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Contribution of Trade Facilitation Measures to the Operation of Supply Chains

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Abstract

CONTRIBUTION OF TRADE FACILITATION MEASURES TO THE OPERATION OF SUPPLY CHAINS

Evdokia Moïsé and Silvia Sorescu
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This report assesses how specific border procedures impact on the operation of supply chains and the resulting policy implications, using data from the OECD Trade Facilitation Indicators (TFIs) database and from the OECD-WTO database on trade-in-value-added. The assessment focusses on the impact of trade facilitation measures in three areas: on the amount of foreign value-added embodied in final domestic demand; on the amount of foreign value-added embodied in the gross exports of a reference country; and on the amount of domestic value-added embodied in foreign final demand for agriculture and primary products, low tech industries, medium-low tech industries, and high and medium-high tech industries. A small increase of 0.1 in TFIs performance could potentially generate increases in a country's value-added "imports" in a range of between 1.5 and 3.5%, while in the case of "exports" these increases could range between 1 and 3%. Measures that enhance the predictability and the speed of movement of goods are critical factors that shape the sourcing decisions of companies. The impact is strongest when the value-added originates in medium-low tech industries, such as mining and quarrying or basic metals sectors, or in high and medium-high tech industries, such as transport equipment, chemicals and electrical and optical equipment, and is destined to high and medium-high tech industries.

Key words: Customs, global value chains, GVCs, intermediate inputs, trade facilitation, trade flows, trade policy, transparency, simplification

JEL: F1, F13, F14, F2, F6

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To consult the **OECD set of trade facilitation indicators**
which identifies areas for action and enable the potential impact of reforms to be assessed,
please see: http://www.oecd.org/trade/facilitation/indicators.htm

Table of contents

Executive Summary 4

1. Introduction 5

2. Global value chains and trade facilitation measures 6

3. The potential impact of TFIs on trade in value-added 7

The impact of trade facilitation on "imports" of value-added 10
Impacts by sector groupings 12
The impact of trade facilitation on "exports" of value-added 12

4. Trade Facilitation Indicators Database – 2014 update for OECD countries 14

Information availability 16
Involvement of the trade community 16
Advance rulings 17
Appeal procedures 17
Fees and charges 17
Formalities - documents 17
Formalities - automation 18
Formalities - procedures 19
Internal border agency cooperation 20
External border agency cooperation 21
Governance and impartiality 21

5. Conclusions and next steps 21

References 22

Annex 1. Quantitative frameworks identified for the analysis of supply chain participation 25

Annex 2. Selected TiVA Indicators 29

Annex 3. TiVA country coverage 32

Annex 4. TiVA sector coverage 33

Annex 5. Gravity Model specifications 34

Executive Summary

The internationalisation of production has given rise to complex cross-border flows of goods, know-how, investment, services and people, referred to as "supply-chain trade". These flows are influenced to varying degrees by both policy- and non-policy-related trade costs. Among those, the significant effect of border procedures on the ability of firms to enter and compete effectively in global value chains is often highlighted. This draft report seeks to shed empirical light on how *specific* border procedures impact the functioning of supply chains and draw attention to the policy implications. The report carries out an assessment of the contribution of trade facilitation measures to the operation of supply chains, using data from the OECD Trade Facilitation Indicators database and from the OECD-WTO database on trade-in-value-added. It draws on new trade facilitation data for OECD countries, collected over the summer 2014.

The analysis focusses on three different measures of integration into GVCs, the amount of *foreign* value-added embodied in final *domestic demand* or in *gross exports* of a reference country, and the amount of *domestic* value-added embodied in *foreign* final demand. These measures give a metric of engagement in the form of *buying from* and *selling to* GVCs, so as to allow exploring within a gravity model framework the impact of trade facilitation measures on the demand and the supply sides of the value chain activity. Their sectoral coverage organised into four main categories, namely agriculture-primary products, low tech industries, medium-low tech industries and high and medium-high tech industries, also allows exploring the specific impact on sector-pairs where value added originates and where it is directed for final consumption or further processing.

Overall, the estimates highlight a positive relationship at the sector level between various sets of specific trade facilitation measures and indicators capturing the level and intensity of countries' integration in global value chains. The analysis finds that a small increase of 0.1 in TFIs performance (TFIs values range between 0 and 2, where 2 denotes the best performance possible that can be achieved) could generate increases in a country's value-added "imports" ranging between 1.5 and 3.5%, while in the case of "exports" these increases could range between 1 and 3%.

Measures that appear to encourage the most linkages on the *demand* side of the value chain activity are, by order of magnitude, the availability of advance rulings, the streamlining of border procedures and controls, the proportionality and transparency of import and export fees and charges and the automation of the border process. These findings strongly highlight the importance of predictability and speed of the goods movement in shaping companies' sourcing decisions.

The impact of trade facilitation measures seems to be most significant when the value-added originates in "medium-low tech industries", such as mining and quarrying or basic metals sectors, or in "high and medium-high tech industries", such as transport equipment, chemicals and electrical and optical equipment, while the destination sector belongs to "high and medium-high tech industries". Most results for the agriculture-primary products sectors show a weak correlation between the value-added traded and trade facilitation.

The key sets of trade facilitation measures for developing the *supply* side of the value chain activity, or the reference country's export base, include the availability of trade-related information, the opportunities for dialogue with the trade community, the proportionality and transparency of import and export fees and charges, the automation of the border process, and the streamlining of border procedures and controls.

The update of the TFI database also allows an assessment of progress in the average trade facilitation performance of OECD countries since 2010. Significant improvements have been achieved in several trade facilitation areas, in particular regarding appeal procedures, the simplification and harmonisation of documents, the streamlining of procedures, and internal and external border agency cooperation. Other areas display smaller improvements or no evolution.

The extension of GVC data in terms of both temporal and geographical coverage, as well as the update of the TFIs for countries outside the OECD area would allow further analysis on these issues for a wider number of developing countries to be undertaken.

1. Introduction

The internationalisation of production has given rise to complex cross-border flows of goods, know-how, investment, services and people –"supply-chain trade" in short (OECD, 2012, 2013a and 2013b; Baldwin and Lopez-Gonzalez, 2013). Such cross-border fragmentation of production enables countries to export domestic value-added to other countries not only directly in the form of gross exports of final or intermediate products in bilateral trade flows, but also indirectly through third countries, by participating in global supply chains (Noguera, 2012). The emergence of global supply/value chains can be observed by looking at how countries have come to increasingly rely on foreign inputs for their own firms' production and exports which may then be further processed in partner countries (OECD, WTO and UNCTAD, 2013).

Supply chains can be described as a system of value-added sources and destinations (Koopman, Wang and Wei, 2014). Value chain participation is defined in terms of the value-added embodied in exports looking both backward and forward from a reference country: backward when it concerns foreign value added embodied in the reference country's exports, and forward when it refers to domestic value added which will be used as input to produce exports in the destination country. Economies can be positioned upstream and downstream in global value chains (GVCs) depending on their specialisation and their positions may change over time.

Both policy- and non-policy-related trade costs shape the fragmentation of production and are in turn influenced by it (OECD 2013b; Johnson and Noguera, 2012; OECD, WTO and World Bank, 2014). Within global value chains, goods can be traded across borders multiple times as intermediates and then as final products therefore further magnifying trade costs. The development of GVCs means therefore that trade policies of different countries are becoming even more interdependent, as well as more immediate and pervasive in their effects (OECD, 2013b).

Fast and efficient administrative procedures at the border have been particularly highlighted as being important to the smooth operation of value chains and to boosting competitiveness (OECD, 2013b). Border procedures and their impact on trade have been analysed using the OECD Trade Facilitation Indicators (TFIs), developed in *OECD Trade Policy Papers* N°118 (Moisé et al., 2011) and 144 (Moisé and Sorescu, 2013) and following closely the structure of the WTO Trade Facilitation Agreement. In these papers the impact of the TFIs was tested on bilateral gross trade flows and trade costs for advanced and developing economies. For developing countries this impact was significant whether they were importing or exporting goods to the rest of the world. Moreover, the estimated results in the case of imports are not only important for the direct impact on imports themselves, but also for the significant effects that this can have on the domestic market and export competitiveness through access to imported intermediate goods. Improving the efficiency of procedures and addressing border bottlenecks on both the import and export side are important components of trade facilitation measures. The analysis also emphasized the importance of simultaneous rather than piecemeal trade facilitation actions and showed that manufacturing trade tends to respond particularly strongly to trade facilitation improvements.

The current study contributes to a better understanding of the impact of the *specific* trade facilitation measures covered by the OECD TFIs on the functioning of international production

networks/GVCs as mapped by the OECD-WTO TiVA indicators. The primary objective of the new work is to shed more empirical light on how *specific* border procedures impact the functioning of supply chains, and draw attention to the policy implications. How do impacts differ across various sectors (sectors in the upstream and sectors in the downstream segments of the chain)? Going further, how do impacts of trade facilitation vary when a sector in the downstream segments of the chain relies on foreign value added sourced across multiple sectors and trading partners? Section 2 reviews recent studies relating trade facilitation issues to global value chains, with the objective of identifying a conceptual framework for analysing the link between TiVA indicators and TFIs. Section 3 proposes an empirical framework for exploring the relationship between trade facilitation measures and trade in value-added data. This is based on an extensive review of quantitative frameworks used in the recent literature for analysing determinants of supply chain participation. Section 3 also discusses data issues and results. Technical details are provided within Annexes. In order to bring the information contained in the 2010-11 TFIs OECD series up to date, member countries were called to provide new data by means of a revised 2014 TFI questionnaire. Section 4 thus presents findings from the 2014 TFIs database update for OECD countries. The last section provides conclusions and next steps.

2. Global value chains and trade facilitation measures

When goods cross borders multiple times, the costs associated with the different trade barriers are magnified. Traded intermediate inputs incur, inter alia, tariffs, transportation costs and costs associated with border procedures, every time these are shipped to another country for further processing. This is identified as the "magnification effect" and concerns all trade costs incurred at every border crossing (OECD, 2013b). Goods traded multiple times along their value chain are subject to those costs at every border crossing, with potentially large cumulative effects. The cumulative effect of tariff and non-tariff barriers can therefore significantly raise costs and prices by the time the finished good reaches final consumers, thus affecting demand, as well as production and investment at all stages of a value chain. This cumulative effect shows that, similar to tariffs, firms involved in GVCs are affected not only by costs incurred at their own borders, but also by those between third countries situated upstream and downstream, which can significantly raise the costs of operation, disrupt and possibly redirect the value chain (OECD, 2013b). The existence of forward and backward linkages within a specific supply chain means that trade facilitation actions on both the export and the import side impact equally on production and competitiveness within the chain.

An additional cost of lengthy customs procedures or inefficient border infrastructure is increased uncertainty, which in turn complicates the ability of firms to engage in just-in-time production or react quickly to demand shifts when components travel through multiple countries. This can have an impact on inventories at each stage of production, which is both costly and ties up working capital which could be used more efficiently (OECD, 2013b). OECD work on GVCs/TiVA has highlighted the fact that the more frequently products cross borders in the course of their manufacture, the more significant trade facilitation policies become. Importantly, trade in components is extremely time-sensitive: the cost of an extra day spent in transit is 60% higher for importers of intermediate goods than for importers of final goods (Hummels and Schaur, 2012).

This particularly highlights the potential of trade facilitation policies to lower such costs and delays. Addressing such procedural obstacles as a consistent effort across a large number of countries could make value chains globally more efficient. This collective effort would also ensure, for countries undertaking costly investments to improve their customs and port infrastructure, that their firms will gain further opportunities to participate and grow in GVCs as their current or potential trade partners do the same (OECD, 2013b).

While a relatively large empirical body of literature connecting trade facilitation and gross trade flows has emerged since the early 2000s, the one examining the impacts of trade facilitation on value-added trade is still relatively limited. One of the important issues in the literature on vertical specialization is the role of trade costs within global production networks (Saslavsky and Shepherd,

2012). Yi (2003) argues that trade within global production networks should be more sensitive to changes in trade costs than gross trade, since vertical specialisation causes products to move across borders many times before reaching their final consumption location.

Ma and Van Assche (2010) analyse the role of trade costs on trade within global production networks using a comprehensive dataset on China's processing trade regime and mapping the location of input production, of processing, and of consumption. The authors find that Chinese processed exports not only depend on *downstream trade costs* (export distance), but also on *upstream trade costs* (import distance), and the interaction of both. However, trade logistics costs are only captured indirectly through the distance to the suppliers and customers of the firm, and then using oil prices.

Saslavsky and Shepherd (2012) use a gravity model to investigate the links between logistics performance and the growth of international production networks. The authors use the World Bank's Logistics Performance Index (LPI) for tracking logistics performance and test its impact on both trade in parts and components and trade in final goods. They introduce some modifications into the traditional trade gravity model – the Baier and Bergstrand (2009) methodology for accounting multilateral resistance- and test whether trade in parts and components is more sensitive to improvements in logistics performance than trade in final goods. The authors find substantial support for their hypothesis, with logistics performance resulting particularly important for production networks within the Asia-Pacific region.

OECD (2014) uses indicators of backward and forward integration as measures of GVC activity, based on OECD-WTO TiVA data, with a view to establishing their key characteristics and their relationship with factors such as market size, level of development, openness to trade and investment, and performance in other policy areas. The authors estimate that logistics performance, intellectual property protection, the quality of infrastructure, as well as the quality of institutions have particularly strong impacts on GVC integration in developing countries.

Shepherd and Archanskaia (2014) calculate value chain connectedness measures for APEC economies by relating trade in value added data from the TiVA database to network theory. They then correlate these measures to indicators such as the World Bank's Doing Business time to export and the World Bank's Logistics Performance Index. This work finds a negative correlation of connectedness with the former indicator and a positive relationship with the latter. The report is a first attempt at understanding the determinants of connectedness based on network analysis methods, and does not yet develop fully-specified econometric models to analyse determinants of such value chains measures. However, the strong correlations obtained by the authors point to trade facilitation, logistics performance, or transport connectivity as key policy drivers of an economy's ability to connect to value chains.

3. The potential impact of TFIs on trade in value-added

The theoretical and empirical literature on determinants of GVC trade has been developing rapidly (e.g. Baldwin and Taglioni, 2012; Brooks and Ferrarini, 2012; Cheng and Fukomoto, 2010; Noguera, 2012; Guillhoto, 2013; Choi, 2013; Nakazawa et al., 2014; Achard et al., 2014), but there is no empirical "gold standard" for investigating determinants of trade in value-added. Many of the most recent empirical studies employ the gravity model of trade by including the recently-developed estimates of value-added or trade in intermediates as a dependent variable (these are reviewed in Annex 1).

In the present study, the potential impacts of TFIs on trade in value-added are assessed within a gravity model framework, which considers various TiVA indicators as alternative dependent variables and includes the set of trade facilitation indicators among the explanatory variables. The analysis focusses on the disaggregated value-added flows from an originating country subsequently used in the exports or in the final demand of a reference economy. These indicators are therefore proxies for backward and forward supply chain linkages in a gravity framework. These measures give us a metric of engagement in the form of *buying* from (backwards) and *selling* to (forward) GVCs or the demand

and supply sides of the value chain activity (OECD, 2014). The gravity model approach allows a consideration of how trade in value-added could be fostered under scenarios of trade facilitation improvement.

The model tests the response of selected TiVA indicators to improvements in trade facilitation policies expressed through the TFIs. In addition to the TFIs, the set of explanatory variables includes the economic masses of the originating country and the destination country (proxies for the market size), the distance between the originating country and the destination country, and a series of other gravity variables (tariffs, the existence of a free trade agreement between the originating and destination countries, common border, common language). Following OECD (2014), the distance to the closest manufacturing hub is also included.

Several quantitative approaches such as Choi (2013) and Nakazawa et al. (2014) confirm strong gravity relationships when using value-added trade flows. However, two drawbacks of using the gravity framework approach need to be accounted for. First, as the TFIs are a country-specific variable, this estimation method precludes the inclusion in the model of country fixed effects – accounting for all other country-specific characteristics[1] - that vary only in the country dimension (as do our key explanatory variables). Second, the GVC setting relates importer and exporter characteristics to third country characteristics. In other words, bilateral value-added flows depend, not only on bilateral trade costs, but also on costs with third countries through which value-added transits from source to destination. As shown by Noguera (2012) their relative importance can be high, although this varies significantly across countries and types of trade costs. Empirical complications arise in trying to capture these indirect effects, but we have brought various adjustments to the base gravity model in the attempt to address these concerns. The various sets of specifications tested are detailed in Annex 5.

The TiVA database, developed by the OECD and the WTO, allows deploying the full strength of input-output analysis to investigate forward and backward linkages in an international context (Escaith, 2014). Backward participation captures the extent to which foreign intermediate inputs are used in the export activity of a given country (foreign value added embodied in exports), while forward participation captures to what extent a given country's exports are used by firms in partner countries as inputs into their own exports (domestic value added used as inputs to produce exports in a destination country). The TiVA indicators manage to track both the direct and indirect flows of value-added associated with international trade, which allows them to reveal bilateral trade in value-added even when bilateral gross trade flows might be zero.

TiVA indicators are available both at country and industry level. At the country level, foreign value-added in exports indicates for instance what part of a country's gross exports consists of inputs that have been produced by other countries, or the extent to which a country's exports are dependent on imported content. It is also an indication of the level of vertical specialization of economies, the extent to which economic activities in a country focus on particular tasks and activities in GVCs. At the industry level, the average foreign value-added is a proxy for the extent to which industry value chains are segmented or "fine-sliced" into distinct tasks and activities that generate trade, compounding the double-counting effect. Recently available TiVA indicators can identify the distinct industries towards which the imported value-added is actually destined.

