992	0.654	-0.122
Pesticides	-0.011	0.192	-0.955	0.781	0.247	1.007	-0.050
Domestic fertilizer	0.131	-0.121	0.630	-0.636	0.160	0.455	-0.013

Source: Calculations using Lopez and Anriquez (2005) estimation results.

Estimates presented in Table 36 suggest that the growth of import-competing agriculture is more dependent on the use of pesticides than the growth of the export-oriented sector. A change in the composition of production in favor of the exportable sector such as the one that has resulted from the EU-Chile FTA tends to be associated with a relative reduction in pesticide consumption.[62]

The elasticities of imported fertilizers with respect to both output types are relatively high, but apparently more responsive to exports than to import-competing agriculture. The implication is that the shift in composition of output toward exportables induced by the EU-Chile FTA has likely contributed to increases in the demand for imported fertilizers. Using the results of the trade outcomes due to the Agreement, one can simulate estimated changes in the demands for the various factors considered above to gauge the effect on agrochemical use. Then, one can obtain a rough estimate of the impacts on environmental quality of the Agreement deriving from the increase or decrease in the use of these inputs.

Table 37 shows some cumulative estimates of the increase in input use that can be attributed to the extra exports to the EU resulting from the EU-Chile FTA. The figures are derived from the econometric estimates in Chapter 2 where the exports to the EU that can be linked to a decrease in tariffs under the EU-Chile FTA are singled out. Then, these exports are used to generate changes in production, and the induced input demands are derived. Simulation results suggest that there is an increase in annual agricultural exports to the EU, due to the EU-Chile FTA of approximately 21% in the last three years (note that the definition of agricultural products is the one used in the CGE simulation, i.e. forestry and fisheries are excluded).

Of the included inputs, imported fertilizers (mainly nitrogen and phosphorus based) are most impacted by the Agreement. Overall, the EU-Chile FTA has resulted in an increase in imported fertilizers (5.6%, i.e. phosphorus and in particular diammonic phosphate) and some nitrogen (urea). The impact on consumption is a much lower increase in pesticide use (1.4%) and domestic fertilizers (0.9%), i.e. mostly nitrates and potash.

[62] Lopez and Anriquez note that, "Between 1990 and 2000 agricultural exportables expanded twice as fast as import substitute outputs. According to our estimates this output expansion is responsible for a 60% rise in pesticide use. Had both sectors expanded at the same rate keeping the total rate constant, pesticide use would have risen by 130% instead of by 100%. That is, the change in the composition of production reduced pesticide use by a significant amount.". Note, however that the degree of detail in active ingredients that is compatible with such estimates may hide the use of a particular pesticide which would increase with the export of a specific product (e.g. a particular fungicide in wine production or a particular insecticide in fruit production).

TABLE 37. ESTIMATED INCREASE IN INPUT DEMANDS DUE TO THE EXPANSION OF EXPORTS TO THE EU AS SIMULATED FROM ECONOMETRIC ESTIMATION

		2003	2004	2005	2006	2007	2008	2009
Estimated percent increase in agricultural exports to EU due to the agreement		6.4	10.3	15.7	18.8	22.2	22.2	21
Input	Elasticity of factor demands with respect to agricultural export index	Percent increase in agricultural exports and input use						
Labor	0.114	0.2	0.3	0.5	0.6	0.8	0.7	0.6
Imported fertilizer	0.992	1.7	2.8	4.1	4.9	6.6	6.1	5.6
Pesticides	0.247	0.4	0.7	1	1.2	1.7	1.5	1.4
Domestic fertilizer	0.16	0.3	0.5	0.7	0.8	1.1	1	0.9

Source: Authors' calculations based on own simulations (econometric estimates using national trade data described in Chapter 2), FAOSTAT, Lopez and Anriquez (2005) elasticities

Using the CGE model simulations presented in Chapter 3, rather than the econometric estimates of exports, the picture is quite similar, but the impacts are even smaller due to a lower level of export growth (the extra exports to the EU induced by the EU-Chile FTA are compensated by lower exports to the US in the simulation, which was not taken into account in the econometric simulations).

Altogether the EU-Chile FTA has resulted in an increase in the use of fertilizers, since the growth in exports of agricultural products and wine to the EU since 2003 corresponds to a 6 percent increase annually. Larger exports of fruits and wine may have lead to an increase in pesticide use of roughly 1.5 percent annually. This impact is therefore more limited than for fertilizers, due to strict standards in the EU (in particular regarding pesticide residues) and the fact that the shift towards export agriculture tends to reduce pesticide intensity in production compared to productions for the domestic market.

6.5 ENVIRONMENTAL IMPACT OF THE EU-CHILE FTA: TECHNIQUE EFFECT

The various studies that have been carried out on the environment in Chile have not managed to assess the magnitude of the technique effect. Quantifying the changes in techniques that are endogenous to trade liberalization is particularly difficult. This is even more a problem when attempting to single out the effect of the EU-Chile FTA. Here we rely on some qualitative considerations and on the changes in technology that are brought about by EU exports of green goods, equipment and services.

6.5.1 CHANGES IN POLLUTION INTENSITY

The technique effect captures the changes in technology, and overall the changes in pollution intensity that result from trade liberalization. It can either offset or reinforce the scale and composition effects. The technique effect encompasses several types of mechanisms.

Greening of technology

A first channel that leads to changes in the pollution intensity is the transfer of input saving technology. No comprehensive study seems to have been carried out on this issue, even though the OECD-ECLAC (2005) study raises the issue that trade agreements have made it easier for the Chilean industry to access new technology. There is a lot of partial anecdotal evidence that foreign investments have brought some know-how to sectors that benefited from a reduction in input waste. In particular, EU investments in services and utilities have brought experience in terms of logistics and organization under stricter environmental standards and higher liability exposure. This has contributed to the development of waste management, recycling and water treatment in Chile. During the workshops that were organized in May 2011, stakeholders pointed out that technology transfer in aquaculture had helped the Chilean industry adopt more environmentally friendly techniques. Interviews suggested that the FTA with the EU (but also with the United States) have been an important step for the adoption of stricter standards in the Chilean automotive sector. This has contributed to the reduction of some air pollutants, in particular in the Santiago area.

Firm selection

A second channel for changes in the pollution intensity of production is through the exit of less efficient firms. To the extent that older or less efficient plants use outdated technology and that they tend to use more intermediate inputs per unit of output, they combine economic underperformance with more waste and pollution. An important effect of freer trade includes some competitive pressure that results in the exit of less productive firms (Feenstra 2006). Irarrazabal and Opromolla (2005) find that the series of FTAs concluded by Chile has had a large effect on the efficiency of the manufacturing sector. Most of the incremental change is due to the reallocation of resources to more efficient plants, which could lead to less wasteful and therefore cleaner production. O'Ryan et al. (2006, 2010) provide empirical evidence of changes in the composition of production both between and within each sector as well as shifts in technology. However, the impact of the EU-Chile FTA is too diluted within a general movement of trade liberalisation to single out its role in the exit of less productive firms and the self selection of environmentally responsible ones.

Demand for greener goods

A third channel that leads to changes in pollution intensity is the demand for more environmentally friendly goods and for environmental services. It is well accepted that the income elasticity of demand for environmental inputs is positive and larger at higher levels of income. Trade liberalization ontributes to income growth and the induced demand for environmental amenities could drive a supply of greener products as well as a supply of environmental regulation by policy makers. While this is likely to be a significant effect if one considers overall trade liberalization, the contribution of the EU-Chile FTA through this channel appears very limited if one considers the changes in income that result from this sole agreement measured in Chapter 3.

Foreign market standards

A fourth channel is the pressure for stricter standards created by the new market. In the in-depth interviews that have been carried out, most of the stakeholders in the administration and in the private sector have stressed the role of trade agreements with environmentally conscious customers such as those in the EU and Canada in raising the benchmark of good practices. The online survey of stakeholders show that 62% of the Chilean exporters of goods respond that EU environmental standards require efforts to export to the EU, but are elusive regarding whether the EU-Chile FTA has led them to change their environmental practices. The joint work of OECD and ECLAC stressed the role of the export market in the move of the Chilean business sector towards more environmentally friendly practices. While their scope is broader than the singe EU-Chile FTA, the OECD notes that a number of firms, which accounted for roughly half of the Chilean GDP, have concluded voluntary agreements so as to limit their environmental damages, a major reason being that their export markets in OECD countries required some stricter standards (OECD-ECLAC 2006).

Endogenous environmental policy

A fifth channel is the indirect role of trade liberalization in pressing for regulatory changes, through both the increase in income and the familiarity with cleaner products.[63] Several studies find that there has been a concomitant strengthening of environmental policy in the 2000s (OECD-ECLAC 2006; Word Bank 2001, O'Ryan 2005, O'Ryan et al. 2006, 2010). Major pollution problems were tackled by policy makers. Installation and operation of waste disposal sites and water treatment plants, improvement in Santiago air quality as well as in areas close to copper mines stand out as important steps. The relative importance of the different motives (domestic pressure linked to income growth and foreign determinants) is nevertheless uncertain. In the interviews conducted with the private sector, as well as with the participants in the workshops organised in May 2011, most of the respondents agreed with the idea that international trade has played an important role in these results.

The EU-Chile FTA is certainly not the only form of pressure for stricter standards. Former officials that were interviewed stressed that the desire to be integrated into the North American Free Trade Agreement in the 1990s has been an important driver of a more proactive approach to environmental management. The trade agreement with Canada was also presented as imposing an effective requirement, i.e. that Chile complies with its environmental legislation, which led to progress in enforcement of domestic regulation. The EU-Chile FTA seems to have played a significant role in encouraging exporters to develop environmental certification. One reason is that EU standards are among the highest in the world, and that the EU buyers of Chilean products do not want to risk reputation and liability

[63] The link with trade liberalization is not demonstrated, but an illustration of the tightening of environmental standards in Chile is the changes that took place in the case of water pollution in forestry. While the pulp production in the region of Valdivia was accused of major pollution and decline of biodiversity, the CONAMA requested improvement in wastewater treatment system and to the excessive pH levels of water dumped into rivers. The Chilean wood pulp company Celulosa Arauco's Valdivia seems to be in the process of implementing a combination of a recycling of water and technology improvements (membranes) that are presented as a pilot project wordwide in terms of pollution reduction in the international professional media. This illustrates the spillovers of standards adoption that are facilitated by integration in trade with countries such as the EU.

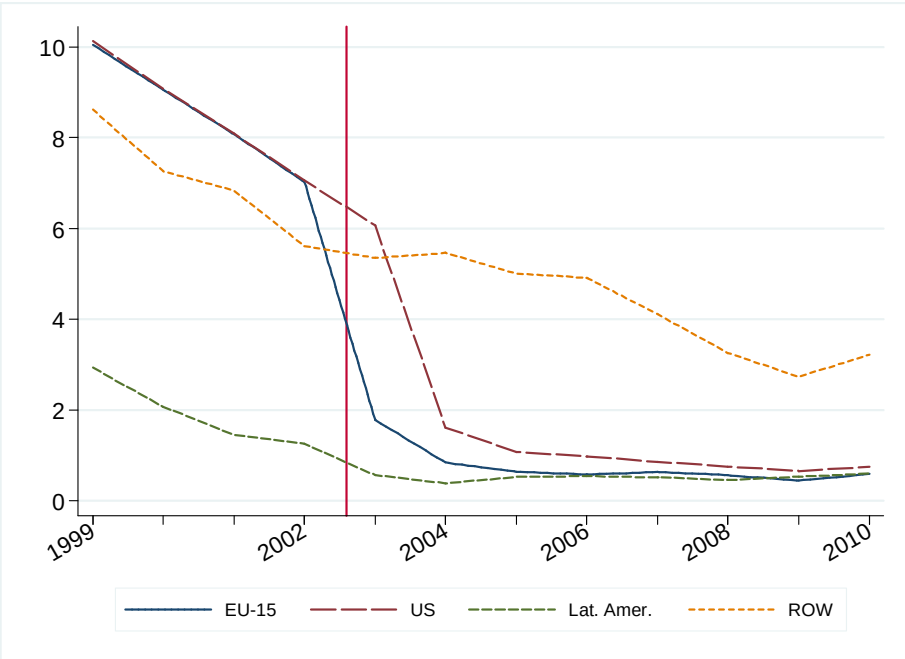
damages. Private equity and EU investors in Chile also require environmental assessment of projects to reduce risks of problems due to inadequate environmental safeguards. The EU-Chile FTA included, in addition to the trade component, a cooperation component. It made assistance on adaptation to higher standards easier, according to the interviews with former officials in the Chilean government (meetings in Santiago, May 2011).

6.5.2 Trade in environmental goods

The shift to greener technology induced by access to imports of equipment and services is only one component of the technique effect, as described in the previous section. The EU-Chile FTA resulted in a cut in tariffs of some goods and equipments that make it possible to improve the environmental balance of production and transformation processes. One way to assess the impact of the EU-Chile FTA in this area is to look at whether a list of "environmental goods" has benefited from tariff reductions.

Several lists of environmental goods have been put together, in particular by the Asia-Pacific Economic Cooperation forum. Several non-official lists have been put together in more informal arena, including by German authorities. These lists tend to combine depollution technology and energy savings equipment with some "green" goods such as organic products. In order to capture the technology change effect, the more restrictive list put together by the OECD was used (Steenblik 2005). In its HS6 version, it is a list of some 131 tariff lines (once duplications in the HS list were eliminated). These tariff lines contain a number of environmental goods in several categories (air pollution control; wastewater management; solid waste management; remediation and clean up equipment; environmental monitoring; analysis and assessment equipment; cleaner/resource-efficient technologies processes, production and products; indoor air pollution control; water supply purification; renewable energy plants; heat/energy savings and management equipment, etc.). Here, we comment on the results on tariffs and trade of the aggregate goods.

Figure 33: Chilean tariffs on environmental goods (as defined by the OECD)

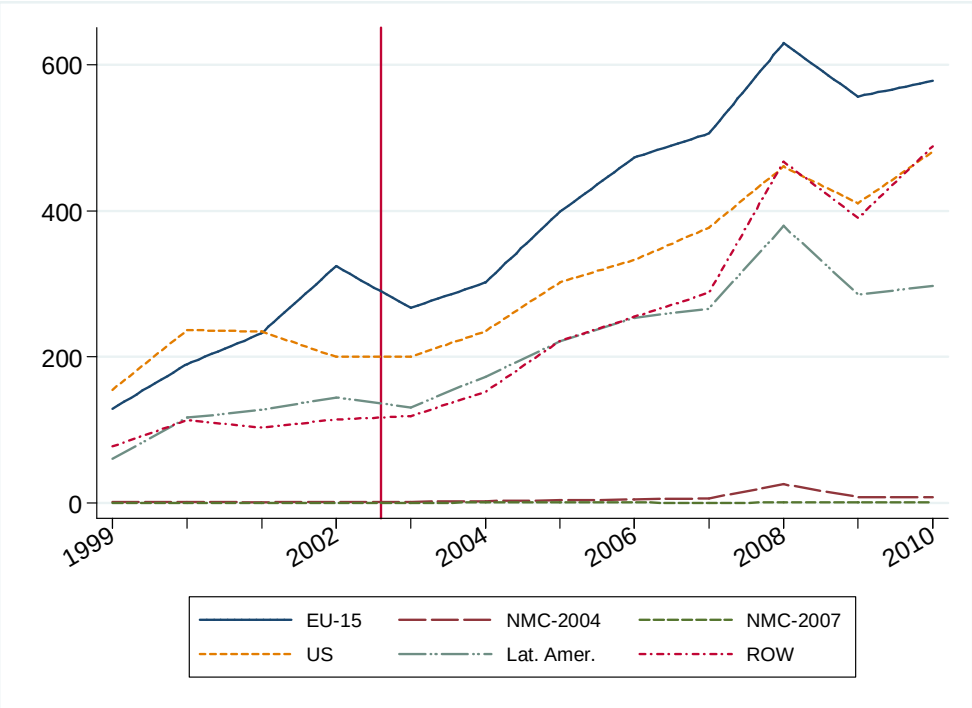


Source: Authors' calculations, based on Chilean tariff data.
Note: Import-weighted mean.

Figure 33 shows the reduction in the aggregate (import-weighted average) tariff faced by environmental goods in Chile, from different origins. Both the agreements with the EU and the US led to a significant increase in the number of green goods (approximated by the HS6 statistical classification) imported duty free. The resulting protection on these goods imported from the EU and the US – but also from Latin America- is very low, while imports from third countries still face a significant tariff. It is noteworthy that the EU-Chile FTA has resulted in an immediate liberalization of most of the environmental goods (as defined by the OECD list) that Chile could import.

The import of US$600 million of environmental goods from the EU suggests that the EU-Chile FTA has eased technology transfers and the purchase of more environmentally friendly equipment and technology. This illustrates the positive contribution of the EU-Chile FTA to the "technique" effect (Figure 34). However, if we compare the growth in these imports with those from other countries since 2003, neither the EU-Chile nor the US-Chile FTAs have made it possible to match the growth of imports from Asian countries.

FIGURE 34: CHILEAN IMPORTS OF ENVIRONMENTAL GOODS (AS DEFINED BY THE OECD), MILLION US$



Source: Authors' calculations, based on Chilean tariff data.

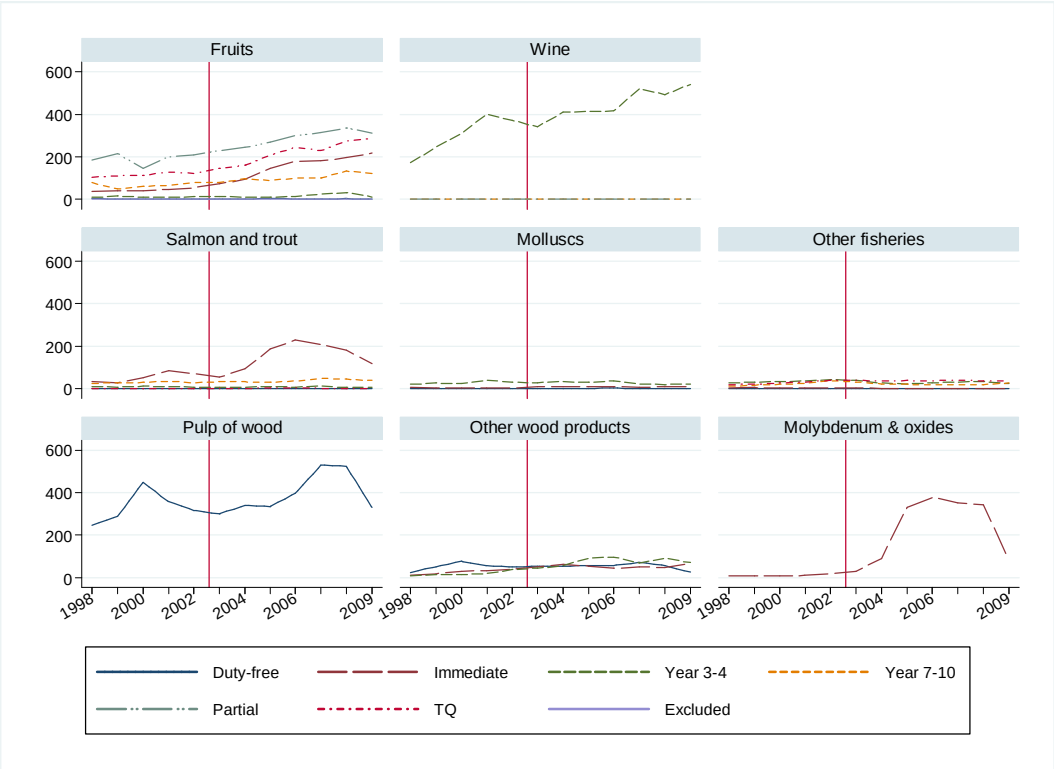
6.6 ENVIRONMENTAL IMPACT OF THE EU-CHILE FTA: SECTORAL INVESTIGATIONS

While general equilibrium modelling makes it possible to isolate the effect of a particular agreement from other economic changes, it only provides a global assessment of the changes in outputs and the use of inputs that are related to major environmental issues. In this section, we combine this approach with the statistical analysis carried out in Chapter 1 and Chapter 2, with the information obtained thanks to surveys and in-depth interviews.

We cross-checked the sectors where the EU-Chile FTA has had an impact on trade and investment with the sectors identified as sensitive from an environmental standpoint (section 6.2). The issues that match the joint criteria of being identified as problematic from an environmental point of view and being affected by the EU-Chile agreement (either through trade flows or investment flows) include the export-oriented agricultural sector, the wine sector, the fisheries sector, the aquaculture sector, the forestry sector and the mining sector (even though the bulk of exports has not been affected by the EU-Chile FTA since copper faced a zero tariff in the EU prior to the Agreement).

Figure 35 illustrate the relative progression in terms of import value and market share of Chilean products in EU imports. The figures give an idea of the relative importance of preferential trade flows for the different product categories. For these categories of products, the EU-Chile FTA has coincided with an increase in EU imports from Chile.

FIGURE 35: EU15 YEARLY IMPORTS FROM CHILE BY TARIFF CONCESSION SCHEDULE FOR SELECTED PRODUCTS WITH A POSSIBLE ENVIRONMENTAL IMPACT (MILLION EUROS)



Source: Authors' calculations, based on COMEXT data.

6.6.1 ENVIRONMENTAL IMPACT IN THE MINING SECTOR

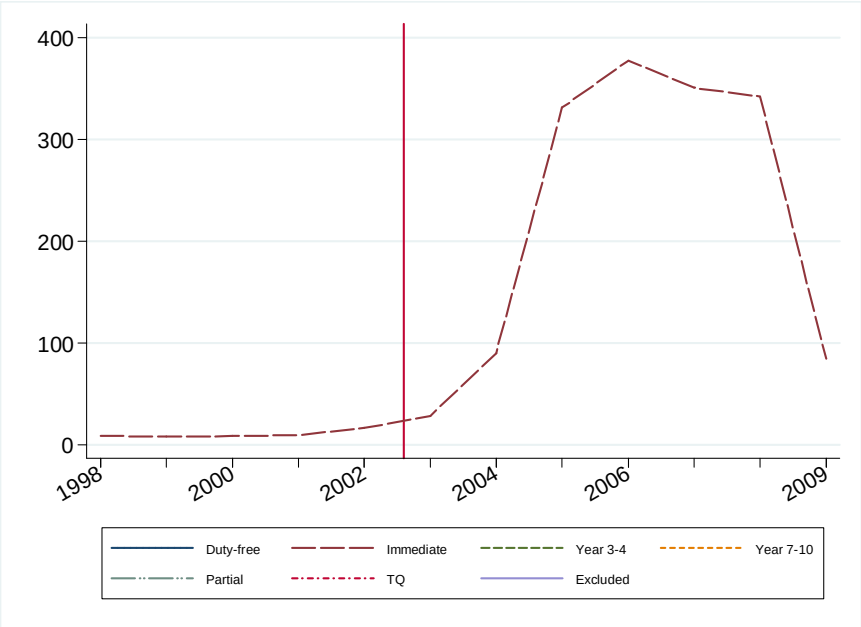
The mining industry is a major source of pollution in Chile according to the OECD-ECLAC environmental assessment. Mining and related activities release chemicals and heavy metals such as chrome, lead, copper, mercury, and nickel. In Chile, it is also a major source of SOx, particulates and arsenic in air pollution. The OECD stresses the weakness of control of emitters of toxic air contaminants in Chile (OECD-ECLAC 2009). The treatment of water is in general only partial and some pollution goes into rivers and oceans. Solid industrial waste is often sent to landfills where it is exposed to precipitation and surface run-off, ending up in

streams or in groundwater aquifers (O'Ryan et al. 2010; Larrain 2010). The industry has nevertheless experienced some positive changes over the recent years, and for arsenic from copper smelters, large reductions of emissions have been achieved thanks to more stringent standards.

The impact of the EU-Chile FTA

All ores entered the EU duty-free prior to the EU-Chile FTA, as did copper. MFN dutiable minerals were molybdenum and lithium, which were subject to immediate tariff reductions in most cases when the EU-Chile FTA was implemented, and for some products, after a 5-year period. Hence, the products that experienced a growth in trade that can reasonably be linked to the Agreement are ferro-molybdenum (preferential imports increased from €9 million in 2002 to €286 million in 2008, all subject to a tariff reduction under the EU-Chile FTA) and molybdenum oxides and hydroxides (from €6 to €77 million of preferential imports during the same period (Figure 36). Other significant products from the mining industry are sodium nitrate and lithium carbonates (less than €30 million of preferential imports in 2008).

FIGURE 36: EU15 YEARLY IMPORTS FROM CHILE BY TARIFF CONCESSION SCHEDULE FOR MOLYBDENUM AND OXIDES (MILLION EUROS)



Source: Author's calculations using Comext and Taric data.

Overall, the EU-Chile FTA only had limited consequences in the expansion of the mining sector, given that the largest amounts of imports entered duty free. By liberalizing the few mineral products that were subject to a tariff, the EU-Chile FTA facilitated trade in several hundred million euros of products. The EU-Chile FTA therefore contributed, albeit marginally to the pollution problem in the mining industry. The extent to which the negative effects have been offset by technological improvements facilitated by the EU-Chile FTA is uncertain and rather impossible to measure.

6.6.2 Environmental impact in the Forestry sector

Context

The definitions of forest vary across institutions, leading to imprecise figures. According to FAO, 22% of Chile is forested. Of this, 26% or 4.4 million hectares is primary forest (some estimates put this figure down to 15%, using other definitions). The high degree of biodiversity in Chilean native forest has been emphasized by many authors. Chilean primary and coastal forests are a unique example of the richness of tempered native forest. This contrasts with much lower biodiversity in planted forest (Neira et al. 2002; Smith-Ramirez 2004).

Overall, the forest coverage has increased in Chile since the conclusion of the EU-Chile FTA (16.2 million hectares in 2010 compared to 15.8 million in 2000 according to FAO's Global Forestry Resource Assessment). However, area in primary forest keeps decreasing even though at a much lower rate than the decline that took place in the 1980s and 1990s.[64] There is considerable disagreement regarding the causality between afforestation with exotic trees and the destruction of primary forest (see Box 6.3.). Some authors see the global demand for wood and paper products and export of woodchips as the main reasons for replacing primary forest by planted ones (Catalan and Ramos 1999; Lara et al. 2000; Niera et al. 2002). Others point out that more than 85% of the raw material used by the Chilean industry come from plantations.

The pulp and paper industry, the woodchip industry, sawmills and related industries are the largest economic activities related to forestry. During the 1990s, the sector expanded considerably, becoming the second largest export sector of the country in 2003. A few corporations dominate production and concentrate most of the planted surface, pulp exports and paper production, and the sector benefits from economies of scale in logistics and transportation.

The production of pulp faces particular criticisms that go beyond those addressed for planted forests (O'Ryan 2006). Indeed, environmental groups, but also fishermen and some academic groups, point out the negative impact of cellulose plants on water and ecosystems because of pollution and water use. A large scale project in Valdivia, in the mid 2000s, is accused to have led to the destruction of habitats for rare fauna and has been repeatedly cited as an environmental disaster by environmentalists. The paper industry responds that cellulose production has implemented environmental standards and technology improvements that have reduced water pollution considerably. Chilean authorities also stress that government agencies are now much stricter in granting authorizations. For example, the largest pulp producer has recently requested a capacity expansion for one of its plants in Valdivia, and the CONAMA has imposed considerable improvements in the treatment of water compared to the initial phase of the project.

[64] Sources: FAO Global Forest Resources Assessment (2005, 2010) and the UNEP State of the World's Forests, various issues.

Box 6.3. Controversy regarding the destruction of primary forests

Chile has experienced a very high rate of reduction in natural forest area over time. If one compares current levels to 19th century figures, about 80% of Chile's natural forests have been destroyed (Neira et al. 2002; Arnold 2003). Much of it took place in the early 20th century. The period between 1970 and 2000 has also seen a very high rate of deforestation (Echeverria et al. 2006). Plantation was then heavily encouraged by Chilean authorities. Economic incentives in the 1970s led to massive plantations of pine (*Pinus Radiata*, more than 70% of planted area) and eucalyptus (*Eucalyptus sp*, roughly 15% of planted area).

As far as the extent of the destruction of primary, or native, or "frontier" forest is concerned, figures from national authorities, which fuel the FAO's Global Forest Assessment, differ significantly from the ones put forward by NGOs. According to the former, if the destruction of primary forest persists, it is at a much lower rate than in the past. Official estimates, such as those provided by the FAO put the rate at 10,000 hectares a year. By contrast, the WWF, claims that "each year, 120,000 hectares of its native forests are cleared".[65] The definitions used may explain some of the gap (Chile has 4.4 million hectares of primary forest but 9.4 million hectares of "other naturally regenerated forest" according to FAO figures). There is an even more considerable controversy regarding the role of forest plantation in the destruction of primary forests. Some environmental NGOs claim that plantations of pine and eucalyptus have increased the disappearance of native forests and are responsible for the loss of biodiversity (Lara et al. 2000: Larain 2010, Neira 2002). Other environmental groups, such as the WWF are more careful in establishing a causal link. Global Forest Watch and The World Resources Institute have long claimed that there is a direct link between high prices driven by exports of pulp and woodchips, and conversion to plantations of exotic species.[66]

The industry claims that most of the afforestation has taken place on previously degraded lands used in low yield agriculture, and that the availability of wood from plantations has actually reduced the pressures on native forests. The industry also point out that some intensive forestry management groups (e.g. CMPC and Arauco) reached an agreement with the ecologist group Forest Ethics at the end of the 1990s, to not substitute native forests and implement sustainable management practices. Several studies also suggest that forest management by small landowners, who fail to innovate and sell their trees in bulk for low price pulp logs, is not more environmentally friendly (O'Ryan et al. 2010). The possible responsibility of individuals cutting trees for firewood in the destruction of primary forest,

[65] Figure quoted in http://wwf.panda.org/who_we_are/wwf_offices/chile/about_chile/threats/

[66] The WWF argues that "*In dealing with the issues of deforestation and the high demand for wood products, companies have begun planting non-native tree species such as the Radiata Pine, which now dominates throughout Chile. The establishment of non-native tree plantations is considered by many to be the greatest threat to Chile's native forests. Every year, non-native trees replace around 300,000 acres of native forest*". Global Forest Watch claims that "*Chile's frontier forests today face several urgent threats, such as illegal logging, conversion to plantations of exotic species, and unsustainable management practices*" and "*current protection plans in Chile are not sufficient to safeguard these valuable forests*" (Global Forest Watch). The World Resources Institute claims that "*Chile's native forests are being eroded by the skyrocketing global demand for wood and paper products", and that returns have attracted overseas investments so that large-scale plantations of pine and eucalyptus, many of which have resulted in the clearing of precious native forests, provide most of the timber needed for the domestic and export markets*" and that. "*the result is a dramatic loss of biodiversity, increased soil erosion, and changes in the water level of streams*". See respectively:
http://www.globalforestwatch.org/english/chile/index.htm
http://earthtrends.wri.org/maps_spatial/maps_detail_static.php?map_select=451&theme=9

rather than paper companies, was also mentioned by some stakeholders during the interviews conducted for the study.

The impact of the EU-Chile trade agreement

Trade liberalization can affect forest and biodiversity in two ways. The first one is through the change in prices of products that compete with forest for the land resource. Typically, an export sector will benefit from a trade agreement and the returns to land in this sector will increase, hence a higher rent and a risk of more intensive utilisation. Liberalization in the agricultural sector may result in deforestation, for example, given that in Chile, there is rather direct competition for land between forest plantations and rain fed crops (cereals and protein seeds) as well as livestock (O'Ryan et al. 2010).

The agricultural sectors where Chilean exports to the EU have increased significantly after the EU-Chile FTA are the wine and fruits sectors. Neither the fruits nor the wine sectors have involved significant deforestation. By the time of implementation of the EU-Chile FTA, the areas of production of wine and fruits for exports had already been converted into agricultural production for decades. Exports of livestock to the EU have been capped by limited quotas, and the increase in production caused by the EU-Chile FTA cannot have contributed to significant deforestation.

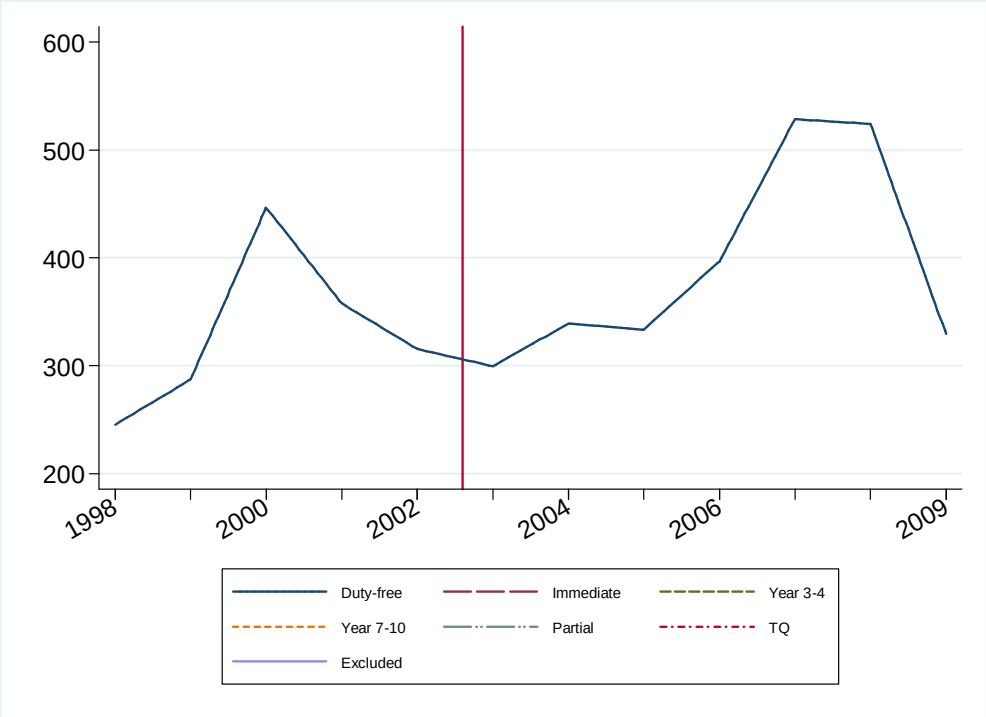
The second way trade liberalization may impact forests is the direct export of forestry products, made more profitable by easier market access for exports. Trade statistics show that the only channel through which the EU-Chile FTA had an impact is the export of pulp and woodchips.

Most wood chip exports go to Japan as raw material for pulp mills (one large Japanese pulp and paper producer has invested in tree plantations in Chile as a means to procure wood chips for its mills, Nippon Paper Group 2009), but Finland is also a significant market for Chilean woodchips (Honnold 2009). However, the EU-Chile FTA seems to have played no particular role in these imports, given that woodchips were imported duty free in the EU before the entry in force of the Agreement.

The EU's MFN tariffs are also zero for most of the categories of wood pulp (see Table 3 in Chapter 1). Only a few tariff lines were dutiable and were liberalized immediately, and most Chilean exports to the EU take place under an item that faced zero duties (470320). Hence, tariff concessions under the EU-Chile FTA can hardly be the cause of exports to the EU. It is nevertheless possible that the Agreement has facilitated EU imports from Chile on non tariff aspects. Indeed, the European market has become a significant outlet of Chile's exports, even though a large share of the Chilean production is exported to China and South Korea. Chilean exports of pulp to Italy tripled in 9 years to 475 thousand tonnes in 2007, and exports to the Netherlands increased from zero to 278 thousand tonnes. Overall, Chile exports of pulp to the EU have increased both in absolute value and in market share after the EU-Chile FTA (the drop in 2009 followed a general fall in international trade and an even larger fall in trade of raw material for packaging such as cardboard, see Figure 37). This surge in exports to the EU has not been matched by a decrease of Chilean exports to other destinations, so it is possible that the EU-Chile FTA, by facilitating trade, contributed to a greater draw on the forest resource in Chile. It is noteworthy that Chilean pulp capacity and production have expanded during the past decade. Pulp production more than doubled, from 2 million metric tonnes in 1997 to 4.7 million metric tonnes in 2007 (Honnold 2009).

Plywood was not imported from Chile in the EU before the EU-Chile FTA was signed. Imports now reach some €78 million (see Table 7 in chapter 1).

FIGURE 37: EU15 YEARLY IMPORTS FROM CHILE BY TARIFF CONCESSION SCHEDULE FOR PULP OF WOOD (MILLION EUROS)



Source: Author's calculations using Comext and Taric data

Overall, the EU is a significant and growing market for Chilean wood products. However, this does not mean that the EU-Chile FTA has encouraged deforestation.

