



**Asia-Pacific  
Economic Cooperation**

**Advancing** Free Trade  
for Asia-Pacific **Prosperity**

# **Case Study on the Role of Services Trade in Global Value Chains: Transport Services in Chile**

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## EXECUTIVE SUMMARY

Deepening integration with global value chains (GVCs) is a key policy priority for many economies in the Asia-Pacific. GVC development has been notable in the region, particularly in sectors like transport equipment and electrical goods. But it is also spreading to other sectors, including agribusiness, resources, and services.

Services sectors can give rise to value chains in their own right, for example through business process outsourcing, but they also play an important role in manufacturing value chains. In many ways, services are the glue that holds manufacturing and resource value chains together. Lead firms have to be able to provide coordination and “headquarters” services—typically classified as business services—to construct the interlinked network of producers and distributors that lies at the core of any GVC.

From a policy point of view, there is a clear need for a better understanding of the ways in which services markets interact with GVC business models to produce observed outcomes. Intuitively, there seems to be real scope to promote and support the extension of GVCs to new economies and sectors by continuing along the path of progressive liberalization of services markets. APEC economies have already taken important steps in that regard, and future developments could have real economic benefits, not just in terms of traditional efficiency rationales, but also by supporting GVCs.

This case study represents an effort to better understand the relationship between services and GVC activity. It focuses on one particular example: transport services in Chile. By leveraging OECD and World Bank data, as well as qualitative sources, it is possible to develop a clear picture of the state of Chile’s transport sector, covering all relevant modes. In addition, new data and techniques can be used to analyze the linkages between the transport sector and Chile’s GVC activity. In particular, it is possible to identify the sectors that use transport services relatively intensively in terms of their export activity, i.e. which have a significant proportion of “embedded trade” in transport services. Intuitively, continued liberalization of the sector will do most to promote GVC activity in those sectors, which include the important agribusiness sector. The finding is an important one in part because GVCs are often thought to center on heavier manufacturing sectors, like transport equipment, and electronics. This case study clearly shows that agribusiness GVCs also rely heavily on transport services, which lays out important perspectives for the benefits of regulatory reform. This finding is of interest to a variety of APEC economies where agribusiness is important, developing and developed alike.

This case study is one of a set commissioned by PSU to examine the state of play in a selection of APEC economies and sectors. The particular value added of this case study lies in a number of factors. First, Chile’s membership of the OECD means that the analysis can be relatively data rich, both in terms of measuring GVC activity, and tracking policy changes over time. Second, Chile is a Latin American APEC economy, and it is important to have that perspective in addition to the Asian one, in particular because Latin American GVCs tend to be more resource intensive than manufacturing GVCs in East and Southeast Asia. Third, Chile has undertaken important service sector reforms affecting transport, so there is the perspective of identifying a clear link between policy changes and subsequent value chain development.

Concretely, the case study finds that Chile has undertaken substantial transport sector liberalization over recent years, although some measures remain that are deserving of a detailed benefit cost analysis. Chile's regulatory stance is generally quite liberal, and this is reflected in a substantial embodiment of foreign transport value added in exported GVC goods in sectors like agribusiness, and paper products, as well as resource sectors.

On the basis of an econometric model, it is concluded that the combination of transport sector reform efforts in Chile perhaps contributed to increase GVC performance by around 7%. Transport services are an important input into many GVCs, including those where Chile has been successful, so it should come as no surprise that liberalization can make a non-negligible contribution to promoting the expansion and deepening of GVCs.

More broadly, the work presented here supports APEC's focus on the role of services in manufacturing value chains. Moreover, it suggests that sectors like agribusiness, where GVCs are becoming more relevant for a number of APEC economies, also rely on services like transport, as well as wholesale and retail distribution. As a result, regulatory reform in key backbone services sectors, including transport, has the potential to help develop GVC activity across APEC, with the national income and development gains that brings with it.

On a methodological level, an important contribution of this case study has been to show how datasets on regulation can be combined with newly emerging quantitative data on value chain development to develop links between policy restrictiveness and GVC participation. From an analytical point of view, such work is in its infancy, but it offers the perspective for an enhanced understanding of value chain processes, as well as a clear set of policies that can help support the development and extension of GVCs across the region.

Chile offers a particularly rich background for this type of study because it is not only a member economy of APEC, but also a member of the OECD. As such, it is included in OECD databases on GVCs and services policy restrictiveness, including domestic policies. Indeed, a key insight to come out of this work is that although from a strictly trade policy point of view, Chile is quite liberal, there are remaining issues of domestic regulation that perhaps deserve attention, such as slot allocation in air transport, and price setting in other modes. Chilean policies in the transport sector contain relatively little *de jure* discrimination against foreign service providers, which is admirable. However, it will be important to maintain the momentum towards efficient and effective sectoral regulation by conducting rigorous cost benefit assessments of some of the measures that have been identified here.

APEC has been active in supporting the liberalization of services markets, as well as goods markets. In addition, it has supported domestic regulatory reform, and a number of APEC economies are developing, or have developed, comprehensive structures for Regulatory Impact Assessment (RIA). Results here suggest that continuous evaluation of policies and progressive liberalization within a context of ensuring that important social objectives are met, can have important economic benefits for economies, including developing economies. Greater involvement in GVCs is a policy goal for a variety of APEC economies, and Chile's experience, as well as previous PSU work, point to the importance of work on services sector policies as a means of promoting that. In terms of APEC's broader agenda, there is a clear synergy with the Renewed APEC Agenda for Structural Reform (RAASR), for which economies are currently developing individual action plans. PSU work has shown that structural reform, centered around pro-competitive reforms in backbone services markets, can bring real economic benefits to the region. Moreover, there is strong evidence to suggest that

developing economies have the most to gain, in particular once productivity effects are accounted for. This previous and ongoing work, taken together with the results of this case study, highlight the importance of pursuing analytical work on the links between services policies and goods GVCs, including in emerging areas like agribusiness.

## 1. INTRODUCTION AND PROJECT OVERVIEW

Deepening integration with global value chains (GVCs) is a key policy priority for many economies in the Asia-Pacific. GVC development has been notable in the region, particularly in sectors like transport equipment and electrical goods. But it is also spreading to other sectors, including agribusiness, resources, and services.

Services sectors can give rise to value chains in their own right, for example through business process outsourcing, but they also play an important role in manufacturing value chains. In many ways, services are the glue that holds manufacturing and resource value chains together. Lead firms have to be able to provide coordination and “headquarters” services—typically classified as business services—to construct the interlinked network of producers and distributors that lies at the core of any GVC.

From a policy point of view, there is a clear need for a better understanding of the ways in which services markets interact with GVC business models to produce observed outcomes. Intuitively, there seems to be real scope to promote and support the extension of GVCs to new economies and sectors by continuing along the path of progressive liberalization of services markets. APEC economies have already taken important steps in that regard, and future developments could have real economic benefits, not just in terms of traditional efficiency rationales, but also by supporting GVCs.

This case study represents an effort to better understand the relationship between services and GVC activity. It focuses on one particular example: transport services in Chile. The objective of this report is to analyze the role that transport services play in Chilean GVCs, focusing on quantitative evidence and data-based analysis. By leveraging OECD and World Bank data, as well as selected qualitative sources, it is possible to develop a clear picture of the state of Chile’s transport sector, covering all relevant modes. In addition, new data and techniques can be used to analyze the linkages between the transport sector and Chile’s GVC activity. In particular, it is possible to identify the sectors that use transport services relatively intensively in terms of their export activity, i.e. which have a significant proportion of “embodied trade” in transport services. Intuitively, continued liberalization of the sector will do most to promote GVC activity in those sectors, which include the important agribusiness sector. The finding is an important one in part because GVCs are often thought to center on heavier manufacturing sectors, like transport equipment, and electronics. This case study clearly shows that agribusiness GVCs also rely heavily on transport services, which lays out important perspectives for the benefits of regulatory reform. This finding is of interest to a variety of APEC economies where agribusiness is important, developing and developed alike.

This case study is one of a set commissioned by PSU to examine the state of play in a selection of APEC economies and sectors. The particular value added of this case study lies in a number of factors. First, Chile’s membership of the OECD means that the analysis can be relatively data rich, both in terms of measuring GVC activity, and tracking policy changes over time based on rigorous quantitative analysis. Second, Chile is a Latin American APEC economy, and it is important to have that perspective in addition to the Asian one, in particular because Latin American GVCs tend to be more resource intensive than manufacturing GVCs in East and Southeast Asia. Third, Chile has undertaken important

service sector reforms affecting transport, so there is the perspective of identifying a clear link between policy changes and subsequent value chain development.

The case study proceeds as follows. The next section discusses approach and methodology. Section 3 presents the case study. The final section concludes, and discusses policy implications.



## 2. METHODOLOGY AND APPROACH

This study highlights the role of services in promoting GVC development, focusing on transport services in Chile. Our methodology consists of three components:

1. Analysis of changes in applied service sector policies.
2. Identification of GVCs that use the identified services relatively intensively.
3. Examination of changes in GVC growth and development patterns consequent upon changes in applied services policies.

Focusing on these three issues will provide extensive policy-relevant information on the ways in which service sector openness contributes to the promotion of value chain activity.

Each of the three parts of our methodology will be approached primarily from a quantitative angle, but will be supplemented with relevant qualitative sources. The reason for emphasizing the quantitative part of the analysis is that it lends structure and international comparability to the results, and ensures a certain degree of rigor due to the care taken to assemble the relevant datasets.

An additional piece of value added that relies on the report's quantitative approach is the ability to use an econometric model from the World Bank to identify the link between policy reforms and value chain performance. The model and the data distinguish between policy measures that affect the ability of firms to enter the market, and others that affect the cost of doing business for all firms in the sector. Intuition, as well as the results presented here, support the view that cross-cutting regulatory reform has the greatest potential to produce the standard economic benefits. Although removing discriminatory measures remains important, there is a clear basis for moving to consider non-discriminatory "domestic regulations" as well—the analysis here considers both types of measure. Reform of non-discriminatory measures can give rise to large "rectangle gains" (productivity gains that release resources for use elsewhere), as opposed to the smaller "triangle gains" (improvements in allocative efficiency) from reform of explicitly discriminatory measures. The terminology stems from the shapes taken by the graphical representation of economic gains from policy reform in a simple model. Concretely, reducing the cost of doing business for all operators in the market acts like a productivity improvement, by making it possible to produce the same level of output while using fewer inputs. The difference in input use represents a set of economic resources that are freed for use elsewhere, and which flow into different sectors to increase the total level of production. By contrast, reforming discriminatory barriers primarily results in a transfer of resources from producers to consumers, and relatively small efficiency improvements. Of course, in a dynamic sense it is important to ensure relatively free entry so that market conditions remain competitive, but in a static model, the gains from freeing economic resources for other uses can be considerably larger than the gains from removing explicit discrimination. The analysis highlights the fact that ambitious programs of service sector reform need to go beyond what the WTO recognizes as trade policy (discriminatory measures) to address "domestic regulations". Nowhere is that case stronger than in the transport sector, where cross-cutting regulations play an important role in shaping market conditions for domestic and foreign firms alike.

In terms of the key elements of this report's approach, it is most important to establish a clear indication of the way in which policies changed in the economy and sector under consideration. In the case of transport services in Chile, quantitative policy indices from the OECD paint a clear picture in this regard, distinguishing between different types of measures, supplemented by World Bank indicators that better capture discrimination. In addition, we present a review of recent regulatory practice in the transport sector, to provide further policy detail and complement the quantitative analysis.