The following TiVA indicators are selected as the dependent variables within our gravity framework, across the different specifications, in order to test the impacts of TFIs both in the upstream and downstream supply chain components. They provide a measure of the level and intensity of integration into GVCs and allow exploiting a bilateral pattern (they are described in more detail in Annex 2, Table 2):

1. The use of country fixed effects would allow controlling for price index terms, which aggregate both domestic and international trade costs, and therefore capture multilateral resistance – or the importance of relative costs in determining trade flows.

- as regards backward linkages, they concern both **"imports" of value added**, which denote foreign value-added embodied in final domestic demand, and **foreign value-added embodied in gross exports**. The former are available by destination country, origin country and origin industry, while the latter allow capturing an additional dimension of the value chain, that of the destination industry.

- as regards forward linkages, **"exports" of value added**, which denote the domestic value added embodied in foreign final domestic demand. They are available by exporting country, exporting industry and destination country.

The selected TiVA indicators cover all OECD countries, five other EU countries and seventeen other emerging economies. The full list can be found in Annex 3. The updated TFIs database has allowed covering eight additional OECD countries, compared to the initial sample of 25 OECD countries. The country coverage allows testing the specifications for the sample of OECD countries separately from the rest of economies covered by the TiVA database. The latest years available for the selected TiVA indicators are 2005, 2008 and 2009. TFIs for OECD members and countries outside the OECD area are built with the latest information available[2]. The gravity model specifications are tested as cross-sections for each one of these years[3]. The focus of the analysis is on the OECD sample of countries, but the specifications include also the countries outside the OECD area that TiVA covers, which are considered in the extended origin country sample (in the case of "imports" of value-added) and, respectively, the extended destination country sample (in the case of "exports" of value-added).

The TiVA indicators cover 13 goods sectors (Annex 4), which we group into four main categories, namely: agriculture-primary products, low-tech industries, medium-low tech industries, and high and medium-high tech industries. These groupings allow delving into how specific trade facilitation measures impact the sector groupings pairs where value-added originates and where it is directed for final consumption or further processing.

Table 1. Selected TiVA sectors

Agriculture – primary products	Agriculture, hunting, forestry and fishing
Low-tech industries	Wood, paper, paper products, printing and publishing Food products, beverages and tobacco Textiles, textile products, leather and footwear Manufacturing nec; recycling
Medium-low tech industries	Mining and quarrying Basic metals and fabricated metal products
High and medium-high tech industries	Transport equipment Chemicals and non-metallic mineral products Machinery and equipment, nec Electrical and optical equipment Electricity, gas and water supply Construction

Source: OECD-WTO TiVA database.

2. The first series for OECD countries built in 2010 also covered the latest information available at that time.

3. The 2010 TFIs series is tested against the 2005, 2008 and 2009 value added flows, while the 2014 TFIs are also tested against the 2009 value added flows. TFIs are built with the latest data available, at the time point of the data collection. Given the way they are built, the type of variables they cover, and the way trade facilitation reforms are implemented, they can be viewed as relatively stable over time (for a 3-4-year period). At this stage, we do not account for the date of implementation of measures.

The model yields intuitive results on the core gravity variables. Economic masses – of both origin and destination countries - increase the exchanges of value-added between an origin and a destination country, while distance reduces them. As in Kowalski et al. (2014), the distance to the main manufacturing hubs in Europe, North America and Asia reduces trade in value-added. The distance-related results highlight that the GVC participation of many countries relates substantially to GVC interactions within their respective regions. Tariffs applied by destination countries negatively impact value-added flows originating in partner countries. The existence of a free trade agreement (FTA) between the origin and destination countries impacts positively on both "imports" and "exports" of value-added.

The impact of trade facilitation on "imports" of value-added

"Imports" of value-added show where foreign value-added components of final goods consumed in a destination country originate, and the extent to which final users are connected to industries abroad (this is a *proxy* for the interconnection of a particular sector with those 'upstream' sectors from which it purchases inputs). The model thus reveals how trade facilitation policies impact final users in destination countries sourcing value-added from partner countries (Tables A5.1-4[4]).

The findings confirm a positive relationship between specific trade facilitation dimensions and participation into global value chains[5]. Trade facilitation measures that appear to encourage the most such backward-type linkages are, by order of magnitude, the availability of advance rulings, the streamlining of border procedures and controls, the proportionality and transparency of import and export fees and charges, and the automation of the border process[6]. The order of importance of measures remains the same when the origin country sample includes only OECD countries or the overall TiVA sample. The impact of advance rulings can be ascribed to the higher certainty, predictability and reliability they can provide along the transaction chain: the possibility to determine in advance the treatment of the goods on a number of Customs issues and to ensure that such determination will be binding on all customs offices over a specified period of time, allows companies to minimise the policy-related risk of their sourcing decisions. Predictability is also the most important factor explaining the impact of disciplines on fees and charges, rather than the direct cost they represent for the trader.

On the other hand, the importance of streamlined border procedures and controls relates in particular to the speedier movement of sourced value-added, made possible by the one-off submission of trade documents via single windows for foreign trade, the processing of such documents prior to the arrival of the goods, the rationalisation of physical inspections and their uncoupling from the goods' release thanks to the efficient use of guarantees and of post-clearance audits (PCAs). Additional simplifications offered to trusted traders in Authorized Operators (AO) programs also ensure the swift availability of inputs sourced abroad. In particular, the growing trend to develop single window systems and programmes grouping together documentary requirements of various border agencies allows expediting not only procedures of the customs authorities but also other border formalities and controls, with encouraging results for the overall efficiency of the import movement. Speed and efficiency are also promoted through the automation of procedures, which reduce the compliance costs

4. In the interest of brevity, results are presented for the 2009 cross-section using 2009 TiVA indicators and the latest series available for TFIs (for both OECD members and countries outside the OECD area covered by TiVA database).

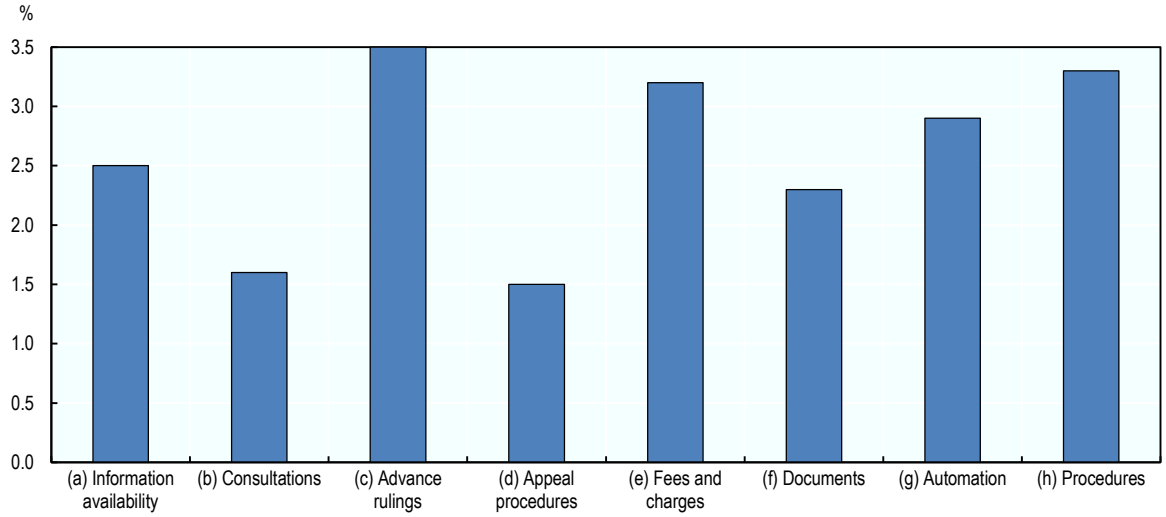
5. Given the data limitations at this stage, we are restricted to performing a cross-section analysis. With more recent data becoming available in the TiVA database, the analysis could be performed in a panel framework and include also time and country-time fixed effects in the model, thus allowing for a more solid analysis of causality.

6. Indicators (c), (h), (e) and (g) respectively.

associated with transmitting and processing trade information, and through the application of targeted controls thanks to risk management procedures.

A country where inputs can be imported within a quick and reliable time frame is an attractive destination to companies looking to build or integrate into value chains. When introducing the TFIs individually in the regressions, TFIs coefficients imply, for instance, that small improvements in trade facilitation policies – expressed by an increase in the TFI of 0.1[7] – could generate increases in a country's value-added "imports" ranging between 1.5 and 3.5% (Figure 1). Pursuing reforms in areas that could bring TFI improvements would not only boost trade flows while cutting trade costs, but also support further backward GVC linkages (examples are provided in Box 1).

Figure 1. Potential impacts on "imports" of value-added from an increase in TFI of 0.1



Note: The calculations denote the impact on destination countries.
Source: Author's calculations based on estimations in Table A5.1 (column reg4_bis).

Box 1. TFI measures potentially encouraging backward-type linkages

The analysis highlighted **advance rulings**, **the streamlining of border procedures and controls**, and **the proportionality and transparency of import and export fees and charges** as the top three indicators that would encourage the interconnection of a particular sector with those 'upstream' sectors from which it purchases inputs (the backward-type linkages). The areas highlighted below are *specific* examples of *measures* that can constitute potential reforms across these three trade facilitation dimensions:

Encouraging backward-type linkages	
Advance rulings	▪ improve the predictability on the issuance time for advance rulings ▪ increase the length of time for which the advance ruling is valid
Fees and charges	▪ increased transparency and information availability on the fees and charges applied both by Customs and other border agencies
Streamlining and simplification of procedures	▪ full implementation of Single Windows ▪ further development of Post-Clearance Audits programmes ▪ further development of Authorised Operators programmes ▪ overall simplification of procedures in terms of both time and costs

Source: Based on OECD TFIs database.

7. Ten basis points increase in the TFI score (0.1 on a scale of 0 to 2). The TFIs across all areas are continuous variables that range between 0 and 2, where 2 denotes the best performance possible that can be achieved.

The least solid results are obtained for internal border agency cooperation (i) and external border agency cooperation (j) which appear either to have a positive but not significant impact on GVC integration, or on the contrary to have a negative impact on GVC integration, i.e. do not bear the expected positive sign.

Impacts by sector groupings

Testing the TFIs against "foreign value-added embodied in gross exports" provides an additional sector dimension. It allows tracking the sector-pairs where value-added originates and where it is then directed for further processing and exportation. Regressions are performed for the four broad sector groupings constructed (agriculture-primary products, low-tech industries, medium-low tech industries, and high and medium-high tech industries), using the same explanatory variables (Tables A5.8-11). The most robust results as regards trade facilitation measures are obtained when the value-added originates in "medium-low tech industries" (such as mining and quarrying or basic metals sectors) or "high and medium-high tech industries" (such as transport equipment, chemicals, and electrical and optical equipment) and the destination sector belongs to "high and medium-high tech industries".

Trade facilitation measures that seem to encourage most backward-type relationships between these sector groupings are the availability of trade-related information, the opportunities for dialogue with the trade community, the availability of advance rulings, the simplification and harmonisation of trade documents, and the streamlining of border procedures and controls[8]. Sufficient and easily accessible up-to-date trade-related information, as well as simplified and internationally harmonised documentary requirements appear particularly significant in the case of foreign input sourcing for transport equipment, chemicals, and electrical and optical equipment.

Decisions to segment productive activities within industry value chains so as to harness the best sourcing opportunities are fostered not only by the predictability and speed of the border process due to advance rulings and streamlined procedures (see above), but also by the climate of trust prevailing in a transparent, accountable regulatory environment, open to dialogue with the economic operators. The harmonisation and simplification of trade documents further compounds the ease of crossing borders by removing divergences of documentary requirements.

As in the case of gross trade flows (OECD Trade Policy Paper No. 118), most results for the agriculture-primary products are not significant or do not yield the expected direction of impact, showing a weak correlation between the value-added traded for this sector with the TFIs. This finding may be driven by the insufficient information accounting for the specificities of agricultural goods. In particular, the TFIs include few distinctions between perishable and non-perishable goods and only within the procedures indicator, while within the TiVA database, agriculture is currently one aggregated sector which also includes hunting, forestry and fisheries. This can also explain why the results obtained here for agriculture might not differ from the weaker gross trade estimates, as we are not able to employ at this stage a finer disaggregation of the agricultural value-added trade data. The comparison of information received from some OECD members' agriculture-related agencies to replies from Customs administrations and trade ministries shows that there are important particularities for agricultural goods as regards various trade facilitation aspects, such as the required documentation, physical inspections, pre-arrival processing, or clearance time. Moreover, the import/export of agri-food products typically involves several regulatory agencies within the country, thus adding to the complexity of the trade processes related to such goods.

The impact of trade facilitation on "exports" of value-added

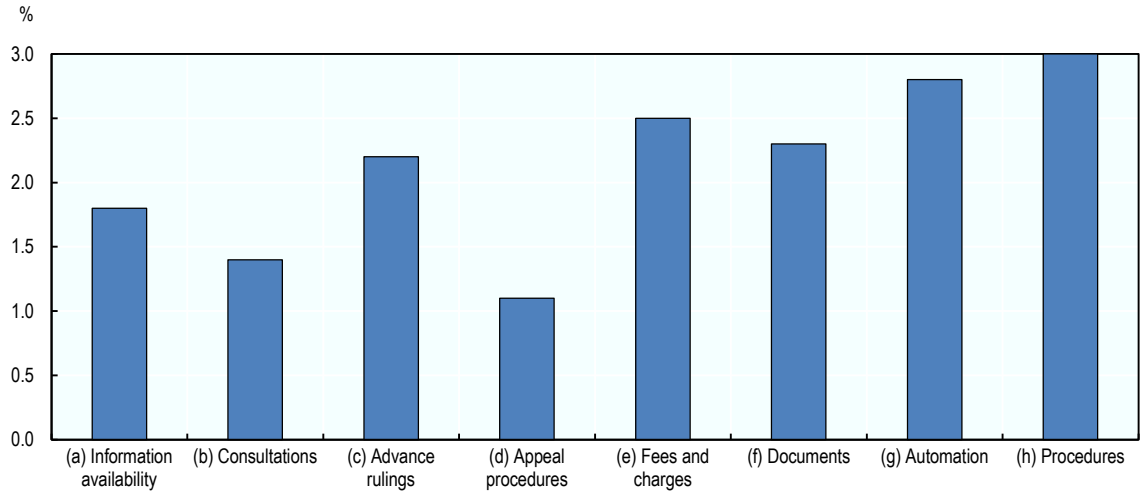
"Exports" of value-added show how industries (in an origin country) export value both through direct final exports and via indirect exports of intermediates through other countries to foreign final users (this is a *proxy* for the interconnection of a particular sector with those 'downstream' sectors to

8. Indicators (a), (b), (c), (f) and (h) respectively.

which it sells its output). Results illustrate how trade facilitation policies can potentially impact these forward-type linkages within value chains. On the origin country side (the "exporter" of value-added), the availability of trade-related information, the opportunities for dialogue with the trade community, the proportionality and transparency of import and export fees and charges, the automation of the border process, and the streamlining of border procedures and controls[9] yield positive impacts and are thus identified as the key sets of measures for developing the reference country's export base (Tables A5.15-18).

When introducing the TFIs simultaneously for the origin and destination countries, the impacts of advance rulings (c) are of larger magnitude for the destination country, highlighting once again the importance of predictability along the transaction chain. Improvements in trade facilitation policies - expressed by an increase in the TFI of 0.1 – could generate increases in a country's value-added "exports" ranging between 1 and 2.5% (Figure 2). Pursuing reforms in areas that could bring improvements to the TFIs would also support further forward GVC linkages (examples are provided in Box 2).

Figure 2. Potential impacts on "exports" of value-added from an increase in TFI of 0.1



Note: The calculations denote the impact for origin countries.
Source: Author's calculations based on estimations in Table A5.15 (column reg4_bis).

It is estimated that in developed countries value-added trade contributes, on average, approximately 18% to countries' GDP and 28% in developing countries (UNCTAD, 2013). Moreover, there appears to be a strong positive correlation between participation in GVCs and GDP per capita growth rates (UNCTAD, 2013). Taking thus into account that value added created from GVC trade can be very significant relative to the size of local economies, such trade facilitation impacts – when controlling for other variables - are of an important magnitude.

The results obtained for "exports" of value-added can also be linked to the estimated impacts for "imports" of value-added. GVC participation depends on both upstream and downstream links in the value chain, as countries can increase their GVC participation both by augmenting the imported content of exports and by generating more value-added through goods and services for intermediate use in the exports of third countries. OECD (2014) also find evidence that across all income groups positive changes in foreign sourcing are associated with positive changes in the domestic value added in exports, thereby suggesting that a greater use of foreign value added is complementary to a growing per capita domestic value added in exports. By increasing participation in these two ways, countries can therefore reap important benefits for the overall economy.

9. Indicators (a), (b), (e), (g) and (h) respectively.

Box 2. TFI measures potentially encouraging forward-type linkages

The analysis highlighted **the streamlining of border procedures and controls, automation of the border process,** and **fees and charges** as the top three indicators that would encourage the interconnection of a particular sector with those 'downstream' sectors to which it sells its output (the forward-type linkages). **Advance rulings, information availability,** and **the involvement of the trade community** also exert important impacts. Indicators for **internal and external border agency cooperation** result to be significant across some of the specifications using "exports" of value added, pointing to the importance of increased border cooperation for supporting value chains participation of industries located at the downstream part of the chain. **Box 1** listed examples of *specific* measures within indicators (h) and (e) that could further support backward-type linkages. These areas of reform are equally valid for encouraging forward-type linkages. The areas highlighted below are *specific* examples of *measures* that can constitute potential reforms across indicators (a), (b), (g), (i) and (j):

Encouraging forward-type linkages	
Information availability	▪ online tools for providing feedback and addressing inquiries ▪ summary guides on procedures; user manuals available online ▪ guidance on how to undertake appeal procedures; online request procedure for advance rulings ▪ quick references among web pages and user friendly guidance on key issues ▪ a dedicated page for professional users
Involvement of the trade community	▪ structures of consultations ▪ frequency of consultations with stakeholder groups
Automation of the border process	▪ import and export procedures that can be expedited electronically ▪ risk management and ratio of irregularities
Internal and external border agency co-operation	▪ national legislation encouraging cooperation and coordination ▪ roles and responsibilities clearly established ▪ cooperation and coordination on both documentary and physical controls ▪ control delegation from other border agencies to Customs at the national level ▪ regular meetings (including the private sector) and exchange programmes

Source: Based on OECD TFIs database.