First, MFN tariffs were already zero for most of the wood products imported before the EU-Chile FTA. Second, there is evidence that the pulp and woodchips exported by Chile to the EU do not come (or at least no longer comes) directly from primary forests. Chile's two major pulp producers, which export most of their production, source their wood primarily from their own *radiata* pine and eucalyptus plantations and also from the plantations of smaller landowners. One firm had 722,000 hectares of *radiata* pine and eucalyptus plantations in Chile in 2009; the other had 449,000 hectares of plantations (CMPC 2009; Arauco 2009). Currently, more than 90% of Chile's wood chip exports are eucalyptus, also coming from plantations. The issue of whether plantations of pine trees and eucalyptus eventually compete with primary forests is controversial as explained in Box 6.2. A 1995 report by the Central Bank directly pointed out the role of exports of pulp and woodchips, in particular to Japan at the time, in the destruction of native forest and their replacement by plantations (Langmann 1998). However, O'Ryan et al. 2010 who reviewed historical patterns, conclude that the current plantations are located on land that had already been deforested in the past. In such case the impact on biodiversity could be minimal or even positive and plantations would have a positive effect on soil erosion.

6.6.3 Environmental impact in the Fisheries sector

Context

Chile was the second largest world producer of fish in 2000, but fell to 7th by 2008 (Love 2010; FAO 2010). It is also the 7th largest exporter of fish, with US$3.9 billion in exports in 2008. The stocks of many of the species that are fished in the Chilean waters, or in the high seas off Chile are considered in decline. An example is anchoveta, or Peruvian anchovy (*Engraulis ringen*). This species is the number one catch worldwide. There are considerable annual variations in the stock of anchoveta due to climatic and current conditions (El Niño), and it is difficult to establish clear trends in the level of stock.[67] It is nevertheless considered as "recovering/overexploited" by the FAO. The catch of pilchards and sardines (*Sardinesops sagax* and *Clupea bentincki*) has gown down dramatically, but there also, linkages with El Niño and the population of anchoveta that compete on the same ecological niche interfere. In the Southeast Pacific, sardines are considered as fully exploited/overfished. It is noteworthy that anchoveta and sardines (primarily fished in Peru but also in Chile) have been mostly used for the production of fishmeal and oil, even though recent trends show an increased use for human consumption.

Jack mackerel (*Trachurus murphyi*, mostly fished by Chile) is also used to produce fishmeal and oil, but the share that goes to human consumption is higher than for anchoveta. The depletion of jack mackerel stocks is hardly questionable, since the stocks do not show as much variation to climatic conditions as anchoveta, and there is evidence of a clear downward trend since 1995 (Peña Torres et al. 2007). In the South Pacific, from 1995's record catch of 5 million tonnes the catch and has remained below 2 million tonnes since 2000, according to the FAO, which classifies the Chilean jack mackerel as fully overexploited, and raises concerns about the state of the stock and the sustainability of the fishery practices (Csirzke 2005). In documents for the 2nd Preparatory Conference for a South Pacific Regional Fisheries Management Organization in 2011, it is estimated that the level of the South Eastern Pacific stock has declined by almost 80% since 2001, and now stands at its lowest recorded historical level. Scientific advice proposed a 50% reduction in catches in relation to 2010 levels as optimal for ensuring the highest probability for the recovery of this stock.

Some other species are also considered to be overexploited in Chile. The worst cases are the Southern (or Patagonian) Hake (*Merluccius australis*) which is classified in the worst list of "fully exploited to depleted" by FAO. So is the Eastern Pacific bonito (*Sarda Chilensis*) considered as "overexploited to depleted". The South Pacific hake (*Merluccis gayi*) is also considered as overexploited. The Patagonian grenadier and Southern blue whiting, found further South in subantarctic waters, are also listed as overexploited/depleted. The cusk eel (*Genypterus blacodes*), the Auracanian herring (*Strangomera benticki*), and the Chilean seabass or Patagonian toothfish (*Dissostichus eleginoides*) are also considered to be fully exploited to overexploited (FAO 2005, 2010).

[67] As an illustration, the catch of anchovy in both Chile and Peru, fell from some 12 million tonnes in 1995 to 2 million tons in 1998 rose to 11 million tonnes in 2000 fell again to 7 million tonnes in 2007 (source OECD Review of Fisheries 2009).

Regarding the impact of the EU-Chile trade agreement, two issues can be identified. The first question is whether the EU-Chile FTA, by creating a new market for Chilean exporters, induced extra exports and therefore additional harvesting of fish whose stocks are overfished or depleted. The second question is whether the EU-Chile FTA has contributed to more (or less) overfishing of species in international waters by any of the Parties.

EU imports of Chilean fish.

Under the EU-Chile FTA, customs duties have been progressively eliminated for the import of Chilean fishery products into the EU. Most products had their tariffs reduced to zero either in 2007 or are scheduled to in 2013. Tariff quotas are applied to various types of fresh hake (for a 5,000 tonnes quota), a small tariff quota of salmon products (dried, salted and smoked), and a 150 tonnes tariff quota of various processed tuna products.

Regarding the imports from Chile of species that are suspected of being overexploited or depleted Table 38 shows that the EU imports roughly €60 million of Southern hake from Chile, as well as roughly €8 million of swordfish under various forms and €3 million of cusk eel. The EU market appears to be as a large outlet for Southern hake, in spite of the quota. Indeed, Chilean exports to the EU are much larger than the quota, in particular because the out-of-quota tariff is hardly prohibitive and because it does not cover the frozen product.[68]

Among the species that we consider in poor shape in this study, the changes in EU imports observed since the implementation of the EU-Chile FTA only show an increase in the imports of swordfish, which remain relatively modest (240 tonnes of fish and 1,000 tonnes of filets). Imports of Southern hakes, while remaining at much higher levels, have gone down, as did the imports of cusk eel.

Overall, the EU-Chile FTA seems to have made it easier for Chile to export swordfish to the EU, but the quantities remain very limited, in spite of an increase after the implementation of the EU-Chile FTA. Exports of swordfish to the EU represent 1.7% of all the exports of fishery products to the EU for the period 2008-2010.

Much larger quantities of Southern hake are exported to the EU. However, in this area, the EU-Chile FTA has not resulted in larger exports to the EU. The EU-Chile FTA has indeed resulted in the implementation of a tariff rate quota. Because most EU imports take place outside the quota, it is likely that the EU-Chile FTA has created quota rents, but has not affected the quantities imported. In addition, the global exports of Southern hake to the EU have gone down since implementation of the EU-Chile FTA.

Overall, the EU-Chile FTA does not appear to have generated significant incentives for Chile to export more overfished species to the EU.

[68] Some 8,000 tonnes of fresh Southern hake item 03026967 only were imported in 2010 while the tariff quota is for 5,000 tons for categories 03026966, 03026967, 03026968 and 03026969. In addition, some 7,000 tons of frozen Southern hake were imported.

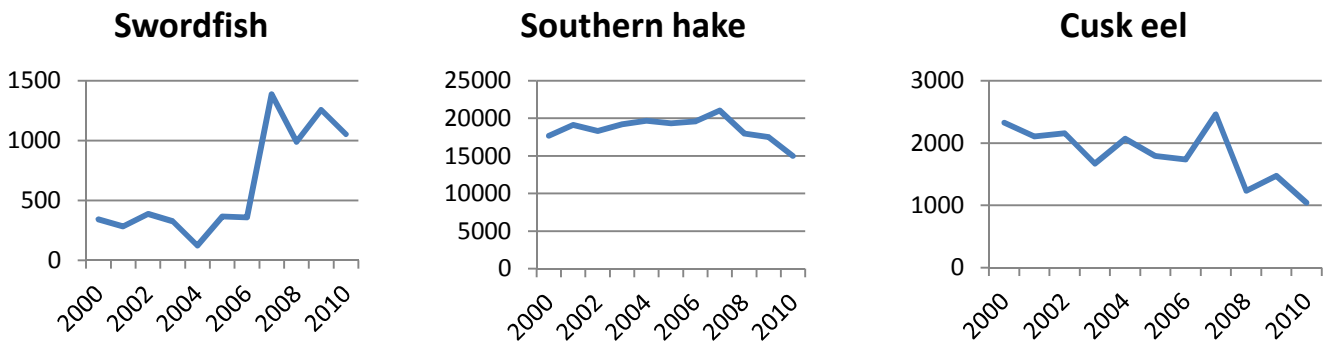
TABLE 38. EU IMPORTS OF FISH FROM CHILE, 2010, IN THOUSAND EUROS AND TONNES (MAIN IMPORTS, I.E. OVER 10 TONNES)

Code NC8	**Product description** (in bold, species considered as fully exploited, overexploited or depleted)	Value in 1000 euros	Quantity in tonnes
03022990	Fresh or chilled flat fish "pleuronectidae, bothidae, cynoglossidae, soleidae, scophthalmidae	948	128
03026700	**Fresh or chilled swordfish "xiphias gladius"**	**982**	**164**
03026967	**Fresh or chilled southern hake "merluccius australis"**	**32523**	**8057**
03026999	Fresh or chilled edible saltwater fish, n.e.s.	102	30
03031900	Frozen pacific salmon	121	33
03032120	Frozen trout of the species "oncorhynchus mykiss",	234	87
03032180	Frozen trout "salmo trutta, oncorhynchus etc.	1543	605
03032200	Frozen atlantic salmon "salmo salar" and danube salmon "hucho hucho"	1050	338
03036100	**Frozen swordfish "xiphias gladius"**	**394**	**85**
03037813	**Frozen southern hake "merluccius australis"**	**29597**	**6931**
03037819	Frozen hake of the genus "merluccius" (excl. Cape hake "shallow-water hake", deepwater hake "deepwater cape hake", argentine hake "southwest atlantic hake and southern hake)	267	202
03037975	Frozen ray"s bream "brama spp."	489	297
03037991	Horse mackerel "scad" "caranx trachurus, trachurus trachurus", frozen	26	24
03037993	**Frozen pink cusk-eel "genypterus blacodes"**	**3182**	**1036**
03037998	Frozen saltwater fish (excl. 0303.10-00 to 0303.79-87)	2608	1835
03038090	Frozen edible fish livers and roes	1303	419
03041110	**Fresh or chilled fillets of swordfish "xiphias gladius"**	**6042**	**803**
03041190	Fresh or chilled meat "whether or not minced" of swordfish "xiphias gladius" (excl. Fillets)	166	20
03041913	Fresh or chilled fillets of pacific salmon	146	22
03041917	Fresh or chilled fillets of trout "salmo trutta"	134	26
03041939	Fillets of saltwater fish, fresh or chilled (excl. Swordfish, toothfish, cod, fish of the species boreogadus saida, coalfish and redfish)	866	283
03042100	**Frozen fillets of swordfish "xiphias gladius"**	**1056**	**168**
03042913	Frozen fillets of pacific salmon	48723	6871
03042915	Frozen fillets of trout > 400 g	1357	189
03042917	Frozen fillets of trout "salmo trutta", "oncorhynchus mykiss" weighing <= 400 g each,	1937	402
03042956	Frozen fillets of argentine hake "southwest atlantic hake" "merluccius hubbsi"	1045	204
03042958	Frozen fillets of hake of the genus "merluccius" (excl. Of cape hake "shallow-water hake", of deepwater hake "deepwater cape hake" and of argentine hake "southwest atlantic hake")	6085	2009
03042991	Frozen fillets of blue grenadier "macruronus novaezealandiae"	153	76
03042999	Frozen fillets of saltwater fish other	22173	10533
03049100	**Frozen meat "whether or not minced" of swordfish "xiphias gladius" (excl. Fillets)**	**88**	**18**
03049910	Frozen surimi	10137	3652
03049921	Frozen meat "whether or not minced" of freshwater fish (excl. Fillets)	2450	689
03049951	Frozen meat "whether or not minced" of hake "merluccius spp., urophycis spp." (excl. Fillets)	5141	2697
03049999	Frozen meat "whether or not minced" of saltwater fish other	2532	1567
03053090	Fillets of fish, dried, salted or in brine, but not smoked other (excl. Cod, and fish fillets salmon, greenland halibut)	449	90
03054980	Smoked fish, incl. Fillets (excl. salmon, halibut, mackerel, trout and eels)	124	24
03055950	Anchovies "engraulis spp." dried, whether or not salted, not smoked (excl. Fillets)	83	16
03061490	Frozen crabs, whether in shell or not	266	23
03062100	Rock lobster and other sea crawfish	1009	32
03072100	Live, fresh or chilled scallops, incl. Queen scallops, of the genera pecten, chlamys or placopecten, with or without shell	730	75
03072990	Scallops	8765	1069
03073910	Mussels "mytilus spp.", frozen, dried, salted or in brine, with or without shell	1350	753
03073990	Mussels "perna spp.", frozen, dried, salted or in brine, with or without shell	48	22
03074918	Frozen cuttle fish "sepia officinalis" and "rossia macrosoma", with or without shell	65	74
03074959	Frozen squid "ommastrephes spp.", "nototodarus spp." and "sepioteuthis spp.", with or without shell (excl. "ommastrephes sagittatus")	359	440
03074999	Squid "ommastrephes spp.", "nototodarus spp.", "sepioteuthis spp.", dried, salted or in brine, with or without shell (excl. "ommastrephes sagittatus")	43	45
03075910	Frozen octopus "octopus spp.", with or without shell	3621	1204
03076000	Snails, live, fresh, chilled, frozen, salted, dried or in brine, with or without shell (excl. Sea snails)	535	129
03079911	"Illex spp.", with or without shell, frozen	291	218
03079913	Striped venus and other "veneridae", with or without shell, frozen	2869	3221
03079918	Frozen molluscs, fit for human consumption, whether in shell or not	3313	3585

Source: Comext. NC8 lines for imports > 10T only.

Note: In bold, species that are considered as overexploited/depleted by the FAO.

FIGURE 38: EU IMPORTS OF SWORDFISH, SOUTHERN HAKE AND PINK CUSK EEL FROM CHILE (TONNES)



Source: Comext (sum of fresh, frozen, fillets).

Fish stock depletion

The depletion of resources in international waters has no apparent link with the EU-Chile FTA. However, diverging conceptions about the responsibility of the decline in the population of particular species in the Southern Pacific has led to political tensions that could have an indirect effect on future negotiations on the FTA. A formal dispute between Chile and the EU took place in the late 1990s regarding the capture of swordfish in international waters off the Chilean coast (see Appendix 6.2). The situation of the stocks of jack mackerel have also been the object of numerous contacts between the Chile and the EU, even though it has not led to a formal dispute, in part thanks to the policy dialogue that has taken place within the framework of the EU-Chile FTA.

Swordfish as well as jack mackerel species are caught in international waters by vessels of different nationalities. Chile argued that some of the countries fishing jack mackerel in international waters off the coasts of Peru and Chile did not respect the same conservation measures as the ones to which Chilean vessels were subject, and the Chilean government imposed prohibition on access to port for vessels supplying foreign fleets (Decree 329 published in January 2010, which completed Decree 123 promulgated in 2004 which aimed at other species). EU authorities questioned the appropriateness of such a unilateral approach given that the negotiators for the establishment of a South Pacific Fisheries Management Organisation have adopted since 2007 Interim Measures to ensure the conservation of jack mackerel. The EU authorities have pointed out that the EU fleet has been "the one that respected all provisions of the Interim Measures since 2007 to the letter". In fact, the EU enshrined these measures in legislation, although they are voluntary in nature.

Some EU (e.g. Dutch) vessels fish jack mackerel in international waters off the Chilean and Peruvian coast (Ybema et al. 2008). In the list of active vessels in the area published by the South Pacific Regional Fishery Management Organisation (SPRFMO) Secretariat the maximum number at any time was 11 vessels (8 were declared active to the SPRFMO in 2009). This compares to a much larger number of vessels from Chile, Peru and Korea, even though one should also account for the different capacity of the vessels. Table 39 shows data from the SPRFMO Secretariat regarding reported catches of jack mackerel in the high seas West of Peru and Chile (the main area of distribution of the jack mackerel). The EU catches

increased from 6,000 tonnes in 2005 to 112,000 tonnes in 2009 but went down to 67,500 tonnes in 2010 according to SPRFMO 2012.

TABLE 39. VESSELS FISHING FOR *TRACHURUS* SPECIES IN THE SPRFMO AREA IN 2010 AND CATCHES 2009

	Number of vessels authorized to fish (2010)	Capacity (2010) Gross tonnage in 1000 tonnes	Declared as actively fishing (2009)	Average vessel size (gross tonnage per vessel in tonnes)	Catches declared in tonnes (2009)	Catches declared in tonnes (2010)
Belize	7	53	1	7537	5681-	2240
Chile	234	144	41	615	343135	109248
		0			+ 491792 in EEZ	+121613 (EEZ)
China	13	74	9	5719	117963	63606
Cuba	2	16	0	7765	-	-
EU	11	85	8	7710	111921	67497
Faroe	3	23	2	7805	20213	11643
Korea	42	46	2	1101	13759	8183
Peru	92	77	6	835	13326	40516
Russia	1	49	1	49173	9113	41315
Vanuatu	4	31	4	7805	79942	45908

Source: SFPRMO Secretariat.
Note: Declarations are voluntary and "authorized to fish" does not mean that fishing by such vessels in the Convention Area is consistent with the 2009 Revised Interim Measures. EEZ stands for exclusive economic zone.

While there is little doubt about the poor shape of the jack mackerel stock, there is no evidence that the EU-Chile FTA has played a significant role in this area. The exploitation of common resources in the higher seas shows little connection with the EU-Chile FTA (by international law, the high seas may be used by any country, see United Nations Convention on the Law of the Sea Annex VI, art. 87, Dec. 10, 1982). In this regard, conservation and management issues regarding jack mackerel are dealt with by the SPRFMO, while for swordfish the EU and Chile have sought a bilateral arrangement and a multilateral dialogue with key fishing nations, as Chile is not a member of the competent regional fish management organisation – the Inter-American-Tropical-Tuna-Commission.

There is no evidence either that the EU-Chile FTA has made it easier for EU vessels to harvest any fully or overexploited species. The Agreement affects fisheries through the (separate) Protocol on Fishing Enterprises (under Annex 10). It establishes conditions for European investment in the Chilean fisheries sector and grants EU and Chilean vessels equal treatment.[69] To our knowledge, there has been limited or no EU investment in the EU fleet

[69] Annex 10 sets out provisions under which the European owners of Chilean companies may register their vessels, buy licenses and quotas, and transfer vessels to Chile. Conditions govern ownership and control, registration and operation of fishing vessels (EU companies owning Chilean companies can apply for, register and operate fishing vessels in Chile, under the same conditions as Chilean companies). EU companies are entitled to fishing permits and their corresponding individual quotas. The transfer of licences and vessels provisions entitle EU companies to receive, by means of transfer, fishing authorisations and vessels under the same conditions as Chilean companies.

in Chile. Nor has it played an apparent role in encouraging, or making it easier, for EU or Chilean vessels to overfish some of the species in critical conditions in international waters.

Rather than an EU-Chile FTA problem, the issue of fish stock depletion therefore relates to a much more general problem of governance of international waters. The EU Commission points out that in the 2nd session of the Preparatory Conference for the Commission of the South Pacific Regional Management Organization in Cali in January 2011 the EU supported a 50% reduction of the catches for 2011, fully in line with the scientific advice. Chile and Peru proposed instead a lower reduction of 40%, which was finally adopted. Nevertheless, other third countries did not join in consensus on those voluntary measures.

6.6.4 Environmental impact in the Aquaculture sector

Context

In the past two decades, Chilean salmon production has grown from under 50,000 tonnes in 1988 to over 630,000 tonnes in 2008 (source: Sernapesca). The sector was hit severely by sanitary problems and exports fell dramatically in 2008. They have been recovering since 2010. The rapid expansion of the salmon aquaculture industry has resulted in the creation of a large number of jobs (see Chapter 7). It has also resulted in significant environmental problems, stressed by several environmental organisations (Claude and Gutierrez 2005) and documented in several academic and institutional studies (e.g. Soto and Norembuena 2004; Niklitschek et al. 2006, OECD and ECLAC 2005). Environmental degradation results from salmon production in saltwater, but also from the production of smolt in freshwater in particular Chilean regions. The key environmental issues are the following (see León-Muñoz et al. 2006; Nieto et al. 2010, Bostick et al. 2007 for a more detailed assessment).

- Excess nutrients from food and feces associated with salmon farms disturb the flora and fauna on the ocean bottom (benthos). There is evidence of concentrations of nitrogen, phosphorous, carbon and particulate organic matter, while species richness was estimated to be 50% lower than in control sites (Soto and Norambuena 2004). Sediments under the cages also contain active antibiotic and other chemical molecules. Some changes in the strain and/or species composition of benthic bacterial communities have been detected (Buschmann et al. 2009). Significant loss of benthic biodiversity and localized effects on the physico-chemical properties of sediments were found in proximity to salmon farms (Buschmann et al. 2006).
- The use of chemicals such as antibiotics, anti-foulants and pesticides can have unintended consequences for marine organisms. Frott et al. (2007) study the tetracycline, quinolones and antiparasitic drug residue in wild fish sampled near aquaculture pens in Cochamó (Region X), finding antibiotics in two wild species consumed by humans (róbalo and cabrilla). The authors suggest that the comparatively heavier use of antibiotics in Chilean aquaculture might have environmental and health implications. A 2007 study (although relying partly on 2003 data) found that Chilean salmon producers used some 170 times more antibiotics and 500 times more anti-louse per ton of salmon produced than the

Norwegian producers (Burridges et al. 2007 based partly on Bravo et al. 2005). The industry stresses that significant progress has since been made.

- Viruses and parasites can transfer between farmed and wild fish.
- Escaped farmed salmon could compete with wild fish and interbreed with local wild stocks of the same population, altering the overall pool of genetic diversity.[70] The number of escaped salmon also make them top predators in lakes, threatening other species (Arismendi et al. 2009).
- The production of smolts is a source of nitrogen pollution in freshwater. Soto et al. (2007) conclude that in the lake region, with respect to nitrogen loads on freshwater and marine environments, at the aggregate level salmon farming had a larger impact than cattle farming (although at some locations cattle was more important).
- A growing salmon farming business indirectly puts pressure on fishmeal and fishoil, and therefore on the stock of some of the South Eastern Pacific species such as anchoveta, sardines and jack mackerels.
- Excess food and fish waste in the water have the potential to increase the levels of nutrients in the water. This can cause the growth of algae, which consumes oxygen that is meant for other plant and animal life. The expansion southwards of salmon production particularly worries some Southern environmental organisations in Chile, since the long-term effects of importing nutrients into fragile cold-water ecosystems are unknown. This could change the ecological and biological community structure in unpredictable ways, and interfere with carbon biogeochemical circles.
- The salmon industry also contributes to solid waste pollution in Chile's southern fjords, gulfs and channels. Hinojosa and Thiel (2009) examined the abundance, composition and distribution of marine debris and conclude that sea-based activities (mussel farming and salmon aquaculture) are responsible for most floating marine debris in the zone under study (the majority of debris was made of Styrofoam, plastic bags and plastic fragments).

The impact of the EU-Chile trade agreement

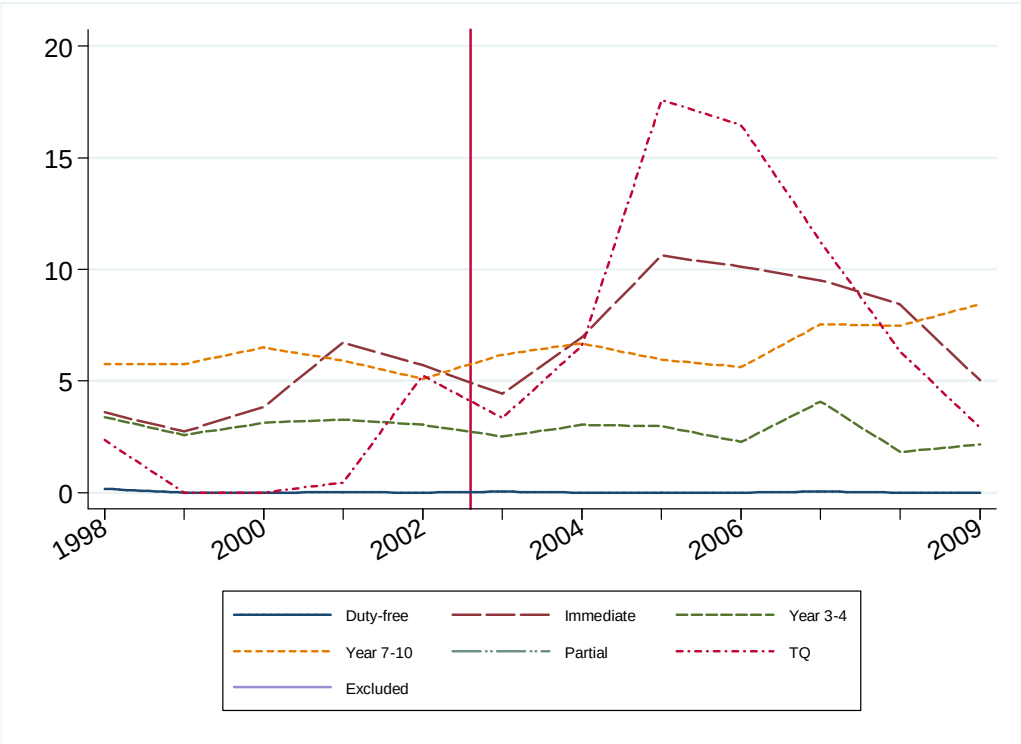
Trade liberalisation has not been the only determinant in the expansion of the Chilean salmon sector. Public policy has been a major driver in the development of the sector, through the development of extension services and pilot farms (Izuka 2009). Technology diffusion, promotion by stakeholders such as *Fundacion Chile* and Salmon Chile also played a considerable role according to OECD (2010) as did the exchange rate in the

[70] There is little information of the magnitude of such escapes but O'Ryan et al. (2006) quote the figure of 2.4 million individuals escaping in 2003. Note, however, that Soto et al. (2006) find that escaped salmon introduced for aquaculture were indeed present in lakes with salmon farming, but "did not seem to be reproducing naturally in affluent streams." Buschmann et al. (2006) note that "escaped farmed fish may have an impact on native species, although their survival in the wild appears low", but also report that "abundance of omnivorous diving and carrion-feeding marine birds increased from twofold to fivefold in areas with salmon farms compared with control areas without them."

early phase of development of the sector in the 1990s and early 2000s. However, the series of trade agreements concluded by Chile gave salmon producers a competitive advantage, or removed the tariff disadvantage that they faced compared to Norwegian and Scottish producers in some markets. These agreements have contributed to the development of salmon production (O'Ryan et al. 2006; OECD 2010). Trade liberalization also made it possible to access equipment and technology and opened the economy to external financial markets. The Foreign Investment Statute gave security to foreign investors allowing them to enter, with their technology and practices. According to participants in a workshop organised in Puerto Montt in May 2011, the stable framework of a network of trade agreements helped to attract FDI, a major source of technology transfer.

The EU-Chile FTA provided Chilean exporters free trade of fresh, frozen and processed salmon, and elimination of tariffs for smoked salmon in equal stages by 2013. Chile mainly exports frozen products to the EU market (Elevstad 2008). The EU-Chile FTA has boosted Chilean exports to the EU, resulting in a strong increase in the market share of Chilean providers in the EU for products immediately liberalised or under TRQ, and in a significant market share growth as of 2007 for products liberalised within 4 years (Figure 39).

FIGURE 39: MARKET SHARE OF CHILE IN EU15 EXTRA-EU IMPORTS, BY TARIFF CONCESSION SCHEDULE, FOR SALMON AND TROUTS



Source: Author's calculations using Comext and Taric data

Overall, increasing exports of Chilean aquiculture products, and mainly salmon, can be associated with negative environmental externalities, especially in the southern fjords. The role of the EU-Chile FTA in the negative environmental impacts generated by the surge of salmon production can be put in perspective using the size of the EU market for Chilean salmon, compared to other outlets.

The EU was a large outlet for Chilean exports of frozen filets. Indeed, in 2006 (at the peak of its production), Chile accounted for 50% of EU imports of frozen fillets. The relative importance of export markets of Chile have changed after the sanitary crisis. In 2010, only 10% of EU imports of frozen fillets of salmon were imported from Chile.

Frozen fillets are nevertheless a small market in the EU. The EU market of non-processed (CN Chapter 03) Pacific and Atlantic salmon is 80% whole fresh and chilled salmon, 6% fresh and chilled salmon fillets and 14% frozen fillets. In the main market segments, Chile is a small player. Most imports (96% of the EU imports of whole fresh and chilled salmon and 99% of fresh and chilled salmon fillets) come from Norway.

Overall, even at the peak of Chilean exports to the EU, Chile only supplied a small share of the EU salmon and trout markets. In 2006, the EU market represented 12% in value and 10% in volume of Chilean salmon exports. At the time, Chile only supplied 8% of the EU demand for salmon (roughly 600,000 tonnes) which was mostly met by imports from Norway and domestic (UK) production.

With the recovery of the sector, the market analysis company Multiexport Foods estimates that in 2011, Chile will produce a total of 370,000 tonnes of salmon. This would mean that total Chilean salmon production would equal the production of Norway, the largest salmon producer in the world. However, demands from Asia, the United States, and the considerable increase in demand for salmon in Brazil are such that Chile has not increased significantly its exports to the EU market, which remain at low levels in spite of the recovery in production.

Simulations as a part of this project of the impacts on Chilean exports to Europe due to the introduction of the trade agreement suggest that salmon exports might have increased in the range of 27% in 2004 to 37% in 2008 compared to scenarios without an agreement (see Chapter 2). As a result, the increase in Chilean salmon production due to the EU-Chile FTA could be between three and five percent. In brief, even though trade agreements played an important role in the development of the Chilean production, the role of the tariff reductions under the Agreement has so far played a marginal role in the expansion of the Chilean sector.

FDI is another channel through which the EU-Chile FTA might have had some environmental impact. Foreign investment has never exceeded half of total investment. Most of it came from Japan and Norway, but Dutch investments have also been significant.

The industry argues that such foreign investment has positive environmental results through technology transfers. For example, during the workshops organised for this project, it was pointed out that change in feeding technology, with greater vegetable based food, and use of extruded food that is less subject to waste and benthic pollution than pellets, etc. improved environmental management of salmon production, and that the spillovers of techniques developed abroad in Europe were considerable.

Trade with the EU has also raised the bar for Chilean producers on issues such as antibiotic residues and sanitary control, some of them leading to better control of environmental externalities. The EU regulations are particularly demanding in terms of sanitary standards, residue levels and heavy metals, as well as labelling and traceability. The Chilean government has enforced more stringent regulations and private stakeholders (Salmon Chile) have adopted some voluntary measures which, in part, aim to meet demand

from consumers in third markets such as the EU (Sorensen 2009). The so-called "SIGES" (integrated management system) standards adopted by the industry are linked to the need to comply with certifications from foreign customers (SalmonChile 2008).[71]

6.7 Environmental issues in the EU

Given the very small impact of the EU-Chile FTA on the EU economy, one should not expect to find strong linkages with environmental degradation or improvement in the EU. The EU-Chile FTA raises very specific issues, linked mostly to product transportation and to the growth in a few particular imports, namely wine, fruits and molluscs.

Air transportation

The EU-Chile FTA has made it easier to import some fresh products, including fish, fruits and vegetables, by reducing both tariff and non-tariff barriers. One potential concern is that this might have favoured imports of products with a particularly high carbon footprint, due to both the distance that these products have travelled, and the use of plane transportation for fresh products.

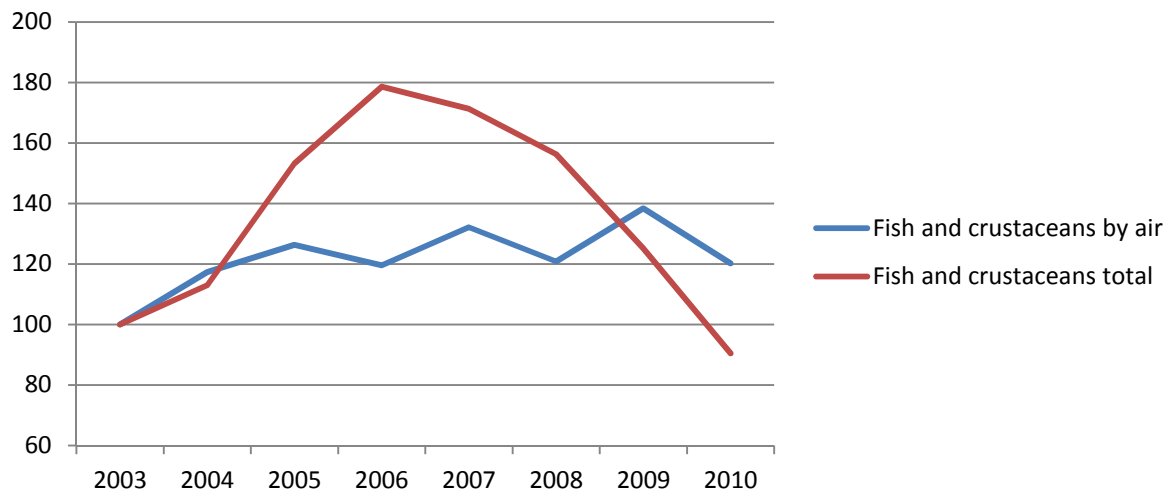
Overall, 5% of the value of EU imports from Chile is transported by plane. In 2010, this lead to imports by plane of roughly €440 million (note, however, that Eurostat statistics by mode of transportation are not fully reliable, with rather large flows entering under transport mode "unknown"). It is mostly in the seafood sector that the share of the trade that takes place by plane (22% in value of the flows) is high. Some €45 million of fish and molluscs enter the EU by plane. In the fruits sector some €13 million of Chilean exports also enter the EU by plane, even though air transportation only accounts for 3% of Chilean exports of fruits to the EU. Significant volumes of metal parts and equipments are also traded by plane between the EU and Chile.

The impact of the EU-Chile trade agreement

Figure 40 and Figure 41 show the relative increase in the mode of transportation for fish and fruits. In the fish and crustaceans sector, the bulk of Chilean exports to the EU is frozen salmon, which has experienced a fall caused by the sanitary crisis. By contrast, the exports of fresh fish have remained steady. The sharp increase (40% between 2003 and 2009) in the fish transported by air between 2003 and 2009 is noteworthy.

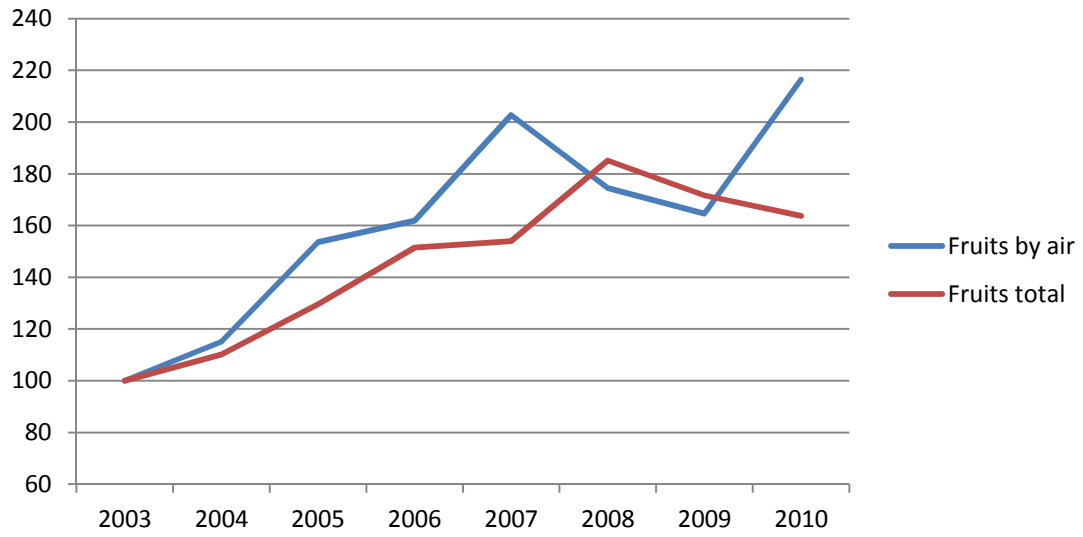
[71] In Chile, environmental variables and impacts are now governed by a set of Environmental Regulations for Aquaculture (RAMA), which intend to ensure the “preservation of nature" and maintain the "ecological healthiness and balance of the areas granted for cultivation”. Regulations seek to set environmental protection measures that ensure the development of aquaculture under levels consistent with the capacities of the lake, river and maritime water bodies. They hold the project’s titleholder responsible for any disturbances to the ecological balance of the area. Codes of practice are also proposed. An organisation that gathers a significant number of producers, SalmonChile, has developed and implemented several commitments and programs such as the Clean Production Agreement, the Sustainable Production Agreement, and the Integral Management System. The public-private research and development institution, Fundación Chile, developed a Code of Environmental Best Practices for salmon farms. These initiatives seek to reduce environmental impacts during the salmon production cycle.