We emphasize Chile's own policies, rather than those of its trading partners, in our exploration of the links between the transport sector and GVCs. Of course, some transport policies depend on actions taken abroad, for example in air transport, where agreements are typically negotiated bilaterally. Similarly, new generation regional trade agreements covering services trade can alter policies in all participating economies in the transport sector. Nonetheless, the nature of the transport sector as a whole suggests that it is appropriate to focus on domestic regulatory reforms. Empirical work suggests that the largest gains typically come from reform of non-discriminatory measures that increase the real economic cost of doing business.

### 3. CASE STUDY: TRANSPORT SERVICES IN CHILE

#### OVERVIEW: TRANSPORT SERVICES IN GVCs

Many economies around the region are involved in GVCs, and Chile is no exception. Geographically, however, Chile is distant from many foreign markets. As a result, many of the services underpinning GVCs need to be efficiently delivered in order to compete in the global economy. One services sector that stands out in this regard is therefore transport. Efficient sourcing of these services by manufacturing firms in the supply chain is likely to have a strong downstream effect on Chile's overall competitiveness. Indeed, transport services intervene in the value chain at a number of different points in Chile. On the one hand, the economy's unique geography means that domestic transport—bringing inputs from production locations to assembly points, or international gateways—plays an important role in supporting value chain development. At the same time, international transport is also needed to move goods efficiently to foreign destinations. Outside the transport sector strictly defined, the logistics sector also provides crucial value chain inputs by organizing the process of transportation and storage through activities like cargo handling and freight forwarding. Given the importance of all of these sectors taken together, it seems clear that transport sector competitiveness can be a major determinant of the performance of GVCs operating in Chile.

The transportation sector spans multiple sub-sectors, including rail, air, maritime, and road transport services. For Chile, air and road are the two most important modes of transportation. Road gives access to regional markets, and air and maritime transport services are the essential means to reach international markets.<sup>1</sup> However, there is complementarity between modes of transport: a well-functioning domestic transport system linked with an efficient maritime or air transport sector will connect inland producers effectively to global markets. This complementarity is not only reflected in the quality of the business providing the transport service, but also in the quality of contingent infrastructure factors such as ports, airports, and the quality of roads. A better quality of Chile's road infrastructure will ensure connectivity, expressed as accessibility and mobility, to its airports. This will greatly benefit domestic producers dependent on quick connections because of the type of products they produce and export, such as agricultural products.

An inefficient transportation network can create a real barrier to participation in GVCs. A recent study from the OECD-WTO investigating the role of aid for trade in development revealed that respondents to a questionnaire singled out the quality of transportation networks and their associated costs as the main factor that can prevent companies from entering GVCs (OECD-WTO, 2013). Respondents represented both the public and private sectors. The quality of the transport network is not only dependent on the physical infrastructure of an economy, but also its efficiency in relation to handling procedures associated with the infrastructure facilities. Moreover, in a world where timely imports and exports are the norm, time in itself can also constitute a barrier to trade. Recent research has found that a one-day delay in exporting is equivalent to a 1% percent tariff or more, and that exporters are willing to pay for better and faster connections (Hummels *et al.*, 2007). Time as a barrier to trade is also more relevant for some products than others. One of Chile's comparative advantage sectors is agribusiness, which involves many perishable products. These products require

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<sup>1</sup> Ninety percent of Chile's freight tonnage passes through roads rather than rail (ITF/OECD, 2016).

quick connection times between Chilean producers and international markets to prevent goods from spoiling.

Traditionally, transport services have been seen as primarily a cost center for businesses. The aim has been to minimize cost, which in terms of sectoral dynamics means lowering prices and improving productivity. However, Chile's involvement in agribusiness value chains makes clear that transport can also be a source of real value addition in the GVC context. As previously noted, perishable goods need to be handled carefully and moved quickly. If the transport sector is not up to the task, the value chain cannot develop at all, or at least not in its international production stages. Efficient transport and logistics services, including in areas such as cold storage, can be vital sources of value for firms looking to export in agribusiness sectors like horticultural goods, including fresh fruits and vegetables. This prospect makes clear that the transport sector's development is not just a question of cost minimization, but also includes issues of quality, technology, and productivity.

The optimal development of transportation services requires effective and coherent policies. Adequate investment in basic infrastructure is needed to ensure the quality of the transportation services network. Many other factors also play a major part in the success of this sector. Many sub-sectors falling under the transportation rubric, including rail and air, were previously state-supplied. And although many economies, including Chile, have liberalized a great deal in these sub-sectors, sound policy and regulation are still important for the competitiveness of the sector. On the one hand, it is of course important to have efficient and effective safety regulations in all transport sub-sectors. Similarly, some transport sectors rely on networks, monopolies, or other structures that may need regulation to ensure efficient outcomes; market forces may be insufficient on their own. The touchstone in transport policy, as in other areas, is that regulation should be effective (achieve its objectives) and efficient (do so at minimum economic cost). In framing effective and efficient regulations, it is important to be aware of the fact that regulation can determine the conditions under which new entrants can break into transport markets, potentially leading to lower prices, higher quality, and greater variety. In addition, regulation has a major impact on the cost of doing business for transport operators—which they pass on to manufacturers and primary producers. Lowering the cost of doing business in a way that is consistent with ensuring safety and efficiency can deliver major economic gains by increasing value chain efficiency and driving productivity improvements.

In addition, transport services embody a public policy component in the sense that they generate positive spillover effects for firms in the rest of the economy (Sàez *et al.*; 2015). In some cases, policies may be needed to reduce or regulate monopolies arising in the rail or aviation sub-sectors. Effective action in this regard is needed to ensure coordination among different agencies. This, of course, is part of a wider policy framework to guard against trade-distorting regulation. We stress that reform of trade-distorting regulations can be welfare enhancing, but it is equally true that putting in place effective and efficient sectoral regulations can be trade promoting.

**Box: Transport Services in Chile’s Agribusiness Value Chains**

The specific case of transport is one example of the broader set of roles played by services in GVCs. Although GVCs have been most heavily analyzed in manufacturing sectors like electrical goods and transport equipment, they are also emerging in a number of economies in other sectors, including agribusiness. This sector is an important one for Chile, as it has a clear comparative advantage in some agribusiness sub-sectors. Its wine industry is very competitive globally, and it has significant opportunities to export fresh fruits and vegetables to the US market, taking advantage of its geography to supply varieties that are out of season in the consumer market.

Fernandez Stark and Bamber (2015a) analyze the case of the wine industry, focusing on a firm-level study of a well-established wine producer active in international markets. They find that 70 services are used at some point in the value chain. Transport plays an important role in two main segments of the value chain: grape production (where grapes need to be moved from fields to the winery), and distribution, marketing, and sales (where the final product needs to be moved to consumers at home and abroad). The authors argue that competitive transport markets—with costs lower than in many comparable economies—have been a key factor enabling wine producers to win global market share. Efficient operation of port infrastructure is one important benefit for Chilean wine producers, as most of their output is shipped by sea. In addition, improvements in the closely-related logistics sector—such as implementation of a Single Window—have helped efficiency and competitiveness.

The same authors also examine the case of the fresh cherry industry in Chile (Fernandez Stark and Bamber, 2015b). The industry is heavily export oriented, with over 80% of production exported. It is on track to become the world’s largest cherry exporter, as planted area is expanding rapidly to market opportunities overseas, particularly in China. Chilean production is highly valued in the world market, and earns a significant price premium. It is a good example of a competitive agribusiness GVC. The case study firm is a major producer, and has innovated heavily, particularly in the area of cold chain storage and a modified atmosphere technique that increases the life of harvested cherries, and allows for global exports. For prized early season cherries, air transport is typically used to move them to final markets, while for mid-season production, maritime transport is more common. Efficient transport services, including the related logistics sector, are a key element in the value chain. Indeed, the value chain would not be truly “global” without them.

**CHILE’S TRANSPORT SECTOR**

Chile’s unique geography means that transport services play a particularly important role in trade and production. Figures 1a and 1b show that Chile is geographically dispersed, with a long coastline. Although agglomeration effects mean that economic activity tends to cluster around population centers, there is still a need to move goods—including primary products—from the site of production to processing centers, and points of consumption. For domestic market integration, as well as linking with international markets, transport services are key.

Figure 1a: Ports with container liner service in Chile, 2016.



Note: Color codes indicate port sizes, as follows: yellow (very small), orange (small), and blue (medium). Only ports with container liner service are shown.

Source: <http://www.worldportsource.com/ports/maps/shipping/CHL.php>.

Figure 1b: Airports in Chile, 2016.



Source: <http://www.mapsofworld.com/international-airports/south-america/chile.html>.

The structure of Chile’s transport sector reflects the need for private sector service provision combined with support and regulation by the public sector, in particular as regards strategic investments in infrastructure. The Ministry of Transport and Telecommunications (MTT) has

responsibility for all transport sub-sectors. Regarding strategic planning within all these transportation sub-sectors, Chile's ministry has published a National Transport Strategy, and work on a National Logistics Strategy, supported by a Logistics Observatory, is ongoing. Next to strategic planning, the MTT takes on the role of developing policies, supervising public and private sector companies operating in the transport sector, coordinating the activities of these firms, and finally, monitoring whether firms and agencies apply the rules, standards, and legislation of the transportation sector.

Some of the responsibility within the transportation sector is divided with the Ministry of Public Works (MOP), which actually has oversight of public transport infrastructure like highways, ferry landing ports, ports, and airports. Many of these works are subcontracted to private companies and therefore it takes on a coordinating role in this regard, consistently with good regulatory practice. The MTT remains responsible for developing overall safety policies of transport services, including standards and other economic regulations. Chile's liberalizing policies in the past have promoted the development of public-private partnerships in the transportation sector, especially in the construction of roads and airports through the Law of Public Works. Chile's ports also have an ownership structure which is a mix between public and privately owned ports.

Having presented some general background on the sector, we now look in more detail at individual transport modes. After presenting some general information on each mode, we present a summary table of major regulatory reforms that have taken place over recent years. We distinguish in the presentation between entry regulations that determine the ways in which companies can start offering services, and conduct regulations, which influence the cost of doing business for all actors. Tracking the course of regulatory reform in transport is challenging because of the large volume of regulations involved, and the fact that they cover multiple modes of transport. We focus here on key measures, and the discussion is not meant to be exhaustive. The aim is to present a concrete overview of actual regulatory measures that feed into the quantitative regulatory data presented later in the report.

## **Ports**

Chile has 68 ports established within its borders. Ownership structures vary, with 10 publicly owned, 15 mixed, and most (43) privately owned. The privately owned ports are typically terminals that are developed by private companies. The OECD estimates that around 95% of foreign trade is shipped through Chile's ports. Within this share, there are three major publicly owned ports that are responsible for almost 26% of trade and are located in the center and southern part of the economy and some of the agricultural areas (OECD/ITF, 2016). On balance, competitive ports or those that have a private stake, seem to perform best across Chile and comparable economies.

The institutional set-up of Chile's ports follows a so-called "landlord" model in which regional and local authorities take up the local planning and the enforcement of regulations, the granting of licenses, concessions, and leases for port operations and services. The port concessions that these regional authorities have awarded to private companies appear to have created a highly competitive structure (World Bank, 2014). This is partly established by way of capping the amount of equity private stakeholders can take in ports and limiting private parties to holding one concession per port. With an appropriate definition of the different services that converge within port structures, this approach ensures that operators in different parts of the transport and logistics value chains operate competitively. Chile does not,



however, have an independent regulator that develops and implements transport policies or regulations. Although a variety of institutional structures can be consistent with a competitive ports sector, one advantage of an independent regulator is that it increases transparency and potentially moves regulation one step away from the political process, which can, in some places, be influenced by incumbent operators. Some states in Australia have adopted an independent regulator model for ports with these and other considerations in mind. In Chile, the MTT is responsible for these matters, or if there are issues of competition policy, it is the antitrust authority that intervenes.