Interestingly, across some of the specifications using "exports" of value added, indicators for internal border agency cooperation (i) and external border agency cooperation (j) result to be significant, contrasting with the neutral or negative results obtained for backward-type linkages (relating to "imports" of value-added). This can point to the importance of increased border cooperation for supporting value chains participation of industries located at the downstream part of the chain. Through the 2014 update of the indicators for OECD countries, we can nevertheless observe improvements in both internal and external agency cooperation aspects, as well as a significant margin for further actions in these areas (section 4). The inconsistency in results for the different measures of GVC participation leads us to believe that further distinctions of integrated border management need to be explored. Indeed, the coordination of delivery times and multiple inputs into production at specific stages does require effective performance and coordination by a wider range of agencies than we are able to capture at the moment.

4. Trade Facilitation Indicators Database – 2014 update for OECD countries

The OECD Trade Facilitation Indicators were developed in OECD Trade Policy Paper 114 (Moisé et al., 2011). The eleven indicators are composed of approximately one hundred variables and are consistent with the families of articles covered in the recently adopted WTO Trade Facilitation Agreement. The OECD TFIs focus thus on *very specific* border-related procedures. Table 2 lists the indicators and the main areas they each cover.

Table 2. OECD Trade Facilitation Indicators

Indicator	Description
(a) Information availability	Publication of trade information, including on internet; enquiry points.
(b) Involvement of the trade community	Consultations with traders.
(c) Advance rulings	Prior statements by the administration to requesting traders concerning the classification, origin, valuation method, etc., applied to specific goods at the time of importation; the rules and process applied to such statements.
(d) Appeal procedures	The possibility and modalities to appeal administrative decisions by border agencies.
(e) Fees and charges	Disciplines on the fees and charges imposed on imports and exports.
(f) Formalities – Documents	Simplification of trade documents; harmonisation in accordance with international standards; acceptance of copies.
(g) Formalities - Automation	Electronic exchange of data; automated border procedures; use of risk management.
(h) Formalities - Procedures	Streamlining of border controls; single submission points for all required documentation (single windows); post-clearance audits; authorised economic operators.
(i) Border agency cooperation - internal	Co-operation between various border agencies of the country; control delegation to customs authorities.
(j) Border agency cooperation – external	Co-operation with neighbouring and third countries.
(l) Governance and impartiality	Customs structures and functions; accountability; ethics policy.

Note: The indicators value range from 0 to 2, where 2 indicates the best performance possible. The full description of the variables composing the indicators can be found at http://www.oecd.org/tad/facilitation/indicators.htm .

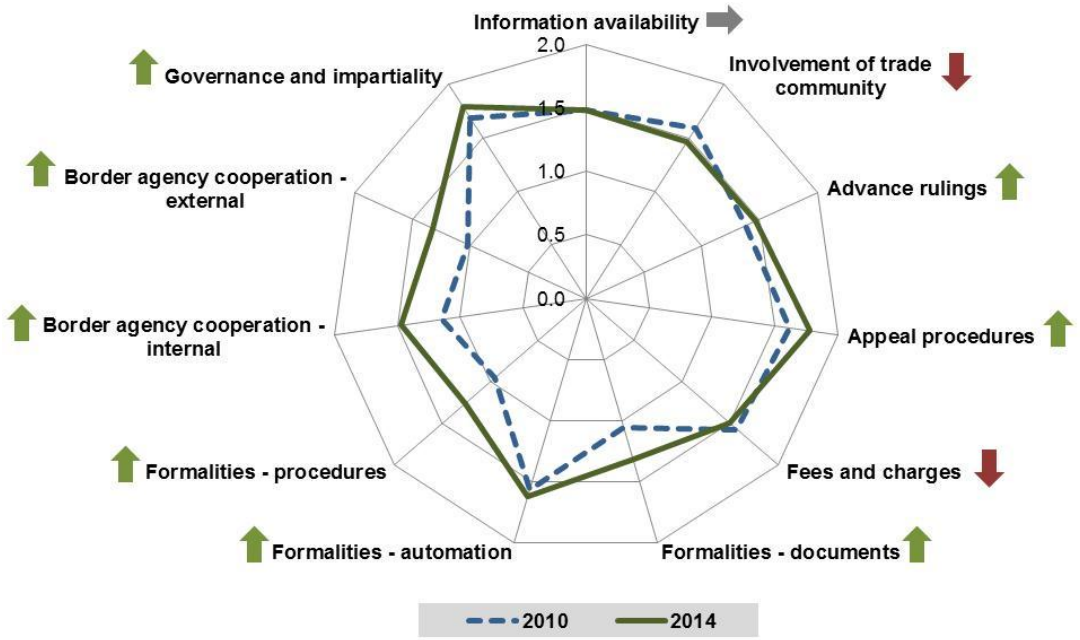
The TFIs database constructed in 2010 and used for quantitative analysis in OECD Trade Policy Paper No. 118 (2011) covered 25 OECD countries (Australia, Belgium, Canada, Czech Republic, Denmark, France, Germany, Greece, Hungary, Italy, Japan, Korea, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States) and Hong Kong, China. In order to bring the information contained in the 2010-11 series up to date, OECD countries were called to provide new data by means of a revised TFI questionnaire[10]. The data collection process was conducted over the period July-October 2014. The Secretariat also conducted a verification of the information received through the questionnaire against publicly available information and other existing reports. The 2014 update allowed including in the database eight additional OECD countries (Austria, Chile, Estonia, Finland, Ireland, Israel, Luxembourg and Slovenia).

Figure 3 highlights the evolution in the average performance for the sample of OECD countries. The 2014 average includes the additional OECD countries covered by the database; however the observed changes are mainly attributable to the evolution of trade facilitation in the OECD countries initially covered in 2010-11 and not to the expansion of country coverage.[11] Overall, the most significant improvements can be observed for appeal procedures, simplification and harmonization of documents, streamlining of procedures, as well as internal and external border agency cooperation. As regards advance rulings, automation, and governance and impartiality small improvements can also be noted, while for indicators such as information availability, involvement of the trade community, and fees and charges there is no evolution or even a slight regression.

10. In order to avoid diverging interpretations and minimise the risk of ambiguity several questions have been reviewed, while various definitions of terms and references to the WTO Trade Facilitation Agreement articles were added as to provide explanatory support to the questions.

11. The 2014 TFIs average for OECD countries is more or less the same whether calculated with the full sample of 33 countries or with the initial 25 countries only. Exceptions, such as in the case of documents, are described below.

Figure 3. TFIs average for OECD countries, 2010 and 2014



Note: The 2014 average includes the original 2010 country sample, for purpose of comparison.

The following sections highlight preliminary conclusions across the areas covered by the TFIs, based on the new replies to the questionnaire.

Information availability

Information on applicable legislation and import and export procedures is commonly available online across the sample. All countries offer the possibility to ask for supplementary information. Notable improvements can be observed across areas such as the publication of user manuals, the provision of a dedicated page for professional users (e.g companies), and the publication in advance of trade-related regulations.

While information on appeal procedures and advance rulings is widely published on the Customs website, fewer countries appear to provide user-friendly guidelines on appeal procedures or an online request procedure for advance rulings. There is significant variation across the sample as regards the existence of online means for providing feedback to Customs and of full-time hotlines for asking questions to Customs. The user-friendliness of Customs websites varies as much as in 2010, with a limited set of countries providing sufficient relevant information through the "search" function for selected keywords.

Involvement of the trade community

There appears to be a wider variation for the yearly average of consultations across the sample when compared to the 2010 baseline. Moreover, for some of the countries within the sample, the average number of yearly consultations with stakeholders appears to have reduced, while for others it increased considerably. There also appears to be a wider variation as regards the provision of adequate and timely information on trade-related regulatory changes across countries. In the large majority of OECD members, there are now at least four groups of stakeholders[12] included within the structures of

12. Among the following proposed groups: SMEs, large traders, transporters, customs brokers, citizens, or other.

consultation. Public comments appear to be widely taken into account when drafting new trade-related legislation, although in many of the cases this process is not explained within the relevant legislation.

Advance rulings

Considerable improvements have been made by some countries as regards a quicker issuance of advance rulings (ARs), as well as making sure that ARs are not subject to expiration until revoked and that an importer can request a review of an AR or of its revocation/modification. This reflects customs agencies' efforts to encourage compliance through increased communication and confidence between the administration and the traders.

However, improvements concerning the length of time a ruling is in effect or the timeliness of issuance by Customs are not shared by all countries. Limited progress is also noted as regards the publication of rulings of general interest to the trade community.

As in 2010, there continues to be a significant variation in the number of advance rulings issued per year, for both tariff classification and origin. The analysis conducted in the OECD Trade Policy Paper 114 (Moisé et al., 2011) rejected trade volume as a highly significant determinant of advance rulings. Analysis of cross-sectional data demonstrated that the main predictors of the number of advance rulings, in order of importance, were the average tariff levels, the number of tariff lines, the per cent of trade entering under a preference program and the number of importers. Trade volumes do impact advance rulings, but only modestly and only in selected sectors.

Appeal procedures

There is notable improvement in the publication of information on appeal procedures and on the availability of information on the motives of the administration's decisions. On the other hand, appeal procedures follow different patterns across the sample. As in 2010, the OECD sample confirms the expected tendency to have a much higher number of administrative appeals than judicial appeals. There continue to be significantly more administrative appeals than judicial appeals, but the total number of appeals for both categories has significantly decreased, on average, for the sample.

Fees and charges

Although the notion of proportionality between service rendered and the corresponding fees and charges appears to be quite clear in the legislation of the sample countries and almost all of them indicate that they provide information on fees and their level, such information remains very hard to find in practice for some countries. Most of the time this information can be found in the Customs Code or other paper publications, but it does not benefit from a dedicated webpage across 40% of the countries.

Publicly available data on fees and charges highlight the paucity of related online information and strongly point to the need for OECD countries to improve their performance in this area. Precise information on the specific types of fees and charges collected and the respective collecting entities remained also difficult to obtain through the questionnaire or via publicly available data.

Formalities - documents

The majority of OECD countries accept copies of supporting documents required for import, export and transit formalities with exceptions (related to the type of good, the circumstances or the agency). As a result of increasing the country sample, the average per cent of procedures that accept copies has reduced compared to 2010. 70% of members no longer request originals when the declaration has been lodged electronically.

With the introduction of new countries in the database, there is a wider variation between countries in the number of documents required for importing and exporting. Meanwhile, the number of documents required for import and export transactions has fallen on average.

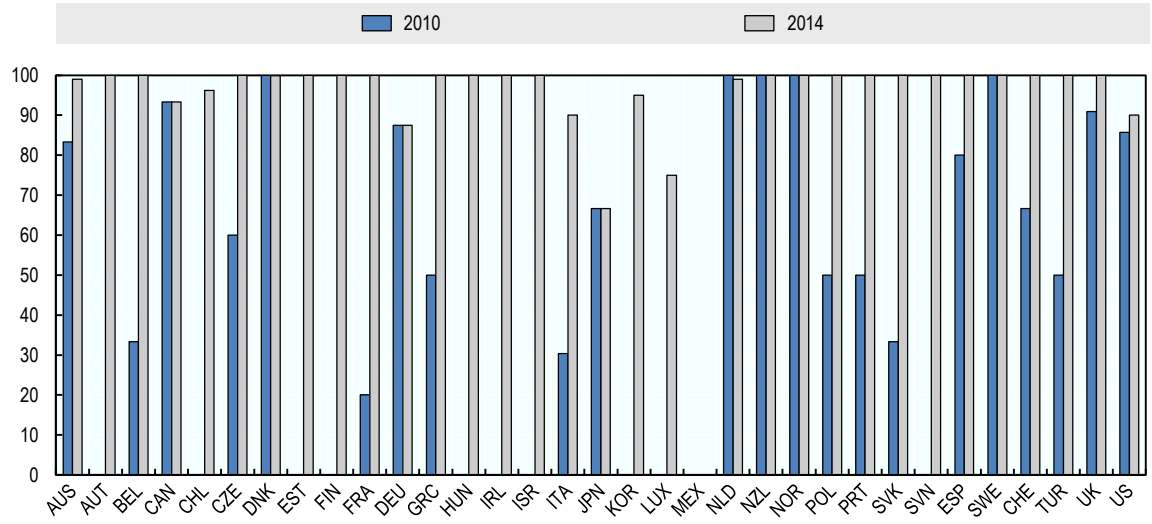
Formalities - automation

Most of import declarations are now cleared electronically (Figure 4). There is a substantial improvement in the average percentage of export procedures that can be expedited electronically across the sample, compared to 2010. It was also possible this time to collect more information on the rates of irregularities and there is a strong variation for this variable among countries.

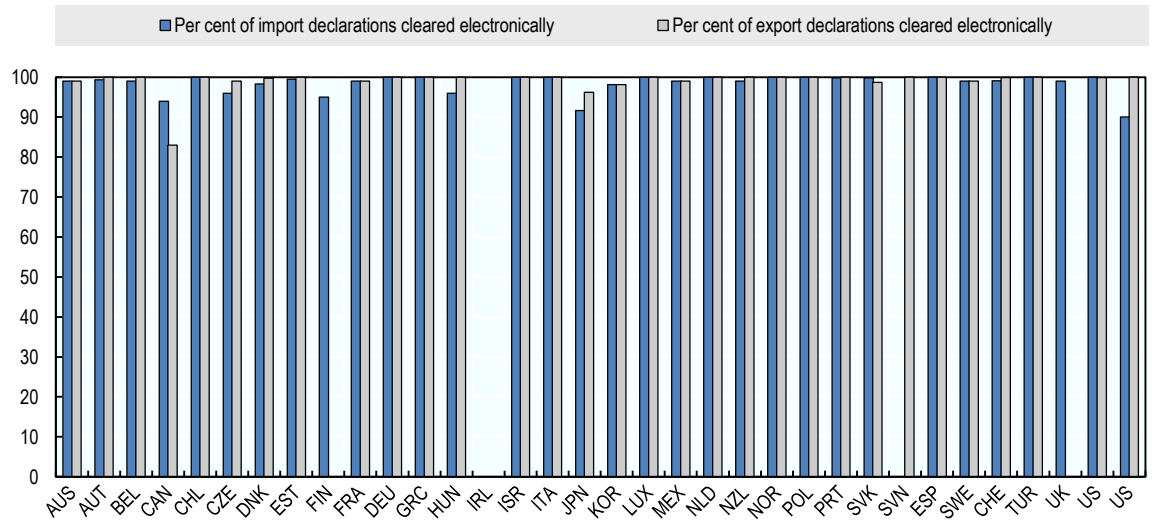
Similar to 2010 questionnaires, information on automation spending remains very scarce and this can appear surprising for OECD countries. Meanwhile, almost all countries provide full-time automated processing for Customs declarations, and 70% of members implement digital certificates and signatures.

Figure 4. Procedures expedited electronically (%)

(a) Per cent of import and of export declarations cleared electronically, 2014



(b) Per cent of import and export procedures that can be expedited electronically,[1] 2010 and 2014



1. The percentage of all import and export procedures, including processing of documents and payment of duties, taxes, fees and charges that can be expedited electronically.

Formalities - procedures

While according to the current replies it appears that the large majority of countries grant special treatment for perishable goods as regards physical inspection, there is very scarce information on the percentage of physical inspections for perishable goods. About half of the countries in the sample appear to also provide preferential treatment to perishable goods as regards the separation of release from clearance, but there is very limited information on the actual per cent of releases prior to final determination and payment of Customs duties for perishable goods.