FIGURE 40: EVOLUTION OF EU27 IMPORTS OF FISH AND CRUSTACEANS, TOTAL AND BY AIR (IN VALUE, INDEX 100 IN 2003



Source: Authors, using Eurostat COMEXT data by mode of transportation

FIGURE 41: EVOLUTION OF EU27 IMPORTS IMPORTS OF FRUITS, TOTAL AND BY AIR (IN VALUE, INDEX 100 IN 2003)



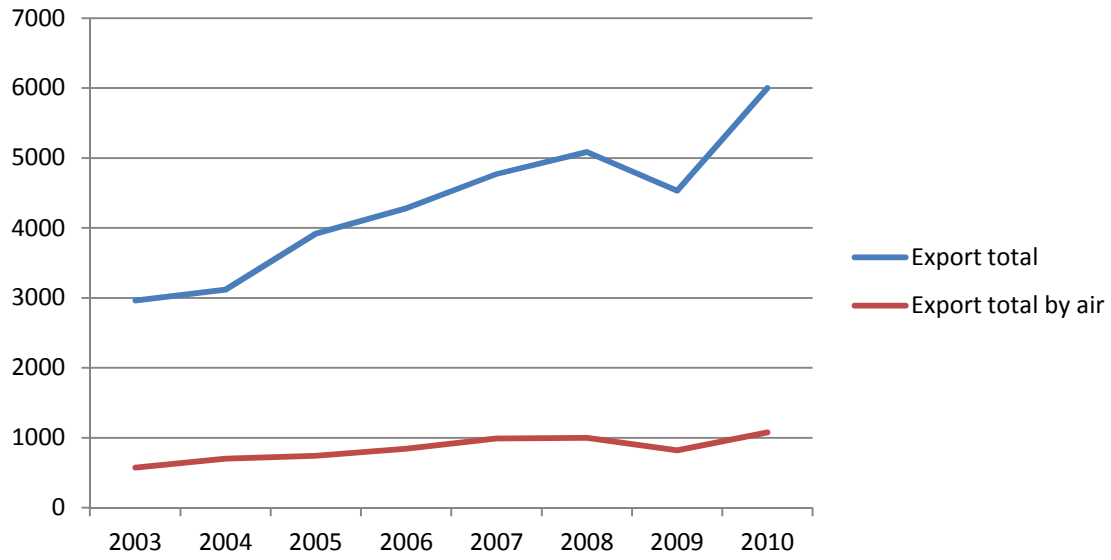
Source: Authors, using Eurostat COMEXT data by mode of transportation

In the fruits sector, the increase in fresh fruits transported by air (some €24 million in 2010) follows the same pattern as the bulk of fruits exports which represent much larger amounts (€923 million in 2010). The sharp increase between 2003 and 2010, is nevertheless noteworthy.

The EU-Chile FTA has also resulted in an increase of EU exports to Chile (Figure 42). The share of EU exports to Chile that was transported by air (17% in value in 2010) is much higher than the share of Chilean exports to the EU transported by air (5%). This is due to the importance of some high value products such as pharmaceuticals, but also some high value

added mechanical and electrical technology, such as medical equipment, optical equipment and electronics. If airborne exports have doubled between 2003 and 2010 (in value), their share in total exports has slightly decreased.

FIGURE 42: EVOLUTION OF EU27 EXPORTS TO CHILE, ALL SECTORS, TOTAL AND BY AIR (MILLION EURO)



Source: Authors, using Eurostat COMEXT data by mode of transportation

Packaging

Another sector where the EU-Chile FTA has had a significant impact is the trade in wine. Exports of Chilean wine to the EU have increased rapidly (even though this may also reflect a change in consumption patterns rather than an effect of the Agreement, as evidenced by the increase in imports of Australian wine). The transportation of bottled wine results in significant greenhouse gas emissions, per litre consumed. In addition, Chilean wine is exported to countries (e.g. Ireland, the United Kingdom) where large amounts of green (bottle) glass are imported while little is exported. Such green glass cannot be recycled locally in other uses, and is often turned into sand for construction material with a questionable environmental balance.

6.8 COMPARISON WITH THE EX-ANTE SIA

The 2002 ex-ante SIA stressed the possible environmental consequences of the EU-Chile FTA. Few quantitative measures of the potential impact of the FTA were provided, but the main issues that were also identified in this ex-post assessment were already identified in the ex-ante SIA (Planistat 2002).

The ex-ante SIA stressed the potential negative environmental impact of the EU-Chile agreement in both the forestry and the mining sector. The focus on these issues now appears surprising given that the EU-Chile FTA has not changed significantly the trade conditions prevailing between Chile and the EU, most minerals and ores being already duty free in the EU.

In most other cases, the ex-ante assessment raised the main environmental issues that were identified in this report. In particular it stressed the environmental risks linked to the forecasted growth in the export agriculture sector. The simulations were conducted with a multicountry general equilibrium model (the Global Trade Analysis Project or GTAP model). The sectoral decomposition of the model was rather crude. According to the simulation results, the beverages/tobacco sector and the grain sector were to grow most compared to the reference situation. As a result, a growth in the consumption of pesticides was seen as a major environmental threat in the sector. As already commented, the present ex-post assessment finds in contrast that growth in grain exports remained limited. It also suggests that a “technique” effect has offset some of the “scale” effect in this sector, and lead to conclude that the growth in the consumption of fertilizers was more an issue.

The ex-ante assessment anticipated that the growth in exports of forestry products to the EU would have adverse environmental effect, that new investments would only partially offset thanks to the technique effect. The present ex-post assessment indeed finds a possible role of the exports of plywood, but a very limited one. The fact that the tariffs were already low in the EU makes it difficult to link further destruction of primary forest to the EU-Chile FTA.

Another issue raised by the ex-ante SIA is the growth in fish exports, leading possibly to more depletion, but warned that the issue would depend on the effective implementation of appropriate management techniques. The ex-post assessment is not conclusive in this area. We could not establish a formal link between the dramatic decrease in some fish stocks and the EU-Chile FTA. The reason is that exports of Southern Hake to the EU and Swordfish have gone down after an initial increase. And that there is no link between the EU-Chile FTA and the issues concerning the depletion of stocks in international waters off the Chilean coast.

Chapter 7 - SOCIAL IMPACTS

Trade liberalization processes create winners, but also losers, with different channels coming into play. The income of particular producers or workers, like small farmers, can decrease due to the erosion of the market share linked to the competition of imported products. Some groups may also suffer from the depletion of particular resources, or –in particular cases linked to privatisation or domestic and foreign investments- from restricted access to resources that were formerly managed as communal goods. Meanwhile, members of the same groups can be positively affected by, and gain from the liberalisation of trade as the variety of consumer goods increases, and prices decrease due to the entry of external competitors in the local market.

The identification of the impacts of the liberalisation of the trade relations between the EU and Chile has already been object of studies in the past. The ex-ante study on the EU-Chile FTA (the Sustainability Impact Assessment –SIA- Study, Planistat 2002) attempted at identifying the sectors for which liberalisation might have created losers, focusing on certain subsector of agriculture and manufacturing industries. It also tried to identify potential negative impacts on groups characterised by gender (women in agriculture) and by indigenous status, due to their dependence on traditional resource-based activities. Section 7.7 in this chapter will present a more detailed comparison between those predictions and the findings of this study.

More recently, another unrelated study for the European Commission has analysed the social impacts of the trade pillar of the EU-Chile Association Agreement, focusing on the dimensions more specifically linked to labour issues, such as job creation, wage levels, labour conditions, types and duration of contracts and social dialogue (Ergon Associates, 2011). The Ergon study combines qualitative and quantitative methods, targeting sectors where the impacts of the EU-Chile FTA are most significant (following their approach the focus was on: wine, fruit, salmon and forestry sectors). Notably, the study found "tentative evidence of a link between improved performance on employment indicators (quantity and quality) and increased trade with Europe".

The approach followed in the present study is intimately linked to the quantitative assessments presented in the previous chapters, and aims at giving further insights on the impact of trade liberalisation on producers of the agricultural sector. Such a specific sectoral focus is justified by the statistical evidence, by the results of the simulation from the

modelling of the impacts across the economy, and finally by the availability of a significant amount of data from the agricultural census.

The simulations carried out with the general equilibrium model presented in Chapter 3 gave an overview of the ex-post impact of the EU-Chile FTA on the Chilean economy. The EU-Chile FTA's outcome in terms of income and employment was measured, relative to a counterfactual benchmark (i.e. the Chilean economy without the EU-Chile FTA). By nature, general equilibrium simulations refer to the impact on the structural equilibrium of the economy. For that purpose, the long-run social consequences are actually expressed in these simulations in terms of the impact on factor incomes and on goods' relative prices, assuming full utilization of factors. Under such assumptions, the instrument is less well adapted to gauge the more immediate potential impacts of a FTA on unemployment.

Long-term assessments rest on strong assumptions. In particular, they disregard the difficulty for production factors to move across sectors, as is required if the economy is to adjust fully to the shock faced, and as is assumed in the model's simulations. In the short to medium run, such reallocations are problematic and give rise to adjustment costs. Access to capital, inputs and technology, and domestic Chilean institutional issues such as land property rights, could play a significant role in the spreading of the benefits of the EU-Chile FTA to all stakeholders (or the lack thereof).

One way to deal with these issues is to introduce explicitly a dual labour market in a computable general equilibrium model, through an informal sector. However, this is a source of unwanted effects.[72] Here, we rather use the results of the macroeconomic simulations as an input for a detailed analysis, taking into account the structure of the production sector, whereby the consequences for living standards can be assessed by household category. Because the most significantly impacted sectors are in agriculture, and because small farmers (as well as small fishermen) were considered at risk in the ex-ante assessment of a future EU-Chile FTA, this analysis is carried out for agriculture.[73] Focusing on this sector also makes it possible to carry out a deeper investigation, due to the existence of specific detailed information available from the agricultural census, which is lacking in other sectors. In agriculture, where changes are the largest, more detailed analysis of differences across subsectors in terms of size, structure and export orientation allows the nature of the adjustments to be better understood. The aim is to establish a link between changes within the sector and impacts of the liberalisation process between the EU and Chile.

In addition to the quantitative assessment of the income and employment consequences of the EU-Chile FTA, some other issues deserve particular investigation, although in a more qualitative way. Of issue is the impact on labour conditions in sectors that have been most affected for specific groups of workers by the EU-Chile FTA, and in particular the sectors of agriculture, fisheries, aquaculture and canning (see Chapter 2). In these industries, women often occupy the least skilled and lowest paying jobs, and they might have felt in a particular way a potential widening of the wages spectrum and an

[72] For example, any reform that lowers the size of the informal sector is a source of welfare gains through global productivity increases (the informal sector where excess labour gathers has a lower productivity). This often tends to result in excessive benefits tied to a decrease in the size of sectors such as agriculture in which it is often assumed that hidden unemployment is located, under specifications *à la* Lewis.

[73] The study by Ergon Associates for the EU Commission analyses farm contract workers, and provides a useful complement to the findings presented in this section. See Ergon Associates (2011).

increase in inequality. Another potential issue is the consequence of the EU-Chile FTA on access to natural resources. Because of the new outlets created by the Agreement, some traditional access points to common resources might have changed, even though EU imports of most forestry products were liberalized long before the implementation of the EU-Chile FTA

In the following sections, the short- to medium-run adjustment cost, based on the CGE simulations are assessed. More specific analysis of the potential consequences of adjustment across agricultural subsectors is carried out. A methodology is then proposed to assess the long-run consequences of the EU-Chile FTA for rural households. In other sections, the potential links of the Agreement with gender issues and with common resources are investigated, and the question of the social impact of the Agreement in the EU is raised.

7.1 Impact on production patterns and adjustment costs

There are many reasons why the adjustments needed for an economy to fully adapt to the new context created by a preferential trade agreement may be costly.[74] The most important adjustment costs are linked to cross-sector reallocations of production factors. The CGE-based assessment of the EU-Chile FTA impact presented in Chapter 3 is used to characterise the nature and possible magnitude of these costs.

Beyond these reallocations across sectors, trade liberalisation may have contrasting impacts across producers within a given sector, as the so-called “new new” international trade theories have emphasised. The corresponding adjustments across producers within a given sector also originate adjustment costs, which are likely to be significant when export changes are substantial. Since the simulations showed that agricultural sectors are those where the EU-Chile FTA’s impact is strongest, we focus this within-sector analysis to agriculture. Taking advantage of the detailed information available from the Agricultural Census, we show that export orientation varies greatly across farms, and analyse which type of agricultural producers are most likely to have benefited from the new export opportunities created by the EU-Chile FTA.

7.1.1 Assessed consequences of the EU-Chile FTA in terms of cross-sector reallocations

An important source of adjustment costs to trade liberalisation is that not all production factors can be used indifferently in any sector. A significant part of the capital stock is composed of machinery or buildings specifically designed for a certain kind of activity. Intangible capital of various forms (networks, knowledge, reputation, etc.) is also to a large extent related to a specific activity or set of activities. The specificity is also evident in the case of land: land use can change, but this is generally a source of costs, linked to the change itself and in some cases to the lesser suitability of the land for the new activities. Finally, labour skills are to a large extent specific to the sector of activity. The cross-sector reallocations induced by a trade agreement may lead some sector-specific skills to be left

[74] See e.g. Fernandez de Cordoba et al. (2005) or Bacchetta and Jansen (2003) for reviews on adjustment costs resulting from trade liberalization.

unused for workers losing their jobs in the sectors most heavily impacted by import competition. This is not necessarily a long-term loss, since new job opportunities are created in other sectors, and retraining and on-the-job learning may allow other specific skills to be developed. However, adjustment remains costly.

The necessity for each worker to find a suitable job, and for each firm to find suitable workers, also means that any structural change may cause transitional unemployment, and possibly transitional wage losses in some cases. Another important cause of adjustment costs is that cross-sector mobility of persons frequently implies regional mobility. Both psychologically and financially, this potentially involves significant costs. As emphasised above, the CGE model's assessment of the EU-Chile FTA actually refers to long-run impacts, with costless cross-sector reallocations of production factors in particular. However, the simulation results allow the amount of cross-sector reallocation to be evaluated, hence providing a basis with which to calculate what the adjustment costs might be.

The most important production factors from a social point of view are low-skilled and medium-skilled labour, as well as independent employment. For each of these labour categories, we used the CGE simulations to assess how each sector's share in total employment changed between 2002 and 2008, and what the impact of the FTA have been (Table 65, Appendix 7.1). The sum of the changes in absolute value for all sectors is an indicator of structural change at the economy-wide level (Table 65, last row). It shows that the contribution of the EU-Chile FTA to the structural change of the Chilean economy between 2002 and 2008 is very small: for low-skilled labour, the assessed impact of the Agreement is a total reallocation of 0.8% of employment (sum of changes in absolute value), compared to an observed gross change of 23%; for medium-skilled labour, the Agreement impact is estimated to be 0.7%, out of 21% of observed change; for independent labour, 0.6% out of 35%. In relative terms, this means that the assessed impact of the Agreement in terms of employment cross-sector reallocations only amounts to between 2% and 4% of total reallocations over the period. This very small figure is the combination of the small estimated impact of the EU-Chile FTA with the rapid pace of structural change in the Chilean economy over the period.

In this context, social adjustment costs of the EU-Chile FTA can hardly be considered as problematic, at least at this aggregate level. They may have contributed to sustain or reinforce structural change in the economy, though. A closer examination at the most important reallocations in relative terms is thus useful. For the three categories of labour considered, fruit growing is the sector where most important new employment opportunities arise: the EU-Chile FTA boosts growth in this sector, which is of significant size in Chile, with relatively intensive use of labour with intermediate or low skills. This assessed positive impact is matched by a substantial increase of the sector's share in total employment for unskilled labour, but not for medium-skilled and independent labour. The other sectors where the estimated impact of the FTA are most positive are fisheries, winemaking and seafood processing.

It is in the sectors "other machinery", "basic metal industry", "chemicals" and "paper and printing" that the FTA impacts on sector shares in employment are most negative. These effects are always less than one tenth of initial employment of the labour category, though. And while the strongest negative effects in relative terms are registered in machinery, they take place in a context of relative growth of employment in this category, except for independent labour. For chemicals, paper and printing, though, the assessed negative

impacts of the EU-Chile FTA contribute to a fall in the share of these sectors in total employment in the categories considered.

7.1.2 Adjustments within agriculture: Farm distribution and possible links with the EU-Chile FTA

The modern theory of international trade has put a lot of emphasis on firms' heterogeneity in relation with the impact of trade liberalisation, following in particular Mélitz's work (Mélitz 2003). This analysis relies in particular on the assumption that sunk costs are associated with exporting. Whether investing to pay for these costs is profitable, and what the ensuing gains will be, then depend upon the efficiency of the firm. These mechanisms apply in the case of a trade agreement like the one studied here, even though the distributional effects across producers are only likely to be significant in those sectors most heavily impacted by the EU-Chile FTA. These sectors are mainly found in agriculture here, and the sunk costs of exporting are arguably significant in this sector. Because sanitary and phytosanitary standards are rather stringent in the EU, the cost of matching the corresponding requirements is arguably high. The capacity of farms to match them, and the profitability for them to do so, is therefore likely to vary substantially depending on the farm's and product's characteristics.

To shed light on this link and on its possible consequences in terms of adjustment, this subsection relies upon Chile's Agricultural Census in 1997 and 2007 (INE), with special emphasis on small farming.

Farm size and income sources

Table 40 shows the number and average size of farm units in 2007. Farms with a standardised size of less than 2 hectares HRB[75] account for 68% of all units. In terms of physical hectares, these small farms have very little irrigation on average and have about 6 total hectares. While some commercial operations are of less than 12 HRB, most have more than 12. These medium and large farm groups account for only 8.5% of total farm units.

One should note the use here of the term "production unit" in counting farms, because these are not necessarily family farms in the sense that there is some family dependent on farming, with farm structures and equipment. As Table 41 shows, for 2007 data, while there are almost 200,000 "farms" of between 0 and 2 HRBs, only 23% of them earned more than 50% of their income from agriculture; that is, about 50,000 farms. Of the approximately 70,000 farms with 2 to 12 HRBs, about 40% received 50% or more of their incomes from agriculture; or about 28,000 farms. Adding up "small farms" then, one finds about 78,000 dependent on agriculture for their livelihood in 2007.

Even more telling is that 62% of the farms of less than 2 HRB earn less than 25% of their household income from farming, and 41% of those 2-to-12 HRB farms earn less than 25% from agriculture – that is, many of the 153,000 small farm units counted by the census

[75] Farms size is measured based on a standardised measure of productive land. The acronym, HRB, indicates "*hectareas de riego basico*" – hectares of equivalent productive capacity, based on irrigated land of a reference soil fertility and slope. For more information, see http://www.indap.gob.cl/Prodesal/Documents/Material%20de%20Apoyo/Documentos/Normativas/Tabla_Equivalencias_HRB.pdf.

are not farms in the traditional sense. However, unlike a wealthier European or US model of a hobby-farm being one of a middle class or wealthier household, in the case of Chile, as a middle-income country, the bulk of these non-farm-dependent families with "farm" units have lower incomes. The assessed positive impact of the EU-Chile FTA on a number of agricultural activities may thus trickle down to a number of low-income households, beyond what the mere volume of output might suggest.

TABLE 40: NUMBER OF FARMS AND AVERAGE SIZE AND HECTARES IN IRRIGATION BY FARM SIZE CLASS, 2007

	Count		Average size (in physical hectares)	
Farm size (HRB)	Nb of farms	Share in total (%)	Irrigated	Non-irrigated
< 2	197,029	68.1	0.2	5.9
2 to 12	67,795	23.4	2.9	35.4
12 to 60	19,351	6.7	17.9	153.0
> 60	5,331	1.8	90.7	2,410.8
All	289,506	100.0	3.7	66.9

Source: Chilean Agricultural Census 1997 and 2007

TABLE 41: DISTRIBUTION OF FARMS ACCORDING TO THE WEIGHT OF FARM INCOME IN FAMILY INCOME, BY FARM SIZE, 2007

Farm size HRB	>75%	50% to 75%	25% to 50%	< 25%	Total
< 2	14	9	15	62	100
2 to 12	28	14	18	41	100
12 to 60	35	14	17	33	100
> 60	39	12	13	37	100
All	18	11	16	55	100

Source: Chilean Agricultural Census 2007

Changes in land use, farm size and sales profile

Table 42 presents land use changes between 1997 (prior to the EU-Chile FTA) and 2007 for high-valued products by farm size using the HRB classification. Less-than-12 HRB farms have reduced their allocations to wine grapes and horticulture. In general, and consistent with the simulation results presented in Chapter 3, the trend between 1997 and 2007 is a decline in hectares devoted to cereals and improved pastures and an increase in fruits, table and wine grapes. According to the *Oficina de Estudios y Políticas Agrarias* (ODEPA, part of the Chilean Ministry of Agriculture) interpretation of the Agricultural Census, as a share of gross value of output, the small farm sector declined by 10%, the medium farm sector increased by 9%, and the largest farms increased by 69%. There has been substantial structural change over the last decade, and the products that are expanding are exportables.

TABLE 42: TOTAL LAND USE FOR FRUITS, VINEYARDS AND HORTICULTURE, BY FARM SIZE, 1997 AND 2007 (THOUSAND HECTARES)

	Fruits			Vineyards			Horticulture		
Farm size HRB	1997	2007	Change	1997	2007	Change	1997	2007	Change
< 2	20.9	21.5	2.9%	13.1	10.2	-22.1%	18.2	16.0	-12.1%
2 to 12	35.4	41.3	16.7%	15.3	14.9	-2.6%	37.7	29.6	-21.5%
12 to 60	79.2	97.8	23.5%	24.6	35.2	43.1%	37.9	40.8	7.7%
> 60	98.2	163.1	66.1%	29.1	70.0	140.5%	32.1	35.9	11.8%
All	233.7	323.7	38.5%	82.1	130.3	58.7%	125.9	122.3	-2.9%

Source: Agricultural Census 1997 and 2007.
Note: Vineyards include wine and pisco grapes.

Overall, as Table 42 shows, there has been a decline between 1997 and 2007 in the land devoted to annual and fruit crops among small operations, and an increase in land devoted to these crops among larger operations. Compared to all annual and fruit crops (Table 43), the contrast is especially marked for fruits and vineyards, precisely the two agricultural products for which the strongest export gains to the EU were estimated as a result of the EU-Chile FTA. This finding suggests that the new opportunities associated with the Agreement may not have been neutral with respect to farm size. The underlying causality may be twofold. On the one hand, large farms are likely to be better equipped to meet the conditions needed to export to the EU, and to be well informed about the possible gains to be reaped from adaptation, when needed. On the other hand, those farms benefiting most significantly from the EU-Chile FTA might have increased opportunities to enlarge. The fixed costs linked to exports may also create additional incentives for mergers between farms, and more generally for an increase in farm size.

TABLE 43: THOUSAND HECTARES IN ANNUAL AND FRUIT CROPS, BY FARM SIZE, 1997 AND 2007

Farm size HRB	1997	2007	% change
< 2	203	139	-31.8%
2 to 12	360	252	-29.9%
12 to 60	436	411	-5.9%
> 60	397	491	23.8%
All	1,398	1,294	-7.4%

Source: Chilean Agricultural Census, 2007.

This size bias of the EU-Chile FTA is confirmed by a more specific analysis. With respect to market orientation, in 2007 the census included a question regarding whether or not the farm unit produced for exports, for agro-processors, and/or produced under contract arrangements (unfortunately this information is not available in the pre-Agreement census of 1997). As Table 44 demonstrates, the small operations are relatively uninvolved in more sophisticated markets and are thus less likely to take advantage of opportunities offered by trade agreements, including the EU-Chile FTA. Those farms that are involved in exports or downstream processing or contracts tend to be larger operations. Small farms tend to specialize in traditional commodity crops, import competing and non-tradables (e.g., potatoes, dry beans and some horticulture), and larger operations in export fruits and vegetables. This was almost certainly the case prior to the EU-Chile FTA.

TABLE 44: SALES PROFILE BY FARM SIZE, 2007. PERCENT OF FARMS ACCORDING TO SIZE BY EQUIVALENT PRODUCTIVE CAPACITY (HRB)

Farm size	Exports	Sales to agroindustry	Contract farming
< 2	2.5	4.3	1.0
2 to 12	8.7	18.2	7.4
12 to 60	27.4	39.4	21.9
> 60	44.8	45.6	29.5
All	6.4	10.7	4.4

Source: Chilean Agricultural Census, 2007.

Farm types prior to the EU-Chile FTA

Prior to the EU-Chile FTA, subsistence small farm units represented approximately half of all small farms in Chile (Table 45, figures from the 1997 Census). While they were relatively more numerous in the South, this proportion was comparable across regions. Today, the differences across regions are still linked more to product specialisation than to differences in farm types.[76]

TABLE 45: NUMBER AND PERCENTAGE OF SMALL FARMS BY MACRO-ZONE AND FARM IN 1997

Macro-zone	Subsistence	Transition	Consolidated	Total Small Farms
North	10,915	8,825	622	20,362
	(53.6%)	(43.3%)	(3.0%)	(100%)
Center	43,026	47,357	4,575	94,958
	(45.3%)	(49.9%)	(4.8%)	(100%)
South	100,879	64,444	3,745	169,068
	(59.7%)	(38.1%)	(2.2%)	(100%)
Total National	154,820	120,626	8,942	284,388
	(54.4%)	(42.4%)	(3.1%)	(100%)

Source: Chilean Agricultural Census, 1997.
Note: See footnote 76 for the definition of small farms.

Table 46 shows the importance of the small farm sector in 2003, according to product type (exportables, importables and non-tradables). Subsistence and transition farms tended to produce importables and non-tradables, consolidated small farms and commercial farms concentrated production in exportable products. This contrasting weight of exportable products across farm types was reflected, and even accentuated, in the composition of

[76] The CASEN (*Caracterización Socioeconómico Nacional*) surveys are national, across economic sectors; they are fairly detailed with respect to income sources, broadly defined by activity and work position, and also reveal household demographics and health and living conditions. Farm production characteristics from the Agricultural Census were matched to self-employed agricultural households in the CASEN. Small farm units are defined as those producing on less than a certain number of hectares, the specific size depending on agro-ecological zone, and those with less than 10 employees; such small farm units are then classified as Subsistence, Transition and Consolidated, based on level of contracted employment. Subsistence farm units contract no employees. Transition farm units contract labour, but have no administrators. Consolidated farm units hire administrators.

family farm net income. Increased export opportunities thus tended to favour consolidated farms when compared to subsistence farms. This conclusion is corroborated by Heran and Livenais (2011): based on detailed work focused on a particular region (Limari), they show that the development of export agriculture in the fruit sector resulted in a concentration of land and water rights. It also coincides with the crisis of subsistence farms, and with the seasonal move of some of the farm workers to export agriculture.

Income per capita is significantly lower in subsistence farms than in consolidated farms, by approximately one third (Melo and Lopez de Lerida, 2006). The increasing importance of exports may have thus resulted in both higher average income per capita and increasing inequalities. Although higher for subsistence farmers (12%), labour income represented a relatively low proportion of total income for all farm types, meaning that the exposure of farmers to the profitability of their main activity remained overwhelming.

TABLE 46: IMPORTANCE IN NATIONAL FARM PRODUCTION OF THE SMALL FARM SECTOR, BY PRODUCT AND FARM TYPE (VALUE OF PRODUCTION IN 1000 US DOLLARS, 2003)

	Farm type					
	Subsistence	Transition	Consolidated	Small farms	Other farms	Total
Product						
Exportables	37,752	85,503	29,758	153,013	704,171	857,184
	19%	27%	51%	24%	49%	43%
Importables	89,414	158,835	22,097	270,346	718,778	989,124
	35%	40%	28%	42%	37%	37%
Non tradables	100,148	110,142	12,185	222,475	210,959	433,434
	47%	33%	21%	34%	14%	20%
Total	227,314	354,480	64,040	645,834	1,633,908	2,279,742
	100%	100%	100%	100%	100%	100%

Source: Adapted from Melo and Lopez de Lerida (2006) using 2003 data

In sum, the trade orientation of farms was far from being neutral, in particular with regards to size and farm type. The development of exports as the one enabled by the EU-Chile FTA mechanically favoured large, with respect to small farms. And within the small ones, if favoured consolidated, in contrast to subsistence farms. The development of large and consolidated farms is a deep structural trend in Chile's agriculture sector, but this finding suggests that the EU-Chile FTA may have contributed significantly to this trend, and probably accelerated it.

7.2 LONG-RUN IMPACT OF THE EU-CHILE FTA ON HOUSEHOLD INCOME OF CHILEAN SMALL FARMERS

The simulations presented in Chapter 3 of impacts of the EU-Chile FTA (on factor prices, incomes, and trade) found a small income gain to the entire Chilean economy (0.23% relative the base case). The impacts on factor prices also suggest that the distributive consequences of the EU-Chile FTA remain limited, and tend to reduce inequalities: real wage are assessed to be higher by 0.33% for unskilled workers and by 0.14% for independent workers, while they are lower by 0.36% for medium-skilled workers, and by 0.30% for high-

skilled workers. Beyond the very small estimates obtained, the interest of these results is to point out the direction of effects.

Certain economic sectors benefit more than others; and the simulations do indicate that the main Chilean sectors to gain are fruit growing, wine making, fisheries and fish processing. The impacts of the EU-Chile FTA on the agricultural and fisheries sectors are most notable in terms of the percentage gain in volume of exports to the EU, although the per-unit values of agricultural production in various subsectors are impacted to a much lesser degree. This is unsurprising given the level of openness of the Chilean economy and the export orientation of the agro-food sector prior to the Agreement: international markets would tend to determine prices to producers in a small country.

Nevertheless, the EU-Chile FTA would affect to some degree, albeit small, the incentive framework facing Chilean farmers, making import-competing production less attractive relative to the type of exportables in which Chile is particularly competitive. The ensuing adjustment costs in the short term were just described. In the longer term, prices of traditional agricultural commodities, such as cereals and beef show a slight decline in the simulations, while prices of fruits and forestry products show a slight increase. These changes to prices of farm commodities (and decreases relative to petroleum-related products) are of policy interest because of their impacts on the small farm sector – the sector's poorest and most vulnerable part. The impacts of the EU-Chile FTA on commodity prices not only influence small farmer production but also household consumption costs. One expects that the cost of living for poorer households would decrease, at least slightly, due to the lower prices of cereals and meat suggested by the simulation results. If farm commodity prices were to trend in the direction as indicated by the simulation results, lower prices of traditional crops would put further pressure on incomes for small farm households. The small farm sector could be a beneficiary of what appears to be an increase in fruit and forestry prices to the extent that this sector participates in these activities.

Despite the rapid modernization of Chile’s agricultural sector, family farms are still important in terms of household numbers and value of output (reaching about a third of the national total). And family farms have different levels of market integration, not only with respect to sales of farm production but with respect to input use and consumption patterns. Therefore, in assessing the welfare impacts of price changes to commodities, it is important to consider the effects on the input side and on the cost of the household consumption basket.

When addressing the impact of changes to commodity prices brought about by the EU-Chile FTA on small farm households, the crop production mix of individual farms is likely important in determining the final impacts of price changes on household welfare. The crop production mix varies not only by agro-ecological zone, but also by farm size. From the simulations in Chapter 3, farm product price changes are slightly negative for traditional agriculture, such as the production of grains, oil seeds, and livestock, but slightly positive for other products which are not traditional commodities, many of which are perishables, such as fresh fruits and vegetables. The potential benefits at the household level would be concentrated on farmers oriented to that favoured subset of products. The final impact on farm income depends on a weighted sum of domestic price changes. Similarly, impacts on farm production costs of price changes of petroleum-related inputs and chemicals depend on the cost shares of purchased inputs (mainly in this case, pesticides and fertilizers). On the consumption side, household expenditure patterns are available by income quintile, and this

analysis concentrates on the first and second quintiles that correspond to the poor and near-poor.

While carrying out this analysis, we are well aware that the order of magnitude of the simulation results is very small, meaning that the implied income consequences will themselves be small. The direction of changes is nevertheless often as interesting in such simulation results as the magnitude of the effects, which may vary depending of a series of factors which cannot be modelled in a CGE framework. In addition, the methodology presented and applied here may be used to assess other agreements, where simulated effects might be large.

The next subsection presents simulation results The methodology used for assessing the impact of price changes on production income, farm costs and the cost of the household consumption basket are presented in Appendix 7.2.

7.2.1 Simulations by farm type: The impacts of agricultural and purchased-input price changes due to the EU-Chile FTA

Simulations

The simulations presented here compare the real incomes of small farm households based on the price changes attributed to the EU-Chile FTA with the simulations presented in Chapter 3. Table 47 shows the simulated price changes for the main products associated with the agriculture and food sector. Note that these changes are fairly small in the particular case of Chile, due to the relatively low (and uniform) levels of protection in Chile prior to the EU-Chile FTA.

Table 47: Simulated price changes due to EU-Chile FTA for the main products associated with the agriculture and food sector (%)

Agriculture	-0.096%
Fruits	0.029%
Livestock and animal products	-0.058%
Forestry	0.080%
Fishery	-0.048%
Meats	-0.071%
Seafood products	-0.268%
Fruit and vegetable preparations	-0.161%
Alcohol and liquors	-0.151%
Wine	-0.345%
Other foods and beverages	-0.162%
Refined petroleum	0.0014%
Chemicals and derived products	-0.261%

Source: CGE simulations in Chapter 3.
Note: All changes are expressed relative to the model numeraire, the price of the “other services” sector.

These percentage changes serve as the basis for the shocks considered in the farm-household-income simulations. In addition to changes to farm product prices, the

simulations also incorporate the effect of price changes in refined petroleum and chemicals, two important inputs in farm costs.

To assess the impact on farm-household income, the simulations that follow make use of an approximation of the composition of production on small farms that existed at the time of the EU-Chile FTA's initiation.[77]

TABLE 48: SHARES OF SELECTED CROPS, IN NET FARM REVENUE BY TYPE OF FAMILY FARM, USED IN SIMULATIONS

	Subsistence	Transition	Consolidated	Family farming
Major importables				
Wheat	12.7%	17.0%	14.7%	14.9%
Maize	0.5%	0.9%	0.7%	0.8%
Rice	0.4%	1.1%	0.4%	0.8%
Milk	4.5%	5.3%	5.7%	5.2%
Beef	6.0%	6.9%	8.8%	7.1%
Major non tradables				
Veget. garden plot	16.7%	5.2%	2.1%	8.1%
Potatoes	24.2%	19.4%	6.6%	17.2%
Major export crops	8.2%	16.9%	43.1%	20.7%
Others	26.8%	27.2%	17.8%	25.2%

Source: Melo and Lopez. Some of the characteristics of the households in the Agricultural Censsus of income from 2003

Note that major export products include raspberries, apples, table and wine grapes, avocados, prunes, pears, peaches, kiwis, seeds (flower, vegetables, maize, grasses), and others.

At the level of small-farm income, the impact of commodity price changes depends on the composition of products. Table 48 shows the average shares of selected crops in net farm production income by type of farm. Subsistence farms have a greater share of net income derived from non-tradables and import-competing crops, while consolidated farms have a lower share of non-tradables and a relatively high share derived from exportables. The impact related to the changes in prices of petroleum-related products and chemicals depends on the cost share of relevant inputs in production. Table 49 shows the share of labour, seeds, pesticides, fertilizers and other inputs relative to gross revenues. The impact on the consumption basket of farm households as consumers depends on the expenditure weights of importables, exportables and non-tradables (food and transport), which are shown in Table 50. For all farm households categories, food and beverages represent 27% of household expenditures, but for the poorest two quintiles, food represents at least 40% of total household expenditures.

[77] It is noteworthy that some of the households characteristics from the 1998 CASEN surveys were used and matched with the Agricultural Census data due to lack of other information.