Major regulatory measures affecting Chile's ports are summarized in Table 1.

Table 1: Regulatory reform in Chile's ports sector.

	<b>Entry</b>	<b>Conduct</b>
1980-1990s		State establishes freely its tariffs since 1990.
1991	Law passed to end state monopoly (Emporchi) introducing private sector to supply harbor services, ending the exclusive operation of Emporchi inside ports	Law 164 passed that allows for concessions for most public works including roads, ports and airports. Concessions are worked out mainly on a build-operate-transfer-basis (BOT) where a third party finances, builds, operates, and maintains the infrastructure facility. Concessions are granted through auctions open to any participant, being domestic or foreign with a duration of contracts between 15 and 30 years.
1997	Law 19542 introduced decentralization of state-owned ports with 10 new State Port Enterprises. Introduction of concessions of port terminals by private companies under the condition to have an investment plan presented. These Port Enterprises are legal entities established under public law and constitute state enterprises with their own assets.	Law 19542 introduces port terminals are as of now administered under a multi-operator format so that terminal administrator should sublease its facilities
1999		Law 19642, grants the export status to companies operating or exploiting public ports for the purposes of Article 36 of Law Decree 825 dated 1974. Moreover, Article 36 establishes that exporters are entitled to tax reimbursement regarding the tax paid when buying goods or using services for the purposes of export activity. They enjoy equal right regarding the tax paid for importing products for the same purpose.
2011		Law 19542, modernizes the state port sector. For instance, Law 20190 derogates Article 15 of Law 19542, which was previously establishing a special pledge as a guarantee of using port concessions.
2013		Decree 96, approves regulations for the preparation of annual management plans of state port companies created by Law 19542 and repeals Decree 104 dated 2001 issued by the Ministry of Transport and Telecommunications. The Decree 96 establishes variables to consider in elaborating the annual plan, including economic indicators that need to be employed. The Decree also provides that the Annual Management Plan shall be presented by the State Port Enterprise once a year, and adopted at the Board of Directors meeting of the Enterprise. The Annual Management Plan has to be submitted to System Companies Committee (SEP), with a copy to the Ministry of Transport and Telecommunications.

Source: Authors.

In addition to presenting regulatory changes that affect ports specifically, it is also important to look at the maritime transport sector more broadly. Table 2 provides a recapitulation of key measures.

Table 2: Regulatory reform in Chile's maritime transport sector.

	<b>Entry</b>	<b>Conduct</b>
1979		Merchant Marine Development Law eliminated cargo reservations as well as tax exemptions and subsidies (with the exception of those to the cabotage traffic)
1981	Law 18 032 ended the license system for stowage; opening this activity to any worker, with a respective compensation for 2700 workers	
1990		Law 18 966 definitively left stowage services, cargo transfer and berthing in the hands of the private sector. Emporchi only would be devoted to administer the infrastructure and to the storage in ports.
1991		Law 164 passed that allows for concessions for most public works including roads, ports and airports. Concessions are worked out mainly on a build-operate-transfer-basis (BOT) where a third party finances, builds, operates, and maintains the infrastructure facility. Concessions are granted through auctions open to any participant, being domestic or foreign with a duration of contracts between 15 and 30 years.
1994		Law 18773 requires to transform the maritime state enterprise into a joint stock corporation. This law sets out that the initial assets of the Maritime State Enterprise will be transferred as in proportion of 1% for the Treasury and 99% for the Corporation of Production Development. No minimum percentage of shares that should have been owned by the Corporation of Production Development are stipulated eventually in this law as this provision was abolished.
2006	Law Decree 3059 establishes the promotion of merchant maritime activities. The Law establishes, <i>inter alia</i> , tax rates for imports of ships and vessels and the conformity of international practices of the use of maritime transport. Yet, modifications of this law requires cabotage in this field to be reserved exclusively for Chilean ships and vessels. Foreign commercial ships and vessels may participate in cabotage in cases of when cargo weight exceeds 900 tons, following a public tender called well in advance. In this case and for the purposes of the award of the tender, bids from foreign commercial ships and vessels shall be increased by a general rate of customs duty. The Ministry of Transport and Telecommunications authorizes a foreign ship or vessel to carry a cabotage. The transport of empty containers may only be made by foreign owners of ships and vessels or foreign operators, when there is equal opportunity to do so to the Chilean	

	shipping companies in the respective economies of the foreign owners of ships and vessels, or in the group of economies, in case of group of economies with common maritime policies of the economy of the owner of ships and vessels, i.e. upon reciprocity.	
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Source: Authors.

### **Aviation**

Chile has a large number of airports, ranking 15<sup>th</sup> overall in the world. However, most are for small scale civil aviation purposes, not international air freight that would be relevant to GVCs. Indeed, air freight is not growing particularly rapidly on an overall basis, by 18% since 2000 (based on the World Development Indicators). Of course, this figure is affected by the global trade slowdown, which has hit Chile in the same way as many other economies. Nonetheless, air transport is an important part of the Chilean economy, accounting for perhaps 1.6% of GDP and supporting 73,000 relatively high productivity jobs (Oxford Economics, 2011).

It is important to look at the composition of air freight to understand its potential importance for GVCs. Although air freight represents only 0.5% of freight tonnage with the rest of the world, it accounts for 34.6% of value (Oxford Economics, 2011), which means that the goods being shipped have a very high value to weight ratio. This finding is typical of GVC use of air transport, where goods like parts and components or perishable agricultural products travel by air to the next stage in the chain, or to a consumer market. As noted in the Box above on firm-level case studies, air transport, as well as maritime transport, provide important inputs into agribusiness GVCs like fresh fruit and vegetables.

Table 3 provides an overview of major regulatory measures affecting Chile's air transport sector.

Table 3: Regulatory reform in Chile's air transport sector.

	<b>Entry</b>	<b>Conduct</b>
1970s	State-owned company LAN had exclusive right for national and international routes thereby limiting competition.	
1979	Civil aviation law regulated competition between airlines, routes were opened for national and international airlines. Chile established most liberal cabotage rules upon reciprocity of Chilean carriers abroad.	
1980-1980	In 1980s Chile started negotiating open sky policies which very few economies accepted. Since 1990s, increased number of open sky agreements.	
1988	Law 18400 authorizes the Corporation of Production Development and the national airline company - Chile to form the national airline corporation - Chile S.A. In addition, Law 18768 abolishes in Law 18400 the requirement for the Corporation of Production Development it should have at least a share of 67% made up of the capital by the National Airline LAN.	
1989		LAN was privatized.
1991		Law 164 passed that allows for concessions for most public works including roads, ports and airports. Concessions are worked out mainly on a build-operate-transfer-basis (BOT) where a third party finances, builds, operates, and maintains the infrastructure facility. Concessions are granted through auctions open to any participant, being domestic or foreign with a duration of contracts between 15 and 30 years.
2004		Law 16972 settles the organization and functions and establishes general provisions of the Directorate General of Civil Aviation, including the fact that it is responsible, <i>inter alia</i> , for proposing of adoption of standards, recommended practices and procedures approved by the International Civil Aviation Organization and the World Meteorological Organization. It is also responsible for appointing officials who benefit from state grants and scholarships, or national and international organizations scholarships, and for proposing candidacies for appointment to represent Chile in the congresses, meetings or international conferences on aeronautical technical subjects.
2010		Decree 270, approves airworthiness regulations "DAR - 08" containing technical requirements for airworthiness.
2015		Decree with the force of Law 241, merges and reorganizes various services related to civil aviation. Under this law, commercial aviation companies are obliged to provide the background information to the Civil Aeronautics Board for the purpose of developing air traffic statistics. The Civil Aeronautics Board shall publish on its website the information about delayed and cancelled flights by each airline, route and airport for domestic and international operations, individually for each flight.

Source: Authors.

## Roads

The Chilean road network is extensive, but quality is an issue in some areas, with many unpaved roads. In terms of domestic trade, almost all of the total freight within Chile is shipped through its roads. Chile has toll roads in its network with the main reason being to attract Foreign Direct Investment (FDI) in the form of public-private partnerships. In Chile, there are around 40,000 companies active in the road freight market, which are in large part small companies (96%) with a sales figure of less than USD 1000 a year (OECD/ITF). This means that overall, the market for road transport service providers is quite fragmented.

The whole road network is managed by the Ministry of Public Works, including regional and rural roads with a decentralized structure. The road transport sector is also marked by both public and private road operators in the form of public-private partnerships, mainly of expressways, with the main goal of having a source of funding. Overall, the inclusion of private parties has increased the quality of roads in Chile and in comparable economies.

Table 4 presents key regulatory measures affecting road freight in Chile. The decision to focus on road freight operations is based on its role as the main vector for GVC activity linked to roads in Chile.

Table 4: Regulatory reform in Chile's road freight sector.

	<b>Entry</b>	<b>Conduct</b>
1970s	Entirely deregulated throughout this period.	
1980-1990s		The State only established technical regulations
1991		Law 164 passed that allows for concessions for most public works including roads, ports and airports. Concessions are worked out mainly on a build-operate-transfer-basis (BOT) where a third party finances, builds, operates, and maintains the infrastructure facility. Concessions are granted through auctions open to any participant, being domestic or foreign with a duration of contracts between 15 and 30 years.
2002		Decree 298, regulates transport of dangerous goods on streets and roads. Article 5. For the transportation of dangerous substances, motor vehicles must be equipped with tachographs or other electronic device to register time, speed and distance travelled. The owner of a transport vehicle must transfer the records of these devices to the Ministry of Transport and Telecommunications, Police Department, the consignor and consignee once in 30 days' period. Previously it was 90 days' period.
2003		Law 19872, creates the National Land Freight Registry and establishes the Special Registry of Trailers, which will take over the responsibility of the Civil Registry and Identification, and makes it obligatory to register the trailers whose gross vehicle weight is more than 3,860 kilograms.

Source: Authors.

## **Rail**

Chile's railroad network covers in total 5300 km which is on the lower side compared to many economies around the world. Its network is divided into two operators, one in the North and one in the South, a so-called horizontal structure. In addition to this geographical separation, railway transport providers can also be separated in the sense that the infrastructure (i.e. network) and train operating companies (i.e. service providers) are separated, i.e. vertical separation. The main goal for this latter approach is to attract third (private) parties to compete with local service providers. In addition, a third type of arrangement is found so that there are entirely private mining railways in the North. The freight services of the South of Chile are in private hands.

In Chile the rail network has lost a lot of freight over the years to the road transport network. In comparison with other comparable economies, both the North and the South have low levels of freight transshipment. For instance, the net ton-km freight in Chile stands at 2 whereas in an economy like Japan, where rail transport is crucial, this number stands at 131. In terms of passenger transport, the rail network has also lost out to the road network over the years, particularly in long-hauls.

Table 5: Regulatory reform in Chile's rail freight sector.

	<b>Entry</b>	<b>Conduct</b>
1980-1990s	Responsibilities to the Ministry of Transport, but no official department occupied with this sector.	Privatization of rail freight taking place.
1981	Decree 1157 introduces changes to the text of General Law on Railway Transport and requires opening of foreign capital entry.	Decree 1157 also grants concessions for establishment of railway lines. The concessions have to be presented to the President of the Chilean Republic, and should contain the general map of the route and the guarantee for the value obtained at a rate of 50 pesos per km, with a minimum of 1,000 pesos. Each concession should set the concession period, the deadline for the initiation and completion of the work, the security deposit for fulfilling the obligations of the contract in the part concerning railway construction, the fine to be incurred by the dealer for each month of delay in completion of the works.
1994	Introduction of second freight operator in South, FEPASA. 51 percent of it was sold through public tender. Infrastructure still owned by first operator, EFE. In the North, two operators exist, FERRONOR and FCAB.	
1996		Decree 900 (Concessions Law, MOP) further modifies law 164.
1997	FERRONOR turned into CORFO and privatized. FEPASA and EFE negotiate to open tracks for any other user under similar economic conditions.	
2014		Decree with the force of Law 1, coordinates the text of the organic law on state railway enterprise and establishes that the State Railway Enterprise is a legal person established under public law, is an autonomous state enterprise, entitled to its own assets, domiciled in the city of Santiago and reporting to the Government through the Ministry of Transport and Telecommunications.