Figure 5. Per cent of pre-arrival processing

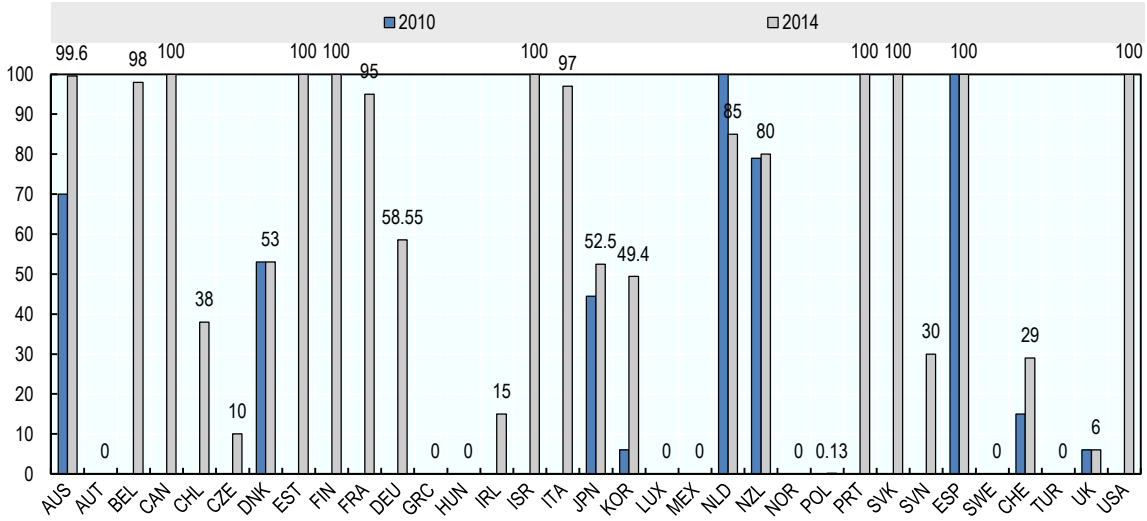
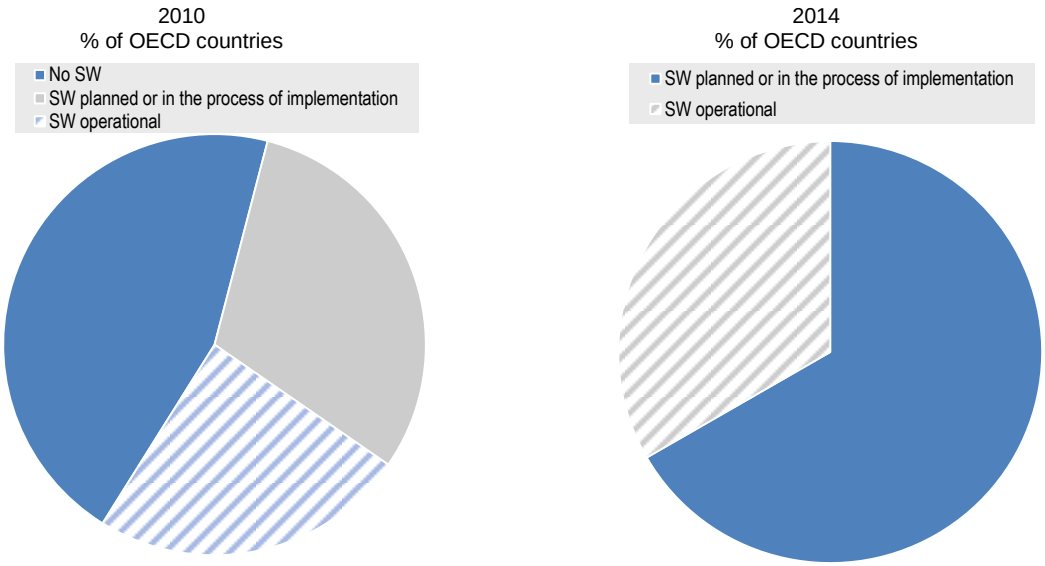


Figure 6. State of single window implementation, 2010 and 2014

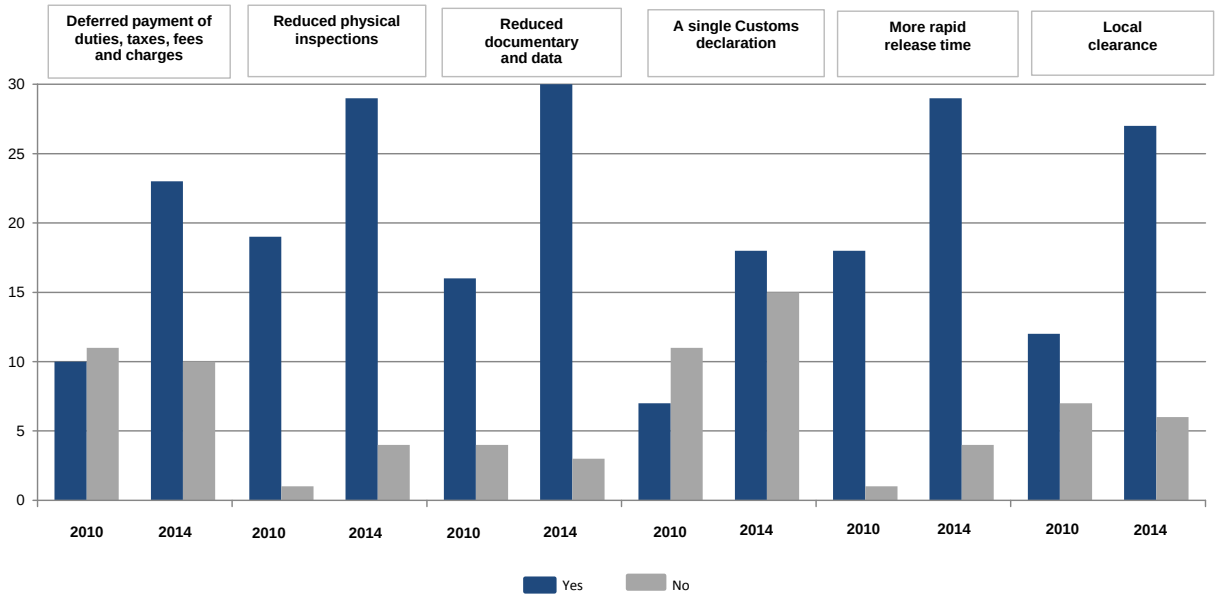


Note: 25 OECD surveyed countries in 2010 and 33 OECD surveyed countries in 2014.

The percentage of pre-arrival processing has increased for many of the surveyed countries, but there is still significant heterogeneity across the sample (Figure 5). As in 2010, there still seems to be no clear relation between the rate of physical inspections and the percentage of post-clearance audits. Single Windows are an important trade facilitating measure, which is not yet prevalent in the OECD area. However, when compared to the situation in 2010, the majority of countries are currently in the process of setting up an implementation plan or in the process of implementing a Single Window (Figure 6).

The information provided on the characteristics of Authorized Operators (AOs) programmes has much improved compared to 2010. In the case of countries which have provided sufficient relevant data, AOs are a limited percentage of total traders but they handle a significant percentage of total trade (an average of 42% for the current sample). The benefits linked to the AO status continue to vary across countries in terms of implementation. AO status generally offers reduced physical and documentary controls and a reduced release time, while other benefits, such as the possibility of local clearance are increasingly being granted compared to 2010 (Figure 7). The less widespread benefit granted to AOs appears to be the use of a single Customs declaration for all imports and exports within a given period.

Figure 7. Benefits linked to AO status



There are notable improvements in the simplification of procedures as regards clearance time across the sample, but less so as regards the cost to import, with only seven countries appearing to have experienced a significant decrease in the cost to import over the last three years.

Internal border agency cooperation

There is progress as regards border agency co-operation both for one-time documentary controls and for co-ordinated physical inspections. Improvements are recorded also concerning control delegation, with countries reporting an increasing number of agencies delegating controls to the Customs administration.

While countries report that there are regular meetings held at the national level between the different agencies involved in the border process, for approximately half of the sample these do not appear to include the private sector.

External border agency cooperation

The majority of countries continue to be involved in extensive co-operation and exchange programmes with neighbouring and third countries. While some countries report the introduction of new exchange programmes with third countries beside existing ones with neighbouring countries, other countries state that some of the programmes previously in place are no longer operational.

The most widespread forms of international cooperation appear to be: cross border agency agreements with agencies in neighbouring countries, joint controls, and alignment of working days and hours. Less widespread forms of cooperation in the case of OECD countries are the alignment of procedures and formalities, common facilities developed and shared with other neighbouring countries, and one stop border posts shared with neighbouring countries.

Governance and impartiality

All countries state that functions of the Customs are publicly available, and confirm the existence of an ethics policy and code of conduct. Improvements are noted with respect to an efficient internal communication about policies and procedures, the transparency and proportionality of disciplinary provisions, and the existence of clear provisions for the financing of the Customs administration. The variables for which there still exists a significant variation across the sample is the existence of a help desk guiding staff on ethics issues and the inclusion of sufficient information in annual reports on Customs activities.

5. Conclusions and next steps

Overall, our estimates highlight a positive relationship at the sector level between various sets of specific trade facilitation measures, as covered by the TFIs, and selected TiVA indicators capturing the level and intensity of countries' integration into global value chains. Across all specifications, the sets of trade facilitation measures that seem to have the greatest impact are the availability of advance rulings, the proportionality and transparency of import and export fees and charges, the automation of the border process, and the streamlining of border procedures and controls. Small improvements in these trade facilitation dimensions - expressed by an increase in the TFI of 0.1[13] - could lead to increases of such trade in value-added flows of between 1.5 and 3.5% in the case of "imports" of value-added, while in the case of "exports" these could range between 1% and 3%. At the industry level, trade facilitation tends to exert the largest impact on value-added trade in complex manufactures ("high and medium-high tech" sectors).

The release of the updated TiVA database, particularly the addition of later years, will enable us to strengthen the analysis, providing a better fit for the model when using the latest TFIs series built for OECD member countries.

At this stage, the coverage of developing countries in TiVA is not comprehensive enough to support targeted analysis on this group of countries. The recent work on developing countries' participation in global value chains [see TAD/TC/WP(2014)12/FINAL] mapped out key determinants of GVCs integration. This work has been using the TiVA database as a point of departure, but has also been exploring other datasets in order to cover many more developing countries in the quantitative analysis. This work could support an extension of this analysis to countries not covered by the TiVA data set at a later stage. Such work would also benefit from the update of the TFIs for the countries outside the OECD area, foreseen for the next biennium.

13. The TFIs across all areas are continuous variables that range between 0 and 2, where 2 denotes the best performance possible that can be achieved.

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Annex 1.

Quantitative Frameworks Identified for the Analysis of Supply Chain Participation

This annex briefly reviews the latest identified studies providing a quantitative analysis of determinants within supply chain participation.

Recent literature on the trade gravity model shows that when modelling gross trade flows which account largely for intermediate products, the classical trade gravity model results are modified (Baldwin and Taglioni, 2012). Baldwin and Taglioni (2012) specifically refer to using the GDP as a proxy for the size of the economy. If the consumer- and producer- demands evolve simultaneously, then GDP may be a reasonable proxy for both consumer and producer demand shifter. But if the role of vertical specialisation trade is changing over time, GDP would be less good at proxy-ing for the underlying demand shifters. Origin-country's GDP and destination's country GDP will have diminished explanatory power for those countries where value-chain trade is important. Authors show, for instance, that the traditional gravity specification including GDPs does not work well for Factory Asia countries. When studies concern a broad set of countries and commodities, the mis-specification of the mass variable probably can have a lower impact on the results. However, when studies focus on trade in parts and components, Baldwin and Taglioni (2012) advocate for the use of total output instead (although they note that there are data availability issues).

Current reflections on the analysis of international production networks stem overall from two streams of economic literature. The first one focuses on the importance of trade in intermediate goods and services (Hillberry and Hummels, 2002; Yi, 2003; Nordas et al., 2006; Athukorala and Yamashita, 2006; Kimura et al., 2007; Ando and Kimura, 2009; Orefice and Rocha, 2011; Caliendo and Parro, 2012; Saslavski and Shepherd, 2012). Following the definition introduced by Hummels et al. (2001), a second stream of literature focuses on "vertical trade"[1]. The literature on vertical trade aims at measuring sequential trade in vertical production chains by looking at the import content of exports. Trade in value added is a broader concept but shares with this literature a common concern, namely in which ways we can distinguish the foreign and domestic value added in gross exports. The first papers to refer explicitly to a measurement of the value added of trade (with some empirical measurement) are: Daudin et al. (2006, 2011), Johnson and Noguera (2012), Koopman et al. (2011).

Brooks and Ferrarini (2012) developed an indicator of production sharing and processing trade to investigate the determinants of such trade in the context of a gravity model. Their Network Trade Index measures countries' interdependence through the extent of trade in parts and components for further processing and assembly of final exports goods. The intensity of processing trade among 75 countries between 1998 and 2005 is then assessed against the typical gravity determinants of trade. Authors find that trade policy variables (applied tariffs and joint adherence to a preferential trade agreements) play a significant role in facilitating the intensity of production sharing and vertical trade. A very recent stream of gravity model literature (Cheng and Fukumoto, 2010; Noguera, 2012; Choi, 2013) studies determinants of trade in value added directly.

Cheng and Fukumoto (2010) analyse in parallel the determinants to gross trade and the determinants of the domestic value added of exports. Authors estimate a gravity equation for four categories of exports measured in gross value as well as domestic value added. The four categories of

1. There is vertical trade when three conditions are met: (1) a good (or service) is produced in two or more sequential stages; (2) two or more countries provide value-added during the production process; and (3) at least one country uses imported inputs in the process and some of the output is exported.

exports are: primary exports, which are produced entirely domestically and are closely related to the factor endowment theory even though in many cases foreign capital and technologies are tapped to produce these primary goods; final goods, which may or may not contain a significant amount of imported intermediate inputs; capital goods, which often contain imported intermediate inputs; intermediate goods. Capital goods, consumption goods and intermediate goods are further divided into those characterized by vertical intra-industry trade and those characterized by horizontal intra-industry trade. The analysis is conducted for 33 countries overall, as well as for a sub-sample of 22 OECD countries and a sub-sample of nine Asian countries. When comparing results for gross exports versus domestic value added of exports in the case of Asia, the coefficients of importer GDP are very much similar but differ for the exporter (are much larger in the case of value added trade). Primary goods are demand driven and strong home demand has a larger effect on bilateral trade flows as well as domestic value added. Domestic demand also has a larger effect on domestic value-added of exports in the case of consumption goods. In the case of intermediate goods, results indicate that foreign demand stimulates domestic value added of exports more than home demand.

Noguera (2012) identifies a number of additional benefits from studying value added trade directly within a gravity framework. More specifically, bilateral value exports represent the resulting outcome of the process of producing goods for final demand using domestic value added and domestic and imported intermediate inputs; in contrast, gross final and intermediate goods trade flows reflect only one round of the overall pattern of production and consumption decisions. Second, using trade in value added can help identify how the different trade costs depend on multiple cross-border production linkages (i.e. bilateral trade costs versus trade costs with third countries).

Noguera (2012) uses the methodology in Johnson and Noguera (2012) to decompose aggregate value added into bilateral value added trade flows. By linearising and combining this decomposition with the gross trade gravity equation, Noguera (2012) obtains an equation that relates bilateral trade value added exports to the gravity variables. His resulting gravity equation for value added trade resembles the standard gravity equation for gross trade, but presents several differences. First, usual source and destination economic masses, bilateral trade costs, and inward and outward multilateral resistance terms are scaled by terms that depend on the global structure of production; these terms track both the domestic value added content of goods shipments from source to destination as well as whether the destination uses those goods for final consumption or in the production of other goods for export. Second, the gravity equation for value added trade shows new determinants which do not appear in the gravity equations for gross trade. These determinants reflect the gravity relations with third countries through which value added travels in the form of intermediate inputs in its journey from the source to the destination. In a nutshell, the equation derived by Noguera (2012) shows that production sharing arrangements are important to understand how bilateral value added exports respond to bilateral trade costs as well as how they may be affected by trade costs with third countries. His resulting equation expresses the change in the bilateral trade flow from country i to country j, as a function of changes in economic mass variables, bilateral trade costs, multilateral resistance terms, and the global input-output linkages. This methodology has significant requirements in terms of the necessary data for empirical testing. Noguera (2012) applies this equation to data for 42 countries (covering the OECD plus many emerging markets) and a composite rest of the world region from 1970 to 2009; four composite sectors are considered: (1) agriculture, hunting, forestry and fishing; (2) non-manufacturing industrial production; (3) manufacturing; (4) services.

Choi (2013) investigates the determinants of trade in value added, by incorporating it into the framework of the gravity model. The trade in value added data (expressed as domestic value added embodied in foreign final demand) is used as dependent variable and regressed against variables as GDP, distance, contiguity, common language, colony, as well as the relative capital/labour ratio, high- and low-skilled technological differences in order to test the fit to Heckscher-Ohlin (HO) and Ricardo models. The author's results indicate that the significance test statistics improve substantially when trade in value added is considered as a dependent variable, compared to gross trade. The explanatory power of the HO model is higher when trade in value added is used.

Guilhoto et al. (2013) analyse the structure of trade in value added terms across Brazilian states. Authors use a multilateral approach to trace the trade relation throughout the entire value chain and thus introduce a trilateral estimation model. Trade in intermediate goods in a trilateral set-up depends on both the exporter-importer couple's characteristics and the origin and demand characteristics in third countries. Hence, the exporter may serve as a go-between origin and final demand in third countries and the bilateral trade volume between the exporter and the importer becomes partly - since it also partly concerns trade in final consumer goods - the result of this trilateral relation that is typical of components trade. The trilateral model shows that the structure of exports from origin to re-exporter and from re-exporter to consumer market is not the same (Guilhoto et al., 2013).

Rahman and Zhao (2013) analyse the export performance of European states by using value added trade statistics and explore: where exports values are created, the role of vertical supply links in export growth, what is contributing to the growth in supply links, and how comparative advantages of countries are affected by supply links over time. They use a gravity model for analysing the factors contributing to a country's decision to send a part of its production abroad. Higher GDP level, lower distance, the presence of a common border and common language positively affect a country's decision to locate a part of its export production in another country. Lower tariff and free trade agreements also influence this decision positively. Authors include a list of structural variables that are thought to drive fragmentation of export production: labour cost differential, initial level of similarities in industrial structure (i.e. two countries with a similar initial export structure are more likely to link), and exchange rate volatility. They are able to show thus that the ability to integrate to supply chains depends on gravity variables, such as the size of the GDP, per capita income, and distance from the hub country, but also on cost differential and similarities in industrial structure.