TABLE 49: PURCHASED INPUT COSTS AS SHARE OF GROSS REVENUE, USED IN SIMULATIONS

Product/Cost	Labor	Seeds	Pesticides	Fertilizers	Total	(1-Total)
Rice	0.11	0.06	0.08	0.09	0.34	0.66
Oats	0.1	0.05	0.05	0.15	0.35	0.65
Maize	0.28	0.15	0.15	0.08	0.66	0.34
Wheat	0.09	0.07	0.08	0.29	0.53	0.47
Potato	0.08	0.21	0.01	0.11	0.41	0.59
Beans	0.07	0.14	0.16	0.05	0.42	0.58
Cabbage	0.43	0.15	0.25	0.15	0.98	0.02
Clover	0.34	0	0.03	0.01	0.38	0.62
Winter clover	0.24	0	0.01	0	0.25	0.75
Alfalfa	0.19	0.22	0	0.09	0.5	0.5
Small-scale hort.	0	0	0	0	0	1
Raspberry	0.47	0	0.02	0.03	0.52	0.48
Apples (red)	0.31	0	0.15	0.04	0.5	0.5
Apples (green)	0.31	0	0.15	0.04	0.5	0.5
Avocado	0.45	0	0.21	0.05	0.71	0.29
Table grapes	0.28	0	0.09	0.04	0.41	0.59
peas	0.32	0	0.03	0.02	0.37	0.63
Home orchards	0	0	0	0	0	1
Tomato (fresh)	0.23	0.002	0.04	0.01	0.27	0.73
Tomato (process)	0.25	0.1	0.02	0.02	0.39	0.61
Tomato (glass)	0.22	0.03	0.03	0.01	0.29	0.71
Wine grapes	0.39	0.12	0.06	0.18	0.75	0.25
Pisco grapes	0.15	0	0.08	0.04	0.27	0.73
Dairy cows	0.2	0	0.05	0.26	0.51	0.49
Beef cows	0.18	0	0.09	0.42	0.69	0.31

TABLE 50: CHILEAN HOUSEHOLD MONTHLY EXPENDITURE SHARES

	Average of all households	1st quintile: subsistence and transition	2nd quintile: consolidated
All expenditures in pesos	445,637	143,644	224,669
Food and beverages	27%	44%	40%
Fruits	2%	3%	2%
Bread, cereals, pastas	5%	10%	8%
Meat	5%	9%	8%
Milks, cheese and eggs	2%	4%	4%
Oils, butter, etc.	1%	2%	1%
Sugar, coffee, tea, etc.	3%	4%	4%
Vegetables	3%	6%	5%
Beverages, restaurants	6%	6%	7%
Fish and shellfish	1%	1%	1%
Transport	13%	8%	9%

Source: Instituto Nacional de Estadisticas (INE), Santiago, 2007.

TABLE 51: SIMULATION RESULTS: IMPACT OF EU-CHILE FTA ON INCOMES OF THE SMALL-FARM PRODUCERS

Item	Subsistence	Transition	Consolidated
change in net revenues due to product prices	-0.187%	-0.181%	-0.076%
change in net revenues due to input prices	0.171%	0.225%	0.273%
change in total net farm revenue	-0.016%	0.045%	0.197%
net change in consumption basket cost	-0.017%	-0.017%	-0.015%
net change in real household income (not including off-farm labor income and transfers – adjustment in parentheses)	0.001% (0.005)	0.062% (0.050)	0.212% (0.166)

Source: Authors' calculations.

Simulation results are presented in Table 51. Changes in net farm revenue are decomposed into effects due to commodity prices and input prices. Commodity price changes taken alone have small, negative impacts on net revenue (less than a half percent), but these effects are larger for subsistence farms. Subsistence-type farms are more numerous in traditional crops. Consolidated-type small farms did have a greater focus in exportables, the prices of which increase slightly in the CGE simulation, but at the time of the EU-Chile FTA's initiation they did still have significant income from wheat, milk and beef. The impact on net revenues of higher input prices is also small, but the estimated decline in chemical prices (fertilizers and pesticides) due to the Agreement is larger than the estimated decreases in traditional crops. Net revenues increase slightly (0.2%) for consolidated farms due in part to their greater concentration in fruits, but mainly due to decreases in fertilizer and pesticide prices. The net effect on net farm revenue is negative but small for subsistence-type farms. For transition farms, the negative impact of declines in traditional crop prices is offset by the positive effects of decreased input costs, yielding a slight gain.

On the consumer side, all farm types experience a very small decrease in the cost of their consumption baskets. The net effect on real household income is shown in the final row of Table 51. All types of farms, subsistence, transition and consolidated households enjoy an increase in real income. If one were to include off-farm income in the base, the percentage impact on real incomes would be less. In the case of subsistence and transition farm households, off-farm income (as seen in Table 48) contributes a relatively greater amount to total income compared to consolidated farm households. The adjustment to real income effects of price shocks by including off-farm income and transfers is shown in parentheses in Table 51, and reduces the relative gains in real income of subsistence and transition farm families. As suspected, the adjustment in real income effects for consolidated farm families is slightly lower due to their lower dependence on off-farm income and transfers.

Comments

One objective of Chilean small-farm-sector policy has been to promote the production of exportables – namely fruits and vegetables, which are considered the most dynamic sectors. But the small farm sector remains concentrated in import-competing products, although as the number of farmers declines, remaining producers tend to be more commercially oriented and, if not in export activities, larger and more competitive with imports. The clearest example of the results of international competition has been in the dairy industry, which made a transition from net importer to net exporter, shedding many

small dairy operations over the last two decades. Broader national economic policy has long emphasized the integration of Chile into world markets; both via a unilateral policy of low and uniform tariffs and via trade agreements, such as the one with the EU. The resulting general decline in tariffs has changed relative expected returns against import-competing products (i.e., wheat, maize, dairy, beef and oilseeds) over the last decades. The EU-Chile FTA was just another step in the same direction, although the impacts on the incentive structure for the small farm sector were small in absolute value.

The analysis here suggests that, due to the EU-Chile FTA, net returns to small farmers in exportables would have, *ceteris paribus*, increased slightly due to increases in fruit and forestry prices and decreases in purchased input costs. Those small farms – the smallest and least commercial – more heavily involved in traditional crops and livestock lose, but again to a small degree, and their losses are largely mitigated by reductions in input costs. This is before changes in the cost of living associated with price impacts on the consumer side. The most market-oriented family farmers (still poor, but less so) gain the most: net farm income is slightly higher and the cost of living lower. And cost-of-living effects will be enjoyed by the urban poor similarly, but without any declines in farm income coming from traditional crops.

7.3 Gender issues related effects of the EU-Chile FTA

Gender and the EU-Chile FTA

The gender issue cannot be considered independently from other forms of economic inequality. Singling out gender as a category in the assessment of the social consequences of the agreement is nevertheless justified by the fact that the sectors most affected by the EU-Chile FTA are characterized by particular forms of employment, including for some of them a high labor participation for women.

The EU–Chile Association agreement includes provisions in the cooperation chapter specifying that the Agreement should strengthen policies and programs that improve, ensure and increase the equal participation of men and women in all sectors of political, economic, social and cultural development; and that cooperation will facilitate women's access to all resources required for the full exercise of their fundamental rights. No legal obligation is included in the Agreement, though.

According to the EC Country Strategy Paper for Chile, gender shall be a cross-cutting issue and permeate all work that is being done in the different sectors concerning cooperation and aid, e.g. areas concerning labour, education and social cohesion.

The economic situation of women in Chile

Chile ranks 33rd in the OECD's 34 countries on female labour participation rate, ahead of only Turkey. There is also a significant gender gap in salary.[78] The distribution of

[78] The average wage of employed women aged 20 to 49 who work 35 hours per week in 2006 was 75% percent of the salary of men under the same conditions (source of the data: CEPAL). After correction for education and part time labour, the gender ratio was still found to be between 82 and 91 percent by Perticará (2010). The 2008 INE survey (EncuestaSuplementaria de Ingresosdel INE 2008) shows a ratio of 0.72 on paid hired labour.

social benefits is also particularly uneven between men and women as well as among women.[79] Table 52 shows that the rate of participation of women in the workforce has increased over time, even though, at 42%, it remains one of the lowest in Latin America. CEPAL data also suggest that if the poverty rate of women has gown down significantly between 2003 and 2009 (from 19% of women classified as "poor" to 12%, i.e. a reduction of 36%), the reduction in poverty rate has been higher for men (40%). Data from the 2009 CASEN survey show that the percentage of women classified as "poor" went down from 19.0% in 2003 to 14.3%in 2006, but increased to 15.7% in 2009.

A widening gap has also been observed between the poverty rate in households that are headed by a man and those whose head is a women in the CASEN surveys. While in 2003, the poverty rate was roughly 15% in both cases, the 2009 survey shows a fall in the former case (to 12.2%) and increase in the poverty rate in the latter (to 16.6%). This contrast reflects the legalization of divorce in 2004 (Chile was one of the only three countries in the world without legal divorce) and the lower average income of monoparental families headed by a woman compared to the average household.

Since 1991 and the creation of the Servicio Nacional de la Mujer (SERNAM), a list of laws and regulations have aimed at the improvement of the conditions of women on most social aspects, from violence to social rights (Fernández Venegas et al. 2010). The principle of equality of salary was enacted in 2009.

TABLE 52: CHANGES IN THE PARTICIPATION TO THE LABOUR FORCE 2000-2009

Year	Gender	Employed	Unemployed	Inactive	Participation rate	Unemployment rate	Occupation rate
2009	Men	4037526	392821	1831150	70.8%	8.9%	64.5%
	Women	2599355	362431	4040122	42.3%	12.2%	37.1%
2006	Men	4045755	257925	1622038	72.6%	6.0%	68.3%
	Women	2532570	261432	3666137	43.2%	9.4%	39.2%
2000	Men	3490213	371990	1402995	73.4%	9.6%	66.3%
	Women	2006231	265888	3438812	39.8%	11.7%	35.1%

Source: INE.

Gender and employment

The sectors with the highest employment of women in 2010 are the retailing sector, domestic services and education (Table 53). Women represent the highest proportion of workers in domestic services, social services, education, hotels and restaurants. If we focus on the sectors exposed to international trade, agriculture and the manufacturing sector are the largest employers in absolute terms (source INE data for 2010). The sectors with the highest proportion of women employed are the manufacturing sector (30% in 2010), and the agricultural sector (17% in 2010). At the subsector level, the sectors with higher percentages

[79] PNUD (2010) shows that the inequality between men and women is also reflected in pensions. Regarding the distribution of social payments, some are particularly regressive, such as those for maternity-leave (52% of payments go to the richest fifth of women and just 5% to the poorest fifth according to The Economist Intelligence Unit; The Economist, 2011).

of women employed are commercial agriculture ("*cultivos*"), processing industries and services, and manufactured consumption goods. In the manufacturing sector, the largest employer of women is the processing and canning sector of food, including fisheries, fruits and vegetables (source ENIA survey 2008, INE).

A noticeable trend during the 2000s is the growing feminization of family labour in agriculture. The ratio of women to men over 15 years of age in agricultural labour increased from 30% in 1997 to 41% in 2007. In absolute terms, the number of women working on farms increased from 96,300 in 1997 to 130,600 in 2007 (+ 36%), while in the same period male family labour decreased from 227,800 to 184,100 men (-19%).[80]

TABLE 53. EMPLOYMENT PER SECTOR, MEN AND WOMEN IN 2010 (1000 WORKERS), COMPARED TO 2002.

	Men (2010)	Women (2010)	% women in 2010	%women in 2002
Agriculture, hunting and forestry	559.18	114.79	17%	11%
Fisheries	39.17	4.68	11%	16%
Minerals	193.38	14.33	7%	6%
Manufacturingsector	592.29	257.35	30%	24%
Electricity, gas, water	56.28	9.91	15%	13%
Construction	551.07	31.08	5%	4%
Retail and repair	805.02	713.07	47%	33%
Hotels and restaurants	107.61	143.46	57%	57%
Transports and communication	449.01	86.02	16%	16%
Finance	67.13	61.43	48%	46%
Real estate	267.09	178.26	40%	33%
Administration and defence	228.38	156.45	41%	29%
Education	164.49	356.51	68%	66%
Social services and health	95.31	211.1	69%	68%
Domestic services in private households	83.56	397.42	83%	91%
Other	151.39	94.54	38%	-
Total	4410.36	2830.4	39%	

Source: INE's compendio de estatisticas de genero 2011 for data 2010 and INE 2004 "Mujeres chilenas tendenciasen la última década" for data 2002.

The consequence of the EU-Chile FTA on women's employment and income

It has not been possible to include gender differentiation in the data for the CGE model, in order to obtain specific results for women. Simulations can be provided to reflect the initial gender composition of the labour force in each sector, but the percentage variations would be the same for both genders.[81]

[80]Note that these figures come from the VIIth agricultural census, and differ from those in Table 53 from the 2010 INE statistics, due to different definitions (women over 15 years in the agricultural census).

[81] Distinguishing female and male labour in the simulations would require data per gender and per qualification for the subsector that match the SAM, which are not available in the absence of a specific treatment of the individual data. In addition, for an FTA to generate a larger change in men and women's labour, differentiated elasticities would need to be calibrated. Because of the small impact of the EU-Chile FTA on sectoral employment that was found in the simulations (see Chapter 3), any further assumptions to calibrate a SAM

Simulations suggest that the impact of the EU-FTA in terms of employment was, overall, very small (see Table 65 and section 7.2). In terms of employment, the EU-Chile FTA has only positive visible consequences on the fruit growing sector, and to a lesser extent in the fisheries, wine making and food processing sectors. It has very small but negative consequences in the chemical, metal and machinery sectors, as well as consequences in the non tradable sectors, mostly due to indirect macroeconomic effects (exchange rates).

In the sectors that have particularly benefited from the EU-Chile FTA, i.e. agriculture and food processing, the share of women employment has increased (Table 54). Nigel and Martinez (2007) also find a strong correlation in the increase in agricultural exports and the increase in women's labour in agriculture over the 1996-2005 period. They actually explain the overall increase in agricultural employment between 2001 and 2005 using the incorporation of women in agriculture (out of the 61,000 net jobs created, 51,000 corresponded to women's labour). Using more detailed data than our CGE simulations, they also conclude that export agriculture has benefited women's employment.

TABLE 54. CHILEAN SALARIED WORKERS IN THE ECONOMY AND AGRICULTURE SECTOR IN CHILE.

	1996	2006	Growth Rate 1996/2006
Economy			
Men	2,463,136	2,906,083	17%
Women	1,406,534	1,909,727	36%
Men / Women ratio	1.8	1.5	
Agriculture			
Men	423,133	450,198	6.3%
Women	82,068	135,499	65%
Men / Women ratio	5.2	3.3	

Source: Calculations from CASEN 1996 and 2006 Note: (Age 16-65).

There is another, less positive, effect that explains the feminization of the agricultural labour force. The data gathered by ODEPA (2009) shows that the number of farms headed by women has increased significantly between 1997 and 2009, while the (much larger) number of farms headed by men has fallen (Table 55). Women are overrepresented in the smallest farms. Figures from the Agricultural Census in 2007 show that 88% of the farms headed by a women were classified as "small farms" and 48% of them were considered to be subsistence farms only (Table 56). Field surveys by Nigel and Martinez (2007) lead to the conclusion that the development of export oriented activities plays a role in the feminization of agriculture, because it tends to marginalize small farmers whose activities are increasingly left to women. According to ODEPA (2009), the increase in the share of women in the agricultural labour force illustrated in Table 53 can therefore be interpreted as "replacement" of men by women. In that sense, the feminization of agriculture is also a family strategy of survival, where the man's labour migration outside the farm is associated with a farm managed by a woman.

differentiating labour by gender would increase the uncertainty on the parameters, already large compared to the magnitude of the simulation results.

TABLE 55. NUMBER OF FARMS AND ACREAGE BY GENDER OF THE HEAD OF PRODUCTION UNIT

	Men 1997	Men 2007	Women 1997	Women 2007	% variation Men	%variation Women
Number of farms	227325	188532	63675	80225	-17	26
Acreage	12098228	9884706	2239399	3085884	-18	38

Source: ODEPA (2009) from censuses.

Simulations in section 7.2. suggest that the EU-Chile FTA has accrued benefits much more to consolidated farms than to small and subsistence farms. However, the EU-Chile FTA seems to play a rather marginal role in the trend where smaller farms become less viable and are increasingly left to women. Detailed data by ODEPA-QA (2009) show that those subsectors where exports under the EU-FTA have increased most (e.g. fruits, wine) are characterized by a change in the proportion of women that is similar and even lower than the one observed in those subsectors where the EU-FTA has not had any visible impact on production (e.g. beef, forestry).

TABLE 56. NUMBER OF FARMS HEADED BY A WOMEN BY CLASS OF GROSS RECEIPTS,1997 AND 2007

				Number of farms		
Class of Gross Income	Total 1997	Women 1997	% women 1997	Total 2007	Women 2007	% women 2007
0-1,8K	162,823	40,496	25%	146,423	48,728	33%
1,9K-3,7K	38,936	6,687	17%	35,792	9,4	26%
3,7K-11,1K	37,326	5,228	14%	33,609	7,523	22%
11,1K-22,2K	12,847	1,465	11%	12,357	2,37	19%
22,2K-44,4K	7,336	884	12%	7,247	1,42	20%
SMALL FARMS						
0- 44.4K pesos	259,268	54,760	21%	235,428	69,441	29%
44.4K-185K	6,852	975	14%	6,695	1,53	23%
185K-463K	1,004	87	9%	1,176	275	23%
MEDIUM SIZED FARMS						
44.4K to 463K pesos	7,856	1,062	14%	7,871	1,805	23%
463K-1853K	139	10	7%	202	43	21%
>1853K	2	0	0%	7	1	14%
LARGE FARMS						
>463K pesos	141	10	7%	209	44	21%
Total classified	267,265	55,832	21%	243,508	71,29	29%
Total (including non classified)	282,283	60,503	21%	266,539	79,441	30%

Source: ODEPA-QA (2009), Estudio de caracterización de los hogares de las explotaciones silvoagropecuarias, sourceCensus 2007.

In addition, although the development of export agriculture tends to marginalize smaller farms, there is some evidence that even some of them have started to contribute to the export of particular products such as honey, berries, quinoa and flower bulbs, most of

the time through intermediaries (Nigel and Martinez 2007). These authors find that in a significant number of rural municipalities, export related agriculture is important for small women farmers, even if it is indirectly through the purchase of dairy, berries or meat to small farm households. According to Caro (2009), approximately 50,000 small producers sell some of their products to the agroindustry, in particular fruits, grapes (for wine) and berries.

Part time and seasonal jobs for women

There is a great deal of uncertainty regarding the number of paid workers in agriculture between the different sources, also reflecting the more or less formal forms of contracts. According to the various sources, permanent agricultural workers number between 130,700 (CASEN 2006) and 188,160 (Census 2007). However, all figures converge to suggest that women more highly represented among temporary workers.[82]

The growth in agricultural exports has been accompanied by an increase in temporary contracts for women (Nigel and Martinez 2007, ODEPA-QA2009). According to Nigel and Martinez, women employed in export agriculture tend to have a more precarious status than the typical male farm worker. They also find that the increased participation of women corresponded to a decrease in the wage rates over the 2001-2005 period in the agricultural sector. One explanation is the persistent gap in salaries between men and women. Data from pensions declarations show an average salary for women at 86% of the one for men (ODEPA 2009). Agrocap (2009) finds that the average salary for women employees in agriculture is 89% of the average salary for men. Another explanation is that women tend to hold less qualified and more seasonal jobs. In the fruit sector, for example women represent the majority of workers in packaging, which is by nature a seasonal activity, concentrated in spring and summer.

Whether the growth in agricultural exports that has accompanied a variety of trade agreements, including the EU-Chile FTA, has actually improved the status of women workers is controversial. Several case studies and regional surveys find that in agriculture, many employees work without formal contracts, with little social protection, retirement or unemployment benefits. Valdés (2007), Caro (2009), Mendoza and Donosco (2011), Cristóba Cornejo (2011) describe the precarious working conditions of women in the fruit sector, with short term contracts, long times spent commuting, and poor sanitary conditions. However, CEDEM's estimate is that in the agricultural sector 40% of workers did not have a formal contract in 2006; this figure was down from 53% in 2003. Nigel and Martinez's (2007) survey suggest that women who moved to the agricultural sector on temporary contracts are fully aware of the low pay, the precarious status, the tough work conditions and the fact that there is a gender gap in salaries. Women surveyed by these authors nevertheless see temporary farm labour as an improvement relative to past conditions, and overall see it as an opportunity to leave an informal sector for a cash generating activity.

The development of the aquaculture sector has also been a source of employment for women. Women account for 52% of the workforce in the salmon industry if one includes

[82] According to the 2007 census, the number of workers fluctuates between 152,500 and 402,400 over the year. The percentage of women ranges from 22.7% in May-July to 37.4% in November-January. Other sources such as CASEN come up with 255,100 temporary workers of which 35.4% were women in 2006. In any case, this is much higher than the share of women in permanent workers, i.e. roughly 10 percent.

the subcontractant (*maquila* operations) and 30% if one considers the farming operation only (Arengo et al. 2010). Pinto and Kremerman, (2005) provided figures suggesting that women experienced low wages, as well as discriminations in particular in times of motherhood. An more recent study by Arengo et al. (2010) on labour conditions in salmon farming does not find issues specifically targeting women, with the exception of health issues caused by the repetitive task of fish preparation (filleting and packaging) into which women are more specialized.

In brief, the EU-Chile FTA has contributed to the development of Chile's exports in the fruits, wine and seafood sectors (aquaculture, molluscs), where it has encouraged an absolute growth in women's employment, in particular because low skilled jobs in the canning sector and in the fruit sector are held by women. However, the EU-Chile FTA may have contributed to the decline of traditional agriculture, which seems to have disproportionately affected women. While the EU-Chile FTA has provided job opportunities for women in the wine and export agriculture sectors, these are often seasonal jobs (see Box 7.1.).

TABLE 57. DISTRIBUTION OF WORKERS PER CAGORY OF GROSS SALARY (100 PESOS), GENDER AND COMPANY SIZE, 2008

Type of company	Gender	<C$ 159	>C$159 <C$238	>C$238 <C$318	>C$318 <C$477	>C$477 <C$795	>C$795<C $1272	>C$1272 <C$1908	>1908
Micro	Men	5%	51%	15%	13%	10%	4%	2%	2%
	Women	10%	48%	16%	10%	8%	4%	2%	2%
Small	M	5%	33%	21%	17%	13%	6%	3%	2%
	W	10%	39%	17%	13%	13%	6%	2%	1%
Medium	M	3%	43%	15%	17%	13%	5%	2%	2%
	W	9%	29%	19%	17%	15%	7%	2%	1%
Large	M	5%	19%	17%	22%	18%	9%	5%	5%
	W	12%	30%	17%	15%	13%	7%	4%	2%
Total	M	4%	31%	17%	19%	15%	7%	4%	4%
	W	11%	33%	17%	14%	13%	7%	3%	2%

Source : Encuesta Nacional de Coyuntura Laboral, ENCLA, Dirección del Trabajo

Box 7.1. Exports and labour conditions: the case of the wine industry

Wine exports to the EU have grown by 50% since the implementation of the EU-Chile FTA. While the growth in exports also corresponds to an increase in consumption in the EU, imports from Chile have grown more than those from Australia, for example, suggesting that the EU-Chile FTA played a role, as confirmed by our econometric estimates and model simulations (see Figure 26). Wine exports now make up 2.6% of Chile's total exports and 14% of exports in the forestry-agriculture-livestock sector (2009 figures). The wine industry operates in several regions of the country, from the Coquimbo Region in the north to the Araucania Region in the south. The Maule and O'Higgins regions have the greatest concentration of area planted to wine grapes (53%), but the Metropolitan, Valparaıso and Biobıo regions also have a significant industry.

The growth in production and exports has had positive impacts in terms of income and employment. Large companies have clearly benefited, but so have the small- and medium-sized companies, which account for 80% of Chile's wine exporters. Indeed, the sector has more than 260 companies with annual exports greater than US$50,000, 21% of which export more than US$4.2 million per year (Felzensztein 2011). This development has also benefited the suppliers of materials, technology and complementary services, and particularly grape growers supplying some of the wineries, most of whom are small producers. The wine industry has attracted both domestic and foreign investment to historically less-developed zones such as the Maule Region.

According to the Center for Women's Studies (CEDEM) ongoing work in the wine sector is made up of 70% men and 30% women. However, under the most precarious status of temporary contract workers, 60% are women (Cedem 2009). One explanation is that women tend to be preferred for the harvesting of grapes for high quality wines where precise handpicking of grapes is required. Based on case studies in the Maule and Casablanca regions respectively, Molina (2008), Wilson and Caro (2009) have investigated the labour conditions of employees in detail. They report that short term contracts are common, even when women are hired in wineries to work for 6 to 8 months in successive temporary contracts so as to avoid paid leave and social benefits; they report exposure to chemicals, and in many cases poor observance of labour rights, with cases of anti-union practices. Wilson and Caro (2009) also stress the difficulty for women to coordinate child care under the working conditions of temporary workers. The implementation of corporate social responsibility strategies, as a response to the standards imposed primarily by EU retailers (under GlobalGap, formerly EurepGap) nevertheless leads to better working conditions in certified wineries (Molina 2008).

7.4 The EU-Chile FTA and common resource dependent communities

Trade in wood products and forest dependent communities

Chilean forests, and in particular the native forests are important as a source of timber, non-timber forest products, and fuel wood for many rural communities, including indigenous communities (Neira 2002). Forests are also important as a source of water regulation, watershed protection, soil stabilization and the maintenance of hydrological and nutrient cycles, to an extent such that many communities' economic activities depend crucially on them. There has been a recurrent conflict between some indigenous communities and forest companies, which have planted large areas with fast growing species partly because of the new export opportunities provided by free trade agreements. These communities claim that this has affected their well-being, in particular because it has resulted in the destruction of native forest, often used as a common resource (see Box 7.2.).

Specific studies in the Eighth and Ninth Regions suggest that the growth in exports of pulp and woodchips played a significant role in the price increase for forestry products in the late 1990s and early 2000s and participated to the shift in the use of land, from traditional agriculture to tree plantations (O'Ryan et al. 2006; De Gregorio et al. 2002). Since the forestry sector is less intensive in labour and more intensive in capital than agricultural

activity on small and subsistence farms, the development of exports of pulp and woodchips has not absorbed all of the local low skilled labour (Soto and Turche 2004). In the regions of forest plantations, unemployment and poverty incidence rates tend to be higher than the Chilean average (O'Ryan et al. 2006).

With the exception of plywood, the EU-Chile FTA has not significantly changed the tariffs faced by Chilean exports. Pulp and woodchip imports enter duty free in the EU. Imports of plywood have nevertheless been liberalized but represent small quantities compared to the exports of pulp, woodchips and other forestry products to Asia (see Chapter 6). The changes in exports that can be attributed to the EU-Chile FTA do not seem large enough to play a significant role in the potential deprivation of local communities of the natural capital associated with native forests.

Box 7.2. Social impacts of forestry activities

In Chile a considerable amount of forest land under the control of small and medium landowners, along with most of the state-owned lands, have been transferred to large companies over time. The issue can be tracked back for centuries, but social conflicts refer particularly to the period when the Chilean government subsidized forestation with exotic species in the 1970s (Neira 2002; .Catalan et al. 2005).

There is some evidence that indigenous communities, and in particular the Mapuche, have been adversely affected by the development of forest plantations even when they voluntarily sold their land, often at low prices. Lenient controls on whether these lands were actually degraded or eroded resulted in the destruction of native forests, classified as bush so as to be burnt or uprooted and to comply with the law converting bushes “to something more productive” (Lara et al. 1995; Catalan and Ramos 1999).

Conflicts between the indigenous Mapuche communities and some forestry companies are still a source of controversy nowadays, leading some NGOs to question the role of trade in pulp and woodchips as a new form of incentive to plant trees. Mapuche leaders point out that plantations for exports have damaged their traditional way of life, that the highest poverty areas are precisely where plantations have developed and that the development of plantations for exports particularly affects the Mapuche ethnic group among the rural poor. They also complain that the development of plantations limits their access to wood, food, fodder, medicine plants and water. Some of the lands occupied by forestry plantations are claimed by indigenous groups as ancestral lands that ended up in the hands of private companies or non-indigenous owners.

The wood and paper industry argues on the opposite that the poverty of indigenous populations and rural poor are the result of low quality lands, extensively degraded by inadequate farming practices for decades and even centuries. The industry points out the deforestation that takes place in primary forests used by local communities and the role of logging for firewood by small owners in the destruction of the resource.

The social conflicts are too deeply rooted to be directly related to the EU-Chile FTA. The general trade liberalization policy chosen by the Chilean government that is accused of facilitating exports of forest products has most likely played an important role in the development of plantations, whose products are mostly exported. However, a direct link between the EU-Chile FTA and the welfare of the indigenous communities can hardly be

established once one considers the limited exports to the EU and the fact that EU imports of most forestry products were liberalized long before the implementation of the EU-Chile FTA.

Trade in aquaculture products and social issues

The development of the Chilean salmon industry has generated employment in rural areas, at least until the sanitary crisis. It has resulted in the creation of a large number of jobs with visible impacts on poverty reduction in the Lakes and Aysén Regions (Léon Muñoz 2006). The Chilean industry stresses the steep decrease in the poverty rate in the municipalities with a salmon industry compared to the neighbouring ones, as well as a steeper reduction in illiteracy, higher attendance to schools and positive migration flows (Salmon Chile 2008b). More independent sources confirm the positive impact on employment and poverty. For example, the overall poverty in the Los Lagos Region has diminished considerably as measured by the Basic Needs Basket. It dropped from 39.8% to 14% between 1990 and 2006, placing the region above the national percentage (Arengo et al. 2010). This has been confirmed by a survey of the perception of the benefits of the industry in terms of employment and social developments carried out by the University of Los Lagos (Contreras et al. 2010).

With the sanitary crisis after 2007, employment fell from a peak of 53,000 workers (some 30,000 employed directly in farms) to half of this figure (source: Salmon Chile). Interviews of companies working indirectly for the salmon industry, as well as interviews of salmon workers confirm that the unemployment following the sanitary crisis has had very visible social consequences in the Puerto Montt region, in particular. This confirms the importance of salmon exports for employment in the Southern regions of Chile.

The mussels industry also underlines the creation of jobs and indirect employment in a network of small family firms. Representatives of the industry interviewed in May 2011 stress the social benefits of this production, which has grown considerably after the implementation of the EU-Chile FTA. Mussel exports to the EU originate from small size fishermen who got involved in producing mussels. Many of the jobs that were created have been in rural and remote areas (islands) where there would otherwise be few work opportunities. The services activities that are induced rely on a network of family companies that have specialized not only in maintenance, mechanics and harvesting, but also in training, administration, etc. The industry, which has developed over the past five years, now generates some 10,000 permanent jobs, and up to 18,000 at peak time during the year if one includes production, transformation and related services (source: industry figures provided by P. Leiva). Firms that invested in the production of mussels also offered their assistance to small producers in terms of access to credit and technology. They also stress that contracts with small producers are official, registered and legally binding, providing these families with a higher degree of security and better work conditions than in many other sectors in the area.

There are nevertheless some questionable aspects in the development of the seafood industry for exports. The issue of social consequences of salmon development have long been controversial and the figures put forward by the industry, unions and the government seldom coincide (Contreras et al. 2010). Pinto and Kremerman (2005) provided figures on the low wages in the industry and on the poor safety conditions. Igor Melillanca and Díaz Medina (2007) pointed out the disrespect of some of the workers' rights (unpaid

overtime, lack of maternity leave). In 2008 many of the infractions in the Los Lagos and Aysèn regions were on health and safety issues (half of them) and more than a fourth on working hours (Arengo et al. 2010, from Labour Bureau data). However, there are signs of improvement. In 2003, 73% of the companies inspected were found in violation of labour rights, in 2006, the figure was down to 53% according to the same sources. In the interviews that were conducted with the union's representatives in the Puerto Montt area in May 2011, workers seemed to acknowledge the rather good conditions that prevail in the salmon industry (more exactly, these conditions prevailed before the crisis). They also recognize the positive impact of growth in mussel production. However, they point out the tough work conditions and the small share of the benefits of the EU-Chile FTA that is captured by workers, and stress the limited changes made to a particularly unequal distribution of wealth in the Chilean economy.

The fast development of salmon and trout aquaculture has also had some negative effects on other social groups. It has even generated conflict between the industry and part of the coastal population, in particular small scale fishermen and the tourism industry (Arengo et al. 2010). Part of the conflict arises from the negative environmental externalities of salmon production (see Chapter 6). It also results from acquisition of coastal concessions or zones for aquaculture, which has led to large price increases in property. Both competition for use and speculation have triggered resentment from coastal populations, fishermen and the tourism industry that opposed the expansion of concessions, and pressed the government for stricter zoning (Zibechi 2009). The sanitary crisis has led to some negative externalities while having considerable negative consequences in terms of employment and has made the situation worse for these groups that suffered from the "tragedy of the commons" (Katz et al. 2010, Contreras et al. 2010).

As is the case for the environmental impact described in Chapter 6, the EU-Chile FTA has not had consequences large enough, relative to the size of the EU economy, to make it possible to precisely assess the contribution of the Agreement. At the peak of production, the EU represented less than 10% of Chilean exports of salmon, therefore these consequences are necessarily indirect. The negative social consequences of the development of these industries refer to institutional issues in Chile, with no or little connection with the EU-Chile FTA.

7.5 Health and education

The consequences of the EU-FTA in the areas of health and education cannot be measured precisely. Chile has experienced considerable changes in these areas due to economic growth and policy reforms, so that the role of the EU-Chile FTA cannot be isolated. Based on the results discussed in section 3.3., attempting to quantify the impact with a CGE model would lead us to discuss changes that are too small to be interpreted with confidence. The simulations presented in Table 65 suggest that if the EU-Chile FTA has had a visible impact on health and education, it would be in the sector of export agriculture and in the aquaculture and seafood industry, particularly in the exports of fruits, wine and mussels and salmon products.

The growth in fruits exports has generated a form of employment that is often temporary, targeting women. Several studies commissioned by unions and NGOs have

stressed consequences for the health of these workers, pointing out hard working conditions that lead to health problems (work in the heat and cold, lack of clean water and toilets, repetitive movements in the packaging sector, etc., see Caro and de la Cruz 2005; Caro 2009). As discussed in section 7.3 some of these conditions have improved recently, for example with the mandatory provision of toilets and sanitary facilities for workers in fruit harvesting (Mendoza 2009). However, the temporary nature of employment often requires seasonal migration, in particular of women, which has an impact on children's health and education (Anamuri 2007).

Medical tests showed contamination of farm workers by pesticides (Marquez et al. 2005). Since the mid 2000s, some of these conditions have improved, for example with a more systematic use of masks for pesticide application (Mendoza 2009). The requirements of the EU customers have also led to more control on pesticides use (see section 6.4.3).

In the aquaculture sector, unions also point out the tough working conditions and the impact on health (these issues were raised by the Union's representatives in a workshop organized in Puerto Montt in May 2011). Igor Melillanca and Díaz Medina (2006) provided figures on the high rate of accidents in the salmon sector; rejection of maternity leave obligations; and poor ergonomic conditions. The Chilean salmon industry publishes figures that, on the contrary, stress the better medical conditions in areas that have benefited from the returns of the salmon industry, with health indicators more favourable than in the region as a whole, and the investment and donations of the industry in both education and health centres.[83] A comprehensive study by Arengo et al. (2010) reaches rather balanced conclusions. It concludes that in Chile, as well as in other countries producing salmon, health and safety is problematic in the industry, with high rates of tendonitis and muscle inflammation. It stresses the dangerousness of diving and the potential for accidents. However the study finds that companies surveyed tend to comply with health insurance regulations and provide adequate equipment.

In brief, the EU-Chile FTA has not had consequences large enough, relative to the size of the Chilean economy, to make it possible to precisely assess the contribution of the Agreement to health and education. In the sectors that have directly benefited from export opportunities under the FTA, one observes some improvements in the labour conditions (improvement in the utilization of pesticides in the fruit sector; development work with official contracts that gives some social coverage in the mussel sectors), even though work conditions remain difficult in these sectors, and the respect of particular labour standards remains partial.

7.6 Social consequences of the EU-Chile FTA in the EU

As is the case for the environmental impact described in Chapter 6, the EU-Chile FTA has not had impacts large enough, relative to the size of the EU economy, to have generated significant consequences for social issues.

One exception is in the area of mollusc exports which have grown rapidly during the recent years. In 2002 the EU imported 2,800 tonnes of prepared mussels (HS code

[83] According to Salmon Chile (2008b), the rate of illness was 15 percent lower in those municipalities where salmon farming was implemented than in the region as a whole.

15059019). These imports had multiplied by nine by 2009. Even though this is clearly a small sector[84], the EU mussels sector has faced significant competition in some market segments, in particular canned and frozen mussels. In some areas where local production or harvest of mussels is mostly directed to the canned market, several processing plants have closed. This is especially the case in Denmark, where four out of five plants have closed and where production had decreased by 70% in ten years according to the producers' organisation. Similar impacts are seen in Germany, Ireland and the Netherlands. While the fresh mussels market has not experienced the same direct competition from Chilean exports, the shift of the processing industry to imports has had some spillover effects, according to EU producers.