Source: Authors.

## CHILE'S TRANSPORTATION SERVICES SECTOR IN GVCS

This section begins the report's quantitative analysis by using trade in value added data to look at the ways in which the transport sector enters GVCs. The discussion mobilizes two key concepts: intensity, and linkages. The former looks at the extent to which downstream sectors like agribusiness, wood and paper products, and manufacturing more generally, use transport services in their production process. The latter focuses on indirect exports and imports of transport services through their embodiment in the output of other sectors. From a policy perspective, the analytical discussion here is important for two reasons. First, it highlights downstream sectors that rely relatively heavily on transport, and which can, therefore, benefit most strongly from boosting sectoral competitiveness, including through regulatory reform. Second, it shows the ways in which international trade in goods and services creates complex linkages among transport sectors in different economies, and allows us to characterize the dominant economic role that the sector plays in terms of Chile's international economic connections.



## Intensity

The OECD-WTO Trade in value Added (TiVA) database can be used to analyze the extent to which transport services enter into Chilean value chains, distinguishing among the various sectors of production. A simple metric is intensity, or the proportion of total sectoral value added that is accounted for by the transport sector. The sectors that use transport sectors most intensively are the same ones that are likely to see the largest proportional effects from improvements in transport competitiveness, including quality as well as price. Results from the analysis are in Table 6. We consider Chile only, as that is the focus of the report, but note that results on intensity can differ across economies due to differences in production technology and organization.

On this basis, Chile's most intensive user of transportation services is its Distribution sector, i.e. another service sector. Although GVCs have most commonly been studied in manufacturing, they are also increasingly becoming relevant in services. Distribution, which includes logistics, is an example of a sector where large lead firms, like the express carriers DHL, FedEx, and UPS, can perform an important role in terms of sectoral upgrading once barriers to FDI fall, and conditions are favorable for foreign actors. However, the focus of this report is on GVCs outside services, so we focus on those sectors in what follows.

The second most intensive user of transport services is the Wood and Wood products sector. This means that both distribution and the wood product sectors absorb high value-added from the transportation sectors within Chile. After that, the Paper and Paper products, Non-Metallic industry as well as the Chemical sector are high downstream users of Chile's transport services. These sectors in Chile are therefore highly dependent on a well-functioning transportation system. The least intensive sectors using transportation services are some of Chile's domestically oriented services sectors such as Health and Social services or Real Estate activities. Compared with other economies in the TiVA database, Chile has been relatively successful at exporting value added in Metal products and Mining, as well as the Wood and Paper and Agribusiness sectors. Table 6 shows that the data support an inference that transport services have played an important role in the development of most of these sectors, as well as mining, where Chile has a strong comparative advantage.

Table 6: Most and least intensive users of transport services, Chile, 2011.

Top	Industry description	Intensity
Most		
1	Wholesale and retail trade; repairs	0.160
2	Wood and products of wood and cork	0.106
3	Pulp, paper, paper products, printing and publishing	0.077
4	Other non-metallic mineral products	0.075
5	Chemicals and chemical products	0.075
6	Renting of machinery and equipment	0.065
7	Rubber and plastics products	0.064
8	Textiles, textile products, leather and footwear	0.057
9	Mining and quarrying	0.055
10	Manufacturing nec, recycling	0.054
Least		
1	Real estate activities	0.005
2	Electrical machinery and apparatus nec	0.012
3	Finance and insurance	0.013
4	Electricity, gas and water supply	0.018
5	Health and social work	0.021
6	Other transport equipment	0.024
7	Post and telecommunication	0.025
8	Hotels and restaurants	0.026
9	Basic metals	0.029
10	Construction	0.029

Source: OECD-WTO.

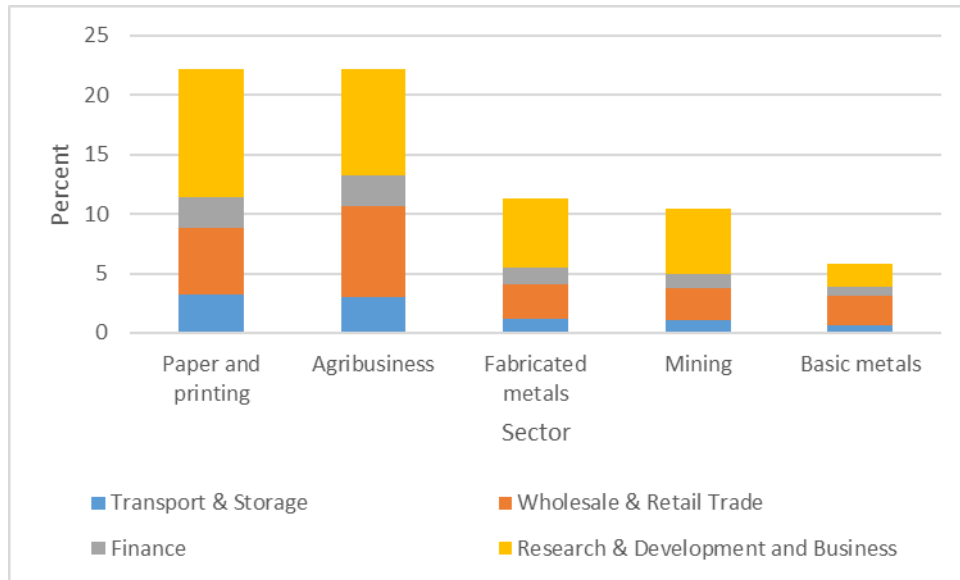
### Backward and Forward Linkages

In GVCs, value-added can be brought in indirectly from abroad as well as indirectly exported through other goods and services, which are respectively called foreign backward and domestic forward linkages. Traditionally, measured in gross values, services exports such as transportation services were thought to be directly exported to other economies. This is still true, but recent research has found out that most of services' value-added are exported through other downstream or using industries and sectors. Hence, in the case of transport services, their value-added is integrated into other goods and services, which are in turn exported, and could even be used in the exports of other third economies.

Figure 2 shows data for selected sectors where Chile has been active in GVCs. The figure indicates the extent to which each sector indirectly exports services value-added from within Chile embedded in their goods such as agribusiness goods or metal products. These kinds of indirect exports are sometimes referred to as "Mode 5", or embodied services trade, in a reference to the four existing modes of supply under the GATS. The figure shows that the agribusiness and paper and printing industries in Chile are the ones which export most of Chile's value-added in transportation services. The fact that the paper and printing sector shows high export linkages of transport services is no surprise as domestic value-added

linkages in transport services of this sector are also high. Yet, a large part of this transport services value-added is also exported through paper and printing products. By contrast, the agribusiness sector did not show up as a top user of domestic transportation services, which points to the fact that despite the relatively low intensities of transport services in agribusiness, most of the value-added is at the same time being exported indirectly. Therefore, a competitive transport sector is key for Chile’s agribusiness products.

Figure 2: Domestic value-added of Chile’s services in exports, selected sectors (2011), share in total.



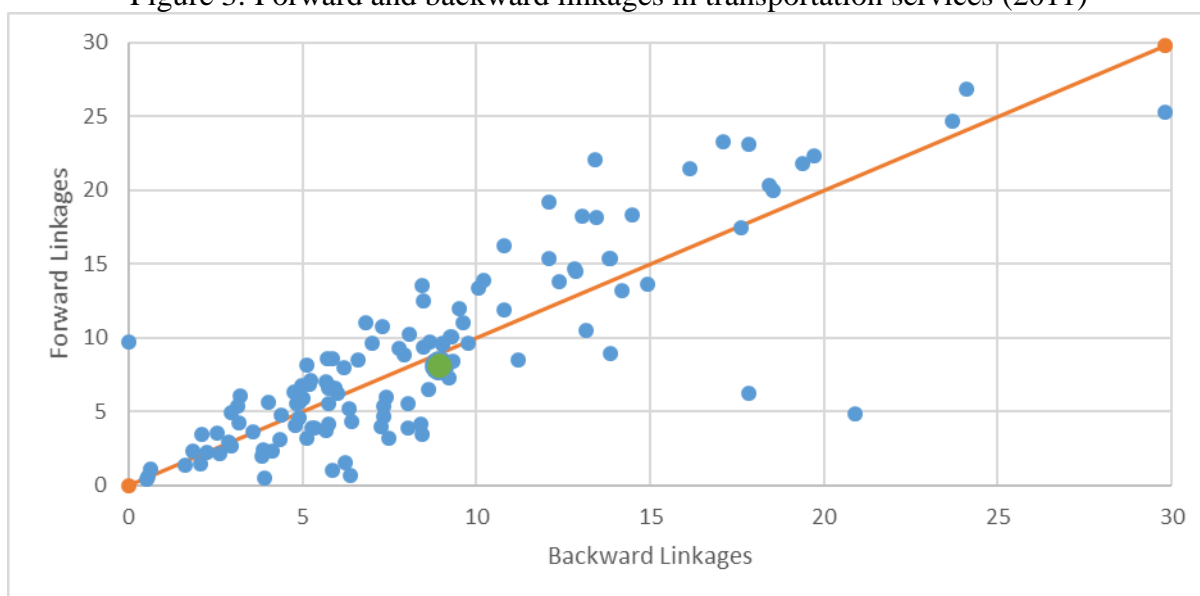
Source: OECD TiVA; author’s calculations

Although the majority of services are domestically produced, and therefore also domestically consumed or exported, economies participating in GVCs are also increasingly involved in foreign backward linkages. A greater level of imports of value-added which is embodied in other goods and services that Chile imports reflects an increased participation in international production stages. It does not therefore mirror any loss of value-added domestically created or exported. On the contrary, a greater level of intermediate inputs, measured in value-added, is likely to stimulate the competitiveness of Chile’s export sectors, which are in turn very dependent on its transportation sector.

To better understand the role that transport services play in GVCs, it is important to go further into the types of linkages that are involved. On the one hand, domestic forward linkages refer to indirect exports of Chilean services value added by embodying it in exports. By contrast, foreign backward linkages refer to indirect imports of services value added embodied in other economies’ exports. We can investigate the relationship between the two more thoroughly using the World Bank’s Export Value Added Database. Looking at the relative roles of forward and backward linkages makes it possible to tease out the extent to which value-added in services is carried forward in the entire economy and supplied as in input (i.e. forward linkages) in addition to how much value-added the services sector itself carries along and demands inputs from other sectors in the upstream economy. Note that these linkages span value-added flows of the entire economy, which means value-added which is domestically consumed as well as exported directly or indirectly.