Achard et al. (2014) study the determinants of GVC participation using measures of backward and forward participation, based on the TiVA database. The authors use the gravity approach as a complement to their benchmark econometric specification; they use this approach to benefit from its bilateral character and to estimate the impact on GVC integration of policies for which we have relatively few data points. The authors test the value of imports of value added embodied in intermediate inputs by using sector k in country i, originating from country j—the "imports of intermediates" against variables such as: bilateral or unilateral indicators of geographical distance, contiguity, colonial relationship, common coloniser, or belonging to the same country in the past; country-specific indicators of other non-policy characteristics of countries i and j such as distance to manufacturing hubs, and distance to economic activity; country-specific indicators of policy determinants of GVC trade in countries i and j such as openness to FDI and tariffs. All country-specific variables enter the equation twice, first for the reference country and second for the partner that is the source of value-added. Controlling for country and partner fixed effects eliminates variation that is precious in identifying drivers that do not fluctuate a lot over time (such as institutions) or not at all, like distance to manufacturing hubs, therefore they are not included in this specification. Multilateral resistance is controlled for using weighted distance to economic activity for both the source and destination of value-added. Market sizes, distance, and degree of industrialisation stand out as the leading determinants in the entire sample. Of policy related determinants, tariffs and investment openness make a greater difference in developing countries, which the authors interpret as being consistent with MNEs in high-income countries either serving functions that do not require an intensive use of intermediates, or are concentrated in economies that are less GVC intensive possibly due to large size.

In another recent study, Nakazawa, Yamano and Webb (2014) analyse market size, geography and technological gaps as determinants of value added. They employ a gravity setting in which they use value added exports (value added embodied in foreign final demand) and gross exports (total, intermediates, household consumption, gross fixed capital formation) as dependent variables and test the impact of economy-specific factors such as population, prices, capital, human capital and TFP. Gravity equations fit better to value added exports than to gross exports in their results. Authors obtain more robust effects of production and market size on value added than on gross trade, while no robust

evidence is obtained for home market effect. They observe weaker effects of geographical distances on value added trade than on gross trade. Capital ratios and technological differences have significant effects on TiVA flows, while labour skills in terms of educational attainment result irrelevant to TiVA flows in the majority of sectors. Authors obtain a positive and significant impact of the log difference in capital/population ratio for three manufacturing sectors ("metal, etc.", "machinery, etc.", and "electrical, etc.") and two services sectors ("electricity supply, etc." and "financial"). Value added trade flows also appear to reflect bilateral technological gap in terms of TFP level better than gross trade flows. Meanwhile, bilateral differences in factor endowments do not appear to explain trade patterns similarly to previous studies based on Heckscher-Ohlin model.

Annex 2.

Selected TiVA Indicators

The TiVA database, developed by OECD and WTO, links intermediary trade flows with national accounts data to construct international input-output tables and measure the valu-added content of trade. The database encompasses a wide series of indicators revealing the changing trade and production relationships between countries and the underlying economic significance of exports and imports in the production of final goods. For any given exported product by an industry, it should be possible to decompose its entire value into (OECD, 2013a):

- **Domestic value added** generated in its production, both directly from the main producing industry, and indirectly via transactions between domestic industries and between domestic and foreign industries.
- **Imported value added** generated in **producing** the imports used in production (excluding any part of the import value that reflects domestic value-added).

TiVA indicators allow the mapping of GVCs by tracking value added flows across countries and are thus specifically designed for the analysis of the exchanges that value chains facilitate (Shepherd and Archanskaia, 2014). The concept of "value added" reflects the value that is added by industries in producing goods and services in addition to the cost of inputs required for their production. Practically, it is equivalent to the difference between the value of output (in basic prices) minus the sum of required intermediate inputs (in purchaser prices) of goods and services. On the supply side, firms produce intermediate goods and final goods that are sold domestically or exported; on the demand side they use intermediate inputs (either domestic or imported) including financial and non-financial services and generate value-added which is used to compensate employees, pay taxes and generate (distributed and retained) profits.

TiVA allows deploying the full strength of input-output analysis to investigate forward and backward linkages in an international context (Escaith, 2014). These linkages give us therefore a metric of engagement in the form of *buying* from (backwards) and *selling* to (forward) GVCs or the demand and supply sides of the value chain activity. Backward participation captures the extent to which foreign intermediate inputs are used in the export activity of a given country (foreign value added embodied in exports), while forward participation captures to what extent a given country's exports are used by firms in partner countries as inputs into their own exports (domestic value added used as inputs to produce exports in a destination country) (Achard et al., 2014).

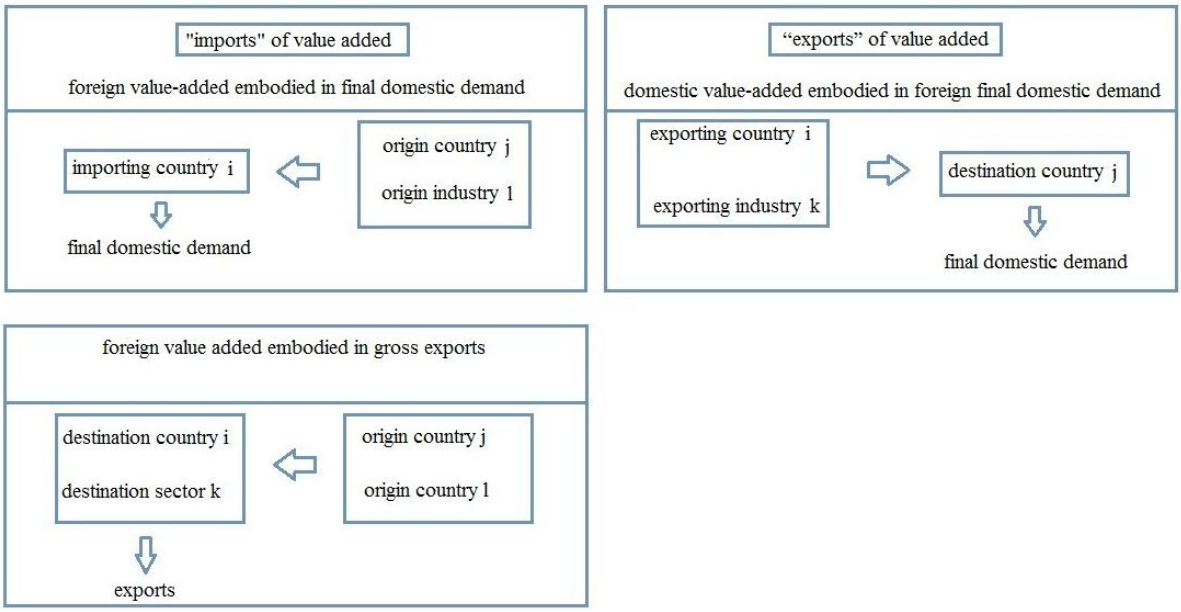
The TiVA indicators manage to track both the direct and indirect flows of value added associated with international trade, which allows them to reveal bilateral trade in value added even when bilateral gross trade flows might be zero.

The selected TiVA indicators are described in Annex Table A2.1 and Annex Figure A2.1.

Annex Table A2.1. Selected TiVA indicators

Category	Indicator	Description	Availability
Value-Added embodied in Final Domestic Demand ("exports" and "imports" of value added) (released in May 2013)	**FDDVA**: Exports of value added (Domestic Value-Added embodied in Foreign Final Domestic Demand)	Shows how industries export value both through direct final exports and via indirect exports of intermediates through other countries to foreign final consumers (households, charities, government, and as investment). They reflect how industries (upstream in a value-chain) are connected to consumers in other countries, even where no direct trade relationship exists. The indicator illustrates therefore the full upstream impact of final demand in foreign markets to domestic output. It can most readily be interpreted as **'exports of value-added'**.	- bilateral (by exporting country, exporting industry and destination country) - available for total economy and by industry - expressed in USD million
	FDFVA: Imports of value added (Foreign Value-Added embodied in Final Domestic Demand)	Shows for a final good or service (purchased by households, government, non-profit institutions serving households, or as investment) where foreign value-added originates. It is the **'import' corollary of FDDVA** and shows how industries abroad (upstream in a value-chain) are connected to consumers at home, even where no direct trade relationship exists. It can most readily be interpreted as **'imports of value-added'**.	- bilateral (by importing country, origin country and origin industry) - available for total economy and by industry - expressed in USD million
Foreign value added embodied in gross exports (released in June 2013)	**EXGR_VA_BSCI:** Foreign value added embodied in gross exports by destination country, destination industry, origin country and origin industry	It reflects the foreign value added component of gross exports, indicating the share of foreign value added that industry l in country j sources in country i's industry k.	- bilateral (by origin country, origin industry, destination country and destination industry) - available for total economy and by industry - expressed in USD million

Annex Figure A2.1. Selected TiVA indicators



Source: Based on OECD-WTO TiVA.

Annex 3.

TiVA Country Coverage

OECD countries
Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States
Other EU countries
Bulgaria, Latvia, Lithuania, Malta, Romania
High-income and emerging economies outside OECD area
Argentina, Brazil, Brunei Darussalam, Cambodia, China, Chinese Taipei, Hong Kong, China, India, Indonesia, Malaysia, Philippines, Russian Federation, Saudi Arabia, Singapore, South Africa, Thailand, Viet Nam

Annex 4.
TiVA Sector Coverage

	ISIC Rev 3	Industry
1	01-05	Agriculture, hunting, forestry and fishing
2	10-14	Mining and quarrying
3	15-16	Food products, beverages and tobacco
4	17-19	Textiles, textile products, leather and footwear
5	20-22	Wood, paper, paper products, printing and publishing
6	23-26	Chemicals and non-metallic mineral products
7	27-28	Basic metals and fabricated metal products
8	29	Machinery and equipment, nec
9	30-33	Electrical and optical equipment
10	34-35	Transport equipment
11	36-37	Manufacturing nec; recycling
12	40-41	Electricity, gas and water supply
13	45	Construction
14	50-55	Wholesale and retail trade; Hotels and restaurants
15	60-64	Transport and storage, post and telecommunication
16	65-67	Financial intermediation
17	70-74	Business services
18	75-95	Other services

Annex 5.

Gravity Model Specifications

The model tests the response of the selected TiVA indicators to improvements in trade facilitation policies expressed through the TFIs. The set of explanatory variables include the economic masses of the originating country and the destination country, the distance between the originating country and the destination country, and a series of other gravity variables (tariffs, the existence of a free trade agreement between the originating and destination countries, common border, common language). Following Achard et al. (2014), the distance to the closest manufacturing hub is also included. Several quantitative approaches such as Choi (2013) and Nakazawa et al. (2014) confirm strong gravity relationships when using value-added trade flows.

Two drawbacks of using the gravity framework approach must be accounted for. First, as the TFIs are a country-specific variable, this estimation method precludes the inclusion in the model of country fixed effects – accounting for all other country-specific characteristics[1] - that vary only in the country dimension (as do our key explanatory variables). Second, the GVC setting relates importer and exporter characteristics to third country characteristics. In other words, bilateral value added flows depend, not only on bilateral trade costs, but also on costs with third countries through which value added transits from source to destination. Empirical complications arise in trying to capture these indirect effects. As shown by Noguera (2012) their relative importance can be high, although this varies significantly across countries and types of trade costs. In order to improve the fit of the model, we try to bring several adjustments to the benchmark equations.

The issue of not being able to introduce fixed effects is dealt with by employing Baier and Bergstrand's (2009) methodology for considering multilateral resistance in the gravity model. This methodology allows to take into account the fact that bilateral value added flows depend not only on the specific costs of trading bilaterally, but also on the importance of trade costs relative to the ones linked to trading with all other partners.[2] Following this methodology, the "classical" bilateral trade costs variables (distance, contiguity, common language, the existence of a trade agreement) are adjusted to account for multilateral resistance[3].

Reflecting relationships with third countries

A first modification we bring to the equation is interacting selected variables on the right-hand side of the gravity equation (i.e. explanatory variables) with terms that can proxy the key features of value chain trade, beyond the bilateral relationship between the origin and destination countries,

1. The use of country fixed effects would allow controlling for price index terms, which aggregate both domestic and international trade costs, and therefore capture multilateral resistance – or the importance of relative costs in determining trade flows.

2. Shepherd and Saslavsky (2012) use this methodology when estimating the impact of logistics performance on trade in intermediates.

3. The multilateral resistance (MR) terms are calculated as follows:

$MR\_B_{ij} = \sum_k \left(\frac{Y_k}{Y_w} * \ln(B_{ik})\right) + \sum_m \left(\frac{Y_m}{Y_w} * \ln(B_{mj})\right) - \sum_k \sum_m \left(\frac{Y_k}{Y_w} * \frac{Y_m}{Y_w} * \ln(B_{km})\right)$, where Bij denotes the bilateral trade cost variable (e.g. distance, common border) and Yw denotes total GDP across the country sample

i.e. for instance, the different stages of production that would have taken place in third countries even in cases where most of the value of the final product would be added there.

The value added traded between two countries i and j can be ultimately influenced not only by the direct importance of trade facilitation implementation in i and j, but also by the status of trade facilitation implementation characterising all countries k_c ($c = \overline{1,n}$) that are direct and indirect trading partners of i and j. Although imperfect at this stage, the multilateral resistance terms can help account to some extent for this. We can construct a bilateral measure from the individual country TFIs[4] and adjust it according to the Baier and Bergstrand (2009) methodology described above. Employing the TFIs in such a way helps taking into account – to the extent possible – that it is not only the origin and destination countries' trade facilitation performance that matters but also the trade facilitation performance of each other trading partner of the two countries.

Cumulative barriers

As a robustness check, we account for third country effects through a "remoteness-type" variable based on the TFIs. A similarly constructed explanatory variable is used by Ma and Van Assche (2010) in their analysis of trade costs and China's processing trade regime. Authors estimate Chinese provinces' processing exports with their foreign trading partners within a gravity framework. They not only introduce the export distance between province i and country j as an explanatory variable, but also the weighted import distance for province i in period t. To measure import distance, they take into account that multiple inputs from various countries are used in the production of a specific export good[5].

Alternative measures for economic masses

Baldwin and Taglioni (2011) argue that, with an increasing importance of trade in intermediates, the use of the GDP of origin and destination countries as the 'mass' variables in the gravity equations can be inappropriate. This is the case because expenditure (proxied by GDP) in the country of destination fails to capture demand for intermediate goods used in exports. In addition, the origin nation's GDP is no longer a good proxy for the total value of goods that must be sold, as this value now contains imported intermediates (Baldwin and Taglioni, 2011). When the model is run at a specific sector level, the size of the economy (i.e. GDP) is replaced by the size of the sector, proxied by the output value in origin countries and expenditure in importing countries (Anderson and Yotov, 2010).[6] Output values are extracted for OECD economies from the STAN database.

4. The geometric average of the importer and exporter countries TFIs is constructed: $TFI_*^c = \sqrt{TFI_i^c TFI_j^c}$.

   This bilateral indicator can also smooth accuracy issues, when for instance an index for country i will be based on several missing variables opposed to an index for country j computed without missing variables (Moisé et al., 2011).

5. The authors measure import distance using the following formula: $MD_{it} = \sum_j \frac{M_{ijt}}{\sum_j M_{ijt}} * XD_{ij}$, where Mijt is province i's imports from country j in period t; and XDij is the distance between the Chinese port closest to province i and the source country j.

6. Expenditure is proxied with data for the value of total consumption.

1. "Imports" of value added (FDFVA: Foreign value-added embodied in final domestic demand)

(reg1): $\ln(FDFVA_{ji}^{k}) = \beta_0^k + \beta_1^k \ln(\text{distance}_{ij}) + \beta_2^k \text{contig}_{ij} + \beta_3^k \text{lang}_{ij} + \beta_4^k \text{RTA}_{ij} + \beta_5^k \ln(1 + t_{ij}^k) + \beta_6^k \text{GDP}_i + \beta_7^k \text{GDP}_j + \beta_8^k \text{TFI}_j^c + \beta_i^k B_{ij}\_\text{MR} + \varepsilon_{ij}^k$

i, j, k denote the exporting country, the importing country, the value added exporting sector

$FDFVA^k_{ij}$ are the "imports" of value added from origin country i's sector l to destination country j

distance_{ij} represents the bilateral distance between i and j

contig_{ij} denotes the existence of a common border, lang_{ij} the existence of a common language, rta_{ij} is a dummy variable that is equal to 1 when an active free trade agreement exists between countries i and j

t_{ij} represents the total average tariff for imports of country j from country i in sector k

GDP_i and GDP_j denote the Gross Domestic Product of country i and j, respectively

B_{ij}_MR denotes the bilateral trade costs variables (distance, contiguity, common language, the existence of a trade agreement) adjusted to account for multilateral resistance.

subscript c indicates the specific TFI indicator

Origin and destination countries GDP (in millions of current USD) are drawn from the World Bank's World Development indicators. Variables capturing natural trade barriers and cultural or historical proximity come from the CEPII Gravity dataset: distance, contiguity, common language, former colonial links, common legal system and time difference.

Individual regressions with each TFI are tested, as well as introducing them simultaneously within a same regression[7].

We introduce B_{ij}_MR separately, but also as the difference between the original value of the variable and their adjusted multilateral resistance term.

- A similar specification is tested, in which we consider both the importer and exporter TFIs.

(reg2): $\ln(FDFVA_{ij}^{k}) = \beta_0^k + \beta_1^k \ln(\text{distance}_{ij}) + \beta_2^k \text{contig}_{ij} + \beta_3^k \text{lang}_{ij} + + \beta_4^k RTA_{ij} + \beta_5^k \ln(1 + t_{ij}^k) + \beta_6^k \text{GDP}_i + \beta_7^k \text{GDP}_j + \beta_8^k \text{TFI}_i^c + \beta_9^k \text{TFI}_j^c + \beta_i^k B_{ij}\_\text{MR} + \varepsilon_{ij}^k$

We also test a specification including the geometric average of the destination and origin countries TFIs. The geometric average allows smoothing accuracy issues, when for instance an index for country i will be based on several missing variables opposed to an index for country j computed without missing variables (Moisé et al., 2011): $TFI_*^c = \sqrt{TFI_i^c TFI_j^c}$. We also adjust the bilateral trade cost variable for the multilateral resistance. We consider this as a proxy for the fact that the value added traded between two countries i and j can be influenced not only by the direct importance of trade facilitation implementation in i and j, but also by the status of trade facilitation implementation characterising all countries k_c ($c = \overline{1,n}$) that are direct and indirect trading partners of i and j. An

7. Statistical tests for the indicators coefficients are performed when TFIs are tested individually, as well as when they are introduced simultaneously within a regression, and the results indicate that the effects of each facilitation index are significantly different from each other.

additional robustness check is testing the inclusion of country fixed effects together with the bilateral index for TFIs.