The EU industry complains about stricter production constraints in Europe than in Chile, in particular regarding the geographic coverage of sanitary inspection procedures (source: European Molluscs Producers Association). The EU industry also points out that in addition to social costs, the growing imports could have some environmental consequences, given that locally, the production of mussels plays a role in water filtration and the prevention of eutrophisation. So far, however, statistical evidence that Chilean imports have affected the price of fresh mussels runs into a lack of reliable data (the price of mussels varies a great deal across regions and time, depending on local demand, site productivity, rearing density and spat supply).

7.7 Comparison with the ex-ante SIA

On social issues, the 2002 ex-ante 'Sustainable Impact Assessment of the Trade Aspects of negotiations for the EU-Chile Association Agreement' estimated that the EU-Chile FTA would have several impacts (Planistat 2002). The ex-ante assessment can now be compared to some ex-post findings, even though unravelling what was caused by the FTA and by other sources remains uncertain.

The simulations conducted by Planistat (2002) for ex-ante assessment suggested that the EU-Chile FTA would result in some significant increase in employment in "other agriculture" as well as in the sectors of arable crops, processed foods and cattle. The authors expected that employment might go down in the steel, motor vehicles, electronic and other machinery sectors in Chile, after the EU-Chile FTA. The impact of the Agreement was estimated to be rather negligible in other sectors.

Because of the aggregation of the CGE model used in the ex-ante SIA, comparison with results presented in Table 65 are difficult, especially because the fruit and wine sectors were not isolated at the time. Overall, the changes in the relative employment that can be attributed to the EU-Chile Agreement using the decomposition analysis at a detailed country specific level in the current study appear smaller than the ones expected in the 2002 ex-ante assessment. If we compare Table 9.5 of Planistat (2002) with the findings of section 4 in the present study, the effects of the EU-Chile FTA on the relative share of employment by sector tended to be overestimated. One explanation is perhaps that the time horizon of the ex-ante

[84]The European Molluscs Producers Association estimates that there are some 4,000 mussel producers and 500 commercial fishermen of mussels in the EU.

simulations was longer than the one observed here. Among the sectoral effects, the impact of the EU-Chile FTA seemed to have been overstated for grains.

There is a rather good match between the development of export agriculture and the ex-post findings in section 4 of the current report. As a result, the social consequences that were anticipated in the ex-ante SIA are rather close to what actually took place. Indeed, the SIA mentioned the possibility that small farmers would be increasingly confined to producing for their own consumption and be priced out of marketing their produce. In the medium and long term, these trends were seen as leading to the integration of small producers into larger holdings. The increase in the demand arising from the EU-Chile trade agreement was also expected to have a positive impact on small farm employment, when compared with the situation without an agreement (section 11.1 in Planistat 2002). All of these turned out to correspond with the trends observed between 2003 and 2009, as described in section 7.1.2 of this report. However, further intensification was expected to lead to a subsequent loss of employment in the agricultural sector, and, overall to a loss of agricultural employment. Data shows that the number of farms has indeed gone down from 282,000 to 267,000 (Table 55). The employment of hired labour over the same period has limited the impact of the decline of small farms.

The ex-ante SIA raised the possibility that women might benefit less than men from the expansion of export agriculture, arguing that women's participation in the formal agricultural sector labour force is very low. It turned out that women benefited a great deal from the expansion of the fruit, aquaculture and mussel sectors, occupying most of the net jobs created in export agriculture, and half of the jobs in the aquaculture sector. The negative side to this positive development was that women typically occupy more temporary jobs when hired by export agriculture. By taking a larger place in subsistence agriculture when men have moved outside the informal sector, women managers now represent a higher proportion of the subsistence farms. Such developments were mentioned as possibilities in the 2002 SIA (page 286).

The ex-ante SIA also raised the issue that the use of forestland for agriculture and the expansion of forest plantations might exacerbate the problems faced by indigenous people, even though no factual or quantitative information was provided. While acknowledging the seriousness of this concern, the present analysis concludes that a direct link between the EU-Chile FTA and the welfare of the indigenous communities can hardly be established (see Box 7.2).

7.8 Concluding comments

The general overview of the assessed economic consequences of the EU-Chile FTA obtained as a result of the CGE simulations presented in Chapter 3 suggests that its social impact would remain limited: estimated changes in incomes and factor prices remain small in magnitude. The approach nevertheless tends to neglect adjustment costs and the related social consequences.

Based on cross-sector reallocations of production factors, the adjustments needed to accommodate the new context created by the EU-Chile FTA are mainly characterised for medium and low skills by an increased demand in several agricultural sectors (fruits and wine in particular) and in fisheries. These are coupled with lesser demand in some industrial

sectors, machinery in particular. On the whole, these reallocations are small compared to the rapid structural change undergone by the Chilean economy since the Agreement's enforcement.

In agriculture, the export increase resulting from the EU-Chile FTA is substantial, and it is far from being neutral in terms of size and type of farms. Small subsistence farms are less likely to benefit from new opportunities, while large, consolidated farms are in a position to reap the full benefit from the new trade context. This might be reflected in larger within-agriculture income inequalities, but also by an increase in average agricultural incomes, resulting in lesser inequality between agriculture and other sectors. Interestingly, the Agreement's effects are also found to parallel structural trends, and to be consistent with existing policy orientation.

Although small, the long-run consequences can be analysed in terms of impacts on real income. The methodology proposed here to do so is fairly general and could be used in other contexts. While confirming that households in small farms may lose relative to those in large, more commercial farms, it shows that they globally benefit from the changes brought about by the EU-Chile FTA, when the consequences for both income and consumption prices are accounted for.

Several social issues have been raised in the interviews that have been conducted in Chile. They relate to the impact of the EU-Chile FTA on jobs and salaries in those industries that have experienced the largest changes due to the Agreement, i.e. fruits, wine and seafood products. It is again difficult to isolate the consequence of the EU-Chile FTA from other determinants and from domestic social and labour policy. It seems that in the fruit, wine, aquaculture and mollusc sectors, the EU-Chile FTA has led to higher income, with visible positive consequences. The FTA has also encouraged an absolute growth in women's employment but in low skilled and seasonal work, while contributing to the decline of traditional agriculture, which particularly affects women.

CONCLUSION

The EU-Chile FTA is an ambitious and broad-scoped agreement. It includes innovative provisions and paves the way for integrating a wide-ranging set of provisions which had not been integrated in other FTAs signed by both parties before. Some eight years after its implementation, a number of lessons can be drawn as to its consequences. This report combines several evaluation techniques and sources of information. Beyond the assessment of the impact of the EU-Chile FTA, the objective of this report is also to deepen our understanding of the bearing of such trade agreements and to help improve the design of future agreements. The work carried out in this report also intends to design and test methodological tools that are appropriate for ex-post assessments of the impacts of other EU trade agreements.

Assessing the impact of the EU-Chile FTA is particularly challenging due to the uneven sizes of the two economies. The Agreement only has a limited impact on the EU economy as a whole, even though it affected specific sectors (e.g. mussels, wine and a few agricultural products). The initial structure of protection is also very different across the two parties. The low and rather uniform level of protection in Chile and the dispersion of tariffs in the EU introduce some asymmetry to the relative gains of liberalizing trade. Because Chile has experienced considerable structural and macroeconomic changes since the implementation of the Agreement and has concluded a large number of free trade agreements over the same period, unravelling the different determinants of changes in trade and income and isolating those changes that are caused by the EU-Chile FTA is difficult. This is also the case when one looks at the social and environmental consequences that are largely driven by domestic policies and institutions.

Descriptive statistics show that, in spite of the ambition of the Agreement, the EU's market shares in Chilean imports have declined since the EU-Chile FTA was enforced. This does not mean that the Agreement was inefficient. Exports to Chile from other regions have benefited from the other agreements being phased-in, and the EU-Chile FTA can be seen as preventing the EU's market share from sliding further down.

Identifying the actual impact of the EU-Chile FTA relative to a business-as-usual benchmark requires sophisticated techniques. Econometric methods, relying on a gravity framework and using information at a highly detailed tariff line level makes it possible to quantify the substitution between Chile's imports from those of different origins, and to assess how much Chilean imports originating from the EU have been affected by the tariff

cuts under the EU-Chile FTA. The elasticities that were obtained are large, but estimates appear significant and quite robust to different estimation techniques. These estimates suggest that without an agreement, EU exports to Chile might have dropped considerably in relative terms, in a context where Chile was phasing in trade agreements with a large number of partners. In particular, the EU-Chile FTA seems to have made it possible to limit the crowding out of EU exporters of manufactured products from the Chilean market by the US-Chile FTA. On the Chilean side, simulations suggest that EU imports from Chile, in particular in the food sector, would be significantly lower were Chile granted the GSP regime rather than signing the FTA. Overall the EU-Chile FTA is estimated to have resulted in EU imports from Chile to be a quarter higher than they would have been without the Agreement. Chilean imports from the EU are estimated to be at least 40% higher than in a counterfactual case without the Agreement.

In order to take into account the macroeconomic effects, a general equilibrium model of the Chilean economy was constructed. The methodology used made it possible to work at the finest degree of product detail (HS6) for the trade component. Counterfactual simulations show that the primary winning sectors are fruit growing, wine making, fisheries and fish processing on the Chilean side. Machinery, transport equipment and the chemical industries in the EU are the sectors that benefit most from the EU-Chile FTA. Simulations also show that the Agreement has triggered a modest but significant gain for the Chilean economy as a percentage of GDP. This model used econometric estimates of elasticities, which suggest that the sensitivity of bilateral trade flows to tariffs is significantly larger for the EU's bilateral exports than for Chile's. The significant difference in EU exports to Chile relative to the counterfactual (no agreement) scenario is linked to the strong substitutability across providers in the Chilean markets. It is accompanied by substantially lower Chilean imports from third countries, in particular the US.

In relation to trade in services, the EU-Chile FTA includes a wide set of commitments. These commitments are more wide ranging for the EU than for Chile, but this was already the case for their commitments under the GATS. Based on an analysis of sector-specific commitments, we conclude that they bring significant additional consolidation of trade in services for both signing parties. To assess the trade-creating impact of these provisions, our quantitative analysis relied upon a cross-sectoral analysis of the relationship between export growth and commitment level. The methodology used, consistent with the one carried out for trade in goods, controls for sector-specific factors independent from the FTA. This analysis shows that EU exports in services tended to grow more rapidly in sectors where Chilean commitments were more wide ranging, but this trend does not appear to be specific to EU-Chile bilateral trade flows. Instead, it may well reflect the fact that commitments targeted prioritize those sectors with highest export potential. Turning to Chile's exports of services, a focus on trends specific to EU-Chile bilateral relationships shows an above-average performance in several sectors where the EU's FTA commitments significantly improved those made in the GATS. This result is suggestive of the trade-enhancing impact of the Agreement. Given the qualitative nature of commitments and the limited detail of available statistics, such quantitative analysis faces far more limitations than it does for trade in goods, and the conclusions should be considered as tentative. Still, the methodology developed here is broadly applicable and paves the way for the evaluation of other agreements.

Even though the blueprint of the EU's agreements has evolved since 2002, the EU-Chile FTA included ambitious institutional provisions and rules to facilitate trade. The provisions regarding SPS measures, technical standards and wines and spirits required substantial adjustment on the Chilean side in particular, given the stringency of the EU's requirements on these aspects. The EU-Chile FTA required an efficient dialogue between both parties, and putting the provisions into practice demanded significant effort for both Chile and the EU. The study shows that the two parties kept up with commitments and that the provisions of the Agreement have been put effectively into practice, apparently to the satisfaction of the contracting parties. Technical issues have been raised (in particular regarding SPS measures and technical standards), but all were solved through dialogue, as a result of mutual efforts, showing that the EU-Chile FTA works well on the institutional side. It is noteworthy that, even though the EU requirements still raise complaints, the improvement of SPS standards in Chile's agriculture is recognised by many stakeholders as a positive by-product of the FTA's provisions. Surveys and interviews suggest that the technical requirements imposed under the EU-Chile FTA are now seen as having spurred an upgrade in production practices in Chile, easing access to a wider range of foreign markets. This is also true for the discipline imposed by the Agreement on Wines and Spirits on the use of geographical indications.

Assessing the environmental consequences of the EU-Chile FTA proved particularly difficult, given the numerous agreements signed by Chile and the structural changes that have taken place in the Chilean economy since 2002. Among the EU imports from Chile that generate the more pollution are ores, mineral and metal products and paper pulp, but most of these products have not been affected directly by the EU-Chile FTA in the sense that they already entered the EU duty free prior to the Agreement. It is difficult to draw conclusions on the role of EU imports of forestry and wood products on biodiversity, given that they come from planted forests, whose link with the destruction of primary forest is controversial. Some authors claim that these forests were planted long after initial deforestation took place, while NGOs tend to link the two issues. The production of salmon is the source of numerous negative externalities. The EU-Chile FTA has played a significant role in the growth in Chilean exports of salmon to the EU, but the latter have always remained rather small as a percentage of EU consumption as well as Chilean total exports. The Agreement does not seem to have played a particular role in the depletion of fish stocks (EU imports of Southern hake contribute to the low level of stocks but these import levels do not depend on the tariff cuts laid out in the EU-Chile FTA).

The EU-Chile FTA has played a significant role in the growth of Chile's agricultural exports. An input decomposition analysis shows that the Agreement has resulted in a limited but noticeable increase in the use of fertilizers. Larger exports of fruits and wine may have also led to an increase in pesticide use, but because of the strict standards in the EU and the reduction of pollution intensity for export agriculture, the analysis suggests that the EU-Chile FTA has had little overall impact in this area.

On the other hand, interviews suggest that the EU-Chile FTA has made technology transfer easier, and the exports to the EU, where customers impose higher sanitary, phytosanitary and environmental standards have had some positive impact on the adoption of greener techniques. The significant increase in trade of "environmental goods" that were liberalized with the EU-Chile FTA supports this idea that the Agreement, through different channels (requirements from EU customers, access to technology, domestic pressures for

higher standards, etc.), has reduced the intensity of pollution arising from production activities.

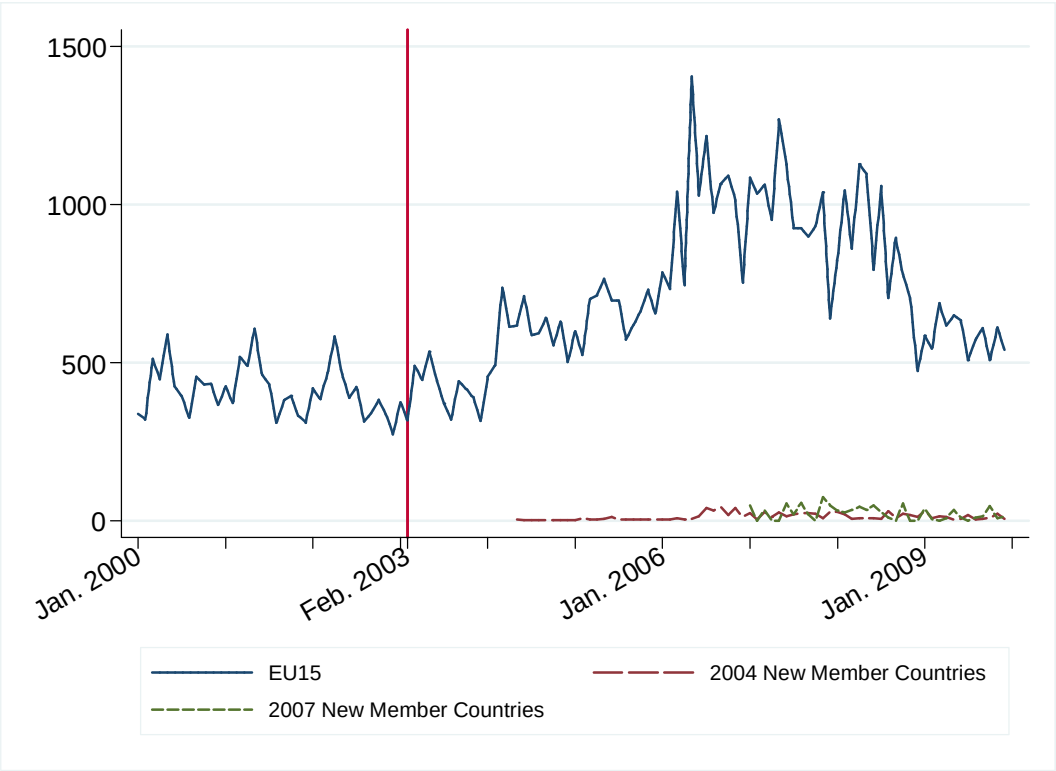
Given the difference in size across the contracting parties, the social impacts of the EU-Chile FTA are bound to remain very limited in the EU. In Chile as a whole, reallocations of the labour force caused by the Agreement are small compared to the rapid structural change undergone by the Chilean economy. In agriculture, the export increase brought about by the EU-Chile FTA is more substantial. While confirming that households in small subsistence farms may have lost relative to those in larger and/or more commercial farms, the methodology developed in the report shows that employment of low skilled workers in agriculture globally benefits from the changes brought about by the Agreement. This is particularly the case for female employment, even though the employment that can be directly attributed to the EU-Chile FTA often consists of seasonal jobs. In the fruit, wine, aquaculture and mollusc sectors, the EU-Chile FTA has led to higher incomes, with visible positive consequences (in particular for canning, the salmon and wine industries). However, in terms of wage inequality or the decline of traditional agriculture (which particularly affects women), questions persist.

APPENDICES

The first number in appendices' numbering below refers to the chapter, the second to the numbering of appendices within each chapter.

APPENDIX 1.1: ADDITIONAL TABLES AND FIGURES ON TARIFFS AND TRADE

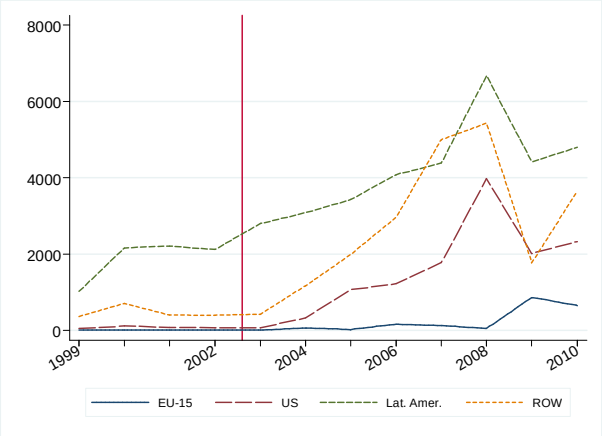
FIGURE 43: TOTAL EU MONTHLY IMPORTS FROM CHILE (MILLION EUROS)



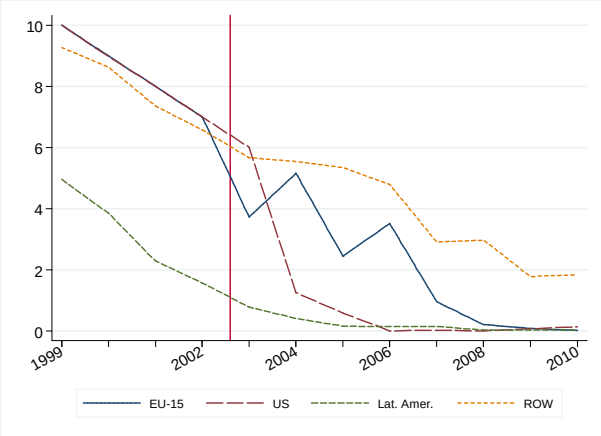
Source: Comext, Eurostat.

FIGURE 44: CHILE IMPORTS OF OIL BY REGION OF ORIGIN (VALUE IN M US$ AND AVERAGE TARIFF DUTY COLLECTED IN %, YEARLY DATA)

A. Imports in value (M US$)



B. Average tariff duty collected (in %)



Source: Authors' calculations based Chile's Customs administration data.
Scope: HS Chapter 27 ("Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes").

TABLE 58: 50 TOP PRODUCTS IN TERMS OF PREFERENTIAL IMPORTS BY EU FROM CHILE

		Preferential imports (M euros)			Dutiable in total imp. (%)	Coverage of pref. (%)		Utilis'n of pr. (%)	Total imports (M euros)	
Code	*Description*	2008	2005	2002	2008	2008	2002	2008	2008	2002
72027000	FERRO-MOLYBDENUM	261.6	286.1	9.7	100	100	100	100	262.1	13.0
08061010	FRESH TABLE GRAPES	215.9	145.4	0.0	100	100	0	74	292.5	122.2
22042185	WINE OF FRESH GRAPES, INCL. FORTIFIED WINE AND GRAI	209.1	155.9		100	100		98	220.5	
03042913	FROZEN FILLETS OF PACIFIC SALMON 'ONCORHYNCHUS NI	173.3			100	100		99	175.0	
08105000	FRESH KIWIFRUIT	83.6	55.3	0.0	100	100	0	84	100.0	60.2
28257000	MOLYBDENUM OXIDES AND HYDROXIDES	79.3	44.3	6.3	100	100	100	100	79.3	6.5
44123900	PLYWOOD CONSISTING SOLELY OF SHEETS OF WOOD <= 6	76.3			99	100		98	78.4	
22042184	WHITE WINE OF FRESH GRAPES, IN CONTAINERS HOLDING	74.9	53.1	0.0	100	100	0	98	86.5	141.1
28342100	NITRATE OF POTASSIUM	73.6	39.2	24.7	100	100	100	100	73.6	25.7
22042179	WHITE WINE OF FRESH GRAPES, IN CONTAINERS HOLDING	61.5	39.9	0.0	100	100	0	98	64.1	36.2
16059019	MUSSELS OF THE SPECIES MYTILUS AND OF THE SPECIES PE	60.9	18.1	6.5	100	100	100	99	61.3	6.5
08081080	FRESH APPLES (EXCL. CIDER APPLES, IN BULK, FROM 16 SEI	51.7	44.0		100	100		27	193.4	
22042180	WINE OF FRESH GRAPES, INCL. WINE AND GRAPE MUST W	42.3	27.5	0.0	100	100	0	98	43.8	77.6
08023200	FRESH OR DRIED WALNUTS, SHELLED AND PEELED	37.6	14.1	0.0	100	100	0	98	38.3	5.5
22042984	WINE OF FRESH GRAPES, INCL. FORTIFIED WINE AND GRAI	37.4	24.7	0.0	100	100	0	99	37.9	6.6
08112031	RASPBERRIES, UNCOOKED OR COOKED BY STEAMING OR E	35.4	18.7	0.0	100	100	0	95	37.2	18.2
03026967	FRESH OR CHILLED SOUTHERN HAKE 'MERLUCCIUS AUSTRA	32.2	16.7	0.0	100	100	0	90	35.9	34.0
16023111	PREPARATIONS CONTAINING EXCLUSIVELY UNCOOKED TU	30.7	12.2	0.0	100	100	0	100	30.8	7.8
02071410	FROZEN BONELESS CUTS OF FOWLS OF THE SPECIES GALLU	30.5	21.5	0.0	100	100	0	98	31.3	3.5
08104050	FRESH FRUIT OF SPECIES VACCINIUM MACROCARPUM AN	30.2	8.3	0.0	99	100	0	100	30.7	1.5
03037813	FROZEN SOUTHERN HAKE 'MERLUCCIUS AUSTRALIS'	28.6	23.8	0.0	83	100	0	100	34.4	26.6
08082050	FRESH PEARS (EXCL. PERRY PEARS, IN BULK, FROM 1 AUGU	28.5	19.5	0.0	100	100	0	57	49.9	32.5
28369100	LITHIUM CARBONATES	28.3	17.5	13.4	85	100	100	99	33.5	14.4
16059030	MUSSELS, SNAILS AND OTHER MOLLUSCS, PREPARED OR P	28.3	25.5	17.1	100	100	100	100	28.3	17.1
08094005	FRESH PLUMS	28.0	20.3	0.0	100	100	0	71	39.2	19.9
08132000	DRIED PRUNES	26.7	22.7	0.0	100	100	0	98	27.2	11.2
08092095	FRESH CHERRIES (EXCL. SOUR CHERRIES 'PRUNUS CERASUS	23.9	11.1	0.0	100	100	0	92	25.9	4.4
22042975	WINE OF FRESH GRAPES, INCL. FORTIFIED WINE AND GRAI	23.1	31.1	0.0	100	100	0	100	23.2	33.8
08044000	FRESH OR DRIED AVOCADOS	23.0	26.1	0.0	100	100	0	95	24.2	3.5
02109939	MEAT, SALTED, IN BRINE, DRIED OR SMOKED (EXCL. OF SW	18.6		0.0	100	100	0	100	18.6	0.3
28417000	MOLYBDATES	18.2	4.0	0.5	100	100	100	100	18.2	0.6
08093010	FRESH NECTARINES	17.5	8.3	0.0	100	100	0	74	23.8	7.0
16059011	MUSSELS OF THE SPECIES MYTILUS AND OF THE SPECIES PE	17.3	2.8	2.1	100	100	100	100	17.3	2.1
31025090	SODIUM NITRATE (EXCL. NATURAL SODIUM NITRATE AND	16.2	0.3	0.0	100	100	0	100	16.3	0.0
08112059	BLACKBERRIES AND MULBERRIES, UNCOOKED OR COOKED	15.8	6.2	0.0	100	100	0	93	17.0	9.4
07031019	ONIONS, FRESH OR CHILLED (EXCL. SETS)	15.6	10.5	0.0	100	100	0	99	15.7	11.7
08062090	DRIED GRAPES (EXCL. CURRANTS AND SULTANAS)	15.4	13.5		100	100		99	15.6	
04090000	NATURAL HONEY	14.9	7.8	0.0	100	100	0	93	16.0	6.6
03072990	SCALLOPS, INCL. QUEEN SCALLOPS, OF THE GENERA PECTE	14.9	16.4	20.8	100	100	100	100	14.9	20.8
12099190	VEGETABLE SEED FOR SOWING (EXCL. KOHLRABI 'BRASSIC	12.9	13.1	4.1	100	100	100	87	14.8	4.6
02032955	FROZEN BONELESS MEAT OF DOMESTIC SWINE (EXCL. BELI	11.9	6.6	0.0	100	100	0	29	40.5	3.9
08133000	DRIED APPLES	11.8	7.5	0.0	100	100	0	97	12.2	5.8
22042965	WHITE WINE OF FRESH GRAPES, IN CONTAINERS HOLDING	11.8	11.6	0.0	100	100	0	96	12.3	7.9
22042983	WHITE WINE OF FRESH GRAPES, IN CONTAINERS HOLDING	11.7	6.9	0.0	100	100	0	99	11.8	3.6
08051020	FRESH SWEET ORANGES	11.1	1.9		100	100		97	11.4	
03049910	FROZEN SURIMI	11.1			96	100		100	11.6	
08023100	FRESH OR DRIED WALNUTS IN SHELL	10.6	8.6	0.0	100	100	0	99	10.7	3.7
06011090	DORMANT BULBS, TUBERS, TUBEROUS ROOTS, CORMS, CR	10.0	5.7	0.0	100	100	0	100	10.0	4.8
03049921	FROZEN MEAT 'WHETHER OR NOT MINCED' OF FRESHWAT	8.9			100	100		100	8.9	
02013000	FRESH OR CHILLED BOVINE MEAT, BONELESS	8.7	0.5	0.0	100	100	0	65	13.4	0.1

Note: Products are ranked in decreasing order of preferential imports in 2008. Blanks denote zeroes. Blanks for imports denote cases where the tariff line did not exist in 2002 (due to changes in classification); for coverage and utilisation rates, they denote cases where these rates do not apply.

Source: Authors' computations based on Comext (Eurostat), Single Administrative Declarations and TARIC.

APPENDIX 1.2: COMPUTING AD VALOREM EQUIVALENTS (AVES) OF TARIFF DUTIES

AVEs are necessary to conduct meaningful quantitative analysis, such as comparison, aggregation and econometric estimates, but their computation raises several practical and conceptual issues. The problem is only marginal in an analysis of Chile, since most duties are expressed in *ad valorem* terms. In addition, we could gather, from Chile National Customs, information about the amount of duties collected at the tariff-line level, by country of origin, making it straightforward to compute the AVE as the ratio of duties collected over CIF import value.

No such information was made available for the EU, to the best of our knowledge, and despite our requests to the relevant authorities. Our starting point is thus statutory protection, as defined in the European Community's Integrated Tariff (or *Tarif intégré des Communautés européennes*, hereafter TARIC). Detailed information at the 10 digit level of the CN was put together on a yearly basis.

A first issue is the *ad valorem* conversion of specific tariffs or specific components of complex tariffs. To do this, unit values must be used to convert duties per unit to duties per value, i.e. *ad valorem* duties. Based on Comext data, these unit values were computed at the 8-digit level of the CN, for all trading partners taken together. To prevent yearly changes in unit values to blur the measurement of protection, unit values were measured using averages over the 2002-2008 period.[85] The calculations are carried out using tonnes, the usual physical unit, but also supplementary units when information is available. For non-*ad valorem* tariffs, a correspondence is then made between the unit used in the definition of the tariff and the one used in trade data. In some cases, this requires making use of the supplementary unit and/or using a conversion rate between different units. For mixed tariffs (i.e., a choice between *ad valorem* and/or specific tariffs), the AVE of each component is computed, before applying the logical operator defining the tariff. All tariff exclusions and suspensions are taken into account at the tariff-line level and by import regime.

For goods subject to an entry price, only the *ad valorem* component of the entry price is taken into account. Indeed, entry price systems are fundamentally different from tariff rates, so that any AVE calculation necessarily relies on *ad hoc* simplifications and assumptions. We prefer to disregard this component of protection altogether, since in any case entry price systems are not covered by EU's schedule under the EU-Chile FTA. The preferential margin computed here for Chile would thus remain unchanged, regardless of whether any different assumption be made about entry price systems.

For goods subject to a seasonal tariff, the annual average tariff is constructed using a *prorata temporis* average when necessary (note that, in many cases, the trade analysis is carried out using monthly data). For products subject to a tariff rate quota, the out-of-quota tariff rate (OQTR) is used except for the quotas which have been consistently under-filled (based on our own estimates using trade flows from Comext).

These operations allow AVEs of all non-*ad valorem* tariffs to be computed at the 10-digit level of the CN. They are then aggregated back to the 8-digit level using simple averages (there is actually little variability of protection across 10-digit tariff lines within a single 8-

[85] Because of the financial crisis, 2009 data are not used in this calculation.

digit category). These *ad valorem* equivalent rates at the 8-digit level are used to construct preferential margins as a difference between the MFN tariff and the tariff actually applied under the FTA, also at the 8-digit level.

A major problem in time series analysis has been the very frequent changes in the CN classification codes, and the need to track a product through different tariff lines over time. Historical series have been reconstituted using the transition matrices provided by Eurostat. In cases where tariff lines with different characteristics are combined in a single new tariff line, or conversely when a single tariff line is split across various tariff lines, choices had to be made. For the econometric analysis, such cases were simply considered as breaks in the time series, and products before and after were considered as distinct products. When continuity had to be found for the sake of completeness, as for the descriptive analysis, allocation was made according to the main category, as measured through import values. Even though the customs tariff schedule of Chile (*Sistema Armonizado Chileno*, hereafter SACH) does not change between two HS revisions, the same problem was faced for Chile, due to the entry into force of new HS revisions in 2002 and 2007. The same treatment applied was the same as for the EU.

For comparison purposes, the measure of protection needs to be aggregated across groups of products. Two types of aggregates can be used, both with well-known limitations. The trade-weighted average is oversensitive to the structure of imports (high tariffs tend to have a low weight, hence a downward endogeneity bias) while the non-weighted average poorly reflects the unbalanced structure of exports, a problem bound to be especially glaring when the product specialisation of exports is pronounced, as is the case for Chile (see Bouët et al. 2008, for further discussion). Combining both measures is thus useful.

APPENDIX 2.1: METHODOLOGY USED IN THE ECONOMETRIC ANALYSIS

Since Aitken (1973), the gravity model has been used in an uncountable number of articles to provide a meaningful benchmark, against which the impact of trade agreements can be assessed. We discuss how such a model can be used in the present case, given the specificities of this ex-post assessment exercise. We argue that assessing the impact of one single agreement requires a radically different approach from the one followed in most of the literature, which aims at assessing the trade impact of FTAs *in general*. For a particular, complex agreement like the one studied here, the assessment must acknowledge the progressive and uneven impact of the agreement, and control, at a detailed level, for changes in supply and demand which are not specifically linked to the EU-Chile FTA. We propose to estimate a difference-in-differences gravity model at the product level: we argue such a model provides not only a detailed and robust assessment of the trade impact of the EU-Chile FTA's tariff clauses, but also an evaluation of the consequences of cross-cutting clauses, like the ones related to trade facilitation.

A. DEPARTING FROM TRADITIONAL GRAVITY APPROACHES

Relying on gravity models to assess the trade impact of free trade agreements has become traditional. The extended literature about these models, since Tinbergen's early 1960s work, not only showed that gravity models allow rather accurate representations of trade flows; when duly amended, they are also consistent with a variety of international trade theoretical frameworks (see *inter alia* Anderson 1979 ; Bergstrand 1989 ; Deardorff 1998 ; Anderson et van Wincoop 2003 ; Chaney 2008). Nevertheless, approaches differ widely across studies, resulting in significantly different results (see Baldwin and Taglioni 2006, for a discussion).

Most of this literature focuses upon the statistical analysis of the impact of FTAs *in general*. The basic approach sets a dummy variable equal to one if an agreement is enforced between the two partners, and zero otherwise; it has been used initially in cross-section, and subsequently in panel data analyses (Carrère 2007; Baier and Bergstrand 2007, are two recent examples among numerous others). The ability to jointly analyse a large number of agreements naturally requires simplifications. In particular, three common assumptions are worth mentioning: FTAs are considered as a one-off shock (the "one-off" assumption);[86] the average impact is computed as an average across agreements, implicitly assuming agreement impacts to be identical, even though special cases like custom unions are usually considered separately (the "uniformity" assumption); the aggregate analysis also overlooks differences across products (the "homogeneity" assumption). While these simplifications are natural when a large number of agreements are studied, focusing on a single agreement makes it possible to carry out a more detailed analysis, taking into account the phase-in period, the coverage and preference margin of the agreement, as well as the differences across products.

An additional difficulty in the present case is that other agreements are almost concomitant to the one studied. This is particularly true in the case of the Chile-US

[86] Baier and Bergstrand (2007) is an exception: they account for the phase-in period by assuming that the impact spans over ten years, as reflected in the two lags introduced in their analysis based on five-year interval panels.

agreement, entered into force in January 2004, with potentially important consequences for Chile's foreign trade. This configuration makes it all the more difficult to rely only on the time dimension to identify the impact of the FTA.

Anderson and van Wincoop (2003) were particularly influential in showing the necessity to take into account what they dubbed "multilateral resistance factors", also called remoteness, reflecting in particular the intensity of competition in each country. These factors are difficult to estimate, but omitting them is potentially a source of severe inconsistency. An alternative would be to model remoteness so as to be able to track its evolution over time, as proposed for instance by Baier and Bergstrand (2009). This would require relying on a strong assumption about the underlying model, and it would also ignore the possible impact of other trade agreements signed in parallel by the partners under study, or assume that their impact can be duly identified. As initially suggested by Rose and Van Wincoop (2001) and by Feenstra (2004), this problem can be solved by relying on country fixed effects. When the analysis relies on panel data, these country fixed effects should even be varying over time. A downside of this approach is that the results are difficult to interpret in terms of the impact of the trade agreement, since the fixed effects absorb a large part of the variance. Assume for instance that the EU-Chile trade agreement did increase Chile's export potential as a whole, since its market access to the EU is improved. This effect would be captured by the time-varying, country fixed effects, and could not be identified as such. In addition, this approach has been implemented for aggregate relationships, and it is not clear how it would apply to product-level analyses.

A more promising approach in identifying the trade impact of a given agreement is to take advantage of the multiplicative form of the gravity equation, by transforming the dependent variable. Instead of trade flow x_{ijk} from country i to country j, in product k, the dependent variable is expressed as a ratio with respect to a control exporter i' (or group of exporters): $x_{ijk}/x_{i'jk}$. When the gravity equation is written in logarithm form, this corresponds to a difference gravity equation. This approach was followed by Anderson and Marcouiller (2002), Hanson and Xiang (2004) and more recently Djankov et al. (2010).[87] Differencing with respect to a control exporter allows any unobservable effect linked to the importer—but not specific to any exporter—to be controlled for. Compared to a standard gravity equation, an important advantage of this approach is that it can be applied product by product, or sector by sector, whatever the appropriate definition.