Figure 3 shows the relative importance of these two linkages in one graph for each economy in the dataset, including Chile. If an economy is situated above the 45-degree line it means that the service in question is more important as a backward linkage, whereas if an economy is placed below the line it means that forward linkages are more important. In the case of transport services, Figure 3 shows that for Chile forward linkages are more important. This outcome is contrary to many other economies where transport services are shown to be more important in terms of backward linkages. As a result, for Chile it becomes clear that an efficient domestic transport and logistics services system is essential to remain competitive in trade, as its primary use is as an input into other goods and services that are exported around the world

Figure 3: Forward and backward linkages in transportation services (2011)

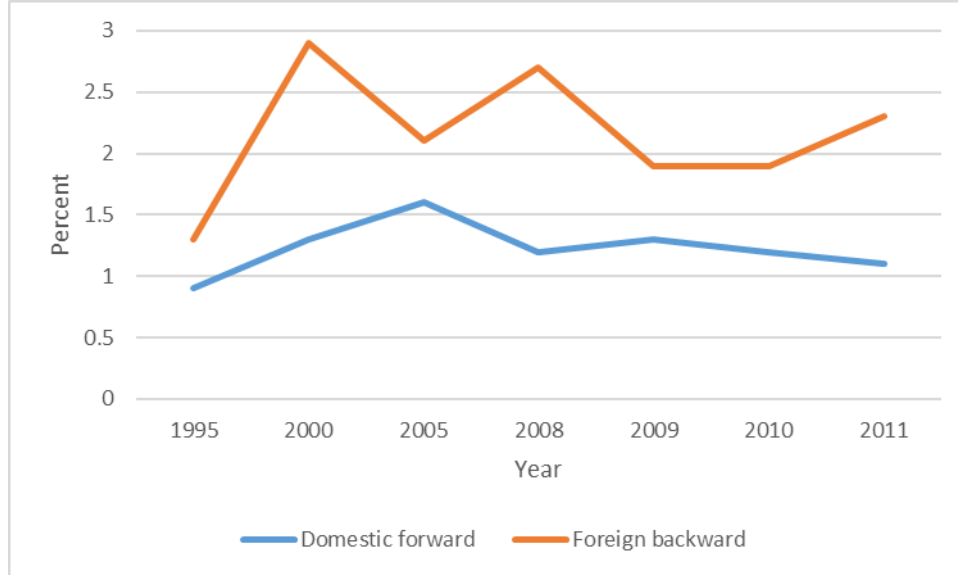


Source: World Bank EVA database.

Note: Chile is the larger, green circle. The line indicates equality between forward and backward linkages.

Figure 4 shows the underlying trends in export linkages, both backward and forward, over time for Chile using the OECD's TiVA database. Although overall for Chile the transport services sector is more important as a forward driver of value-added, in terms of exporting, this value-added happens mainly through backward linkages, i.e. value-added that is transshipped through Chile from abroad. This is confirmed by the fact that domestic linkages of exported value-added for Chile have been relatively low compared to the foreign backward linkages. Although domestic forward linkages grew somewhat until 2005, after this period they fell so that the gap between the two linkages has been increasing in recent years.

Figure 4: Exported forward and backward GVC linkages over time (1995-2011)

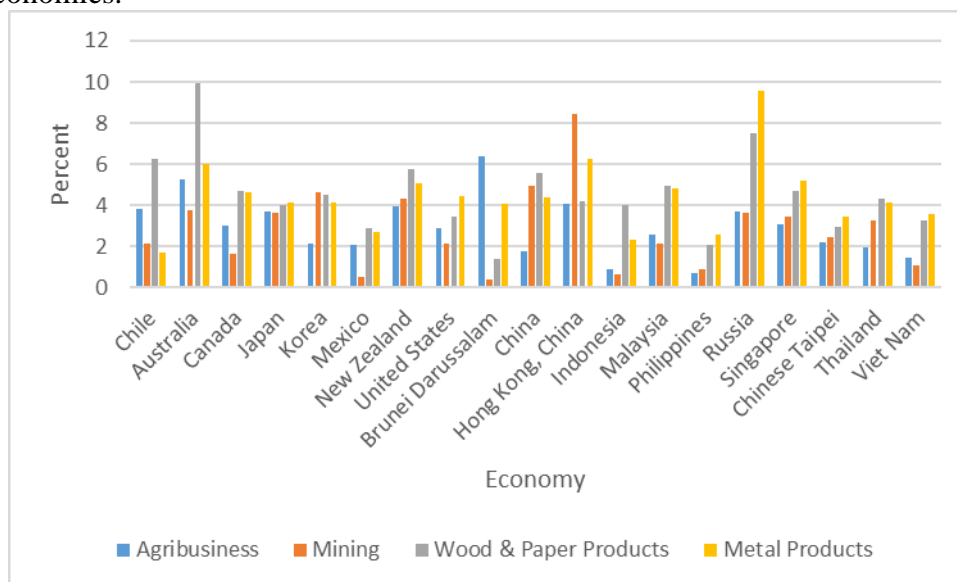


Source: OECD TiVA; authors' calculations

Chile's exported value-added of transportation services can also be compared with its APEC peers for each downstream industry in which Chile has a high ratio of exported value added to domestic value added, i.e. where GVC activity is prevalent. This exercise can shed light on whether the downward trend in Chile's own exported domestic value-added is in line with comparators.

This is shown in Figure 5. The height of each bar reflects the share of transport services value-added (combining foreign and domestic sources) in each of the four downstream GVC sectors' gross exports. In terms of the average across sectors, Chile ranks about mid-way in terms of its intensity of use of transport services. It stands out in sectors like agribusiness and wood and paper products, as having a relatively high intensity of transport services use downstream. Of course, many factors lie behind this result. For example, on average Australia has the highest intensity of use of transport services in the four sectors—but that is most likely driven by a combination of a remote geographical location and very large internal area. It does not follow that higher intensity is necessarily better. At early stages of development, increasing transport sector value added is likely associated with improved performance, but at high income levels, that relationship reverses as cost effects come to dominate technology. The important point to take away from the graph is that within APEC context, Chile's use of transport services is quite representative, which implies that the findings of this case study may be of relevance to a range of economies in similar circumstances, in addition to Chile itself.

Figure 5: Transport services value added, share of gross exports (2011), selected sectors, APEC economies.



Source: OECD TiVA; authors' calculations

Bringing these results together, the conclusion is that transport services are indeed important in sectors where GVCs operate in Chile, such as agribusiness and paper products, as well as other sectors. However, there is evidence that despite improvements in infrastructure and logistics over recent years, domestic value added in transport has not been rising in the way that would typically be expected as these downstream sectors themselves expand. The importance of foreign value added in terms of transport services embedded in exported GVC goods is notable. This role of foreign value added is in no way negative, and could even be consistent with an appropriately open regulatory posture as regards international markets. There is evidence that domestic and foreign value added are complementary in many sectors, which means that opening up to foreign production in the value chain can in fact increase overall value added more quickly than relying on domestic sources only. The role of policy in all of these developments is potentially important, and more is said about it in the next section.

## REGULATORY ENVIRONMENT OF CHILE'S TRANSPORTATION SERVICES SECTOR

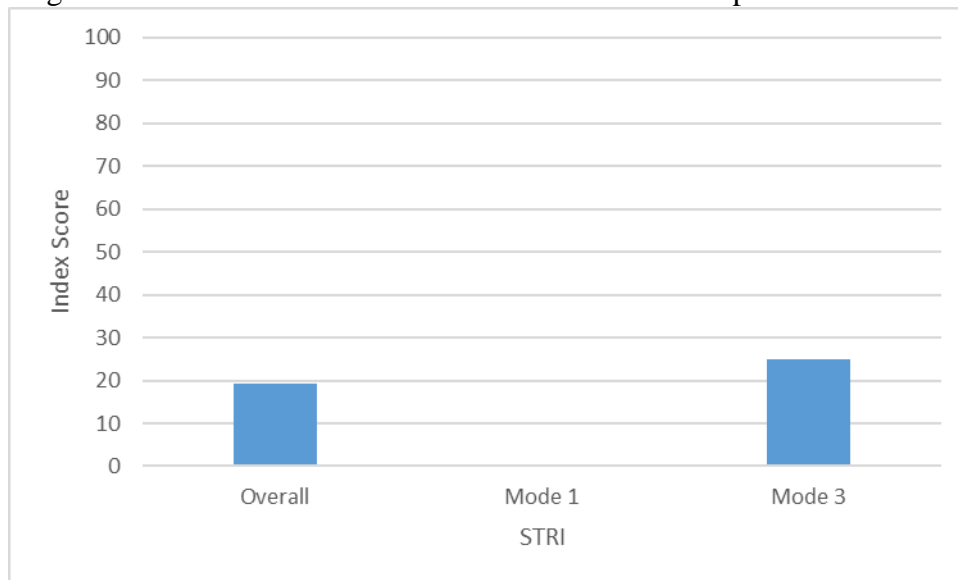
Although there are many factors that determine Chile's competitiveness in services in general, and in transportation services in particular, one factor that policy makers can adjust in the short run is regulatory policies. As in any other services sector, regulatory rules and laws determine in part the competitiveness and international exposure of Chile's economy, which will have knock-on effects on Chile's participation in GVCs. Our general presentation of Chile's transport sector above presented the major regulatory measures by mode. In this section, we move to a consideration of the quantitative data that make it possible to look at convenient summaries of restrictiveness. In particular, we focus on the following questions:

1. To what extent do Chile's transport sector regulations discriminate against foreign service providers?
2. To what extent do Chile's transport sector regulations facilitate entry by new firms into the marketplace?
3. To what extent do Chile's transport sector regulations keep the costs of doing business low for all firms in the marketplace?

Several indicators are available to assess Chile’s regulatory framework regarding domestic regulations and explicit discriminatory policies vis-à-vis foreign firms. One is from the OECD STRI and a second is from the World Bank. Each source covers different aspects of services trade regulations. The OECD covers trade restrictions as well as some domestic regulatory measures that directly or indirectly have an impact on the tradability of transportation services. The World Bank only takes up explicit discriminatory measures against foreign service supplies, such as screening requirements, quotas or economic needs tests for foreign firms. Moreover, the World Bank’s STRI is split into the various modes of supply as defined in the GATS.<sup>2</sup> Figures 6a and 6b show both indices for Chile’s transportation services sector. In the former, the World Bank’s STRI is shown which ranges from 0 (completely open) to 100 (entirely closed) for the different modes spanning all sector activities. The latter shows the OECD’s STRI which is scaled from 0 (completely open) to 1 (entirely closed) divided into separate sector sub-categories.

Both panels show that Chile’s regulatory environment is quite open in transportation services. In particular, the World Bank index shows that Chile is completely open when it comes to Mode 1 trade in transport services. The OECD’s index shows that some restrictive measures exist in the various modes, but they are relatively restrained by comparison with other regions, in particular when it comes to road transport, which is very open.

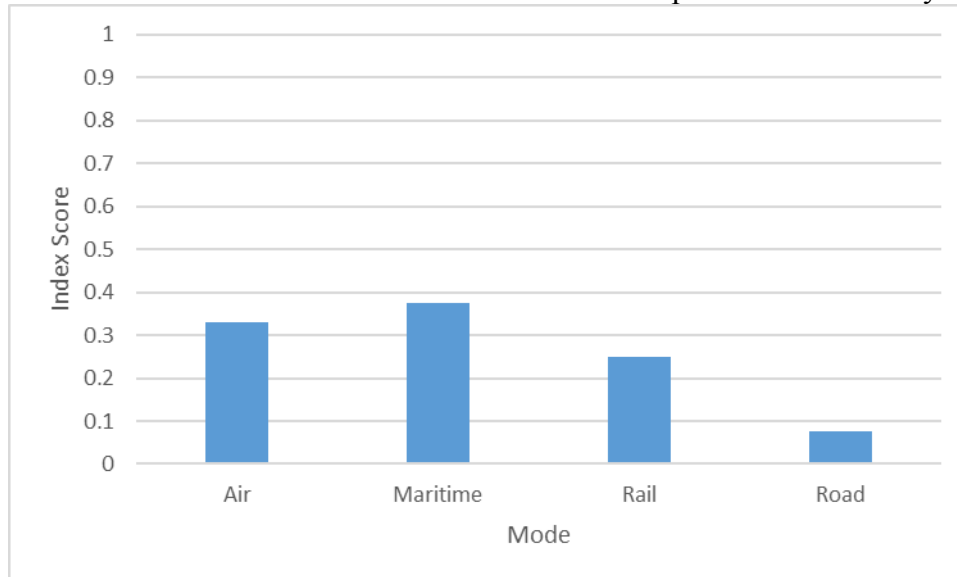
Figure 6a: Chile’s level of trade restrictiveness in Transportation services



Source: World Bank.