(reg3): $\ln(FDFVA_{ij}^{k}) = \beta_0^{k} + \beta_1^{k}\ln(\text{distance}_{ij}) + \beta_2^{k}\text{contig}_{ij} + \beta_3^{k}\text{lang}_{ij} + +\beta_4^{k}RTA_{ij} + \beta_5^{k}\ln(1+t_{ij}^{k}) + \beta_6^{k}\text{GDP}_i + \beta_7^{k}\text{GDP}_j + \beta_8^{k}\text{TFI}_*^{c}\_\text{MR} + \beta_i^{k}B_{ij}\_\text{MR} + \varepsilon_{ij}^{k}$

- As a robustness check, we account for third country effects through a "remoteness-type" variable for the TFIs: $TFI_j\_adj = \sum_i \frac{FDFVA_{ij}^{k}}{\sum_i FDFVA_{ij}^{k}} * TFI_*$.

(reg4): $\ln(FDFVA_{ji}^{k}) = \beta_0^{k} + \beta_1^{k}\ln(\text{distance}_{ij}) + \beta_2^{k}\text{contig}_{ij} + \beta_3^{k}\text{lang}_{ij} + +\beta_4^{k}\text{RTA}_{ij} + \beta_5^{k}\ln(1+t_{ij}^{k}) + \beta_6^{k}\text{GDP}_i + \beta_7^{k}\text{GDP}_j + \beta_8^{k}\text{TFI}_j^{c} + \beta_9^{k}\text{TFI}_j^{c}\_\text{adj} + \beta_i^{k}B_{ij}\_\text{MR} + \varepsilon_{ij}^{k}$

Adjusting tariffs and regional trade agreement dummy variables

Tariffs are drawn from the UN Comtrade database. We follow the treatment procedures used in Achard and al. (2014) that authors base on the approach of Miroudot, Rouzet and Spinelli (2013). Achard et al. (2014) are followed in filling in missing values using rates reported for different types of tariffs, or rates reported in different years (bilateral preferential rates are used when available; otherwise missing values are replaced with the applied Most Favoured Nation tariffs.). Tariff data cover 2005, 2008 and 2009, and are aggregated to the industry detail of the OECD ICIO model, weighting each 6-digit product by its share of bilateral trade in the corresponding industry as reported by the importer. Lastly, the data are aggregated at the country level by weighting with respect to intermediate imports when it comes to backward participation and exports to forward. The weighted average corresponds to a rough measure of the revenue from tariff expressed as a ratio of total trade of intermediates. In constructing the data at the industry level the structure of inputs in each industry is taken into account. Foreign value incorporated in gross exports is used to weight the tariffs by partner and origin sector when it comes to backward participation. T_{ju} is the weighted tariff measure that is used to control for stringency of tariffs over inputs used by industry *u* in country *j*: $T_{ju} = \frac{\sum_i \sum_s t_{jik} * F_{jisu}}{\sum_i \sum_s F_{jisu}}$, where F_{jisu} corresponds to foreign value sourced from country *j* industry *s* and embodied in gross exports of industry *u*, country *i;* t_{jik} corresponds to the tariff rate charged by country *j* on products from country *i* and industry *s*. For forward participation, the aggregation is meant to reflect the stringency of tariffs imposed to exports of intermediates from industry *i* in country *k*: $T_{ik} = \frac{\sum_j \sum_u t_{jik} * F_{jisu}}{\sum_j \sum_u F_{jisu}}$ (Achard et al., 2014).

The variable measuring whether the origin and destination countries are part of a bilateral or regional trade agreement (RTA) is based on information provided by the WTO Regional Trade Agreement Information System. The database covers all RTAs in force until 2012. As for tariffs, we follow the treatment procedures used in Achard and al. (2014) that authors base on the approach of Miroudot, Rouzet and Spinelli (2013). In the case of backward linkages, RTA is adjusted to: $RTA_{ju} = \frac{\sum_i \sum_s RTA_{jik} * F_{jisu}}{\sum_i \sum_s F_{jisu}}$. In the case of forward linkages, RTA is adjusted to: $RTA_{ik} = \frac{\sum_j \sum_u RTA_{jik} * F_{jisu}}{\sum_j \sum_u F_{jisu}}$ (Achard et al., 2014).

We run the same specifications in (reg1), (reg2), (reg3) using the adjusted tariffs and RTA variables.

2. Foreign value added embodied in gross exports (EXGR_VA: by origin country, origin industry, destination country, and destination industry)

We run (reg1), (reg2), (reg3), (reg4) with EXGR_VA as a dependent variable.

As an example, (reg1): $\ln(EXGR\_VA^{k}_{ijl}) = \beta^{k}_{0} + \beta^{k}_{1}\ln(\text{distance}_{ij}) + \beta^{k}_{2}\text{contiguity}_{ij} + \beta^{k}_{3}\text{language}_{ij} + \beta^{k}_{4}\text{RTA}_{ij} + \beta^{k}_{5}\ln(1+\text{t}^{k}_{ij}) + \beta^{k}_{6}\text{GDP}_{i} + \beta^{k}_{7}\text{GDP}_{j} + \beta^{k}_{8}\text{TFI}^{c}_{j} + \beta^{k}_{i}B_{ij}\_\text{MR} + \varepsilon^{k}_{ij}$

i, j, k, l denote the value added "exporting" country, the "importing" country, the exporting sector k and the destination sector l

EXGR_VA^{k}_{ijl} represents the foreign value added that industry l in country j sources in country i's industry k

3. "Exports" of value added (FDDVA: domestic value added embodied in foreign final domestic demand)

We run (reg1), (reg2), (reg3), (reg4) with EXGR_VA as a dependent variable.

As an example, (reg1): $\ln(FDDVA^{k}_{ijl}) = \beta^{k}_{0} + \beta^{k}_{1}\ln(\text{distance}_{ij}) + \beta^{k}_{2}\text{contiguity}_{ij} + \beta^{k}_{3}\text{language}_{ij} + \beta^{k}_{4}RTA_{ij} + \beta^{k}_{5}\ln(1+\text{t}^{k}_{ij}) + \beta^{k}_{6}\text{GDP}_{i} + \beta^{k}_{7}\text{GDP}_{j} + \beta^{k}_{8}\text{TFI}^{c}_{j} + \beta^{k}_{i}B_{ij}\_\text{MR} + \varepsilon^{k}_{ij}$

i, j, k denote the exporting country, the importing country, the value added exporting sector

FDDVA^{k}_{ij} "exports" of value added from origin country i's sector k to destination country j

Sector fixed effects

The TiVA indicators cover 13 goods sectors (Annex 4), which were grouped into four main categories, namely: agriculture-primary products, low-tech industries, medium-low tech industries, and high and medium-high tech industries. These groupings allow delving into how specific trade facilitation measures impact the sector groupings pairs where value-added originates and where it is directed for final consumption or further processing. Fixed effects are also introduced for sectors across the groupings specifications (Tables A5.5-7, A5.12-14, and A5.19-21). The order of impacts for the TFIs on backward- and forward-type linkages remains similar as in the results reported within Tables A5.1-4, A5.8-11, and A5.15-18.

Gravity results: "Imports" of value added

Annex Table A5.1. "Imports" of value added (Total)

Destination country sample	OECD				OECD			
Origin country sample	OECD				All TiVA			
Origin sector	Total				Total			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.5134***	0.5142**	0.6162**	0.5091***	0.4856**	0.6512**	0.4451***	0.5612**
	(-0.0051)	(-0.0021)	(-0.0438)	(-0.0018)	(-0.0176)	(-0.1921)	(-0.0142)	(-0.2624)
		0.6751**				0.8981**		
		(-0.0018)				(-0.0061)		
TFI (b)	0.2011*	0.1452	0.3451**	0.12137	0.3016	0.3516**	0.3119*	0.2451*
	(-0.4601)	(-0.0052)	(-0.0514)	(-0.0912)	(-0.1121)	(-0.0012)	(-0.1766)	(-0.0862)
		0.4781***				-0.2084		
		(-0.0023)				(-0.1167)		
TFI (c)	1.181***	1.2377***	1.2514***	0.9872***	1.4165***	1.3416***	1.3145**	1.2981***
	(-0.0084)	(-0.0011)	(-0.0703)	(-0.0112)	(-0.0103)	(-0.0219)	(-0.9012)	(-0.2032)
		0.8723***				0.7451**		
		(-0.0023_				(-0.0061)		
TFI (d)	0.1556*	0.3817*	0.2014*	0.4115	0.2162	0.3309*	0.4512	0.2341*
	(-0.0045)	(-0.0701)	(-0.0021)	(-0.0127)	(-0.0881)	(-0.0056)	(-0.0532)	(-0.0385)
		0.2556				0.5567		
		(-0.0057)				(-0.0013)		
TFI (e)	0.8562**	0.8445***	0.7583***	0.8335***	0.9256**	0.8246***	0.8535***	0.7524***
	(-0.0014)	(-0.0012)	(-0.0009)	(-0.0533)	(-0.0403)	(-0.0042)	(-0.1339)	(-0.9218)
		0.5268***				0.9234***		
		(-0.0015)				(-0.0128)		
TFI (f)	0.4981***	0.4467***	0.5128***	0.5012**	0.4328**	0.4861**	0.3981**	0.4871**
	(-0.0056)	(-0.0408)	(-0.0025)	(0.0031)	(-0.0042)	(-0.0708)	(-0.2433)	(-0.3102)
		0.3826***				-0.2314		
		(-0.0611)				(-0.0218)		
TFI (g)	0.6712***	0.6915***	0.6981***	0.6512***	0.6341***	0.5891**	0.7584***	0.6167***
	(-0.0025)	(-0.0074)	(-0.7002)	(-0.0024)	(-0.0081)	(-0.0886)	(-0.3642)	(-0.0034)
		1.0123**				0.9712**		
		(-0.0034)				(-0.0534)		
TFI (h)	1.0872***	1.1652***	1.2541***	0.9071***	1.2334***	1.2882**	1.1456***	1.2455***
	(-0.0083)	(-0.0072)	(-0.9403)	(-0.0721)	(-0.0145)	(-0.0567)	(-0.5879)	(-0.5542)
		0.9872***				0.7812**		
		(-0.0014)				(-0.0302)		
TFI (i)	-0.0114	-0.0156	-0.0035	0.0843*	0.1452	0.1187*	0.1034	0.0962
	(-0.0079)	(-0.0032)	(-0.5523)	(-0.0651)	(-0.0101)	(-0.0321)	(-0.1294)	(-0.4504)
		-0.1458				0.0588		
		(-0.0087)				(-0.6730)		
TFI (j)	0.2411	-0.5562	-0.1167	0.1672	0.0582	0.0882	-0.4531	-0.2935
	(-0.0065)	(-0.0062)	(-0.0503)	(-0.0281)	(-0.0588)	(-0.0042)	(-0.0421)	(-0.0524)
		-0.0678				1.0721		
		(-0.0028)				(-0.0034)		
TFI (l)	0.1004**	0.0972***	0.0843**	0.0865***	0.1872**	0.0591***	0.1293	0.0945
	(-0.0012)	(-0.0101)	(-0.0282)	(-0.0123)	(-0.0511)	(-0.1102)	(-0.0987)	(-0.0417)
		0.5671***				0.8451***		
		(-0.0051)				(-0.8712)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses; distance etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 59-65%.

Annex Table A5.2. "Imports" of value added (Low-tech sectors)

Destination country sample	OECD				OECD			
Origin country sample	OECD				All TiVA			
Origin sector	Low-tech				Low tech			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.5162***	0.4512**	0.5871***	0.4471*	0.6121**	0.5972**	0.5335**	0.6781*
	(-0.6811)	(-0.4501)	(-0.0623)	(-0.0106)	(-0.7003)	(-0.0652)	(-0.0044)	(-0.1111)
		0.4671**				0.8612***		
		(-0.0044)				(-0.0081)		
TFI (b)	0.1231**	0.1056**	0.1571***	0.1682*	0.1335**	0.1129*	0.0511**	0.1134
	(-0.1138)	(-0.0098)	(-0.0073)	(-0..0028)	(-0.0036)	(-0.0051)	(-0.0062)	(-0.0361)
		0.0981***				0.0856**		
		(-0.4542)				(-0.0023)		
TFI (c)	1.2332***	1.0632***	1.1782**	1.3762**	1.2542***	1.1185***	1.3872***	1.4034**
	(-0.5122)	(-0.1651)	(-0.0023)	(-0.0063)	(-0.0081)	(-0.0012)	(-0.0072)	(-0.0823)
		0.5671*				0.4817**		
		(-0.4112)				(-0.0029)		
TFI (d)	0.0567*	0.0687*	0.1182**	0.1381	0.0687*	0.1342*	0.0752***	0.0761
	(-0.1711)	(-0.2451)	(-0.0072)	(-0.0623)	(-0.0086)	(-0.0012)	(-0.0046)	(-0.0423)
		0.0942**				0.1562**		
		(-0.4312)				(-0.0071)		
TFI (e)	0.7748**	0.8387**	0.9471**	0.7678**	0.8701*	0.9113**	0.7381**	0.8615**
	(-0.6283)	(-0.2311)	(-0.0082)	(-0.0023)	(-0.0128)	(-0.0023)	(-0.0055)	(-0.0071)
		0.7982**				0.8912**		
		(-0.0341)				(-0.0033)		
TFI (f)	0.4561***	0.4271***	0.4871***	0.4081**	0.5238***	0.5041***	0.4862***	0.5483**
	(-0.5111)	(-0.1271)	(-0.0023)	(-0.0082)	(-0.0087)	(-0..0087)	(-0.0071)	(-0.0023)
		0.5691				0.8719		
		(-0.1711)				(-0.0031)		
TFI (g)	0.6186***	0.7341***	0.6138***	0.6892**	0.7518***	0.7582***	0.5567***	0.7163***
	(-0.6223)	(-0.7623)	(-0.0096)	(-0.0015)	(-0.0056)	(-0.0076)	(-0.0052)	(-0.0028)
		1.0812**				1.0981***		
		(-0.0810)				(-0.0029)		
TFI (h)	1.1387***	1.0271*	1.0431***	1.1872*	1.2761**	1.0982**	1.1882***	1.3623*
	(-0.0033)	(-0.1271)	(-0.0042)	(-0.0076)	(-0.0051)	(-0.0052)	(-0.0028)	(-0.0012)
		1.1191***				1.1028***		
		(-0.0023)				(-0.0076)		
TFI (i)	0.0531	-0.0761	0.0451	0.0592	-0.0545*	-0.0445	0.0671	0.1156
	(-0.8723)	(-0.0561)	(-0.0082)	(-0.0053)	(-0.0026)	(-0.0056)	(-0.0072)	(-0.0062)
		0.1267				0.0982*		
		(-0.0081)				(-0.2220)		
TFI (j)	-0.0442	0.2561	-0.0299	0.0151	0.0423*	0.2519*	0.0971	0.0621
	(-0.3218)	(-0.0072)	(-0.0091)	(-0.0012)	(-0.0051)	(-0.0031)	(-0.0034)	(-0.0023)
		0.1082				0.2135		
		(-0.0014)				(-0.0027)		
TFI (l)	0.1005**	0.0945***	0.2337***	0.3126**	0.1451**	0.0671***	0.2081***	0.2943***
	(-0.0082)	(-0.0081)	(-0.0061)	(-0.0098)	(-0.0042)	(-0.0018)	(-0.0043)	(-0.0087)
		0.2341***				0.0971**		
		(-0.0037)				(-0.0072)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses; distance etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 40-55%.