Even in this case, though, changes in the exporter's supply which are not specific to the market under study should be controlled for. This is especially important when a dynamic economy like Chile is concerned. This is why Romalis (2007) differentiates the dependent variable a second time, with respect to a control market. When the equation is expressed in logarithm, this corresponds to a difference-in-differences approach. We now spell out this approach and the changes we plan to introduce, so as to deliver a robust yet specific assessment of the EU-Chile FTA.

[87] Head and Mayer (2000) follow a slightly different approach, which they refer to as an odds specification, since they use the importer itself as control exporter.

B. Specification of estimating equations

A generic gravity model for trade flows between two given partners, for a given product, can be written as follows:

(5) $$x_{ijkt} = G_{kt} S_{ikt} M_{jkt} \phi_{ijkt}$$

where *x* stand for exports from country *i* to country *j*, in product *k*, at year *t*. *G* is a factor invariant across countries (although possibly time-varying), *S* is an index of the exporter's characteristics, *M* refers to the importer's characteristics. ϕ is an index of determinants of the bilateral intensity of trade flows. In the simplest form of the gravity model, *S* and *M* stand for each country's GDP and ϕ for inverse distance, but such an overly simplistic specification has long been shown to be ill-suited. While more often used at the aggregate level, this equation can also be used at the product level. In such a relationship, the purely bilateral dimension of trade flows is described through ϕ. Accordingly, any impact of trade agreements on partner countries should be looked for in this variable's changes.

Identification is challenged by the difficulty in controlling correctly for multilateral determinants of trade (*S* and *M*). As emphasised by Anderson and van Wincoop (2003), these terms, specific respectively to the supplier and the importer, include multilateral resistance factors which are not directly observable and for which assessment raises a number of difficulties. This hurdle can be sidestepped when considering, instead of trade flows, ratios of bilateral trade flows across partners. Dividing equation (5) term-by-term, written for two exporters *i* and *i'*:

(6)
$$R_{ii'jkt} = \frac{x_{ijkt}}{x_{i'jkt}} = \frac{S_{ikt}}{S_{i'kt}} \frac{\phi_{ijkt}}{\phi_{i'jkt}}$$

where *R* is the ratio of country *j*'s imports in product *k*, from provider countries *i* and *i'*, respectively. This expression washes out both the general term *G* and the importer-specific index *M*. If exporter-specific characteristics are assumed constant over time (or varying evenly across products), then this equation allows cross-partner relative changes in ϕ to be identified. Note that the logarithmic version of equation (6) corresponds to a difference specification, since $ln(R_{ii'jkt}) = \ln(x_{ijkt}) - \ln(x_{i'jkt})$.

When exporters' characteristics are assumed to vary over time (for instance due to demand changes resulting from an FTA), then the changes in these characteristics can be controlled for by focusing on the relative level in markets *j* and *j'* (control importer) of the import ratio from provider countries *i* and *i'*. This "ratio of ratios" (noted BR for bi-ratio) is obtained by dividing equation (6) term-by-term, written for market *j* and *j'*:

(7)
$$BR_{ii'jj'kt} = \frac{R_{ii'jkt}}{R_{ii'j'kt}} = \left(\frac{x_{ijkt}}{x_{i'jkt}}\right) / \left(\frac{x_{ij'kt}}{x_{i'j'kt}}\right) = \left(\frac{\phi_{ijkt}}{\phi_{ij'kt}}\right) / \left(\frac{\phi_{i'jkt}}{\phi_{i'j'kt}}\right)$$

Expressed in logarithm, equation (7) corresponds to a difference-in-differences specification. Romalis (2007) shows that this equation allows to identify the impact of a bilateral FTA upon trade flows between partners.[88] Indeed, under standard assumptions (including perfect competition and differentiated goods according to country of origin) and

[88] In a different context, Head et al. (2007) apply a comparable method to aggregate trade flows.

assuming that transport costs can be written as the product of a time- and a product-fixed effect, the bilateral terms of trade flow intensity can be written:[89]

(8) $$\phi_{ijkt} = a_{ijk} b_t c_k \tau_{ijkt}^{\sigma}$$

where τ is equal to one plus the ad valorem custom duty applied by country *j* over imports of good *k* from country *i* at date *t*. The b_t parameters are time fixed effects, including any factor influencing all trade flows in a given year, like for instance, the outbreak of a worldwide economic crisis or a temporary increase in all transport costs. The c_k parameters are product fixed effects, reflecting product-specific differences in the intensity of trade flows, resulting from transportability, distribution of supply and demand across the world, and other structural factors. Parameters a_{ijk} include the determinants of trade intensity specific to a pair of countries, for a given product, which are constant over time; they usually include distance, contiguity, common language and colonial links, among others. σ_k is the elasticity of substitution between product *k*'s varieties. Estimating this elasticity then allows the impact on bilateral trade of a given cut in tariff duties to be assessed, in comparison to trade flows with other partners. Now, substituting (8) into (7):

(9)

$$BR_{ii'jj'kt} = \left[\left(\frac{a_{ijk}}{a_{i'jk}}\right) / \left(\frac{a_{ij'k}}{a_{i'j'k}}\right) \right] \left[\left(\frac{\tau_{ijkt}}{\tau_{ij'kt}}\right) / \left(\frac{\tau_{i'jkt}}{\tau_{i'j'kt}}\right) \right]^{\sigma}.$$

Following the method applied by Romalis (2007) to the trade-creation effect of NAFTA, equation (9) paves the way for estimating the trade impact of the EU-Chile FTA. In order to do so, let us focus on Chilean exports to the EU (the same analysis, with appropriate alterations, is carried out for EU's exports to Chile), considering that index j refers to the EU-15 (*j* = *U*),[90] and *i* to Chile (*i* = *C*). j' refers to a control group of importers (*j'* = *M*), a set of representative countries whose trade policy with regards to Chile did not change over the period under study. Finally, *i'* is a control group of exporters (*i'* = *X*), including partners which did not face, during the period under study, any specific change in the trade policy applied to them by the EU and by the control group of importers. In these conditions, the ratio of tariff duties applied by the control group of importers, *M*, to the partner, *C*, and the control group of exporters, *X*, does not vary over time. Assuming the elasticity of substitution σ to be constant across products, equation (9) can then be re-written as:

(10) $$BR_{CXUMkt} = \lambda_k \gamma_t \left(\frac{\tau_{CUkt}}{\tau_{XUkt}}\right)^{\sigma}$$

where $\lambda_k = \left[\left(\frac{a_{CUk}}{a_{XUk}}\right) / \left(\frac{a_{CMk}}{a_{XMk}}\right) \right] \left[\left(\frac{\tau_{XMkt_0}}{\tau_{CMkt_0}}\right) \right]^{\sigma}$ and $\gamma_t = \left[\left(\frac{\tau_{XMkt}}{\tau_{CMkt}}\right) / \left(\frac{\tau_{XMkt_0}}{\tau_{CMkt_0}}\right) \right]^{\sigma}$. This type of equation is usually estimated under a log-linear form:

(11) $$\ln(BR_{CXUMkt}) = \alpha_k + \beta_t + \sigma_g \ln\left(\frac{\tau_{CUkt}}{\tau_{XUkt}}\right) + u_{kt}$$

where $\alpha_k = ln(\lambda_k)$, $\beta_t = \ln(\gamma_t)$, *u* is the error term and a subscript *g*, referring to product groups, has been added to σ in order to allow the elasticity of substitution to differ across

[89] Such an expression can for instance be obtained based on Romalis' (2007) model. Here, it is enough to assume that the different components of bilateral trade intensity are combined in a multiplicative form.

[90] To avoid overburdened notations, each index is denoted by single letter.

product groups (see below). The dependent variable here is the difference across importers in differences across exporters, as is clear from the following expression of the dependent variable: $\ln(BR_{CXUMkt}) = [\ln(x_{CUkt}) - \ln(x_{XUkt})] - [\ln(x_{CMkt}) - \ln(x_{XMkt})]$. In this expression, the first term in squared brackets is the difference between EU imports from Chile and those from a control group of exporters; the second term is also the difference between imports from Chile and from a control group of exporters, but this time computed for the control group of importers. In sum, the dependent variable measures the change in EU imports from Chile over and above what is expected given the increase in Chilean exports and EU imports with respect to well-chosen control groups.

Intuitively, the idea is to measure whether EU imports from Chile changed in a way specifically linked to the EU-Chile FTA. These bilateral imports may increase because EU import-demand for a specific product rose. Such an effect would also affect imports from other suppliers, though. Computing EU imports from Chile as a proportion of EU imports from a control group of importers is thus a way to make sure that any trend identified is not linked to changes in EU demand. Still, even when EU imports from Chile are measured through this proportion in comparison to other suppliers, changes may be due to the increasing export capacity of the Chilean economy, independently from the EU-Chile FTA. Would that be the case, however, this dynamism of Chilean exports should materialise in all export markets, not only in the EU. Hence the interest in expressing EU imports from Chile, i.e. Chile's exports to the EU, as a proportion of Chile's exports to a control group of importers. Any remaining trend is not linked to outcomes specific to Chile's export capacity. In sum, the transformation of the dependent variable makes sure that changes analysed are not linked to characteristics specific either to the EU's demand or to Chile's supply, but rather to factors specifically linked to bilateral trade relations between the EU and Chile.

This difference-in-differences specification of the gravity model analyses whether this relative performance of Chilean exporters to the EU market is linked to the relative level of tariffs they face in this market. Identification here only relies on product-by-product changes over time and the specification allows for heterogeneity (i) across years, common to all products (for instance, linked to macroeconomic variables); (ii) across products and years in the competitiveness of Chilean suppliers, since this is controlled through the difference across importers; (iii) across products and years in EU's market demand, since this is controlled through the difference across exporters.

For Poisson and related models, such as the negative binomial model used below, the econometric model is specified in the multiplicative form:

(12) $$BR_{CXUMkt} = \exp\left(\alpha_k + \beta_t + \sigma\, ln\left(\frac{\tau_{CUkt}}{\tau_{XUkt}}\right)\right) \times v_{kt}.$$

This expression is obtained by taking the exponential of the specification in equation (11), the main difference being that the error term (on which distributional assumption are made) is now $v_{kt} = \ln(u_{kt})$. These estimating equations require trade data not only between the EU and Chile, but also between Chile and the control group of importers, and between the control group of exporters and the two markets (EU, control group of importers). This involves two significant constraints, however. The analysis cannot be fully carried out at the EU's or Chile's tariff-line level (at the 8-digit level), since trade statistics between the two control groups are only available at the 6-digit level. Only those product-year pairs for which the ratio-of-ratios is defined are taken into account which requires

exports from the export control group toward both markets, as well as exports from the partner toward the control group of importers, to be non-zero.

The theoretical advantages of analysing difference-in-differences (or ratio-of-ratios, in the multiplicative form) thus go together with practical drawbacks limiting the sample potentially used for estimation purposes. Accordingly, it is also worth carrying out the assessment based on equation (6), where the dependent variable is a simple difference instead of a difference in differences, namely the difference in logarithms of EU imports, from the partner and from the reference group of exporters, respectively:

(13) $$\ln(R_{CXUkt}) = \alpha'_k + \beta'_t + \sigma \ln\left(\frac{\tau_{CUkt}}{\tau_{XUkt}}\right) + u'_{kt}.$$

Such estimation can be carried out based exclusively on European data. This method does not control for output price changes potentially spurred by the EU-Chile FTA, though. If additional demand on the European market drives the price of Chilean exporters up (either through increased production costs, or through higher margins), then the estimate of the elasticity of substitution σ would be biased downward. Still, these estimates are useful robustness checks of the ones based on difference-in-differences.

Estimating equations (11) and (13) makes it possible to assess how tariff concessions granted in the EU-Chile FTA have impacted Chilean exports to the EU. Inverting the role of Chile and the EU in the above description, the same analysis can be applied to identify the consequences for EU's exports to Chile.

The regressions provide two parameters of interest: the elasticity of substitution σ and time fixed effects βs. σ is the elasticity of substitution between providers. The specification used is actually consistent with demand for imports of product k being drawn from a CES subutility function across products from different origins (hence the theoretical consistency with the CGE model described in next chapter). This elasticity of substitution, linked to the degree of product differentiation, is likely to differ across groups of products, but assuming it to be common within large enough product groups is necessary to allow accurate identification. To strike a balance between flexibility and robustness, the elasticity of substitution is allowed to differ across sectors, as defined in Chapter 1.

C. Estimating the impact of non-tariff clauses

The time fixed effects β_t reflect the share of unexplained variance in the dependent variable that is specific to a given year. The estimates may help assess what the effect of the EU-Chile FTA has been over and above what is explained by cross-product differences in tariff cuts.

However, correct identification should recognize the potential cross-product variance in these non-tariff impacts. Trade facilitation, improved data treatment, easier custom clearance and mutual recognition of standards are among the main issues at stake here. The sensitivity of trade to improvement in these areas is likely to differ significantly across products. These different effects can be caught up by allowing time fixed effects to vary across groups of products. The estimating equation would then be

(14) $$\ln(BR_{CXUMkt}) = \alpha_k + \beta_{tg} + \sigma_g \ln\left(\frac{\tau_{CUkt}}{\tau_{XUkt}}\right) + u_{kt}$$

where β_{tg} measures a yearly, product-specific change in imports, unexplained either by performances of Chilean exporters in other markets or by import demand from other providers (these effects are taken into account in the dependent variable), nor by the evolution of tariffs. Accordingly, if the EU-Chile FTA's non-tariff clauses enhance trade in a given product, the corresponding β_{tg} coefficient should increase over time.

Estimates have been carried out for both EU and Chile imports. Again, groups of products are assumed to be sectors, as defined in Chapter 1. In each case, the corresponding effects are not significantly different from zero.

D. Implementation

Implementing the methodology described above raises a number of issues, practical and methodological. The main ones are the following.

Control groups

The methodology described above relies on control groups of exporters and importers to control for changes in the importer's demand and in the exporter's supply not specific to the bilateral relation under study. The choice of control groups is important to the success of the proposed estimation strategy. Because these control groups' trade is supposed to reflect changes in market conditions, countries in these control groups should not face significant changes specific to their trade relations with the partners under study, nor with countries of the other control group. Taking again the example of the analysis of Chilean exports to the EU, countries in the control group of exporters should not have signed (or have been phasing in) any trade agreement with neither the EU nor countries of the control group of importers during the period under study. Similarly, countries in the control group of importers should not have signed (or have been phasing in) any trade agreement with neither Chile nor countries of the control group of exporters during the period under study. An additional requirement for these control groups is to be large enough so that they can be considered representative, and that the number of cases where the data is missing for any of the four flows needed to build the dependent variables remains limited.

In practice, when studying Chile's exports to the EU, the control group of exporters is composed of all Latin American countries not belonging to the ACP group, except Mexico (see the full list in Appendix 2.1). This is a relatively large group of exporters, with a structure of exports comparable to the Chilean one, and no trade agreement with the EU in force over the period considered. The control group of importers is then defined as including all countries, except the EU, Chile and members of the control group of exporters, which do not have any trade agreements in force with either Chile or any member of the control group of exporters during the period under study. This group includes 121 countries. The same control groups are used for the analysis of EU's exports to Chile, inverting their role. Latin American countries thus act in this case as the control group of importers, while other countries form the control group of exports.

Data

The period studied is 2001-2009. The data used to implement the analysis are essentially those described in Chapter 1, namely trade and tariff data at the tariff line (8-digit) level for the EU and Chile. For products covered by an entry price system, only the ad-valorem component is taken into account. This is enough to capture the differential effect of the agreement upon protection faced by each partner, since only the ad-valorem component is cut for such products. The baseline estimations exclude products covered by tariff-rate quotas; as a robustness check, estimates based on inside- and on outside-quota tariff rates have also been carried out. For EU imports, copper and ores are also excluded.[91] Salmon and trout products are also excluded after 2006, since the sanitary crisis strongly blurred trade evolutions afterwards. Preferential and non-preferential suspensions are taken into account. Changes in nomenclatures are corrected for by reconstitution when possible (i.e., when the change was a mere relabeling). When the content of a given nomenclature code changes, it is considered as a different product before and after the break.

Products covered by tariff-rate quotas are excluded from the sample in the estimates presented, because it cannot be asserted systematically whether the binding rate is the inside- or outside-quota tariff rate.[92] Unreported estimates were carried out as robustness checks and they showed that the results are robust to two alternative treatments, namely including quota products using either the inside-quota tariff rate (IQTR) or the outside-quota tariff rate (OQTR). This hardly makes any difference for Chilean imports. For EU imports, using the IQTR naturally leads to a lower estimate, since the corresponding impact may be limited for TRQ products by the size of the quota. Using OQTRs makes very little difference to excluding quota products altogether, although it tends to give slightly smaller estimates, presumably because the cut in the OQTR is not relevant when the quota is not filled.

As already mentioned, the analysis based on difference-in-differences ("bi-ratios") also requires data about trade between the two control groups, which cannot be drawn from EU and Chile national sources. These data can be put together at the 6-digit level of the Harmonised System (HS6 level) for the period 2000-2009 using Cepii's BACI database (built as a harmonization of UN's Comtrade database). To limit discrepancies linked to differences across data sources, BACI is also used as the source for imports from Chile of the control group of importers (for which Chile's national customs would have been another source).

To summarize, tariffs and the term x_{CUkt}/x_{XUkt} in the definition of the dependent variable are computed at the 8-digit level, based on national sources, while the term x_{CMkt}/x_{XMkt} is computed based on BACI data, at the HS6 level. The latter term controls for changes across time[93] in the competitiveness of Chile's exporters in comparison to the control group of exporters, based on imports of the control groups of importers. Constrained

[91] As illustrated in Chapter 1, ores and most of all copper represent a very significant part of EU imports from Chile. However, trade outcomes in these sectors bear little relationship with the Agreement: the corresponding products are not dutiable in the EU, and outcomes are strongly influenced by changes in international prices, which have been very substantial over the period studied, in particular for copper. As a result, these products, if anything, are likely to blur the analysis. Still, we checked that including these products in the econometric estimates does not modify significantly the results.

[92] As mentioned in Chapter 1, TRQs are scheduled in the Agreement for 28 products for Chile imports, and for almost 300 products for the EU.

[93] Heterogeneity in level is accounted for by product fixed effects, defined at the 8-digit level.

by the data, these changes are thus assumed to be common to 8-digit subproducts, within each HS6 product. Another solution would be to aggregate EU and Chile imports and tariffs at the HS6 level and to carry out the analysis at this level; however, this would reduce the information available for identification, and raise issues about the right way to aggregate tariffs.

Estimation methods

By default, ordinary-least squares (OLS) estimates are obtained, with standard-errors robust to heteroskedasticity and to clustering. Clustering is performed at the HS6 level when the dependent variable is expressed as a difference-in-differences (since the denominator is then computed at the HS6 level), and at the 8-digit level when the dependent variable is expressed as a simple difference. In the context of heteroskedasticity, however, feasible generalised least squares (FGLS) estimates are more efficient and so they are used as an alternative. A drawback of both estimators is their inability to take into account the fact that a number of trade flows are zero. A first method to account for this is to consider that the observed distribution is censored, because trade flows cannot be less than the level of trade costs. Following Eaton and Kortum (2001) and Crozet et al. (2011), a possible estimation strategy in this context is to use the lowest observed positive trade flow within each category as a maximum likelihood estimate of the censoring point, here the category-specific sunk cost of exporting. We adopt this estimation strategy as an additional robustness check, using HS chapters as the categories within which the sunk cost of exporting is assumed constant.

Santos-Silva and Tenreyro (2006) have pointed out the bias inherent in the standard estimation approach, linked to both heteroskedasticity and to unsuited treatment of zero flows. They find it preferable to estimate gravity models under their multiplicative form, using a Poisson quasi-maximum likelihood estimator (QMLE). However, Santos-Silva and Tenreyro's (2006) approach has been in turn criticized for not taking into account zero flows in a satisfactory way. Martin and Pham (2008) show that the Poisson model may be unsuitable if there are too many zero-trade observations. When working at the product-level as we are doing here, zeroes are actually an overwhelming majority, making the suitability of this method dubious.[94] Burger et al. (2009) confirm this sensitivity to zero observations, and emphasize in addition the sensitivity of Poisson estimates to overdispersion; they show that negative binomial estimators are more robust in this context. Compared to the Poisson model, the negative binomial model has the same expected value, but the variance depends upon both the conditional mean and a dispersion parameter. Through differences in this dispersion parameter, an additional degree of freedom is introduced in the model, thus allowing overdispersion to be accommodated.

Negative binomial estimators can thus be used to take Santos-Silva and Tenreyro's (2006) contribution into account, in a framework better suited to the specificity of the present estimations. In the present context, however, the transformation of the dependent variable means that zeros in the flows used as controls, i.e. to and from control groups, also result in missing observations, making it more difficult to account meaningfully for zero

[94] Unreported estimates confirmed this concern, with results highly sensitive to specification and sample, sometimes resulting in inconsistent estimated values.

flows. In addition, the properties of this method at a very detailed level of aggregation such as the one used here have not been well explored so far. Against this background, we will only use negative binomial estimates as robustness checks.

E. Comparable estimates

Comparable estimates other than Romalis (2007) cited in the text, are not widespread in the literature. It is uncommon to carry out such detailed estimates, and a more detailed product breakdown leads to higher elasticities of substitution, because estimation at more aggregated levels involves an aggregation bias (see e.g. Imbs and Méjean 2009, for a discussion). Based on a very different method (elaborating from Feenstra 1994), Broda and Weinstein (2006) find for instance that the simple average of the elasticities of substitution for the US between 1990 and 2001 was around -12.6 for ten-digit (HTS) goods (compared to only 4.0 among three-digit goods), although the median is only -3.1 (-2.2 at the three-digit level). Kee et al. (2008) also provide estimates of import demand elasticities at the six-digit level, which average -3.1 for all HS products, i.e. at a somewhat more aggregated level.

APPENDIX 2.2: COMPOSITION OF CONTROL GROUPS

First control group (exporters for the analysis of Chile's exports towards the EU, importers for the analysis of EU exports towards Chile): Venezuela, Colombia, Panama, Costa Rica, Nicaragua, El Salvador, Honduras, Guatemala, Ecuador, Peru, Brazil, Bolivia, Paraguay, Uruguay, Argentina.

Second control group (importers for the analysis of Chile's exports towards the EU, exporters for the analysis of EU exports towards Chile): Afghanistan, Albania, Upper Volta, Angola, Antigua and Barbuda, Netherlands Antilles, Saudi Arabia, Algeria, Armenia, Aruba, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Bermuda, Bhutan, Bosnia Herzegovina, Botswana, Burkina Faso, Burundi , Cape Verde, Cambodia, Cameroon, Chad, Comoros, Congo, North Korea, Ivory Coast, Croatia, Dominica, Egypt, United Arab Emirates, Eritrea, Ethiopia, Fiji, Gabon, Gambia, Georgia, Ghana, Grenada, Guinea, Equatorial Guinea, Guinea-Bissau, Guyana, Haiti, Indonesia, Iraq, Iran, Cayman Islands, Solomon Islands, Israel, Jamaica, Jordan, Kazakhstan, Kenya, Kyrgyzstan, Kiribati, Kuwait, Laos, Lebanon, Lesotho, Liberia , Libya, Macedonia, Madagascar, Malaysia, Malawi, Mali, Mauritius, Morocco, Mauritania, Moldova, Mongolia, Mozambique, Myanmar, Namibia, Nauru, Nepal, Niger, Nigeria, Oman, Pakistan, Papua New Guinea, Qatar, Central African Republic, Dem. Rep. Congo, Republic of Yemen, Russia, St Vincent Grenad., Samoa occ., St. Lucia, Senegal, Seychelles, Sierra Leone, Syria, Sri Lanka, South Africa, Sudan, Swaziland, Tajikistan, Taiwan (Formosa), Tanzania, Thailand, Timor Leste, Togo, Trinidad y Tobago, Tunisia, Turkmenistan, Tuvalu, Uganda, Ukraine, Uzbekistan, Vanuatu, Vietnam, South Yemen, Zambia, Zimbabwe.

APPENDIX 2.3: METHODOLOGY USED TO SIMULATE TRADE IMPACTS

A standard assumption, consistent both with the econometric methodology presented above and with the CGE model used in Chapter 3, is that the elasticity of substitution between imports from different origins is constant. In other words, the bundle of imports for a given product can be represented within consumer preferences through a constant elasticity of substitution (CES) function over imports of different origins. In this case, assuming the budget allocated to each product in total imports is to remain constant, the own-price elasticity of demand for imports from a given country is written:

(15) $$\nu_{ijk} = \frac{\partial \ln x_{ijk}}{\partial \ln p_{ijk}} = \sigma_k(1 - s_{ijk})$$

where x_{ijk} refers to country *j*'s imports of product *k* from country *i*, σ_k is the elasticity of substitution between imports from different providers, and s_{ijk} is the value share of imports from provider *i* in country *j*'s total imports of product *k*.

Let us now assume away any change in producer prices. The only way the EU-Chile FTA changes prices is then through tariff cuts. A first-order approximation of the level of imports that would have prevailed, would the EU-Chile FTA not have been signed, can thus be computed as follows:

(16)
$$\ln \tilde{x}_{ijk} = \ln x_{ijk} + \nu_{ijk} \ln\left(\frac{1 + \tilde{t}_{ijk}}{1 + t_{ijk}}\right)$$

where $\tilde{x}_{ijk}$ refers to the estimated counterfactual level of imports that would have been observed without the EU-Chile FTA, and $\tilde{t}_{ijk}$ is the tariff level that would have prevailed without the EU-Chile FTA. For clarity, let us emphasize again that this counterfactual calculation involves the following assumptions:

- It assumes (tax exclusive) producer prices expressed in the importing country currency remain constant
- It assumes the budget allocated to each product in total imports remains constant
- It is a first-order approximation, since the calculation is based upon the own-price elasticity of demand for imports from Chile, estimated based on observed import levels[95]

The CGE exercise presented in Chapter 3 will allow less simplistic simulations, but this is a useful way to illustrate the implications of the estimations.

An alternative assumption would be the Armington assumption in its initial form, namely the assumption that products are differentiated by country of origin, with domestic products included in the same bundle (i.e., the same CES function) as other imports. In this case, equation (15) would still hold, but replace s_{ijk} by the value share of imports from provider *i* in total domestic demand of product *k*, including demand for domestic products. The corresponding own-price elasticity of demand is higher in this case, but assessing its

[95] Since the own-price elasticity of demand depends upon the market share, it decreases as the level of import increases. Given the orders of magnitude considered here, changes are likely to remain small compared to initial levels, though, hence the assumption that this effect is of second order, and can be neglected.

level requires knowing the level of domestic production of product *k*, a piece of information unavailable at the detailed product level. Still, considering that the share of imports from a given provider in total demand is often low, a useful upper-bound for the price elasticity is obtained assuming this share to be negligible:

(17) $$\nu'_{ijk} = \sigma_k.$$

In the simulations, this elasticity is used to compute upper-bounds of the trade impact of the EU-Chile FTA, i.e. the lower-bound of the estimated level of trade that would have prevailed without the EU-Chile FTA.

APPENDIX 3.1: DATA SOURCES AND METHODOLOGY USED TO BUILD THE MODEL'S DATABASE

A. DATA SOURCES

The Central Bank of Chile builds and regularly updates Input Output Matrices (IOMs) for this country. The two most recent versions are for 1996 and 2003, with methodological changes introduced in the last version.

Both SAMs are based on national accounts data for each year. The 1996 (updated version) and 2003 IOMs followed the methodology used in the 1993 System of National Accounts, coordinated by the United Nations Statistics Division (UNSD). This procedure follows a top-down methodology, which means the SAM is only built for macroeconomic accounts, which is turn is disaggregated by introducing detailed information by sector, by production factor, etc.

The 1996 IPM and the 1996 and 2003 SAMs contain 73 commodities / 74 activities. One of the industries (74th) is a Financial Dummy, used to deal with the value of production in the financial sector. This is a fictional sector that "uses" a substantial amount of financial sector services.

The SAMs information concerns final consumption (households consumption as a whole - no disaggregation according to income distribution is taken into account, government expenses in final goods and exports). Exports and imports are only reported for the rest of the world as a whole. Investment accounts include gross capital formation and capital stock variations.

On the supply side, the Central Bank of Chile details domestic and imported supply and considers two production factors: labor and capital. The data break down receipts from tariff duties, VA tax, indirect taxes on products and services and other indirect taxes on activities.

The available national accounts data also come from the Central Bank of Chile, and it is presented in two sets: before and after the methodological change in 2003. The first set runs from 1996 to 2005 and the second from 2003 to 2008. This is the basic information used to build the two SAMs needed to calibrate our structural CGE model for Chile. This data is also opened for 20 activities, basically disaggregating industrial sectors and services. Data on financial information and cash flows are also available, but of less interest for this work.

The Chilean National Institute of Statistics (INE) provides detailed information on particular sectors: manufacturing, wholesale and retail trade, services, tourism, mineral extraction, electricity, gas and water, transport and communications, and other services. Some sectors provide data on sales, expenses, production costs, employment and investment. These detailed data helped to complete and disaggregate national accounts information to build the new SAMs. Moreover, in order to make the 2002 and 2008 SAMs comparable, we deflate both SAMs by INE's Consumer Price Index (CPI).[96]

Collaboration with the LA-KLEMS-Chile group of ECLAC helped us to get detailed information at the sector level (intermediate consumption, value added and its

[96] Both SAMs are finally expressed in 2003 Chilean pesos.

decomposition in factors' payments, production taxes, gross production and domestic supply). LA-LEMS sectoral information for 2002 and 2008 is one of our main sources for the macroeconomic SAMs decomposition by industry. In addition, these data are carefully harmonized, cross-checked and tested through growth accountancy exercises. From the 31 sectors singled out in LA-KLEMS's data, we keep 28 activities for our SAMs, the most detailed breakdown for which all variables are available.[97] As this classification lacks detail for agricultural and food activities, we further break down agriculture, fisheries, forestry and food products to single out important activities and products with regards to EU-Chile trade relationships, based on additional trade and national account data. The resulting classification is described in Table 59. There is a correspondence between products and activities. For instance, product P20 is the main output of activity S20, but this correspondence is not exclusive: product P20 may also be produced in another activity, and activity S20 may have also produced other outputs. The output per activity is described in the input-output table.

[97] Product breakdown for the new SAMs follows the same description as for activities.

TABLE 59: MODEL'S CLASSIFICATION OF SECTORS AND PRODUCTS

Activity	Product
S1 - Other agricultural activities	P1 - Other agricultural products
S2 - Fruit growing	P2 – Fruits
S3 - Animal husbandry	P3 - Livestock and livestock products
S4 – Forestry	P4 - Forestry products
S5 - Extractive fishing	P5 - Fish and crustaceans
S6 - Mining and mineral extraction	P6 – Minerals
S7 - Meat production	P7 – Meat
S8 - Seafood processing	P8 - Processed seafood
S9 – Canning	P9 - Canned fruits and vegetables
S10 - Production of liquors and spirits	P10 - Liquors and spirits
S11 – Winemaking	P11 – Wines
S12 - Other agro-industrial	P12 - Other foods and beverages
S13 - Textiles, leather and footwear	P13 - Textiles (fabrics and clothing), leather and footwear
S14 - Timber and furniture, cork	P14 - Wood, furniture, other wood products (including cork)
S15 - Paper and printing industry	P15 - Pulp, paper, paper products, printing and publishing
S16 - Fuel industry (oil and nuclear)	P16 - Coke, refined petroleum and nuclear fuel
S17 - Chemical industry	P17 - Chemicals and products
S18 - Plastic industry	P18 - Rubber and plastic
S19 - Other non-metallic minerals	P19 - Other non-metallic mineral products
S20 - Basic metal industry	P20 - Basic metals and fabricated metal products
S21 - Other machinery manufacturing	P21 - other equipment
S22 - Electronics and optics industry	P22 - Electronic and optical equipment
S23 - Transport equipment industry	P23 - Transport equipment
S24 - Other manufacturing and recycling	P24 - Other manufacturing and recycling
S25 - Electricity, gas and water	P25 - Electricity, gas and water
S26 – Construction	P26 – Buildings
S27 – Trade	P27 - Trade sales services
S28 - Hotel and catering	P28 - Hotels and restaurants
S29 – Logistics	P29 - Transportation and warehousing (logistics)
S30 - Communications sectors	P30 - Post and telecommunications
S31 - Financial activities	P31 - Financial intermediation services
S32 - Real estate	P32 - Real estate services
S33 - Leasing of machinery and equipment	P33 - Machinery and equipment rental
S34 - Public administration, defence and social security	P34 - Public services (administration, defence and social security)
S35 – Education	P35 - Education services
S36 - Health and social work	P36 - Health and social work
S37 - Other services to the community	P37 - Other community, social and personal services

Trade and protection data at the tariff-line level from Chilean Customs for Chilean imports are used to break down imports, exports and import duties at the product level. Tariffs faced by Chilean exporters in the EU are measured through AVE computed based on TARIC. The data used are those described and used in Chapters 1 and 2.

The different levels of data disaggregation among sources are harmonized using mapping tables, making it possible to work with 37 activities and goods, 3 production factors (capital, salaried and non-salaried labor) and the distinction of three main trade partners (USA, EU27 and Latin American countries besides the rest of the world). Trade and tariffs are modeled for 199 products.

TABLE 60: SUMMARIZING DATA SOURCES

Data	Sources
Macroeconomic SAMs	National Accounts from Central Bank of Chile (2002 and 2003)
Consumption Price Index (CPI)	INE (2002,2003,2008)
VA, intermediate consumption, production taxes, gross production and domestic supply at the activity level	KLEMS-Chile (2002 and 2008), CEPAL
Intermediate consumption, final consumption (household and government), investment, at goods level	SAM 2003 from the Central Bank of Chile
Imports, exports and import duties, by product and by partner	Chile Customs
Tariffs faced by Chilean exporters in the EU	TARIC

B. METHODOLOGY: HOW TO BUILD THE NEW SAMS?

To construct two SAMs for Chile, one before and other after the EU-Chile trade agreement, we had to define some characteristics, such as sector breakdown, main trade partners, production factors, taxes and particularly, the years for both SAMs.

Since the EU-Chile FTA entered into force in February 2003, we take 2002 as the base year. The last year for which we could hope to put together complete information would be 2009. However, this is a very peculiar year from an economic point of view, due to the economic consequences of the financial crisis, which were especially severe as far as trade is concerned. As a result, we prefer using 2008 as the second reference year.

For the first step in the construction of the SAMs we used National Accounts information from the Central Bank of Chile at the aggregate level and then split the value added between factors' payments according to LA-KLEMS data. Both SAMs were deflated to express them in constant Chilean pesos from 2003 (see the following macroeconomic SAMs).

The choice of sector breakdown reflects a balance between the interest to single out important sectors (in particular from the point of view of international trade), and the need to collect detailed and reliable information about the structure of production and demand.

As already mentioned, the Chile-KLEMS dataset put together by ECLAC constitutes an invaluable source in this respect, with an additional a split between volume and value at the sectoral level. Hence the above-mentioned choice of a disaggregation in 28 KLEMS sectors, with further breakdown of agriculture and food resulting in 37 sectors in total.

The second step concerns goods and activity disaggregation. For that purpose we built share coefficients based on LA- KLEMS sector-level data. Then to split the macroeconomic data into products (intermediate and final consumption and supply), we follow a similar procedure using the Central Bank 2003 SAM.

Chilean SAMs consider the rest of the world as a total. Since our study is focused on the EU-Chile PTA it is important to isolate the EU27 as one of Chile's partners. Moreover, trade relations with the US have also intensified since their FTA was signed, so the US would be another country to isolate from the rest of the world. Finally, many association agreements have also been signed between Chile and some Latin American countries, such as Mercosur countries and the Andean Community. For that reason, it is important to create a Latin American region as one of the main Chilean trade partners. Other countries remain aggregated in one single region. This breakdown across trading partners is carried out based on Customs data. The SAMs are finally rebalanced using a cross-entropy procedure (Robinson et al. 2001).

TABLE 61: MACROECONOMIC CHILE SAM FOR 2008 - CONSTANT BILLION CHILEAN PESOS 2003 (DEFLACTOR IPC 2003=1 SOURCE INE).