<sup>2</sup> In GATS speak, Mode 1 is defined as cross-border trade and covers mostly services traded over the internet; Mode 2 is defined as consumption abroad and measures consumption of consumers in the territory of another economy; Mode 3 stands for sales of foreign affiliate firms in the receiving economy; and finally Mode 4 relates to temporary migration of natural person as foreign service suppliers moving to the economy from where the service is imported.

Figure 6b: Chile's level of trade restrictiveness in Transportation services by Mode



Source: OECD.

Nonetheless, it is helpful to go into further details on the regulations that lie behind these scores. In doing so, it is important to be clear that not all regulations that add to trade costs should necessarily be repealed or reformed: some serve valid public policy objectives, and are important to retain. Rather, the approach here is to highlight cost creating measures so that future work can conduct a detailed cost benefit assessment that can support a better understanding of these measures' overall welfare implications. The goal for Chile, as for other APEC members, is to ensure that regulation in the transport sector, as in other sectors, is effective (achieves its goals) and efficient (does so at minimum economic cost).

Although the OECD's STRI shows that Chile's air transport sector is relatively open, there are some measures related to foreign entry and barriers to competition. In particular, for both passenger and cargo transport, the majority of the board of directors must be nationals in air transport firms. In addition, managers in these companies must also be comprised of nationals. The welfare costs of such measures are unclear in an environment where human capital is well developed—it may be that they are largely redundant, and so could be targeted for reform on a cost-benefit basis. The barriers with an anti-competitive nature are those connected to slot trading and slot allocation systems in both passenger and cargo transport. For instance, regarding the slot allocation system there is still no administrative system in place, and air carriers are allowed to schedule their flights by simply taking into account expected delays at busier airports. It may be that more effective regulation could result in a better use of the scarce resource of airport capacity, although it is recognized that various systems are implemented around the world to deal with these sorts of issues.

The main types of barriers in Chile's maritime transport services are also linked to restrictions on foreign entry. Measures in this area include foreign equity limits in Chile's domestic maritime companies, as well as the fact that the majority of directors and managers in the companies in this field must be Chilean, and that screening measures exist that cannot exclude that an economic interest must be shown. Other measures related to foreign entry are specific, such as restrictions to own and register vessels under national flags and exclusions of foreign-flagged ships (or other criteria, such as foreign-built ships). Chile also holds some



restrictions related to competition such as restrictions on pilotage and towing services, plus has some time limitations on the duration of stay of all types of service supplies (i.e. Mode 4).

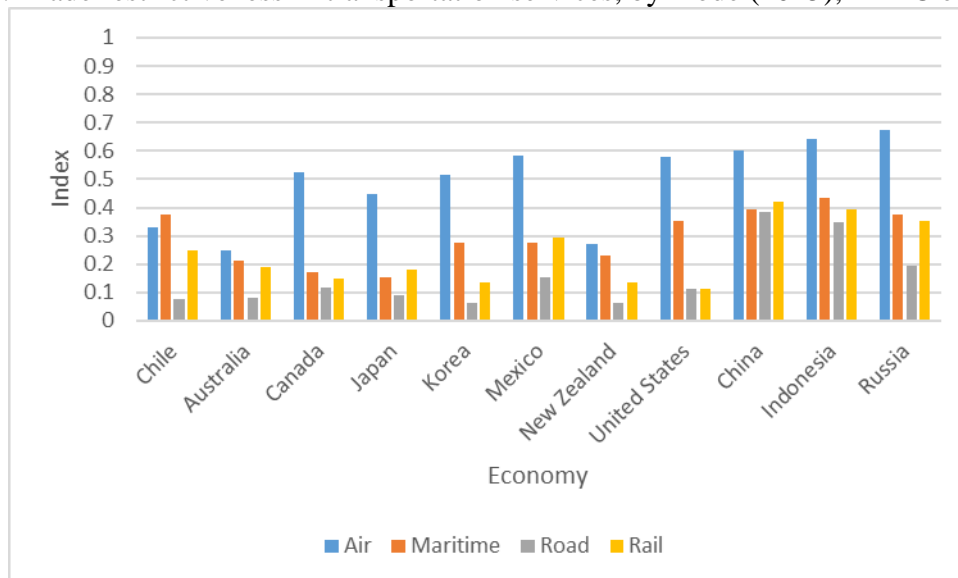
In Chile’s rail services also some barriers remain, which are mainly covering regulations related to competition of this sub-sector. For instance, the government still controls at least one major firm in this sector, and publication and filling of rail rates is not required, rates for terminal running rights are not regulated, confidential contracts are not allowed, bottleneck services are not regulated, and running rights are not mandated. Here too, other categories of rail restrictions that Chile has in place are part of the movement of people which, as in the maritime sector, has a time limit. Restrictions on foreign entry is relatively open in Chile in the rail sector.

Finally, Chile’s road sector shows little distortionary regulation. If any, they are found in the movement of personnel, where time limits still remain, and some anti-competitive rules related to pricing. For instance, the government still provides pricing guidelines for road freight companies, and industry representatives are involved in setting entry and also pricing regulations.

**Chile’s Transport Services Trade Regulations in Comparative Context**

As previously indicated, Chile’s regulatory framework for transportation services is not very restrictive. However, there is potentially scope for additional welfare enhancing regulatory reforms, based on experience elsewhere within APEC (Figure 7). For example, Australia and New Zealand have lower levels of trade restrictions. However, within the context of APEC developing economies, Chile can be seen to be a strong performer, notwithstanding the remaining regulatory issues identified above. Again, we emphasize that it is important to keep an effective and efficient regulatory framework for transport services, so the objective is not to roll back all regulations. Rather, we see potential scope for intra-APEC experience sharing as Chile doubles down on its commitment to supporting open markets in this sector, with flow on benefits to its GVC performance.

Figure 7: Trade restrictiveness in transportation services, by mode (2015), APEC economies.



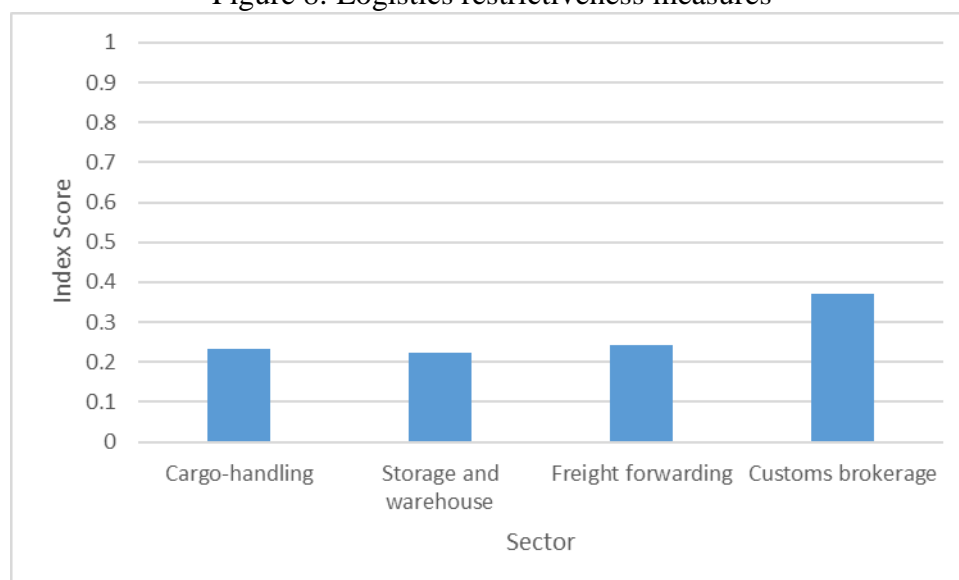
Source: OECD.

## Measures Affecting Logistics Services

As previously stated, the transportation services sector is not a sector that stands alone in a GVC, as the connection between domestic and international markets is also dependent on the quality performance of some of the infrastructure nodes, such as maritime ports or airports, which are in turn also surrounded by regulatory policy. In the GVC context, multimodal linkages, assured by the logistics sector, are crucial for moving goods from the domestic freight network (primarily road) to international freight networks (maritime and air transport). Logistics operators tend to be separate from strict-sense transport sector actors, so regulations often treat them differently. The OECD's STRI has newly created services restrictiveness indicators regarding these logistical connection points, which are for Chile shown in Figure 8. The index of restrictiveness is again scaled from 0 (entirely open) to 1 (entirely closed).

Chile's customs brokerage is the most restricted logistics service. It shows an indicator score of almost 0.4, which means that there are still quite some restrictions in place. The other three logistics services, namely freight forwarding, cargo handling, and storage and warehousing show equal levels of minor restrictions around 0.22 to 0.25 as an indicator score. Looking deeper into the type of restrictions that are in great part responsible for these index scores, it seems that regulatory transparency is the main reason why there are still some restrictions in place. For instance, Chile still requires more than eight types of documents for obtaining a business visa and there is still no legal obligation to announce new regulations to the public. Similarly, Chile requires a substantial amount of procedures to open up a business, and there is no single customs procedure window available. Of course, these regulatory issues are horizontal, in the sense that they apply to sectors other than logistics. But they play a particular role in driving logistics in that case, so it is appropriate to highlight them in the broader context of this case study. Apart from that, in customs brokerage services, there are still some foreign entry restrictions in place such as equity restrictions. Regulatory measures affecting performance of the logistics sector are therefore a mixture of cross-cutting measures and sector-specific regulations. These measures are likely to affect performance in the logistics sector in Chile, with knock-on effects to GVC performance downstream.

Figure 8: Logistics restrictiveness measures



Source: OECD.

## Domestic Transport Services Regulations

The above analysis has been purely cross-sectional, focused on regulatory measures in place as at the date of the index. To bring the discussion closer to the tables of regulatory measures presented above, it is important to introduce a dynamic aspect into the analysis. To do that, we use the OECD Non-Manufacturing Restrictions (NMR) database which forms part of the OECD's Product Market Regulations (PMR) database. The measures in this database do not necessarily measure the restrictiveness of trade per se, but are more related to the domestic regulatory settings of an economy. Yet, since services trade barriers are comprised of regulations, and since many domestic regulations which are de facto non-discriminatory in nature also have an indirect effect on the tradability of services, it may nonetheless provide interesting insights about Chile's general regulatory framework of transportation services and its performance in GVCs.

The NMR's regulatory index for transportation services are comprised of Airlines, Rail and Road; maritime transport is not included. The index ranges from 0-6 with increasing values reflecting higher levels of restrictions. Moreover, this database also allows for a separation of two different types of regulatory barriers, namely entry barriers and regulations on the operations of the firm (conduct regulations). The former refers to measures that make it harder for new firms to enter the transport services market, while the latter include regulations that affect competitive conditions in the market and influence the cost of doing business for transport services firms. See Table 7 for a more precise overview.