Annex Table A5.3. "Imports" of value added (Medium-low tech sectors)

Destination country sample	OECD				OECD			
Origin country sample	OECD				All TiVA			
Origin sector	Medium-low tech				Medium-low tech			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.4551***	0.6152**	0.6213**	0.5577***	0.6112**	0.6801**	0.5921**	0.6017**
	(-0.0052)	(-0.0043)	(-0.0054)	(-0.0091)	(-0.0031)	(-0.0019)	(-0.0035)	(-0.0064)
		0.5412**				0.7612		
		(-0.0098)				(-0.0037)		
TFI (b)	0.0523	0.0326**	0.1238**	0.1756	0.1872**	0.0983*	0.1556**	0.0761*
	(-0.0012)	(-0.0093)	(-0.0065)	(-0.0038)	(-0.0052)	(-0.0025)	(-0.0018)	(-0.0062)
		0.5118*				-0.3451		
		(-0.0048)				(-0.0031)		
TFI (c)	1.4785***	1.3367***	1.7651***	1.4278***	1.4165***	1.4256***	1.3135**	1.3125**
	(-0.0048)	(-0.0016)	(-0.0027)	(-0.0071)	(-0.0051)	(-0.0019)	(-0.0092)	(-0.0023)
		0.8253***				0.5642*		
		(-0.0023)				(-0.0017)		
TFI (d)	0.0452*	0.0557	0.1026*	0.0114*	0.1328*	0.0914	0.0981*	0.1114**
	(-0.0082)	(-0.0391)	(-0.0021)	(-0.0057)	(-0.0081)	(-0.0028)	(-0.0053)	(-0.0038)
		0.1462*				0.4321**		
		(-0.4512)				(-0.0113)		
TFI (e)	0.7180***	0.8145***	0.6558***	0.8751**	0.9556**	0.7246***	0.7535***	0.8524***
	(-0.0012)	(-0.1121)	(-0.0081)	(-0.0045)	(-0.0014)	(-0.0167)	(-0.0013)	(-0.0092)
		0.6128***				0.5483***		
		(-0.0011)				(-0.0038)		
TFI (f)	0.4185***	0.5806***	0.5461***	0.4963***	0.5625*	0.4893*	0.4871**	0.5843**
	(-0.0045)	(-0.0048)	(-0.0025)	(-0.0073)	(-0.0018)	(-0.0017)	(-0.0024)	(-0.0031)
		0.4009				0.6701		
		(-0.0053)				(-0.0034)		
TFI (g)	0.6153***	0.7815***	0.6715***	0.8856**	0.7289***	0.6225***	0.7617***	0.8125***
	(-0.0067)	(-0.0044)	(-0.0047)	(-0.0324)	(-0.0098)	(-0.0086)	(-0.0036)	(-0.0015)
		1.1231**				1.1238*		
		(-0.0035)				(-0.0055)		
TFI (h)	1.2174***	1.1981***	1.5504***	1.2132***	1.2344**	1.0288**	1.2456***	1.1455***
	(-0.0015)	(-0.0052)	(-0.0094)	(-0.0073)	(-0.0074)	(-0.0346)	(-0.0058)	(-0.0042)
		1.1821***				0.7512***		
		(-0.0038)				(-0.0023)		
TFI (i)	-0.1125	-0.0211*	-0.0481	0.1451	0.2013	0.2441*	0.1083*	0.2184
	(-0.0062)	(-0.0034)	(-0.0055)	(-0.0052)	(-0.0051)	(-0.0034)	(-0.0094)	(-0.0045)
		-0.1823				0.0985		
		(-0.0081)				(-0.0057)		
TFI (j)	-0.2312*	-0.4512	-0.3218*	0.0981	0.1523	0.0142	-0.2465	-0.3115
	(-0.0121)	(-0.0034)	(-0.0053)	(-0.0023)	(-0.0028)	(-0.0034)	(-0.0044)	(-0.0054)
		-0.5419**				-0.3014**		
		(-0.0081)				(-0.0112)		
TFI (l)	0.0562**	0.1143*	0.1053***	0.2019**	0.0917*	0.1154*	0.0376**	0.0253**
	(-0.0005)	(-0.0091)	(-0.0013)	(-0.0041)	(-0.0040)	(-0.0022)	(-0.0098)	(-0.0056)
		0.8732**				0.0562**		
		(-0.0016)				(-0.0087)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses, distance, etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 40-55%.

Annex Table A5.4. "Imports" of value added (High and medium-high tech sectors)

Destination country sample	OECD				OECD			
Origin country sample	OECD				All TiVA			
Origin sector	High and medium-high tech				High and medium-high tech			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.6115***	0.5413**	0.4512**	0.5781***	0.5871**	0.5017**	0.6712**	0.4482***
	(-0.0051)	(-0.0085)	(-0.0054)	(-0.0041)	(-0.0035)	(-0.0045)	(-0.0035)	(-0.0012)
		1.0561*				0.4791**		
		(-0.0081)				(-0.0039)		
TFI (b)	0.1872**	0.4561	0.3918**	0.2159*	0.4231**	0.3158***	0.3115	0.3624*
	(-0.0046)	(-0.0052)	(-0.0065)	(-0.0038)	(-0.0112)	(-0.0021)	(-0.0017)	(-0.0018)
		0.5772**				0.2995		
		(-0.0078)				(-0.0014)		
TFI (c)	1.4431***	1.5367***	1.4563***	1.4268***	1.4265***	1.3652***	1.3135**	1.2125**
	(-0.0017)	(-0.0161)	(-0.0027)	(-0.0053)	(-0.0061)	(-0.0032)	(-0.0091)	(-0.0032)
		0.9871***				0.0443		
		(-0.0023)				(-0.0022)		
TFI (d)	0.0315	0.0612	0.2014	0.5423**	0.2314**	0.1982	0.2054*	0.2982
	(-0.0018)	(-0.0039)	(-0.0113)	(-0.0051)	(-0.0488)	(-0.0028)	(-0.0015)	(-0.0085)
		0.2367***				0.5123**		
		(-0.0057)				(-0.0013)		
TFI (e)	0.8912***	0.7445***	0.7623***	0.8712	0.7012**	0.8246***	0.9735***	0.7824***
	(-0.0042)	(-0.0023)	(-0.0081)	(-0.0024)	(-0.0064)	(-0.0042)	(-0.0039)	(-0.0092)
		0.6158***				0.7783***		
		(-0.0112)				(-0.0028)		
TFI (f)	0.5563***	0.4871***	0.4892***	0.5691***	0.4863**	0.4503***	0.6981**	0.4872**
	(-0.0045)	(-0.0048)	(-0.0025)	(-0.0047)	(-0.0018)	(-0.0071)	(-0.0024)	(-0.0031)
		0.3981				0.4011*		
		(-0.0062)				(-0.0042)		
TFI (g)	0.7823***	0.8052***	0.6781**	0.7114***	0.6981***	0.7816***	0.6912***	0.7141***
	(-0.0025)	(-0.0052)	(-0.0047)	*(-0.0013)	(-0.0098)	(-0.0028)	(-0.0036)	(-0.0025)
		1.1256**				1.0121**		
		(-0.0013)				(-0.0055)		
TFI (h)	1.3274***	1.2582***	1.4503***	1.1134***	1.2334**	1.2182*	1.2456***	1.1355***
	(-0.0023)	(-0.0072)	(-0.0094)	(-0.0018)	(-0.0071)	(-0.0034)	(-0.0047)	(-0.0055)
		1.4514***				0.9812***		
		(-0.0038)				(-0.0023)		
TFI (i)	-0.0836	-0.0877*	-0.0814	0.0975	0.0035	0.0014	-0.0688***	0.1722
	(-0.0076)	(-0.0034)	(-0.0045)	(-0.0076)	(-0.0051)	(-0.0043)	(-0.0031)	(-0.0034)
		0.1456				0.1673		
		(-0.0029)				(-0.0026)		
TFI (j)	-0.0887**	0.0255*	0.1087	-0.4558**	0.1152*	0.2215**	0.6082*	-0.4333
	(-0.0061)	(-0.0062)	(-0.0053)	(-0.0043)	(-0.0035)	(-0.0034)	(-0.0044)	(-0.0024)
		-0.1038				-0.1256***		
		(-0.0038)				(-0.0023)		
TFI (l)	0.1021**	0.0753***	0.8752***	0.1627***	0.1881	0.0465*	0.4451**	0.0872
	(-0.0035)	(-0.0071)	(-0.0042)	(-0.0041)	(-0.0046)	(-0.0011)	(-0.0087)	(-0.0031)
		0.5423***				0.8713***		
		(-0.0027)				(-0.0087)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses; distance etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 40-55%.

Annex Table A5.5. "Imports" of value added (Low-tech sectors) (2)

Destination country sample	OECD				OECD			
Origin country sample	OECD				All TiVA			
Origin sector	Low-tech				Low tech			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.4918**	0.4371**	0.5512***	0.4223**	0.5918***	0.5528**	0.5114**	0.6512**
	(-0.0052)	(-0.0620)	(-0.0041)	(-0.0076)	(-0.0044)	(-0.0065)	(-0.0058)	(-0.0018)
		0.5016**				0.8311***		
		(-0.0081)				(-0.0109)		
TFI (b)	0.1091**	0.1281**	0.1325***	0.1482**	0.1123**	0.1205*	0.0488**	0.1056
	(-0.0065)	(-0.0015)	(-0.0044)	(-0.0015)	(-0.0088)	(-0.0012)	(-0.0019)	(-0.0455)
		0.0872*				0.0728**		
		(-0.1075)				(-0.0046)		
TFI (c)	1.2117***	1.1405***	1.1428**	1.2219**	1.2382***	1.0087**	1.3621***	1.3215**
	(-0.0052)	(-0.0092)	(-0.0067)	(-0.0054)	(-0.0062)	(-0.0105)	(-0.0077)	(-0.0226)
		0.5326**				0.4543**		
		(-0.0055)				(-0.0078)		
TFI (d)	0.0488*	0.0516*	0.0874**	0.1114	0.0771	0.1185*	0.0653**	0.0584
	(-0.0079)	(-0.0043)	(-0.0124)	(-0.3207)	(-0.1285)	(-0.0542)	(-0.0088)	(-0.0526)
		0.0772**				0.1084**		
		(-0.0265)				(-0.0107)		
TFI (e)	0.7512**	0.8075**	0.9011**	0.7322**	0.8429**	0.8815**	0.7052**	0.8297**
	(-0.0114)	(-0.0421)	(-0.0105)	(-0.0056)	(-0.0087)	(-0.0137)	(-0.0048)	(-0.0102)
		0.7483**				0.8720**		
		(-0.0019)				(-0.0085)		
TFI (f)	0.4311***	0.4109***	0.4518***	0.4123*	0.4915***	0.5123**	0.4561***	0.5239**
	(-0.0025)	(-0.0031)	(-0.0065)	(-0.0082)	(-0.0091)	(-0.0121)	(-0.0088)	(-0.0014)
		0.5043**				0.8528**		
		(-0.0037)				(-0.0102)		
TFI (g)	0.6014***	0.7018***	0.5973**	0.6584**	0.7327***	0.7219***	0.5521***	0.7015***
	(-0.0056)	(-0.0063)	(-0.0105)	(-0.0029)	(-0.0045)	(-0.0083)	(-0.0088)	(-0.0019)
		1.0182**				0.9256***		
		(-0.0058)				(-0.0091)		
TFI (h)	1.1125***	1.0156**	1.1972***	1.2156**	1.0458**	1.0381**	0.9735**	1.2843**
	(-0.0134)	(-0.0022)	(-0.0051)	(-0.0025)	(-0.0018)	(-0.0014)	(-0.0051)	(-0.0072)
		1.2142***				1.1155***		
		(-0.0067)				(-0.0127)		
TFI (i)	0.0473	0.0581	0.0219	0.0468	-0.0482	-0.0318	0.0512*	0.0911
	(-0.7516)	(-0.2143)	(-0.0458)	(-0.0425)	(-0.0546)	(-0.0985)	(-0.0082)	(-0.0153)
		0.1529*				0.0713		
		(-0.0275)				(-0.0873)		
TFI (j)	0.0255	-0.1981	-0.0315*	0.0213	0.0357*	-0.2541	0.1762	0.0523
	(-0.0782)	(-0.0563)	(-0.0027)	(-0.0198)	(-0.0027)	(-0.0116)	(-0.0048)	(-0.0081)
		-0.2551				0.1186*		
		(-0.0485)				(-0.0035)		
TFI (l)	0.1123*	0.0841***	0.1925**	0.2918**	0.1275**	0.0492***	0.2183***	0.2881***
	(-0.0095)	(-0.0029)	(-0.0024)	(-0.0043)	(-0.0082)	(-0.0057)	(-0.0029)	(-0.0044)
		0.3112***				0.0711***		
		(-0.0048)				(-0.0048)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses, distance, etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. Sectors fixed effects are included. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 50-65%.

Annex Table A5.6. "Imports" of value added (Medium-low tech sectors) (2)

Destination country sample	OECD				OECD			
Origin country sample	OECD				All TiVA			
Origin sector	Medium-low tech				Medium-low tech			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.4492***	0.6018**	0.6082***	0.5481***	0.5956**	0.6652**	0.5725**	0.6118***
	(-0.0027)	(-0.0022)	(-0.0035)	(-0.0085)	(-0.0044)	(-0.0021)	(-0.0045)	(-0.0019)
		0.5317**				0.7418**		
		(-0.0051)				(-0.0074)		
TFI (b)	0.0489	0.0295**	0.1105***	0.1528	0.1675**	0.0903**	0.1493**	0.0685*
	(-0.0276)	(-0.0038)	(-0.0045)	(-0.0116)	(-0.0018)	(-0.0011)	(-0.0092)	(-0.0014)
		0.5023**				0.3142		
		(-0.0029)				(-0.0168)		
TFI (c)	1.4523***	1.3181***	1.6381***	1.4119***	1.3782***	1.4105***	1.2932**	1.3028***
	(-0.0012)	(-0.0027)	(-0.0067)	(-0.0055)	(-0.0039)	(-0.0043)	(-0.0075)	(-0.0094)
		0.8014***				0.5418**		
		(-0.0059)				(-0.0007)		
TFI (d)	0.0493*	0.0482*	0.1183*	0.0205*	0.1276*	0.0856	0.0787*	0.1205**
	(-0.0093)	(-0.0088)	(-0.0059)	(-0.0062)	(-0.0041)	(-0.0284)	(-0.0091)	(-0.0149)
		0.1314**				0.4119***		
		(-0.0652)				(-0.0056)		
TFI (e)	0.6954***	0.8011***	0.6314***	0.8538***	0.9427***	0.6928***	0.7514***	0.8362***
	(-0.0027)	(-0.0039)	(-0.0076)	(-0.0026)	(-0.0073)	(-0.0072)	(-0.0025)	(-0.0048)
		0.5919***				0.5173***		
		(-0.0056)				(-0.0068)		
TFI (f)	0.4056***	0.5514**	0.5227***	0.4703***	0.5428*	0.4514*	0.4532**	0.5739***
	(-0.0033)	(-0.0058)	(-0.0044)	(-0.0062)	(-0.0081)	(-0.0037)	(-0.0056)	(-0.0048)
		0.4126*				0.5003**		
		(-0.0095)				(-0.0029)		
TFI (g)	0.6018***	0.7562***	0.6521***	0.8526***	0.7112***	0.6018***	0.7529***	0.7928***
	(-0.0053)	(-0.0049)	(-0.0058)	(-0.0159)	(-0.0077)	(-0.0072)	(-0.0014)	(-0.0033)
		1.1093**				1.1045*		
		(-0.0035)				(-0.0032)		
TFI (h)	1.1445***	1.0037***	1.3197***	1.2371***	1.0562**	0.9523***	1.1405***	1.0559***
	(-0.0038)	(-0.0067)	(-0.0085)	(-0.0062)	(-0.0034)	(-0.0105)	(-0.0089)	(-0.0043)
		1.2185***				0.8916***		
		(-0.0058)				(-0.0039)		
TFI (i)	-0.0984	-0.0518*	-0.0385	0.1516	0.1843	0.2148*	0.0944*	0.9803
	(-0.0118)	(-0.0095)	(-0.0152)	(-0.0097)	(-0.0109)	(-0.0135)	(-0.0117)	(-0.0203)
		0.1773				1.0421		
		(-0.0172)				(-0.0105)		
TFI (j)	-0.2153*	-0.4501	-0.3112*	0.1173	0.1318	0.0356	-0.2118	-0.3211
	(-0.0177)	(-0.0087)	(-0.0075)	(-0.0068)	(-0.0071)	(-0.0082)	(-0.0093)	(-0.0091)
		-0.5114**				-0.2871*		
		(-0.0058)				(-0.0105)		
TFI (l)	0.0618**	0.1055*	0.0962**	0.1875**	0.1138*	0.1226**	0.0415**	0.0388**
	(-0.0023)	(-0.0084)	(-0.0052)	(-0.0038)	(-0.0035)	(-0.0045)	(-0.0052)	(-0.0081)
		0.8814**				0.0482**		
		(-0.0063)				(-0.0038)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses, distance, etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. Sectors fixed effects are included. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 50-65%.