	AA	CC	K	LdepL	LdepM	LdepH	Lindep	HH	gob	t-iva	t-dirHH	t-indAA	t-renta	t-previsional	t-impo	IngNoTrib	inv	sav	rm	TOTAL
AA	0.00	**178.63**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**178.63**
CC	**96.71**	0.00	0.00	0.00	0.00	0.00	0.00	**59.70**	**11.06**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**15.51**	0.00	**39.98**	**222.95**
K	**24.82**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**24.82**
LdepL	**19.33**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**19.33**
LdepM	**8.15**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**8.15**
LdepH	**6.02**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**6.02**
Lindep	**22.44**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**22.44**
HH	0.00	0.00	**22.40**	**17.47**	**7.40**	**5.47**	**20.27**	0.00	**0.71**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**5.48**	**79.20**
gob	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.73**	0.00	**7.23**	**0.50**	**1.16**	**6.47**	**1.29**	**0.60**	**4.59**	0.00	0.00	**0.39**	**23.97**
t-iva	0.00	**7.23**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**7.23**
t-dirHH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.50**
t-indAA	**1.16**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.16**
t-renta	0.00	0.00	**2.42**	**1.10**	**0.44**	**0.32**	**2.18**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**6.47**
t-previsional	0.00	0.00	0.00	**0.76**	**0.30**	**0.22**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.29**
t-impo	0.00	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.60**
IngNoTrib	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**4.59**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**4.59**
inv	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**15.51**	0.00	**15.51**
sav	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.68**	**12.14**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.69**	**15.51**
rm	0.00	**36.48**	0.00	0.00	0.00	0.00	0.00	**10.99**	**0.06**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**47.54**
TOTAL	**178.63**	**222.95**	**24.82**	**19.33**	**8.15**	**6.02**	**22.44**	**79.20**	**23.97**	**7.23**	**0.50**	**1.16**	**6.47**	**1.29**	**0.60**	**4.59**	**15.51**	**15.51**	**47.54**	

TABLE 62: MACROECONOMIC CHILE SAM 2002 - CONSTANT BILLION CHILEAN PESOS 2003 (DEFLACTOR IPC 2003=1 SOURCE INE)

	AA	CC	K	LdepL	LdepM	LdepH	Lindep	HH	gob	t-iva	t-dirHH	t-indAA	t-renta	t-previsional	t-impo	IngNoTrib	inv	sav	rm	TOTAL
AA	0.00	**83.66**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**83.66**
CC	**41.50**	0.00	0.00	0.00	0.00	0.00	0.00	**32.33**	**6.13**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**6.96**	0.00	**15.77**	**102.69**
K	**10.24**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**10.24**
LdepL	**11.33**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**11.33**
LdepM	**4.95**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**4.95**
LdepH	**3.52**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**3.52**
Lindep	**11.16**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**11.16**
HH	0.00	0.00	**9.54**	**10.54**	**4.62**	**3.29**	**10.38**	0.00	**0.01**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.54**	**39.92**
gob	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.60**	0.00	**3.72**	**0.34**	**0.96**	**2.15**	**0.68**	**0.66**	**1.28**	0.00	0.00	**0.16**	**10.56**
t-iva	0.00	**3.72**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**3.72**
t-dirHH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.34**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.34**
t-indAA	**0.96**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.96**
t-renta	0.00	0.00	**0.70**	**0.39**	**0.16**	**0.12**	**0.78**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**2.15**
t-previsional	0.00	0.00	0.00	**0.40**	**0.17**	**0.12**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.68**
t-impo	0.00	**0.66**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.66**
IngNoTrib	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.28**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.28**
inv	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**6.96**	0.00	**6.96**
sav	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**2.18**	**4.33**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.44**	**6.96**
rm	0.00	**14.65**	0.00	0.00	0.00	0.00	0.00	**3.18**	**0.09**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**17.92**
TOTAL	**83.66**	**102.69**	**10.24**	**11.33**	**4.95**	**3.52**	**11.16**	**39.92**	**10.56**	**3.72**	**0.34**	**0.96**	**2.15**	**0.68**	**0.66**	**1.28**	**6.96**	**6.96**	**17.92**	

APPENDIX 3.2: TECHNICAL DESCRIPTION OF THE MODEL

A. INDEXES

Index	Meaning	Values taken by the index
i (or i1)	Goods	C1*C28
His	Detailed product (HS6 level)	See below
j	Activities	A1*A28
f	Factors	K,Lhigh, Lmed, Llow,Lindep
partner (or reg or reg1)	Partner	LatAm, EU-27, US, RoW

Values taken by the index ihs of disaggregated products (numbers refer to 6-digit HS codes, "irXX" refers to the rest of sector "XX"):

20329, 20442, 20714, 21099, 30269, 30322, 30378, 30379, 30410, 30420, 30490, 30729, 30759, 40900, 60110, 70310, 71080, 80212, 80231, 80232, 80440, 80510, 80610, 80620, 80810, 80820, 80920, 80930, 80940, 81040, 81050, 81120, 81190, 81320, 81330, 100510, 120930, 120991, 121190, 121220, 130239, 150420, 160231, 160411, 160510, 160590, 200980, 210120, 210690, 220421, 220429, 220830, 230120, 230990, 260300, 261310, 261390, 262099, 271019, 271112, 280120, 280700, 281000, 282520, 282570, 283421, 283691, 284170, 285200, 290511, 300220, 300439, 300490, 300610, 310210, 310250, 310420, 310430, 320419, 330300, 330499, 380850, 382490, 390690, 401011, 401169, 440122, 440710, 441112, 441210, 441600, 450310, 470311, 470321, 470329, 481013, 481019, 481022, 481092, 481500, 490199, 510529, 620342, 620462, 710691, 710812, 720270, 720421, 722520, 730610, 730840, 730890, 740200, 740311, 740319, 740400, 740911, 840211, 840220, 840999, 841199, 841370, 841391, 841480, 841950, 842121, 842199, 842230, 842240, 842290, 842641, 842691, 842720, 842951, 842952, 842959, 843041, 843149, 843850, 844319, 844339, 844399, 847490, 848180, 848340, 848620, 850153, 850164, 850212, 850213, 850239, 850300, 850440, 852329, 853530, 853650, 853670, 853690, 853710, 853720, 853890, 854449, 870120, 870190, 870322, 870323, 870324, 870332, 870333, 870421, 870423, 870899, 890190, 901890, 950430, irC1, irC2, irC3, irC4, irC5, irC6, irC7, irC8, irC9, irC10, irC11, irC12, irC13, irC14, irC15, irC16, irC17, irC18, irC19, irC20, irC21, irC22, irC23, irC24, irC25, irC26, irC27, irC28

B. EXOGENOUS VARIABLES AND BEHAVIOURAL PARAMETERS

(Greek letters are written explicitly, indexes feature in parentheses)

ac(i) Armington CES constant parameter
delta(i) Armington CES share parameter
rhoc(i) Armington CES substitution parameter
dences(i) Armington CES temporary parameter
numces(i) Armington CES temporary parameter
acex(i) Armington CET constant parameter
deltaex(i) Armington CET share parameter
rhocex(i) Armington CET substitution parameter
dencesex(i) Armington CET temporary parameter
numcesex(i) Armington CET temporary parameter

io(i,J) input output coefficient
gamma(i,j) multi product parameter
a(j) value added CES constant parameter
alpha(f,j) value added CES share parameter
rhova(j) value added CES substitution parameter
denva(j) value added CES temporary parameter
betahh(i) final consumption parameter (value share of sector i)
betagov(i) gov final consumption parameter
betainv(i) investment parameter, share of sector i in total investment

acd(i) scaling parameter of the corresponding CES function
deltad(i,ihs) distribution parameter of the corresponding CES function
rhocd(i) substitution parameter of the corresponding CES function
(defined as rho = -1+1/elasticity)
acexd(i)scaling parameter of the corresponding CET function
deltaexd(i,ihs) distribution parameter of the corresponding CET function
rhocexd(i) substitution parameter of the corresponding CET function
(defined as rho = 1+1/elasticity)

acdreg(ihs) scaling parameter of the corresponding CES function
deltadreg(ihs,reg) distribution parameter of the corresponding CES function
rhocdreg(ihs) substitution parameter of the corresponding CES function
(defined as rho = -1+1/elasticity)
acexdreg(ihs) scaling parameter of the corresponding CET function
deltaexdreg(ihs,reg) distribution parameter of the corresponding CET function
rhocexdreg(ihs) substitution parameter of the corresponding CET function
(defined as rho = 1+1/elasticity)

TIMPEXO(j) production taxes (the “EXO” suffix signals that the variable is exogenous)
TTARDregEXO(ihs,reg) tariff rate over imports from reg
TTARDCHLEXO(ihs,reg) tariff rate by reg over imports from CHL
TTVAEXO(i) consumption tax
TTVIEXO(i) investment tax
XTHHEXO(F) household factor endowments
XTGOVEXO(F) government factor endowments
TRHHGOVEXO transfers from household to governments
TRHHRMEXO transfers from household to rest of the world
TRGOVRMEXO transfers from government to rest of the world
SAVGOVEXO government saving rate
SAVHHEXO household saving rate
PWMDregEXO(ihs,reg) foreign import price (exogenously fixed, since importers’ behavior not represented)
COMPWEDregEXO(ihs,reg) (exogenous) ratio export price / domestic price (underlying assumption: mill pricing product-by-product, but the export backet is different from the domestic use basket, hence the difference in prices, expressed here as a constant ratio)
numer numeraire

TRADEBAL_ini to define as the initial value of the trade balance

ARGMINIMPDreg(ihs) = values as estimated in Chapter 2 for Chilean imports from the EU
ARGMINEXPDreg(ihs) = values as estimated in Chapter 2 for EU imports from Chile
(σ_i in Figure 13)
ARGMINIMPD(i) = 4/5 * ARGMINIMPDreg(ihs)
ARGMINEXPD(i) = 4/5 * ARGMINEXPDreg(ihs)
ARGMINIMP(i) = 4/5 * ARGMINIMPD(ihs)
ARGMINEXP(i) = 4/5 * ARGMINEXPD(ihs)
ELASKL(j) = 0.5 ;

C. Endogenous variables

Y(j) output index for sector j
YS(i,J) output of sector j in product i
X(j,F) factor use
IC(i,j) intermediate consumption
TIC(i) total demand for intermediate consumptions of product i
VAFC(j) volume of value added
PJ(j) output deflator for sector j
PVA(j) value added price for sector j
YD(i) demand of product i
YDD(i) Domestic demand of product i
P(i) price index
PE(i) export price
PD(i) domestic price
XC(i) total domestic consumption of product i
M(i) imports of good i
PC(i) price index of total consumption (domestic and imported) on the domestic market, net of taxes
PM(i) domestic import price
IMP(j) Production taxes receipts
RDHH Households' available income
RDGOV Government's available income
QDHH(i) household final consumption
QDGOV(i) Government final consumption
W(F) Price of factor f
HHSAVINGS Household savings
GOVSAVINGS Government savings
INV(i) Investment in sector i
TRADEBAL Trade balance
IT Total investment
TVA(i) Tax on value added
TVI(i) Taxes on investment collected over sector i
E(i) Exports of product i

TARDreg (ihs,reg) Tariff receipts
PMD(ihs) Import price

PED(ihs) Export price
MD(ihs) World imports
ED(ihs) World exports
MDreg (ihs,reg) Regional imports
EDreg (ihs,reg) Regional exports
PMDreg(ihs,reg) Regional, tax inclusive import price
EXCHG Exchange rate : p = EXCHG x p*

A. Model's equations

(18) $TIC_i = \sum_j IC_{i,j}$

(19) $IC_{i,j} = io_{i,j} * Y_j$

(20) $PVA_j * a_j = \left(\sum_f \alpha_{f,j}^{\frac{1}{1+\rho va_j}} * (W_f)^{\frac{\rho va_j}{1+\rho va_j}} \right)^{1+\frac{1}{\rho va_j}}$

(21) $X_{j,f} = VAfC_j * a_j^{-\frac{\rho va_j}{\rho va_j+1}} * \left(\alpha_{f,j} * \frac{PVA_j}{W_f}\right)^{\frac{1}{1+\rho va_j}}$

(22) $VAfC_j = Y_j$

(23) $YD_i = \sum_j (YS_{i,j})$

(24) $YS_{i,j} - \gamma_{i,j} * Y_j = 0$

(25) $Pj_j * Y_j = \sum_i p_i * YS_{i,j}$

(26) $PVA_j = Pj_j * (1 - TIMPEXO_j) - \sum_i io_{(i,j)} * PC_i$

(27) $P_i = \frac{1}{acex_i} * \left(deltaex_i^{\frac{1}{1-\rho cex_i}} * pd_i^{\frac{\rho cex_i}{\rho cex_i-1}} + (1 - deltaex_i)^{\frac{1}{1-\rho cex_i}} * pe_i^{\frac{\rho cex_i}{\rho cex_i-1}} \right)^{1-\frac{1}{\rho cex_i}}$

(28) $YDD_i = (YD_i * acex_i^{\frac{\rho cex_i}{1-\rho cex_i}} * \left(\frac{pd_i}{p_i * deltaex_i}\right)^{\frac{1}{\rho cex_i-1}})$

(29) $E_i = (YD_i * acex_i^{\frac{\rho cex_i}{1-\rho cex_i}} * \left(\frac{pe_i}{p_i(1-deltaex_i)}\right)^{\frac{1}{\rho cex_i-1}})$

(30) $M_i = \frac{XC_i}{ac_i} \left(ac_i PC_i \frac{1-\delta_i}{PM_i}\right)^{\frac{1}{1+\rho c_i}}$

(31) $PC_i = \frac{1}{ac_i} \left((1 - \delta_i)^{\frac{1}{\rho c_i+1}} PM_i^{\frac{\rho c_i}{\rho c_i+1}} + \delta_i^{\frac{1}{\rho c_i+1}} PD_i^{\frac{\rho c_i}{\rho c_i+1}} \right)^{1+\frac{1}{\rho c_i}}$

(32) $YDD_i = \frac{XC_i}{ac_i} * \left(ac_i * \delta_i * \frac{PC_i}{PD_i}\right)^{\frac{1}{\rho c_i+1}}$

(33) $PMDreg_{ihs,reg} = EXCHG * PWMDregEXO_{ihs,reg} * numer * (1 + TTARDregEXO_{ihs,reg})$

(34) $TARDreg_{ihs,reg} = TTARDregEXO_{ihs,reg} * EXCHG * PWMDregEXO_{ihs,reg} * numer * MDreg_{ihs,reg}$

(35) $MD_{ihs} = \frac{M_i}{acd_i} * \left(acd_i * PM_i * \frac{deltad_{i,ihs}}{PMD_{ihs}}\right)^{\frac{1}{1+\rho cd_i}}, \forall ihs \in i$

(36) $PM_i M_i = \sum_{ihs \in i} PMD_{ihs} MD_{ihs}$

(37) $MDreg_{ihs,reg} = \frac{MD_{ihs}}{acdreg_{ihs}} * \left(acdreg_{ihs} * PMD_{ihs} * \frac{deltadreg_{ihs,reg}}{PMDreg_{ihs,reg}}\right)^{\frac{1}{1+\rho cdreg_{ihs}}}$

(38) $PMD_{ihs} * MD_{ihs} = \sum_{reg} PMDreg_{ihs,reg} * MDreg_{ihs,reg}$

(39) $$EDreg_{ihs,reg} = (ED_{ihs} * acexdreg_{ihs}^{\frac{\rho_{cexdreg_{ihs}}}{1-\rho_{cexdreg_{ihs}}}} * \left(\frac{COMPWEDregEXO_{ihs,reg}}{EXCHG} * \left(1 + TTARDCHLEXO_{ihs,reg}\right) * \frac{PD_i}{PED_{ihs} * deltaexdreg_{ihs,reg}}\right)^{\frac{1}{\rho_{cexdreg_{ihs}}-1}}, \forall ihs \in i$$

(40) $$PED_{ihs} * ED_{ihs} = \sum_{reg} \frac{COMPWEDregEXO_{ihs,reg}}{EXCHG} * PD_i * EDreg_{ihs,reg}, \forall ihs \in i$$

(41) $$ED_{ihs} = E_i * acexd_i^{\frac{\rho_{cexd_i}}{1-\rho_{cexd_i}}} * \left(\frac{PED_{ihs}}{PE_i * deltaexd_{(i,ihs)}}\right)^{\frac{1}{\rho_{cexd_i}-1}}, \forall ihs \in i$$

(42) $$PE_i E_i = \sum_{ihs \in i} PED_{ihs} ED_{ihs}$$

(43) $$IMP_j = PJ_j * TIMPEXO_j * Y_j$$

(44) $$TVA_i = TTVAEXO_i * PC_i * QDHH_i$$

(45) $$HHSAVINGS = SAVHHEXO * RDHH$$

(46) $$GOVSAVINGS = SAVGOVEXO * RDGOV$$

(47) $$INV_i = betainv_i * IT / [\sum_{i1} betainv_{i1} * PC_{i1} * (1 + TTVIEXO_{i1}))]$$

(48) $$TVI_i = TTVIEXO_i * PC_i * INV_i$$

(49) $$XC_i = TIC_i + QDHH_i + QDGOV_i + INV_i$$

(50) $$QDHH_i * PC_i * (1 + TTVAEXO_i) = betahh_i * (1 - SAVHHEXO) * RDHH$$

(51) $$QDGOV_i = betagov_i * (1 - SAVGOVEXO) * \frac{RDGOV}{\sum_{i1} betagov_{i1} * PC_{i1}}$$

(52) $$RDHH = \sum_f (W_f * XTHHEXO_f) - TRHHRMEXO * numer - TRHHGOVEXO * numer$$

(53) $$RDGOV = \sum_f (W_f * XTGOVEXO_f) + \sum_i (TVA_i + TVI_i) + \sum_{ihs,reg} (TARDreg_{ihs,reg}) + \sum_j (imp_j) - TRGOVRMEXO * numer + TRHHGOVEXO * numer$$

(54) $$\sum_{ihs,reg} (EXCHG * PWMDregEXO_{ihs,reg} * numer * MDreg_{ihs,reg}) + TRHHRMEXO * numer + TRGOVRMEXO * numer - \sum_{ihs,reg} (COMPWEDregEXO_{ihs,reg} / EXCHG * PD_i * EDreg_{ihs,reg}) + TRADEBAL_{ini} = 0, \forall ihs \in i$$

(55) $$\sum_j x_{(j,f)} = XTHHEXO_f + XTGOVEXO_f$$

(56) $$PD_{C28} = numer$$

APPENDIX 3.3 SIMULATION APPROACH: COMBINING STRUCTURAL DECOMPOSITION ANALYSIS AND COUNTERFACTUAL EXPERIMENTS

CGE models are usually used to answer counterfactual experiments, i.e. "what if" questions. For a given benchmark, the impact of a given shock is evaluated, *ceteris paribus*. The present case is special in this respect, since the agreement studied is already applied—even though the phase-in period is still on-going. In this context, counterfactual simulations would not draw the best conclusions out of the existing information, since they would overlook observed changes in tastes, technologies and trade patterns with other partners. While some counterfactual simulations will be used to further assess policy changes (in particular the full implementation of the agreement, at the end of the phase-in period), a different approach is followed to assess the impact the EU-Chile FTA has had so far on the Chilean economy.

A. METHODOLOGY

The methodology applied is inspired by structural decomposition analysis methods. Jean and Bontout (2002) and Abrego and Whalley (2003) are examples of such a methodology, which is also close to some of the experiments carried out with Monash and USAGE models by Peter Dixon and his co-authors (see Dixon and Rimmer, 2004, 2008). Essentially, the objective is to use the model to give an interpretation of observed changes, instead of using it to assess the *ceteris paribus* impact of a specific policy change.

The description of the economy's equilibrium by a CGE model can be thought of as

(57) $$\mathbf{F}(\boldsymbol{\sigma}, \boldsymbol{\theta}, \mathbf{x}, \mathbf{y}) = 0$$

where each of the arguments is a vector. $\boldsymbol{\sigma}$ represents behavioural parameters, usually drawn from external sources; $\boldsymbol{\theta}$ summarises "distributional" parameters (for the most part representing tastes and technology), unknown a priori and usually calibrated; $\mathbf{x}$ are exogenous variables, usually policy variables, known or assumed to be known; and $\mathbf{y}$ are endogenous variables, known for the initial equilibrium from the model's database, but unknown otherwise, and determined as a result of the equilibrium.

The calibration procedure determines distributional parameters based on the assumption of initial equilibrium:

(58) $$\widehat{\boldsymbol{\theta}}_0 : \mathbf{F}\left(\boldsymbol{\sigma}, \widehat{\boldsymbol{\theta}}_0, \mathbf{x}_0, \mathbf{y}_0\right) = 0$$

where a hat over a variable or a parameter signals it is estimated. A value-quantity split needs to be assumed to do so, generally based on the assumption that initial prices are equal to one. Finally, simulations generally involve assessing the impact of a change in policy variables from $\mathbf{x}_0$ to $\mathbf{x}_1$, meaning that the final equilibrium is obtained as

(59) $$\hat{\mathbf{y}}_1 : \mathbf{F}\left(\boldsymbol{\sigma}, \widehat{\boldsymbol{\theta}}_0, \mathbf{x}_1, \hat{\mathbf{y}}_1\right) = 0$$

In the present case, we can think of the year before the EU-Chile FTA enforcement, 2002, as "period 0". But we can also observe economic developments in Chile until 2008.[98] Referring to 2008 as "period 1", this means that there is no need to assess endogenous

[98] Data for 2009 are also available. As already mentioned, however, year 2009 might be misleading due to the financial crisis, which may make it poorly representative of the structural equilibrium of the economy.

variables at this point, $\mathbf{y_1}$, since they can be observed. Instead, the observed values in period 1 of policy variables and of endogenous variables allow the new value of behavioural parameters to be determined:

(60) $$\widehat{\boldsymbol{\theta}}_1 : \mathbf{F}\left(\boldsymbol{\sigma}, \widehat{\boldsymbol{\theta}}_1, \mathbf{x_1}, \mathbf{y_1}\right) = 0$$

This double calibration procedure means that the model is able to track perfectly the changes observed from period 0 to period 1. In the model's framework, they reflect changes in behavioural parameters (from $\widehat{\boldsymbol{\theta}}_0$ to $\widehat{\boldsymbol{\theta}}_1$) and in exogenous, policy variables (from $\mathbf{x_0}$ to $\mathbf{x_1}$). This methodology is a structural decomposition analysis, in the sense that it decomposes changes observed over a given period in the context of a structural model of the economy. In the present case, we are only interested in one specific source of change, namely the enforcement of the EU-Chile FTA.

B. Experiment design

The right counterfactual to the EU-Chile FTA enforcement is not exactly the status quo, in terms of protection, because Chile lowered its almost flat MFN tariff duty from 7% in 2002 to 6% in 2003. We thus modify the initial equilibrium to take this change into account, by carrying out a pre-experiment simulation, whereby Chile's MFN duty rates are lowered from their 2002 level to their 2003 level. The equilibrium obtained as a result of this simulation is considered in the analysis that follows as the initial equilibrium.

As emphasised by Harrison et al. (2000) the contribution of each exogenous shock is not independent from the order in which they are assumed to take place. While the EU-Chile FTA was enforced at the beginning of the period, it includes a still on-going phase-in period, and its effects have been felt progressively. For this reason, it is difficult to assume that the EU-Chile FTA enforcement occurs first, before changes in technology, consumer preferences and world prices take place. Instead, we assume that all shocks are symmetrical in terms of timing. In this context, we assess the impact of the EU-Chile FTA enforcement as the mean between two alternative simulations: one where the EU-Chile FTA is assumed to be enforced first, before any other shock; the other where it is assumed to be enforced last, after all other shocks. The first simulation thus corresponds to the implementation of the shock based on the 2002 initial equilibrium (i.e., the situation obtained as a result of the pre-experiment); the second one can be viewed as the opposite of the impact of dismantling the EU-Chile FTA in 2008. The estimated proportional impact of the EU-Chile FTA is then computed as the average across these two simulated proportional impacts, using a Fisher index.[99]

Formally, let us split the vector of policy variable ($\mathbf{x}$) between tariff duties ($\mathbf{x^d}$) and the rest of policy variables ($\mathbf{x^r}$). The solution of the first simulation, whereby the upfront implementation of the EU-Chile FTA is simulated, can be represented as:

[99] If Δ_1 is the proportional impact of the first shock (enforcement of the Agreement, from the 2002 baseline) on a given variable, and Δ_2 is the proportional of the second shock (enforcement of the Agreement, from the counterfactual 2008 situation without the Agreement), the average is thus computed as $\Delta = \sqrt{(1+\Delta_1)(1+\Delta_2)} - 1$.

(61) $$\hat{\mathbf{y}}_{\mathbf{1}}^{\mathbf{a}}: \ \mathbf{F}\left(\boldsymbol{\sigma}, \widehat{\boldsymbol{\theta}}_{\mathbf{0}}, \mathbf{x}_{\mathbf{1}}^{\mathbf{d}}, \mathbf{x}_{\mathbf{0}}^{\mathbf{r}}, \hat{\mathbf{y}}_{\mathbf{1}}^{\mathbf{a}}\right) = 0.$$

Likewise, the second simulation corresponds to a front-end-loaded enforcement EU-Chile FTA. Starting from the final equilibrium, the shock consists of applying pre-EU-Chile FTA tariff duties, with a solution defined as:

(62) $$\hat{\mathbf{y}}_{\mathbf{0}}^{\mathbf{b}}: \ \mathbf{F}\left(\boldsymbol{\sigma}, \widehat{\boldsymbol{\theta}}_{\mathbf{1}}, \mathbf{x}_{\mathbf{0}}^{\mathbf{d}}, \mathbf{x}_{\mathbf{1}}^{\mathbf{r}}, \hat{\mathbf{y}}_{\mathbf{0}}^{\mathbf{b}}\right) = 0.$$

For any given endogenous variable y (a scalar component of $\mathbf{y}$), the assessed proportional impact of the EU-Chile FTA, $\widehat{\Delta y}$, is then computed as follows:

(63) $$1 + \widehat{\Delta y} = \sqrt{(\hat{y}_1^a / y_0)\left(y_1 / \hat{y}_0^b\right)}.$$

The price for this wealth of results is data requirements, since this methodology requires a consistent, double calibration procedure. This means that two social accountancy matrices (SAMs) of the Chilean economy must be put together; in addition, these two matrices must be consistent in terms of definition of physical units, meaning that deflators of consumption and production factor services must be used. The corresponding dataset has been put together combining the detailed input-output table of the Chilean economy for 2003 (Central Bank), various national account sources, the LA-KLEMS database, Chilean custom data sources, and TARIC for the EU tariffs. Data sources and methodology are described in Appendix 3.1.

We complement this decomposition analysis with standard counterfactual experiments, starting from the 2008 database. Three scenarios are considered:

(i) *Back to MFN*: this scenario assumes that the EU-Chile FTA is phased out, meaning that the EU applies the MFN regime to Chilean exporters, while Chile applies MFN duties to EU exporters. The corresponding simulations should give an impact close to the opposite of the assessed contribution of the agreement over the 2002-2008 period, but they differ somewhat given the change in initial conditions, and the fact that the alternative regime for Chile is now the MFN, instead of the GSP in 2002;

(ii) *Full implementation of the EU-Chile FTA ("Full implementation")*: this scenario assumes the agreement is fully implemented, as planned at the end of the phase-in period;

(iii) *Bilateral quota-free, duty-free trade ("EU-Chile QFDF")*: this scenario assumes that trade is duty-free, and quota-free between the EU and Chile.

Appendix 4.1: Restrictive measures Incorporated by Chile in the FTA with the US

Table 63: Restrictive measures Incorporated by Chile in the FTA with the US

Restriction	Sector(s) concerned	Level of Restric-tion
As a minimum, 85% of employees must be Chilean national citizens in firms with more than 25 employees	All	High
The owner of social mass media, such as the transmissions of image and sound or a national agency of the news, in the case of a natural person, must have an address properly established in Chile, and, in the case of a legal person, must be constituted to reside in Chile or to have an authorized agency to operate within the national territory. Only the Chileans can be presidents, managers, administrators or representatives of the legal person.	Communication	High
The owner of social magazine, mass media, such as daily, or text published regularly with publishing direction in Chile, or a national agency of the news, in the case of a natural person, must have an address properly established in Chile and, in the case of a legal person, it must be constituted to reside in Chile or to have an authorized agency to operate within the national territory. Only Chileans can be presidents, administrators or legal representatives of the legal person. The legally responsible director and the person who replaces it must be Chilean with address and residence in Chile.	Communication	High
A concession or authorization for use of beaches or beach lands is required, marine portions of water and bottoms to take to end aquiculture activities. Only natural or constituted legal people according to Chilean laws and foreign Chilean people that have definitive permanence could be titular of an authorization or concession to realize aquiculture activities.	Aquaculture	Local presence
Only Chilean natural people can provide services of customs brokers.	Custom agencies	High
External auditors of the financial institutions must be enrolled in the Registry of External Auditors of the Superintendent of Banks and Financial Institutions' , as well as with the Securities and Insurance Superintendent. Only the legally constituted legal people in Chile as societies of people or associations and whose main turn of businesses are the services of audit will be able to register in the Registry.	Audit	Local presence
Only Chilean natural people can be authorized to exert the lawyer profession. Only the lawyers can serve such as the sponsorship in the subjects that are followed before courts of the Republic, and is translated in the obligation of which the first presentation of each part must be sponsored by a lawyer qualified for the exercise of the profession; the writing of constitution, modification, termination or liquidation of societies, liquidation of conjugal societies, partition of goods, constituent writings of legal personality, associations managing irrigation channels (*canalistas*), cooperatives, contracts of transactions and contracts of bond emission of joint-stock companies; and the sponsorship of the request of concession of legal personality for the corporations and foundations. Chile maintains a bilateral agreement with Ecuador, by means of which the Ecuadorian possessors of a title of lawyer granted by a university of Ecuador are admitted to the exercise of the profession of lawyers in Chile. None of these measures is applied to foreign legal consultants who practice or advise on the legislation of any country in which that consultant is authorized to exert like lawyers.	Legal services	High

Aids of the justice administration must reside in the same place or city as the court where they will serve. The defending public, notaries public and conservatives will have to be Chilean and to fulfil the same demanded requirements to be judge. The archivists and the referees of right must be lawyers, and consequently, must be Chilean natural people. Only Chilean natural people with the right to vote and the foreigners with permanent and right residence to vote can act like judicial receivers and solicitors of the number. Only natural and foreign Chilean people with definitive permanence in Chile or Chilean legal people can be public auctioneers. To be receiver of bankruptcies it is necessary to own a technical or professional title granted by a university, a professional institute or a centre of technical formation recognized by Chile. The receivers of bankruptcies must not have less than three years of experience in commercial, economic or legal areas.	Auxiliary services of administration of justice	High
Other sectoral restrictions	Restrictions in the transport and fishing boat sectors	High

Source: Own elaboration based on the Chile-US FTA.
Note: To facilitate the analysis, the table only lists regulatory measures and policies that contain discriminatory elements.

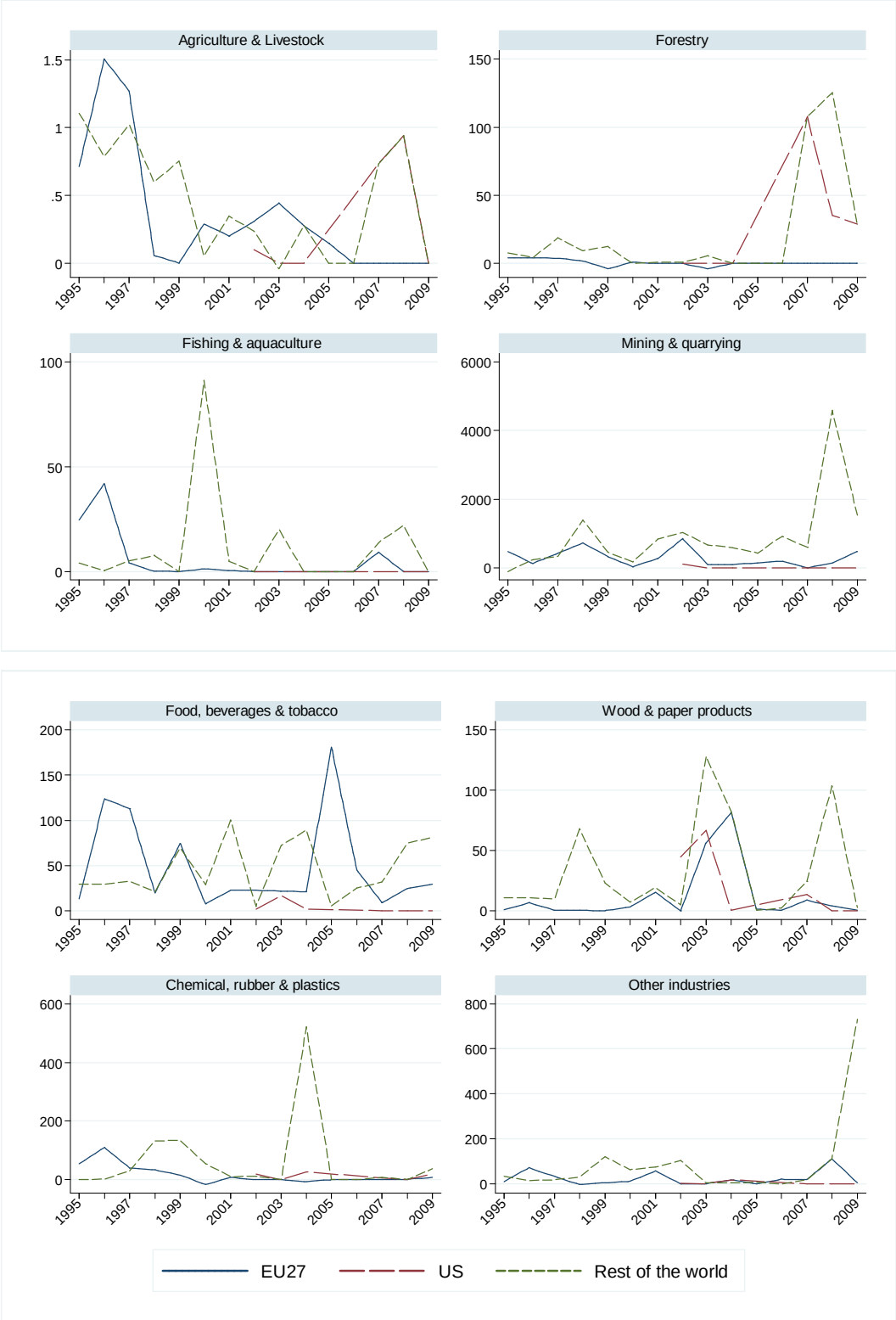
APPENDIX 4.2: SERVICE SECTORS IN THE ESTIMATION SAMPLE

TABLE 64: CODES OF SERVICES SECTORS IN THE ESTIMATION SAMPLE

Balance of payment code	EBOPS code and description
207	1.1.1 Sea transport, Passenger
208	1.1.2 Sea transport, Freight
209	1.1.3 Sea transport, Other
211	1.2.1 Air transport, Passenger
212	1.2.2 Air transport, Freight
213	1.2.3 Air transport, Other
246	3.1 Postal and courier services
247	3.2 Telecommunications services
249	4 Construction services
255	5.2 Freight insurance
256	5.3 Other direct insurance
257	5.4 Reinsurance
258	5.5 Auxiliary services
260	6 Financial services
263	7.1 Computer services
266	8 Royalties and license fees
271	9.1.2 Other trade-related services
272	9.2 Operational leasing services
278	9.3.2 Advertising, market research, and public opinion polling
279	9.3.3 Research and development
280	9.3.4 Architectural, engineering, and other technical services
284	9.3.6 Other business services
285	9.3.7 Services between related enterprises, n.i.e.
288	10.1 Audiovisual and related services

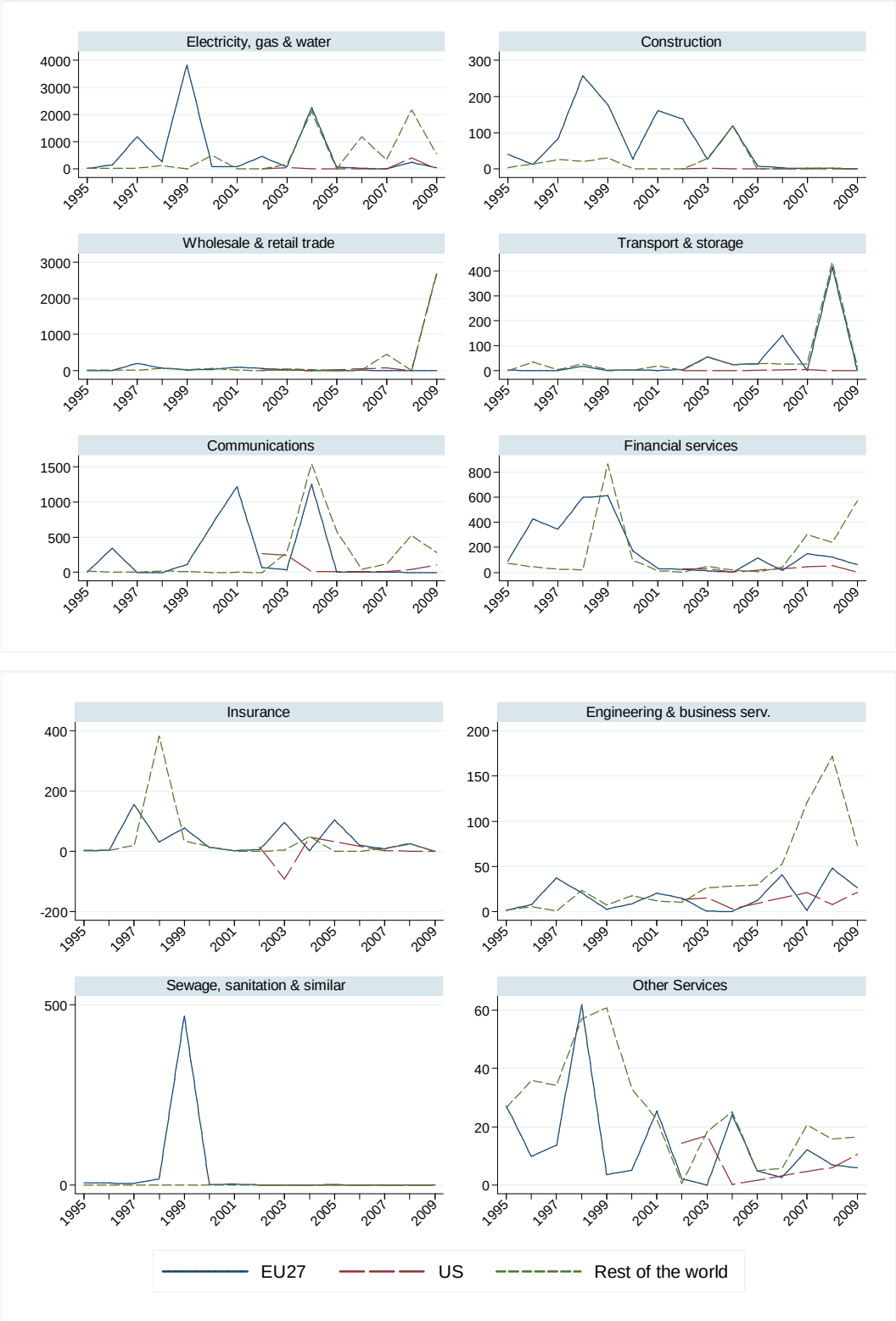
Appendix 4.3: Chile's FDI inflows by region of origin and by sector

Figure 45: Chile's FDI inflows by region of origin and by industrial sector, 1995-2009



Source: Authors' calculations based on data from Chile's Foreign Investment Committee.
Note: Scale varies across graphs. "Rest of the world" refers to all countries other than the EU27 and the US.