Table 7: Type of NMR regulatory barrier by sector

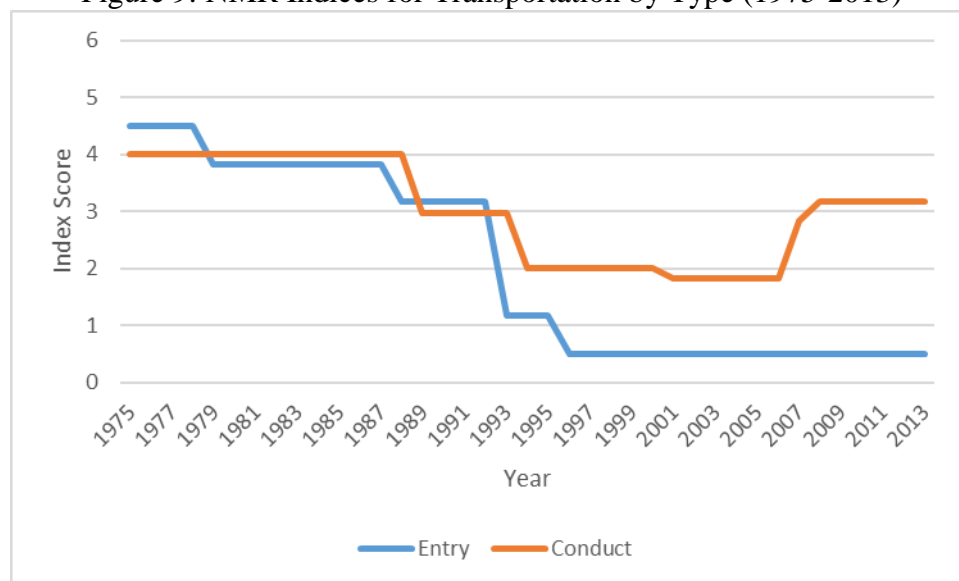
Sector	Regulatory barriers NMR	
	Type	Barrier
Rail (ISIC Rev 3 60-63)	Entry barriers	Entry barriers
	Conduct barriers	Public ownership
		Vertical integration
		Market structure
Airline (ISIC Rev 3 60-63)	Entry barriers	Entry barriers
	Conduct barriers	Public ownership
Road (ISIC Rev 3 60-63)	Entry barriers	Entry barriers
	Conduct barriers	Prices

Source: OECD and authors own calculations. See Koske (2015) for further details.

In line with the tables of regulatory measures presented above, Figure 9 shows that overall in Chile, regulatory restrictions in transport services have been falling over time, particularly in relation to entry barriers, which are now very low. There is some evidence that conduct regulations have ticked back up in recent years, perhaps due to increased regulations related to prices for the road transportation sector. Nonetheless, the general pattern in the data is

consistent with deep and effective liberalization of the sector, leading to the relatively open position already noted in the context of the trade restrictiveness indices.

Figure 9: NMR Indices for Transportation by Type (1975-2013)



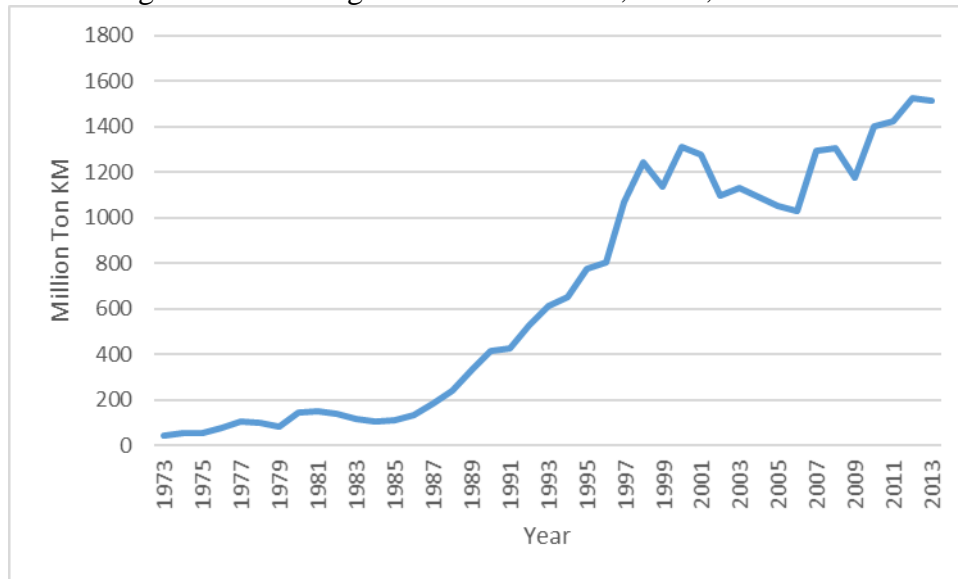
Source: Authors' calculations, OECD

Tables 1-5 above provide full details on the regulatory changes associated with these movements in the quantitative indicators. As can be seen, the key reforms were implemented from the late 1980s through the mid-1990s. In relation to ports, 1991 saw the end of the state monopoly on harbor services, which fundamentally changed the entry conditions for that sector by allowing in private sector actors. This measure was supplemented in 1997 with decentralization of state owned ports and introduction of terminal concessions, which effects entry and conduct regulations. In the air transport sector, Chile crucially began negotiating Open Skies Agreements, which liberalize access for foreign service providers, in the 1980s. The national airline, LANChile, was privatized in 1989. As with the ports sector, concessioning was introduced in 1991, thereby allowing private sector entry. Together, these changes made fundamental changes in the entry and conduct conditions affecting air transport businesses. By contrast, road transport has been quite liberal at all points during the sample, with policies focusing on issues of safety. One important measure that affected the costs of doing business in the sector was the introduction of concessions for public works in 1991. Finally, in the rail sector the pattern of reform was more complex. Privatization of freight services was implemented through the 1980s and 1990s. Concessions for private lines were allowed from 1981. Additional competition was gradually introduced into freight services through the 1990s. As can be seen from this discussion, the presentation of changes in regulatory measures affecting the transport sector in Tables 1-5 is quite coherent with the quantitative information summarized in Figure 9.

To provide some first ideas of the economic impacts of these changes over time, we present relevant data and look at rates of change during and after the primary reform period. We start with the transport sector itself. The longest time series, corresponding to the sample period of the NMRs in Figure 9, is for air transport. Figure 10 shows the amount of air freight moving through Chilean airports, measured in million ton kilometers, as is standard in the industry. The rate of growth accelerates rapidly in the mid-1980s, corresponding with the implementation of Open Skies agreements. The rate is maintained through the 1990s as the

policy is deepened and the additional reforms referred to in the previous paragraph are implemented. Figure 10 clearly suggests that the key policy reforms we have identified in the air transport sector led to an intensification of air freight activity, which is an important way of moving high value goods, like parts and components, within manufacturing GVCs.

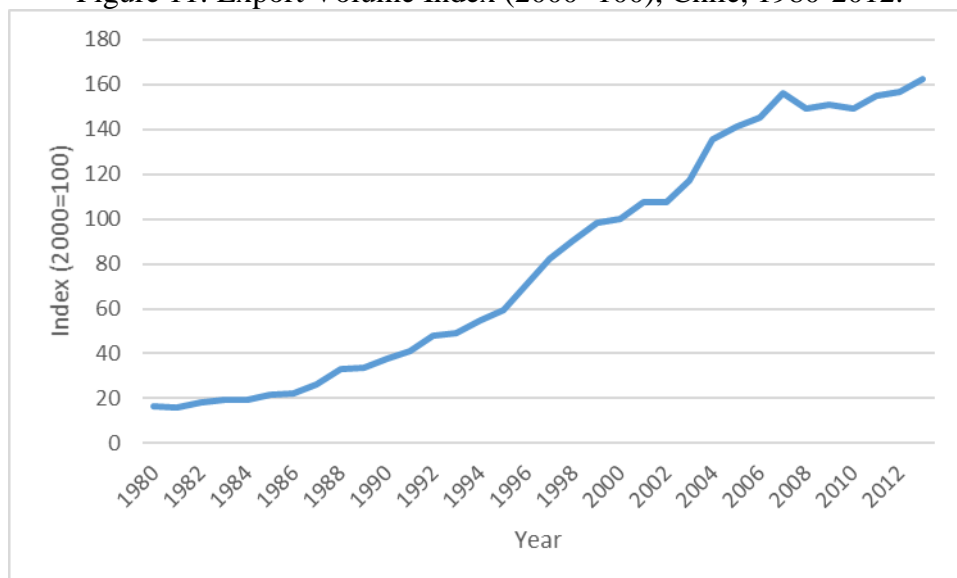
Figure 10: Air freight in million ton km, Chile, 1973-2013.



Source: World Development Indicators.

In assessing economic impacts in the GVC context, it is important to move beyond the transport sector to look at merchandise trade over time. Figure 11 presents an export volume index, which charts export growth over time after accounting for changes in prices. The figure shows that export growth starts to pick up in the mid-1980s, coinciding with the early period of reform, and accelerates markedly during the 1990s. Concretely, the index increased by just over 100% during the 1980s, and by 162% during the 1990s. Given the important links between transport services and merchandise exports, these results are consistent with sectoral reforms contributing to a substantial increase in the rate of export growth during and after the reform period.

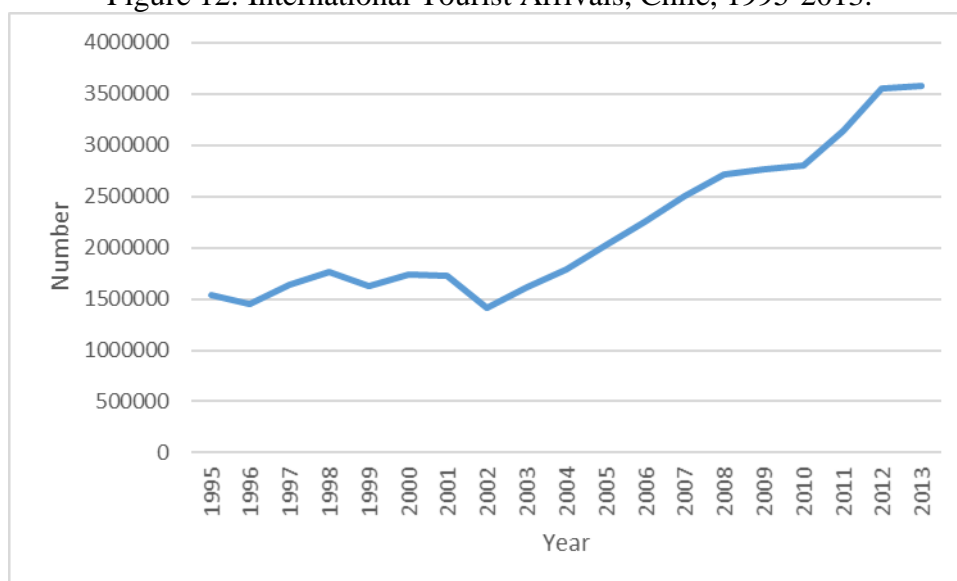
Figure 11: Export Volume Index (2000=100), Chile, 1980-2012.



Source: World Development Indicators.

This case study focuses on manufacturing value chains, so we do not look in detail at the impacts of transport sector liberalization outside goods sectors. However, as the issue is one of policy interest, we can present one figure showing that changes in transport policy also supported development of services value chains. One important services value chain is tourism. Figure 12 shows that following the reforms of the 1980s and 1990s, Chile's tourist arrivals accelerated rapidly from the early 2000s onwards. There is more of a lagged effect with this sector than with the merchandise trade figures examined above. Nonetheless, the effect is clear. Air transport has played a particular role in supporting this development: extra-regional tourists arrive mostly by air, so Chile's Open Skies agreements have made it possible for them to access the market in this important sector.

Figure 12: International Tourist Arrivals, Chile, 1995-2013.



Source: World Development Indicators.

Recent research using firm level data confirms these insights, and shows rigorously that entry and conduct regulations are both important for reaping efficiency effects for downstream

users, albeit in different ways (Van der Marel, *et al.*; 2016). The paper we have cited shows that entry barriers are the main determinant for higher productivity for industries with high services intensities. However, although conduct regulations affect foreign and domestic firms alike, they seem to be the dominant source of lower productivity performance of foreign firms operating in the domestic market.

### Other GVC-related Domestic Regulations

Furthermore, regulatory barriers directly related to the transportation sector are likely to be insufficient in developing optimal transportation networks that accommodate GVCs. On the contrary, many complementary rules and procedures will in addition further increase the efficiency of transport services in Chile. These procedures are related to border compliance and documentary compliance for both importing and exporting.

The World Bank’s Doing Business database measures the extent to which these compliance procedures are costly within an economy. Table 8 below shows a summary of their findings and computes regional and world averages. In all, Chile ranks 63 out of almost 200 economies and hence takes up a middle position. Compared to other parts of the world, Chile performs quite well. For instance, the cost to export in USD is lower in Chile compared to many economies in East Asia or Latin America, or even compared to the APEC average. Yet, compared to other peer groups such as the OECD (of which Chile is also member), there is still scope for improvement.

Table 8: Domestic regulatory policies indirectly related to the Transport Sector (2015)

	Chile	East Asia & Pacific	Latin America & Caribbean	OECD high income	APEC	World
Rank	63					
Time to export: Border compliance (hours)	60	51	86	15	38	64
Time to export: Documentary compliance (hours)	24	75	68	5	34	61
Cost to export: Border compliance (USD)	290	396	493	160	393	388
Cost to export: Documentary compliance (USD)	50	167	134	36	117	173
Time to import: Border compliance (hours)	54	59	107	9	48	87
Time to import: Documentary compliance (hours)	36	70	93	4	44	74
Cost to import: Border compliance (USD)	290	421	665	123	428	463
Cost to import: Documentary compliance (USD)	50	148	128	25	125	199

Source: World Bank Doing Business Database; Authors’ calculations

Although we have examined the main sources in the area of transport sector policy, it is important to recognize the limits of our discussion. Beyond regulations in the strict sense, standards can also play an important role in some sub-sectors, such as road transport. Rigorous cross-economy data on relevant standards are not available, so in the interests of developing a case study that can provide some first indications of the economic impacts of regulatory reform, we prefer to limit the discussion to widely comparable data sources.

As can be seen from the discussion in the above sectors, transport sector regulation is a mixture of specific and cross-cutting measures, from a variety of sources, mostly domestic, but also influenced by international developments, particularly in the case of air transport. There are important complementarities between policy reforms in transport and those in other

services sectors. Indeed, reforming transport is a key part of broader structural reform efforts, pursued by economies individually and also within the context of APEC initiatives. In designing policy reforms, it is important to leverage these complementarities so as to produce maximum benefits.

### **Estimating the Impact of Regulation on GVC Participation**

From a policy perspective, it is important to have a sense of the extent to which regulatory reforms in transport can enhance integration into GVCs, for example as measured by domestic value added in GVC sectors. This question lends itself to a quantitative interpretation. However, fully pursuing the issue is challenging from a number of methodological perspectives. Ideally, there would need to be an assessment of the extent to which regulation interferes with the optimal allocation of resources between transport and other sectors, leading to higher prices and other undesirable effects. Next, it would be necessary to relate those distortions to quantitative indicators of value chain development and performance. Implementing such an approach in practice would require a combination of econometric and computable general equilibrium (CGE) models, and intersects with many questions lying at the frontier of current approaches.

Given that the emphasis of this project is on the production of case studies, a full-fledged quantitative analysis of economic impact is beyond the scope of what is appropriate here. Nonetheless, we endeavor to make use of the fact that Chile is a data rich environment in terms of policy variables and GVC indicators, to provide an approximate “back of the envelope” indication of the extent to which policy reforms have been associated with the development of GVCs. We emphasize that the approach draws on the existing literature and a previously estimated model that relies on a relationship established across numerous economies and sectors. It therefore represents a kind of average effect, and would need to be refined by an economy-specific analysis to produce a more detailed assessment that takes full account of Chile’s particular circumstances. Nonetheless, we present a simple set of calculations for their indicative value, and as a spur to further research and policy analysis in this area.

Van der Marel and Sàez (2016) construct an econometric model that captures the relationship between entry and conduct regulations, as captured by the NMRs analyzed above, and domestic value added as an indicator of value chain performance. Their key results are reproduced in the Technical Annex that appears at the end of this report. Their model controls for sector and time-specific influences, as well as variables that control for GVC characteristics. The relationship of interest is between the two policy variables and GVC performance as they have captured. Their core estimate (Technical Annex, column 4) establishes that a one-point fall in the NMR entry restrictions indicator is associated with a 1.17% increase in domestic value added as an indicator of value chain performance. The corresponding relationship for conduct restrictions is 1.04%. These effects are both statistically significant after controlling for other factors, and there is some claim to be made that the effect is causal, as the authors of the original study relate policies at time (t-1) to performance at time (t).

Using these two estimated sensitivities and the observed pattern of policy reforms in Chile (Figure 9) makes it possible to obtain a very approximate estimate of the extent to which policy changes were associated with improved GVC performance. Chile’s NMR score for entry regulations in transport fell from 4.5 to 0.5 over the sample period. Applying the



estimated sensitivity indicates that these changes were associated with an increase in domestic value added of 4.68%. The corresponding exercise for conduct restrictions shows that the NMR measure fell from 4 to 1.83 at its lowest point, so applying the relevant sensitivity gives an economic impact of 2.26%.

To obtain a basic impact estimate, we can sum these two components. The data therefore support the view that regulatory reform in Chile's transport sector has been associated with an increase in value chain activity as measured by domestic value added of about 7%. Again, we stress that this figure is just an order of magnitude impact assessment that will need to be developed further in future work. Nonetheless, we believe it is informative because it shows that transport sector reform can have an economically significant impact on value chain performance—a key finding for developed and developing economies alike. We emphasize that this estimate is likely a lower bound, as it is based on cross-economy findings and does not account for the very substantial degree of liberalization in Chile, particularly affecting entry barriers. Moreover, it assumes that sectoral intensities remain constant, which is a strong assumption.

## 4. CONCLUSION AND POLICY IMPLICATIONS

This case study has examined the pattern of liberalization in Chile's transport services sectors, specifically from the point of view of the ways in which it has supported increasing engagement with GVCs. It has found that Chile has indeed undertaken considerable liberalization of key modes over recent years, with the combination of efforts perhaps contributing to increase GVC participation, as measured by domestic value added, by around 7%. Transport services are an important input into many GVCs, including those where Chile has been successful, so it should come as no surprise that liberalization can make a non-negligible contribution to promoting the expansion and deepening of GVCs.

A particular aspect of the Chilean experience we have highlighted is the link between transport in combination with logistics as a value, as opposed to cost, service in some sectors. Promoting development of transport as a real source of value added, for instance through cold chain storage, high speed movement of time-sensitive goods, and use of controlled environments to preserve sensitive products, can make it possible for economies like Chile to participate in non-traditional GVCs. As highlighted early on in the report, Chile has been successful in developing some agribusiness sectors into competitive GVCs, and having open and competitive transport markets has been a significant factor in that evolution. The implications are clear for other developing APEC economies with comparative advantage in agribusiness subsectors.

More broadly, the work presented here supports APEC's focus on the role of services in manufacturing value chains. Moreover, it suggests that sectors like agribusiness, where GVCs are becoming more relevant for a number of APEC economies, also rely on services like transport, as well as wholesale and retail distribution. As a result, regulatory reform in key backbone services sectors, including transport, has the potential to help develop GVC activity across APEC, with the national income and development gains that brings with it.

On a methodological level, one contribution of this case study has been to leverage datasets on regulation and value chain development to develop links between policy restrictiveness and GVC participation, including through providing a simple quantitative impact assessment. From an analytical point of view, such work is in its infancy, but it offers the perspective for an enhanced understanding of value chain processes, as well as a clear set of policies that can help support the development and extension of GVCs across the region.

Chile offers a particularly rich background for this type of study because it is not only a member economy of APEC, but also a member of the OECD. As such, it is included in OECD databases on GVCs and services policy restrictiveness, including domestic policies. Indeed, a key insight to come out of this work is that although from a strictly trade policy point of view, Chile is quite liberal, there are remaining issues of domestic regulation that perhaps deserve attention, such as slot allocation in air transport, and price setting in other modes. Chilean policies in the transport sector contain relatively little *de jure* discrimination against foreign service providers, which is admirable. However, it will be important to maintain the momentum towards efficient and effective sectoral regulation by conducting rigorous cost benefit assessments of some of the measures that have been identified here.

APEC has been active in supporting the liberalization of services markets, as well as goods markets. In addition, it has supported domestic regulatory reform, and a number of APEC economies are developing, or have developed, comprehensive structures for Regulatory Impact Assessment (RIA). Results here suggest that continuous evaluation of policies and progressive liberalization within a context of ensuring that important social objectives are met, can have important economic benefits for economies, including developing economies. Greater involvement in GVCs is a policy goal for a variety of APEC economies, and Chile's experience, as well as previous PSU work, point to the importance of work on services sector policies as a means of promoting that. In terms of APEC's broader agenda, there is a clear synergy with the Renewed APEC Agenda for Structural Reform (RAASR), for which economies are currently developing individual action plans. PSU work has shown that structural reform, centered around pro-competitive reforms in backbone services markets, can bring real economic benefits to the region. Moreover, there is strong evidence to suggest that developing economies have the most to gain, in particular once productivity effects are accounted for. This previous and ongoing work, taken together with the results of this case study, highlight the importance of pursuing analytical work on the links between services policies and goods GVCs, including in emerging areas like agribusiness.

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**TECHNICAL ANNEX**

Baseline regressions GVC performance and regulatory Domestic Regulations						
	(1)	(2)	(3)	(4)	(5)	(6)
	Total indirect linkages (VA_Stl)				Foreign backward linkages (VA_Sbf)	Domestic indirect linkages (VA_Sfi)
	ln(DVA)	ln(DVA)	ln(DVA)	ln(DVA)	ln(DVA)	ln(DVA)
RL NMR (all) <sub>t-1</sub>	-0.0225*** (0.0028)					
RL NMR (entry) <sub>t-1</sub>		-0.0178*** (0.0021)		-0.0117*** (0.0030)	-0.0289*** (0.0080)	-0.0100** (0.0045)
RL NMR (conduct) <sub>t-1</sub>			-0.0226*** (0.0032)	-0.0104** (0.0045)	-0.0026 (0.0105)	-0.0173*** (0.0067)
GVC controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Economy-year; sector-year	Economy-year; sector-year	Economy-year; sector-year	Economy-year; sector-year	Economy-year; sector-year	Economy-year; sector-year
Observations	11,758	11,758	11,758	11,758	11,758	11,758
R-squared	0.8569	0.8569	0.8567	0.8571	0.8563	0.8563
RMSE	0.157	0.157	0.157	0.157	0.157	0.157

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Years cover 1995-2011. Domestic value-added are put in logs. GVC controls contain the variables FVAX, DVAR as well as FVADP, all put in logs. The regulatory linkages (RL) variables are lagged with one year and forms the multiplication of the regulatory indicator variables weighted by each services linkages: VA\_Stl, VA\_Sbf and VA\_Sfi separately as shown in the respective columns. VA\_Stl stands for the total indirect value-added linkages in services comprised of foreign backward (VA\_Sbf) and domestic forward indirect (VA\_Sfi) value-added in services. Fixed effects by economy-year and sector-year applied. Robust standard errors in parenthesis clustered by economy-sector.

Source: Van der Marel and Saez (2016).