FIGURE 46: CHILE'S FDI INFLOWS BY REGION OF ORIGIN AND BY SERVICE SECTOR, 1995-2009



Source: Authors' calculations based on data from Chile's Foreign Investment Committee.
Note: Scale varies across graphs. "Rest of the world" refers to all countries other than the EU27 and the US.

APPENDIX 5.1: RESPONDENTS TO THE SURVEY

A detailed only survey was conducted on the evaluation of the functioning of the EU-Chile FTA by stakeholders, i.e. mostly exporters, but also some importers, and investors. More than 70 respondents have given their opinion on the way the provisions regarding trade facilitation works, and on whether the EU-Chile FTA had made it easier to trade and invest.

The rate of response in the EU private sector has been very low. As a result, most of the 70 respondents are Chilean firms or firms located in Chile (see Figure 48 and Figure 47. Within this category most of the respondents are Chilean exporters to the EU, the number of responses from EU importers in Chile and from EU exporters to Chile, as well as from the services industry has been low. A number of respondents ("others" in Figure 48) are professional organisations, chambers of commerce or business associations.

Regarding the characterization of the respondents, among Chilean exporters to the EU only 13% also import from the EU. The few investor respondents indicate that they do not export or import products, suggesting that investment is a stand-alone strategy rather than a tariff jumping strategy.

Roughly 75% of the companies that responded existed before the implementation of the EU-Chile FTA. The sample covers all firm sizes. There is a likely overrepresentation of small firms since 36% have less than 20 employees while 17% have more than 100 employees. 46% of the respondent have a gross receipt between US$ 1 million and US$ 10 million, but 18% between US$ 50,000 and US $100,000, while another 18% between US$ 100,000 and 1 million. More than half are corporations and 40% of them are family firms.

Regarding gender issues, for almost half of respondents, women represent 25 to 50% of the workforce, but for more than 20% of the respondents, they represent more than 75% of the workforce, in particular among individual firms in the wine sector and large companies in the fisheries sector. Women are only heads of the company in 14% of the cases and own it in 12%.

FIGURE 47: CHARACTERIZATION OF THE RESPONDENTS TO THE ONLINE SURVEY

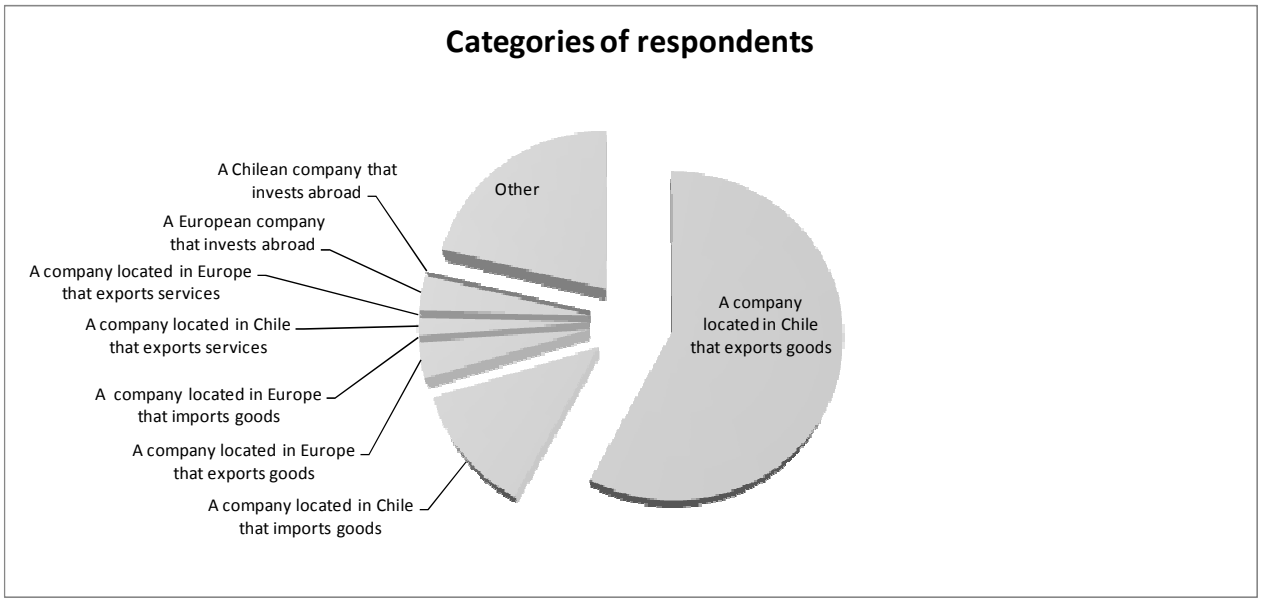
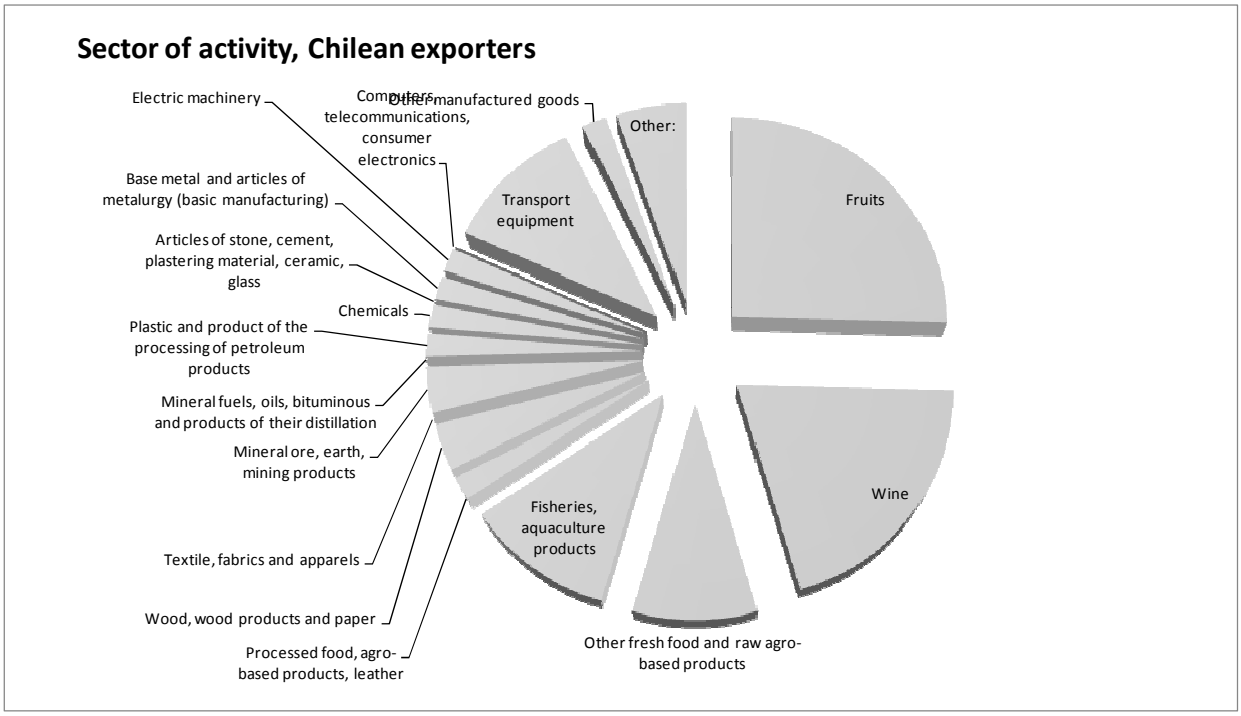


FIGURE 48: MAIN SECTORS OF ACTIVITY OF THE CHILEAN COMPANIES RESPONDING TO THE ONLINE SURVEY



APPENDIX 6.1: METHODOLOGY FOR THE ENVIRONMENTAL ASSESSMENT

Conceptual developments in analysing the environmental impacts of trade liberalization. An analytical framework has emerged from the academic literature on assessing the effect of trade liberalization on the environment. Estimates of scale, composition, and technique effects are often distinguished from each other(Antweiler et al. 2001, Copeland and Taylor 2004). This framework encompasses different phenomena. It includes monotonic relationships between income and the environment (for example, a free trade agreement that leads to direct investment in a polluting sector will draw resources from the less polluting ones through the standard Rybczinski theorem). It also includes non-monotonic relationships, in particular the so called "Kuznets Environmental Curve" assumption, under which pollution is linked to per capita income by a U-shaped relation. Such a U-shaped relation can itself be caused by several phenomena. Some have to do with the changes in the demand for environmental quality as income rises (Lopez, 1994). The U-shaped relation can also be caused by "sources of growth" determinants (assume for example that a country grows primarily via capital accumulation in a polluting sector in the early stage and then by human capital acquisition in later stages, which might generate a rise and then a fall in pollution when per-capita income increases). Other determinants include threshold effects, and economies of scale in the cost of pollution abatement.

One can add extra effects. Strategic interactions and political economy are two of them. For example, the way domestic lobby groups influence environmental policy depends on the comparative advantages in polluting sectors. This makes environmental policy, and hence the pollution intensity of production, endogenous to trade liberalization. A way to model this is to consider that pollution intensity results from the meeting of an implicit demand of pollution by firms (e.g. when regulations or pollution taxes go down, the pollution intensity rises, and production of the dirty good is becoming more attractive) and a supply of pollution that results from the setting of public regulation on pollution (Copeland and Taylor 2004). Empirical difficulties for estimation are nevertheless formidable.

In a country like Chile that experiences rapid transitions, various effects can combine. Trade liberalization can stimulate production of a dirty good (e.g. minerals) which tends to increase the demand for pollution from the industry. Foreign investment can increase the country's capital stock and result in an increase in dirty goods production and hence an increase in net exports of dirty goods. At the same time, an increase in the price of the dirty good can raise the level of the aggregate price for consumption goods relative to the opportunity cost of environmental quality. As a result consumers would like to substitute towards more environmental quality, especially with a growing income, and the policy maker might respond by tightening environmental regulations. Abatement costs might also increase with tougher environmental policy (Sheldon 2005). In such a typical case, the different effects would work against each other, and the magnitude of the overall effect would depend on the model parameters.[100]

[100] Copeland and Taylor (2003) find that for a country that imports a dirty-good, trade liberalization will reduce pollution. The increase in income shifts back pollution supply, and the lower price of dirty goods leads to a reduction in pollution demand. Both income and substitution effects combine to improve environmental quality. On the other hand, for a dirty-good exporter, pollution tends to rise via the substitution effect (the demand for pollution rises as the price of the dirty good rises) but fall via the income effect (the supply of pollution shifts back as real income grows). If the income elasticity of marginal damage is small, then pollution

Methodology used in the study. Identification of the environmental consequences of a trade agreement is particularly challenging for Chile, given the large number of trade agreements and the macroeconomic changes that have taken place. The theoretical framework presented in Section 6.1.1. helps distinguish the various, and often opposite effects in play, but empirical modelling is needed to quantify them. The *scale effect* and the *the composition effect* can be assessed with computable general equilibrium, or with less sophisticated but more robust techniques such as input-output analysis and SAM multipliers. The t*echnique effect* in a country like Chile results from access to new technology, pressures from foreign customers for more corporate responsibility and higher standards, local pressure of higher income consumers for a cleaner environment, all of these may affect the pollution intensity of production. On the other hand, trade liberalization may also strengthen the lobbying of private firms for maintaining a competitive advantage by lower cost of compliance to environmental standards. The desire to attract investment and the possible reluctance to tighten environmental regulations because of concerns over international competitiveness may therefore result in an ambiguous technique effect. Here, a mix of quantitative techniques and qualitative analysis is used in order to assess the impact of the EU-Chile FTA on the pollution intensity of production.

The use of CGE simulations in the environmental assessment. The assessment of the scale effect of trade liberalization on the environment can be done using input output analysis, a classic method for assessing the impact of change in the final demand of a given sector on all sectors of the economy. Caveats of input-output analysis are well known: the assumptions that the underlying production function is Leontief (fixed input output coefficients); that returns to scale are constant; that prices are fixed, hence that supply is infinitely elastic; and that output is demand-determined. Such methods remain interesting for limited changes, in particular for assessing input variations in a small sector. For large changes, they are dominated by more sophisticated approaches.

Social Accounting Matrices (SAM) multipliers allow a distinction between endogenous and exogenous accounts, and take into account "leakages" such as induced revenues, induced demand for imports and induced savings, and are particularly useful for analysing the impact of shocks on the income distribution between categories of labour. Different partitioning of the accounts between endogenous accounts and exogenous ones correspond to different macroeconomic closures.

Policy Evaluation Matrices have also been used, in particular by the OECD. One of their advantages is the ability to make changes dependent on prices through functional forms (elasticities). They rely on a partial equilibrium approach but the specific qualities of these models (their degree of sectoral disaggregation and their parsimony on data requirements) has led some authors to combine them with a general equilibrium framework (Hsin et al. 2004 and subsequent work within the Global Trade Analysis Project consortium).

General equilibrium approaches provide a global framework which, in theory, encompasses other methods. Indeed, there is in theory nothing that a partial equilibrium

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rises in a dirty-good exporting country even though pollution policy is fully optimal. Conversely, if the income elasticity of marginal damage is large, pollution falls. The role of endogenous standards is important (Levinson and Taylor 2008). If increased trade liberalization results in a shift of pollution-intensive industries to countries with weaker environmental policy, then it can be an incentive for regulatory chill and a race to the bottom in environmental regulation.

approach model can do and that a computable general equilibrium approach cannot (see Moschini and Gohin 2006). However, such global approaches become rapidly complex and generate numerical as well as practical (computer time) problems when a realistic representation of the economy, i.e. with imperfect competition, endogenous investment and savings, etc. is implemented. The data requirements become the main obstacle when one needs to disaggregate down to a detailed degree of sectoral representation.

In the case of Chile, general equilibrium approaches are a way to generate a virtual economic environment, i.e. the situation of Chile without the EU-Chile FTA, that can be used as a benchmark. This makes it possible to provide information on the EU-Chile FTA's economic impact (real income; employment; and capital formation) and sectoral trade and output. With this approach, sustainability impacts, whether economic, social or environmental, must arise from an initial economic impact or from the linkage to a sector where there is a direct economic impact.

APPENDIX 6.2: PRO MEMORIA: THE SWORDFISH DISPUTE BETWEEN CHILE AND THE EU

Catches of Swordfish (*Xiphias gladius*) have decreased dramatically since the early 1990s, falling to 6000t in 2008 for the whole South Pacific, half of the amount caught in 2000. In the early 1990s, commercial fishermen from Europe, Japan and Chile increasingly fished for swordfish in the Southeast Pacific high seas (i.e. international waters). In the 1990s Chile enacted laws prohibiting access to Chilean ports of foreign vessels that captured swordfish on the high seas of a size below a certain minimum size. The EU is a member of the IATTC and fishes in accordance with its regulations for the high seas and therefore EU vessels were unable to offload their catches in Chilean ports for packaging (Granger 2008). Foreign vessels, including those from the EU, who did not comply were unable to offload their catch in Chilean ports for packaging and shipment to the United States and Europe and complained of the economic consequences. This turned to a dispute that was raised by Chile and the EU under two different international jurisdictions, i.e. the WTO Dispute Settlement Body and ITLOS, i.e. the judicial body created by the United Nations Convention on the Law of the Sea.

On the WTO side, ANAPA (Asociación Nacional de Armadores de Buques Palangreros de Altura - Spanish National Association of Owners of deep-sea Longliners) lodged a complaint in May 1998 pursuant to the Trade Barriers Regulation claiming a violation of Chile's obligations under GATT 1994 and of several provisions of the United Nations Convention on the Law of the Sea. The Commission concluded that the Chilean ban violated the principle of freedom of transit, established by Article V of GATT 1994. In addition, by making unloading in Chilean ports impossible for swordfish catches made by Community vessels, the Chilean measures also render impossible the importation of the affected catches into Chile, which is contrary to Article XI of GATT 1994 (Orellana 2002). At the same time, in December 2000, Chile submitted a petition to the International Tribunal for the Law of the Sea for consideration regarding the conservation of swordfish stocks by Chile and the EU. The UN Convention on the Law of the Sea establishes a legal framework to regulate all ocean space, its uses, and resources. Chile requested, with the EU's consent, that ITLOS form a Special Chamber to deal with their dispute.

In January 2001, the EU and Chile reached a settlement to resolve the "swordfish dispute" covering both access to Chilean ports for EU fishing vessels and bilateral and multilateral scientific and technical co-operation on conservation of swordfish stocks. The Commission agreed with the Chilean authorities to appoint ports for which EU vessels fishing for swordfish in the southeast Pacific could use. The arrangement, worked out in 2001, was the basis of an agreement concluded in October 2008. On 7 April 2008, the Council of EU Ministers adopted the negotiating directives for a permanent agreement with Chile. On 15 and 16 October 2008, the Commission and the Chilean Government agreed, subject to the completion of their respective internal procedures, on an *Understanding Concerning the Conservation of Swordfish Stock in the South Eastern Pacific*. The deal which had been agreed upon by the Commission and Chilean authorities would allow EU vessels fishing for swordfish to unload and transport swordfish catches from the high sea at three national ports.

Upon request of the EU and Chile, the ITLOS adopted an Order of discontinuance of the ITLOS case on 16 December 2009. On 28 May 2010, the EU and Chile notified to the WTO

Dispute Settlement Body of the discontinuance of the WTO case. The issue is nevertheless not fully closed.

On the EU side, the Council adopted the decision authorising the signature of the Understanding on 3 June 2010. Signature by both parties will allow for the provisional application of the Understanding. Its final conclusion will be subject to ratification by the Chilean and European Parliaments.

APPENDIX 7.1: ESTIMATED SECTOR-LEVEL IMPACTS OF THE FTA ON EMPLOYMENT BY CATEGORY, BASED ON CGE SIMULATIONS

TABLE 65: OBSERVED CHANGE IN AND ESTIMATED IMPACT OF THE FTA ON EACH SECTOR'S SHARE IN EMPLOYMENT, BY LABOUR CATEGORY (%)

	Share in low-skilled employment				Share in med-skilled employment				Share in independent employment			
	2002 (a)	2008 (b)	Observed change (c)	Agr't impact (d)	2002 (e)	2008 (f)	Observed change (g)	Agr't impact (h)	2002 (i)	2008 (j)	Observed change (k)	Agr't impact (l)
S01 - Other agriculture	0.9	1.4	0.51	0.00	0.8	0.6	-0.12	0.00	1.2	0.3	-0.87	0.00
S02 - Fruit growing	1.5	2.8	1.24	0.20	1.3	1.3	-0.03	0.13	2.0	0.6	-1.40	0.15
S03 - Animal husbandry	0.9	1.4	0.50	0.00	0.7	0.6	-0.11	0.00	1.1	0.3	-0.84	0.00
S04 - Forestry	0.9	1.5	0.63	-0.03	0.7	0.7	-0.06	-0.01	1.2	0.3	-0.83	-0.01
S05 - Extractive fishing	1.2	2.1	0.86	0.09	1.0	0.9	-0.08	0.06	1.6	0.5	-1.15	0.06
S06 - Mining	5.1	4.7	-0.41	-0.01	5.3	6.9	1.60	-0.01	0.9	0.0	-0.91	0.00
S07 - Meat production	0.5	0.4	-0.09	0.00	0.4	0.3	-0.11	0.00	0.2	0.4	0.13	0.00
S08 - Seafood processing	0.5	0.5	-0.03	0.04	0.4	0.4	-0.08	0.03	0.3	0.5	0.21	0.03
S09 - Canning	0.3	0.3	-0.04	0.00	0.3	0.2	-0.06	0.00	0.2	0.3	0.10	0.00
S10 - Liquors & spirits	0.0	0.0	-0.01	0.00	0.0	0.0	-0.01	0.00	0.0	0.0	0.01	0.00
S11 - Winemaking	0.3	0.3	-0.04	0.05	0.3	0.2	-0.06	0.04	0.2	0.3	0.11	0.03
S12 - Other agro-industrial	2.3	1.9	-0.40	0.01	1.9	1.4	-0.53	0.01	1.2	1.9	0.65	0.01
S13 - Textiles & leather	1.0	1.3	0.24	0.01	1.1	1.7	0.55	0.01	0.9	1.0	0.09	0.00
S14 - Timber & furniture	1.0	0.7	-0.34	-0.03	1.1	0.6	-0.51	-0.03	1.3	0.7	-0.68	-0.03
S15 - Paper & printing	2.0	1.2	-0.73	-0.04	1.9	1.2	-0.72	-0.04	1.0	0.7	-0.27	-0.02
S16 - Fuel industry	0.3	0.0	-0.29	0.00	0.0	0.0	0.03	0.00	0.0	0.0	0.00	0.00
S17 - Chemical industry	2.2	1.2	-0.99	-0.05	2.4	1.0	-1.46	-0.05	0.4	0.0	-0.38	-0.01
S18 - Plastic industry	1.0	0.3	-0.72	-0.02	1.5	0.5	-0.98	-0.02	0.8	0.4	-0.35	-0.01
S19 - Other non-metallic min.	0.6	0.3	-0.29	0.00	0.5	0.4	-0.10	0.00	0.5	0.2	-0.25	0.00
S20 - Basic metal industry	2.2	3.1	0.92	-0.05	1.9	2.4	0.44	-0.04	1.0	0.3	-0.64	-0.01
S21 - Other machinery	0.4	1.0	0.53	-0.05	0.8	1.2	0.42	-0.08	1.0	0.5	-0.49	-0.08
S22 - Electronics & optics	0.2	0.2	0.01	0.01	0.1	0.1	0.00	0.01	0.2	0.1	-0.10	0.01
S23 - Transport equipment	0.3	0.2	-0.09	-0.01	0.2	0.2	-0.07	-0.01	0.1	0.5	0.47	-0.01
S24 - Other manufacturing	0.1	0.1	0.00	0.00	0.1	0.1	0.00	0.00	0.1	0.1	0.05	0.00
S25 - Electricity, gas, water	1.2	1.4	0.19	0.00	1.1	1.0	-0.09	0.00	0.7	0.3	-0.41	0.00
S26 - Construction	11.9	9.2	-2.75	0.00	9.2	8.3	-0.91	0.02	13.1	17.4	4.36	0.01
S27 - Trade	13.5	14.8	1.25	-0.02	14.2	18.3	4.03	0.00	25.1	20.5	-4.51	-0.02
S28 - Hotel & catering	1.1	0.6	-0.44	0.00	1.7	0.7	-0.97	0.00	1.9	3.8	1.92	0.00
S29 - Logistics	7.3	7.9	0.57	-0.02	10.6	10.1	-0.45	0.00	10.4	11.3	0.82	-0.02
S30 - Communications	2.2	1.6	-0.59	0.00	1.4	1.4	0.00	0.00	2.2	3.7	1.57	0.00
S31 - Financial activities	3.2	4.0	0.85	0.00	3.2	4.9	1.70	0.01	2.5	1.7	-0.79	0.00
S32 - Real estate	0.3	0.3	-0.02	0.00	0.3	0.2	-0.03	0.00	0.0	0.0	0.00	0.00
S33 - Leasing	11.4	13.8	2.48	-0.01	10.1	11.5	1.37	0.01	0.0	0.0	0.00	0.00
S34 - Public administration	7.4	5.2	-2.27	-0.04	9.0	6.2	-2.76	-0.03	3.3	10.2	6.91	-0.02
S35 - Education	7.0	7.2	0.20	-0.02	7.4	7.6	0.24	-0.01	9.4	8.7	-0.71	-0.03
S36 - Health & social	4.0	3.1	-0.93	-0.01	3.0	2.8	-0.18	0.00	9.0	6.9	-2.10	-0.02
S37 - Other services	3.9	4.4	0.49	0.00	3.8	3.9	0.08	0.00	5.0	5.2	0.24	0.00
Total changes in absolute value			**22.9**	**0.8**			**21.0**	**0.7**			**35.3**	**0.6**

Source: Authors' calculations based on the CGE simulations presented in Chapter 3, and on the model's database.

Note: Levels are expressed in percent, changes in percentage points. Shares in employment are computed as full-time equivalents, based on remuneration by sector and assuming wage by category of labour to be equal across sectors. Since figures refer to shares, the weighted average of changes across sectors is 0. Item c) indicates the changes in percentage point. Item d) indicates the contribution of the EU-Chile FTA in the change observed, according to model simulations.

APPENDIX 7.2: METHODOLOGY FOR THE ASSESSMENT OF PRICE CHANGES ATTRIBUTABLE TO THE EU-CHILE FTA IN THE FARM SECTOR

The composition of production of small farmers, especially of poorer farmers, likely meant that they would not be able to benefit from product price increases associated with the type of exports to Europe from Chile that were induced by the EU-Chile FTA. On the other hand, the greater concentration of these households in the production of traditional, importing-competing crops would suggest that they, as producers, might be harmed by further reductions in Chilean import barriers. These households might gain, however, as consumers. To assess the net impact of the Agreement on small-farm households, the following presents a framework for estimating the impacts on incomes and food costs of changes in prices of major food products and tradable farm inputs.[101]

The basic idea is that a first-order estimate of the impact of price changes on farm households (as producers and consumers) depends on the weights of products both in production revenues and in consumption baskets. The farm household has three major sources of income: farm production, off-farm labour income, and remittances and other transfers. The simulation of the impact of commodity and input price changes takes into account the relative weights of these income sources in the determination of changes to final real income, a measure of household welfare.

The analytical framework begins with dividing nominal total household income, I_T , into two principal source, net farm production income, I_A ,and non-farm income from off-farm labour and other sources, I_R : $I_T = I_A + I_R$. Net farm income derives from the production of various crops, Q_i (with associated prices, P_i), less variable production costs derived from per-unit usage, a_{ij} , of purchased inputs, X_j (with associated prices, W_j) :

$$I_A = \sum_i P_i Q_i - \sum_j W_j X_j = \sum_i P_i Q_i - \sum_j W_j a_{ij} Q_i = \sum_i [P_i - \sum_j W_j a_{ij}] Q_i = \sum_i VA_i Q_i$$

where VA_i represents the net value added per unit of product, the level of which, Q_i , is assumed constant in this short-run analysis. A long-run analysis should, however, account for changes in the mix of agricultural products and in the cost-per-unit of input use. In reality, farmers would respond to changes in the value added of different products, not merely the price per unit of the final output (this would be especially relevant if in fact international commodity price changes are contemporaneous to changes in the prices of inputs related to petroleum and natural gas). The elasticity of supply with respect to value added (accounting for possible proportional changes to purchased inputs) will be less than the simple supply elasticity with respect to output price.[102]

In what follows non-farm income will be held constant, although a base estimate is needed for purposes of calculating the share of farm income in total income. Non-farm income derives from off-farm labour days of family members L_R , times average wages w, plus remittances, R, and other transfers (including pensions) P : $I_R = w \cdot L_R + R + P$. Real household income Y is total nominal income deflated by an index of the cost of the

[101] Based on Valdés (2007).

[102] To see this, note that the elasticity of supply of output with respect to value added, ε , is the product of the elasiticy of supply in the usual sense, e , and rate of value added to price, v : ε = ev.

consumption basket C which can vary by household characteristics such as income levels and location (e.g., rural versus urban): $Y = \frac{I_T}{C}$

The cost of the consumption basket depends on a weighted sum of prices of both tradables t and non-tradables n, where the weights α_i are the (constant) shares of the individual goods in total household expenditures:

$$C = \sum_t \alpha_t P_t + \sum_n \alpha_n P_n \quad \text{where } \sum_t \alpha_t + \sum_n \alpha_n = 1$$

In the simulations which follow, the analysis focuses primarily on changes in prices of importables (traditional crops) and on changes in a select set of exportables (fruits and forestry). Other prices and consumption shares will be assumed constant. A long-run analysis should explore the possibility of changing cost shares in consumers' market baskets as consumer demand shifts in favor of substitutes. This in turn would have implications for future impacts on the price of non-tradables, which would likely adjust as a consequence of longer-term international commodity price shifts. One could formulate a system of demands with substitution effects to simulate longer-term impacts on the index of consumption costs. This present analysis focuses on short-run changes, assuming the consumption shares α_i's are constant and the prices of non-tradables and non-food goods remain stable.

The percent change in real income, Δ%Y, from an initial level of Y to a new level of Y', will depend on both changes in the numerator (nominal household income $\Delta\%I_T$) and changes in the denominator (cost of the consumption basket, Δ%C) and can be approximated by[103]

$$\Delta\%Y = \frac{Y' - Y}{Y} \approx \Delta\%I_T - \Delta\%C$$

The percent change in net farm income, $\Delta\%I_A$, holding production levels constant, depends on the change in value added per ton of each crop, $\Delta\%VA_i$.

$$\frac{I'_A - I_A}{I_A} = \Delta\%I_A = \sum_i (\Delta\%VA_i) \cdot \frac{VA_i \cdot Q_i}{I_A}$$

Note that a change in the value added per ton depends on a weighted sum of changes in output and input prices:

$$\Delta\%VA_i = \frac{P_i}{VA_i} \cdot \Delta\%P_i - \sum_j \frac{a_{ij} W_j}{VA_i} (\Delta\%W_j)$$

This yields another expression for the percent change in net farm income:[104]

[103] More generally, writing Y = AB, where A = I and B = 1/C: $\Delta\%Y = \Delta\%A + \Delta\%B + \Delta\%A \cdot \Delta\%B$ and so larger changes will deviate slightly from the above approximation.

[104] A numerical example: Suppose that there are two crops, wheat and non-tradables, where wheat uses fertilizer, but non-tradables do not. Suppose that – per ton – wheat revenues were $100 and fertilizer costs were $20 and other costs were $30. Net revenues per ton of wheat are then $50, and suppose that wheat represents 50 percent of total net revenues from farming. To exaggerate the illustration, suppose also that domestic price increases 40 percent for wheat and 35 percent for fertilizer. The percentage impact of these

$$\Delta\%I_A = \sum_i (\frac{P_i}{VA_i} \cdot \Delta\%P_i - \sum_j \frac{a_{ij}W_j}{VA_i}) \cdot \frac{VA_i \cdot Q_i}{I_A} (\Delta\%W_j)$$

Yet two other expressions for the percent change in net farm income are noted here. One is based on a reference to total gross income from production, $P'Q = \sum P_i \cdot Q_i$:

$$\Delta\%I_A = \sum_i \left[\left(\frac{P_i \cdot Q_i}{P'Q} \cdot \frac{P'Q}{I_A} \right) \cdot \Delta\%P_i - \sum_j \left(\frac{a_{ij}W_j \cdot Q_i}{P_i \cdot Q_i} \cdot \frac{P_i \cdot Q_i}{P'Q} \cdot \frac{P'Q}{I_A} \right) \cdot (\Delta\%W_j) \right]$$

The second expression, useful for practical computation, is to begin with representing the net income of individual crops I_{Ai} in terms of the costs shares, S_{ij} , of each input (j) relative to gross revenue of the crop, and the net revenue margin as a share of gross revenue of the crop, m_i (where $m_i = (1 - \sum S_{ij})$):

$$I_{Ai} = P_i Q_i - \sum_j a_{ij} w_j Q_i = P_i Q_i \left[1 - \sum_j \frac{a_{ij} w_j Q_i}{P_i Q_i} \right] = P_i Q_i \left[1 - \sum_j S_{ij} \right] = P_i Q_i m_i$$

And one can separate the impacts of price changes on revenues and costs in terms of shares of total net farm income (I_{Ai} / I_A) of each product and the net revenue margins of each product:

$$\Delta I_{Ai} = P_i Q_i \left[\frac{\Delta P_i}{P_i} - \sum_j \frac{a_{ij} w_j Q_i}{P_i Q_i} \frac{\Delta w_j}{w_j} \right] \Rightarrow \frac{\Delta I_{Ai}}{I_A} = \frac{P_i Q_i}{I_A} \left[\frac{\Delta P_i}{P_i} - \sum_j S_{ij} \frac{\Delta w_j}{w_j} \right]$$

$$\frac{\Delta I_{Ai}}{I_A} = \frac{I_{Ai}}{I_A} \frac{1}{m_i} \left[\frac{\Delta P_i}{P_i} - \sum_j S_{ij} \frac{\Delta w_j}{w_j} \right] = \frac{I_{Ai}}{I_A} \frac{1}{m_i} \frac{\Delta P_i}{P_i} - \frac{I_{Ai}}{I_A} \frac{1}{m_i} \sum_j S_{ij} \frac{\Delta w_j}{w_j}$$

$$\Rightarrow \frac{\Delta I_A}{I_A} = \sum_i \frac{\Delta I_{Ai}}{I_A} = \sum_i \frac{I_{Ai}}{I_A} \frac{1}{m_i} \frac{\Delta P_i}{P_i} - \sum_i \frac{I_{Ai}}{I_A} \frac{1}{m_i} \frac{\Delta C_i}{C_i}$$

This particular analysis focuses on changes in the consumption basket cost index due to changes in importable food products derived from wheat (bread and pasta), corn, rice, sugar, beef and vegetable oils, and some exportables (dairy and the interesting case of poultry and pork, exportables but depend on domestic and imported grains). The prices of tropical importables and non-tradables are assumed constant. Percent changes in the consumption cost index are a weighted sum of changes in prices of goods:

$$\Delta\%C = \sum_{ma} \alpha_{ma} \Delta\%P_{ma} + \sum_{xa} \alpha_{xa} \Delta\%P_{xa}$$

where the cost shares α_i included in this calculation sum to less than one due to the omission of most exportables, non-tradables and non-food products.

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price changes on total net revenues is then $\Delta\%I_A = (\frac{100}{50} \cdot 40\% - \frac{20}{50} \cdot 35\%) \cdot 0.5 = 33\%$. Note that gross revenues from wheat relative to total revenues increase by 2 x 0.4 x 0.5 or 40 percent, and costs increase by 0.4 x 0.35 x 0.5 or 7 percent.

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