Annex Table A5.7. "Imports" of value added (High and medium-high tech sectors) (2)

Destination country sample	OECD				OECD			
Origin country sample	OECD				All TiVA			
Origin sector	High and medium-high tech				High and medium-high tech			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.6115***	0.5413**	0.4512**	0.5781***	0.5871**	0.5017**	0.6712**	0.4482***
	(-0.0051)	(-0.0085)	(-0.0054)	(-0.0041)	(-0.0035)	(-0.0045)	(-0.0035)	(-0.0012)
		1.0561*				0.4791**		
		(-0.0081)				(-0.0039)		
TFI (b)	0.1872**	0.4561	0.3918**	0.2159*	0.4231**	0.3158***	0.3115	0.3624*
	(-0.0046)	(-0.0052)	(-0.0065)	(-0.0038)	(-0.0112)	(-0.0021)	(-0.0017)	(-0.0018)
		0.5772**				0.2995		
		(-0.0078)				(-0.0014)		
TFI (c)	1.4431***	1.5367***	1.4563***	1.4268***	1.4265***	1.3652***	1.3135**	1.2125**
	(-0.0017)	(-0.0161)	(-0.0027)	(-0.0053)	(-0.0061)	(-0.0032)	(-0.0091)	(-0.0032)
		0.9871***				0.0443		
		(-0.0023)				(-0.0022)		
TFI (d)	0.0315	0.0612	0.2014	0.5423**	0.2314**	0.1982	0.2054*	0.2982
	(-0.0018)	(-0.0039)	(-0.0113)	(-0.0051)	(-0.0488)	(-0.0028)	(-0.0015)	(-0.0085)
		0.2367***				0.5123**		
		(-0.0057)				(-0.0013)		
TFI (e)	0.8912***	0.7445***	0.7623***	0.8712	0.7012**	0.8246***	0.9735***	0.7824***
	(-0.0042)	(-0.0023)	(-0.0081)	(-0.0024)	(-0.0064)	(-0.0042)	(-0.0039)	(-0.0092)
		0.6158***				0.7783***		
		(-0.0112)				(-0.0028)		
TFI (f)	0.5563***	0.4871***	0.4892***	0.5691***	0.4863**	0.4503***	0.6981**	0.4872**
	(-0.0045)	(-0.0048)	(-0.0025)	(-0.0047)	(-0.0018)	(-0.0071)	(-0.0024)	(-0.0031)
		0.3981				0.4011*		
		(-0.0062)				(-0.0042)		
TFI (g)	0.7823***	0.8052***	0.6781**	0.7114***	0.6981***	0.7816***	0.6912***	0.7141***
	(-0.0025)	(-0.0052)	(-0.0047)	*(-0.0013)	(-0.0098)	(-0.0028)	(-0.0036)	(-0.0025)
		1.1256**				1.0121**		
		(-0.0013)				(-0.0055)		
TFI (h)	1.3274***	1.2582***	1.4503***	1.1134***	1.2334**	1.2182*	1.2456***	1.1355***
	(-0.0023)	(-0.0072)	(-0.0094)	(-0.0018)	(-0.0071)	(-0.0034)	(-0.0047)	(-0.0055)
		1.4514***				0.9812***		
		(-0.0038)				(-0.0023)		
TFI (i)	-0.0836	-0.0877*	-0.0814	0.0975	0.0035	0.0014	-0.0688***	0.1722
	(-0.0076)	(-0.0034)	(-0.0045)	(-0.0076)	(-0.0051)	(-0.0043)	(-0.0031)	(-0.0034)
		0.1456				0.1673		
		(-0.0029)				(-0.0026)		
TFI (j)	-0.0887**	0.0255*	0.1087	-0.4558**	0.1152*	0.2215**	0.6082*	-0.4333
	(-0.0061)	(-0.0062)	(-0.0053)	(-0.0043)	(-0.0035)	(-0.0034)	(-0.0044)	(-0.0024)
		-0.1038				-0.1256***		
		(-0.0038)				(-0.0023)		
TFI (l)	0.1021**	0.0753***	0.8752***	0.1627***	0.1881	0.0465*	0.4451**	0.0872
	(-0.0035)	(-0.0071)	(-0.0042)	(-0.0041)	(-0.0046)	(-0.0011)	(-0.0087)	(-0.0031)
		0.5423***				0.8713***		
		(-0.0027)				(-0.0087)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses, distance, etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. Sectors fixed effects are included. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 50-65%.

Gravity Results: Foreign Value Added Embodied in Gross Exports

Annex Table A5.8. Foreign value added embodied in gross exports (Total)

Destination country sample	OECD				OECD			
Destination sector	Total				Total			
Origin country sample	OECD				All TiVA			
Origin sector	Total				Total			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.8976***	0.9456***	1.0342***	1.2136***	0.9005**	1.0823***	1.2381***	1.1117***
	(-0.0542)	(-0.0542)	(-0.0432)	(-0.0273)	(-0.3023)	(-0.1281)	(-0.5023)	(-0.0253)
		1.1785***				0.8762***		
		(-0.8712)				(-0.1281)		
TFI (b)	0.8011***	0.6543**	0.7152***	0.5543**	0.8875***	0.5198***	0.4588**	0.6117**
	(-0.0231)	(-0.1822)	(-0.4238)	(-0.3162)	(-0.1102)	(-0.0023)	(-0.0532)	(-0.0217)
		1.2671***				1.0198		
		(-0.0711)				(-0.2361)		
TFI (c)	0.9871***	1.0123***	1.1167***	0.8723***	1.1922***	1.2672***	1.0828***	0.9845***
	(-0.0238)	(-0.0023)	(-0.0542)	(-0.7192)	(-0.0612)	(-0.3128)	(-0.9012)	(-0.0821)
		1.2598**				1.3452***		
		(-0.6512)				(-0.0321)		
TFI (d)	0.3117*	0.2981	0.2563*	0.4416	0.4156**	0.3328	0.2345**	0.4592**
	(-0.1276)	(-0.0821)	(-0.0126)	(-0.0712)	(-0.0128)	(-0.0512)	(-0.0762)	(-0.0172)
		0.5551**				0.6172**		
		(-0.1728)				(-0.0021)		
TFI (e)	0.7564***	0.8116**	0.8723***	0.6555**	0.8056**	0.9117**	0.6112**	0.7558**
	(-0.1271)	(-0.1002)	(-0.0051)	(-0.4412)	(-0.0412)	(-0.0812)	(-0.1127)	(-0.0521)
		1.0563***				1.1185**		
		(-0.5120)				(-0.0547)		
TFI (f)	0.9423***	0.8762***	0.7563***	1.1282***	1.0127***	0.9457**	1.1178**	0.9235**
	(-0.4512)	(-0.0423)	(-0.1827)	(-0.4412)	(-0.0021)	(-0.0512)	(-0.0281)	(-0.3121)
		1.0128***				0.8745***		
		(-0.0042)				(-0.0312)		
TFI (g)	1.0927***	1.4238**	1.3158***	1.2287***	1.2136***	1.3217**	1.3118**	1.3552***
	(-0.0828)	(-0.4512)	(-0.0412)	(-0.0032)	(-0.0981)	(-0.0341)	(-0.0671)	(-0.0912)
		1.2156**				0.9873***		
		(-0.0256)				(-0.0541)		
TFI (h)	1.3271***	1.5612***	1.4123***	1.5952***	1.6431***	1.4812***	1.6127***	1.4382***
	(-0.1762)	(-0.0072)	(-0.0923)	(-0.0728)	(-0.0145)	(-0.3761)	(-0.5523)	(-0.0423)
		1.4514***				0.7812***		
		(-0.0328)				(-0.2711)		
TFI (i)	-0.1660**	-0.1813***	-0.0531	-0.041	0.3327**	0.0308	0.0787	2.3445***
	(-0.0021)	(-0.3028)	(-0.0523)	(-0.0671)	(-0.5019)	(-0.0425)	(-0.8124)	(-0.0342)
		-0.0456				0.0673		
		(-0.0981)				(-0.2107)		
TFI (j)	0.2548***	0.2640***	0.2301**	0.0172	-0.0305	-0.0593	0.4111***	0.6485
	(-0.0651)	(-0.0012)	(-0.0621)	(-0.0361)	(-0.5412)	(-0.0561)	(-0.0452)	(-0.0712)
		-0.0738				-0.4456***		
		(-0.0092)				(-0.7612)		
TFI (l)	0.1029***	0.9123***	1.2265***	-2.5181***	0.0881	0.0585*	0.3885	0.3781
	(-0.0712)	(-0.0741)	(-0.0423)	(-0.0561)	(-0.0812)	(-0.0012)	(-0.0816)	(-0.0561)
		0.7684***				0.9815***		
		(-0.0291)				(-0.0651)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses; distance etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 55-60%.

Annex Table A5.9. Foreign value added embodied in gross exports (Low-tech origin and medium-low tech destination)

Destination country sample	OECD				OECD			
Destination sector	Medium-low tech				Medium-low tech			
Origin country sample	OECD				All TiVA			
Origin sector	Low-tech				Low-tech			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.9874***	0.8734***	1.0356**	1.2382***	1.0056**	0.9873**	1.2457**	1.1077***
	(-0.0052)	(-0.0048)	(-0.0051)	(-0.0019)	(-0.0034)	(-0.0092)	(-0.0035)	(-0.0012)
		1.0342***				0.7653**		
		(-0.0098)				(-0.0037)		
TFI (b)	0.8034***	0.7543**	1.0123**	0.7638***	0.9083**	0.6528***	0.8342*	1.0547**
	(-0.0041)	(-0.0052)	(-0.0015)	(-0.0039)	(-0.0021)	(-0.0021)	(-0.0017)	(-0.0018)
		0.9126***				0.8115		
		(-0.0011)				(-0.0031)		
TFI (c)	1.1145**	1.2152***	0.9812**	0.8542***	0.9438***	1.1878**	1.0128***	0.8765***
	(-0.0048)	(-0.0016)	(-0.0027)	(-0.0071)	(-0.0063)	(-0.0032)	(-0.0091)	(-0.0031)
		1.4523***				1.3459***		
		(-0.0024)				(-0.0022)		
TFI (d)	0.4372*	0.3562**	0.5523*	0.4287***	0.3112***	0.4523**	0.2983**	0.4019*
	(-0.0018)	(-0.0039)	(-0.0025)	(-0.0057)	(-0.0048)	(-0.0028)	(-0.0012)	(-0.0084)
		0.7817***				0.8124*		
		(-0.0047)				(-0.0091)		
TFI (e)	0.8857**	1.0286**	1.1156**	0.9372***	0.9542**	0.6459***	0.7286**	0.8153***
	(-0.0013)	(-0.0002)	(-0.0089)	(-0.0024)	(-0.0064)	(-0.0067)	(-0.0031)	(-0.0019)
		1.2783**				1.0286**		
		(-0.0112)				(-0.0013)		
TFI (f)	1.1057***	1.2356***	1.3823***	0.9118**	0.9834***	1.1156**	1.2186***	1.0237***
	(-0.0065)	(-0.0048)	(-0.0015)	(-0.0047)	(-0.0018)	(-0.0017)	(-0.0024)	(-0.0011)
		0.9834***				1.2387***		
		(-0.0062)				(-0.0034)		
TFI (g)	1.1582**	1.0982***	1.3128***	1.1152**	1.4322***	1.1278**	1.2168***	1.3148***
	(-0.0026)	(-0.0044)	(-0.0047)	(-0.0013)	(-0.0091)	(-0.0032)	(-0.0032)	(-0.0025)
		0.9827***				0.8762***		
		(-0.0052)				(-0.0055)		
TFI (h)	1.3823***	1.2116**	1.5811**	1.2341**	1.6712***	1.3114***	1.4182***	1.6212***
	(-0.0023)	(-0.0073)	(-0.0091)	(-0.0073)	(-0.0045)	(-0.0034)	(-0.0015)	(-0.0051)
		1.4514***				0.7812***		
		(-0.0038)				(-0.0012)		
TFI (i)	-0.8133***	-0.8292***	-0.3477***	-0.0585	0.001	-0.0081	-0.4815***	0.1581
	(-0.0076)	(-0.0059)	(-0.0045)	(-0.0051)	(-0.0054)	(-0.0043)	(-0.0032)	(-0.0145)
		-0.4451				0.0782		
		(-0.0029)				(-0.0026)		
TFI (j)	-0.5534***	-0.6411***	-0.2626	-0.3147	0.1323	0.2902*	-0.2122	-0.6271*
	(-0.0044)	(-0.0016)	(-0.0053)	(-0.0043)	(-0.0035)	(-0.0034)	(-0.0044)	(-0.0561)
		-0.1823				-0.4117*		
		(-0.0038)				(-0.0014)		
TFI (l)	0.5086***	0.7109***	0.7051***	-0.2093	0.3425***	0.3572***	1.4627***	0.9088
	(-0.0035)	(-0.0071)	(-0.0019)	(-0.0051)	(-0.0046)	(-0.0112)	(-0.0076)	(-0.0055)
		0.7684***				0.9815***		
		(-0.0005)				(-0.0082)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses; distance etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 55-60%.

Annex Table A5.10 Foreign value added embodied in gross exports
(Medium-low tech origin and High and medium-high tech destination)

Destination country sample	OECD				OECD			
Destination sector	High and medium-high tech				High and medium-high tech			
Origin country sample	OECD				All TiVA			
Origin sector	Medium-low tech				Medium-low tech			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.5621***	0.6111**	0.7812**	0.7543***	0.6831**	0.6881**	0.7552**	0.7891***
	(-0.0024)	(-0.0028)	(-0.0054)	(-0.0091)	(-0.0031)	(-0.0018)	(-0.0035)	(-0.0026)
		0.5412**				-0.1635		
		(-0.0039)				(-0.0076)		
TFI (b)	0.4417**	0.5691**	0.4257***	0.5912**	0.6243**	0.4681**	0.6292**	0.5438***
	(-0.0046)	(-0.0035)	(-0.0064)	(-0.0038)	(-0.0011)	(-0.0021)	(-0.0016)	(-0.0018)
		0.4871**				0.2133***		
		(-0.0078)				(-0.0032)		
TFI (c)	0.7645***	0.6812***	0.8972**	0.7562***	0.8902**	0.5117**	0.6781	0.8053***
	(-0.0048)	(-0.0015)	(-0.0027)	(-0.0071)	(-0.0061)	(-0.0019)	(-0.0091)	(-0.0032)
		1.0567**				1.1156		
		(-0.0124)				(-0.0061)		
TFI (d)	0.0567	0.0981	0.0651**	0.2165*	0.2481	0.3126	0.2561*	0.2337*
	(-0.0312)	(-0.0039)	(-0.0012)	(-0.0057)	(-0.0048)	(-0.0028)	(-0.0015)	(-0.0038)
		0.1145**				0.3823		
		(-0.0045)				(-0.0095)		
TFI (e)	0.9456***	0.8726***	0.7523**	-0.5231	1.0056**	1.0236**	0.9945**	0.7653**
	(-0.0013)	(-0.0053)	(-0.0081)	(-0.0024)	(-0.0064)	(-0.0067)	(-0.0141)	(-0.0092)
		0.6227***				1.1562***		
		(-0.0011)				(-0.0013)		
TFI (f)	0.6123***	0.7592**	1.0054***	1.3526***	0.9871**	0.5419**	0.6521**	1.104**
	(-0.0045)	(-0.0041)	(-0.0024)	(-0.0047)	(-0.0018)	(-0.0078)	(-0.0024)	(-0.0031)
		0.5421***				0.4871***		
		(-0.0063)				(-0.0042)		
TFI (g)	1.1452**	1.2345**	1.3287***	0.9874***	1.3897***	1.5217***	1.3584***	1.2675***
	(-0.0025)	(-0.0044)	(-0.0041)	(-0.0013)	(-0.0089)	(-0.0028)	(-0.0013)	(-0.0025)
		1.0982**				1.2344***		
		(-0.0013)				(-0.0055)		
TFI (h)	1.5423***	1.4231***	1.5952***	1.7092***	1.4432**	1.2865**	1.4523**	1.6542***
	(-0.0087)	(-0.0072)	(-0.0094)	(-0.0073)	(-0.0078)	(-0.0034)	(-0.0058)	(-0.0055)
		1.3281***				1.5421***		
		(-0.0038)				(-0.0021)		
TFI (i)	0.0143	0.0452	0.0541	0.0688	0.1876	0.2014	0.0178	0.2175
	(-0.0071)	(-0.0034)	(-0.0045)	(-0.0761)	(-0.0051)	(-0.0043)	(-0.0031)	(-0.0024)
		0.0785				0.0653		
		(-0.0022)				(-0.0036)		
TFI (j)	-0.0514	0.1742	-0.2374	0.1372	0.0562	-0.0177	-0.2971	-0.2053
	(-0.0061)	(-0.0015)	(-0.0052)	(-0.0432)	(-0.0035)	(-0.0041)	(-0.0044)	(-0.0055)
		0.0782				-0.3442		
		(-0.0081)				(-0.0013)		
TFI (l)	0.2288***	0.2781**	0.2047**	0.6345**	0.1885**	0.2412**	0.4452***	0.3781***
	(-0.0012)	(-0.0017)	(-0.0042)	(-0.0041)	(-0.0046)	(-0.0011)	(-0.0089)	(-0.0034)
		0.5951**				0.1578**		
		(-0.0027)				(-0.0087)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses; distance etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 50-60%.

Annex Table A5.11. Foreign value added embodied in gross exports (Low-tech origin and High and medium-high tech destination)

Destination country sample	OECD				OECD			
Destination sector	High and medium-high tech				High and medium-high tech			
Origin country sample	OECD				All TiVA			
Origin sector	Low-tech				Low-tech			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.6523***	0.7123***	0.6218***	0.8531***	0.7116***	0.6532***	0.8152***	1.0216***
	(-0.0041)	(-0.0019)	(-0.0014)	(-0.0002)	(0.0076)	(-0.0092)	(-0.0045)	(-0.0036)
		0.5437***				1.0231***		
		(-0.0052)				(-0.0011)		
TFI (b)	0.5412***	0.4091**	0.4821**	0.4591**	0.6054***	0.4157***	0.5419***	0.4912***
	(-0.0048)	(-0.0055)	(-0.0052)	(-0.0018)	(-0.0032)	(-0.0008)	(-0.0015)	(-0.0017)
		0.6812***				0.8138**		
		(-0.0071)				(-0.0086)		
TFI (c)	0.6153***	0.5932**	0.8174***	0.9172***	0.8126***	0.6256***	0.6812**	0.5916***
	(-0.0025)	(-0.0036)	(-0.0074)	(-0.0011)	(-0.0013)	(-0.0024)	(-0.0096)	(-0.0038)
		1.0126**				1.1372***		
		(-0.0025)				(-0.0017)		
TFI (d)	0.3123**	0.4118*	0.3567**	0.4018***	0.3118***	0.5028***	0.4119***	0.4995***
	(-0.0023)	(-0.0014)	(-0.0021)	(-0.0052)	(-0.0048)	(-0.0028)	(-0.0015)	(-0.0038)
		0.1357**				0.9456**		
		(-0.0014)				(-0.0093)		
TFI (e)	0.5023***	0.6152***	0.5819***	0.6023***	0.5872***	0.4325***	0.5543***	0.6523***
	(-0.0057)	(-0.0121)	(-0.0081)	(-0.0024)	(-0.0064)	(-0.0065)	(-0.0013)	(-0.0092)
		0.4815***				1.0283***		
		(-0.1111)				(-0.0015)		
TFI (f)	0.7642***	0.8116**	0.7421***	1.1095***	1.0261**	0.9173***	0.8712**	1.2315***
	(-0.0018)	(-0.0084)	(-0.0026)	(-0.0047)	(-0.0083)	(-0.0017)	(-0.0024)	(-0.0031)
		0.5912***				0.7118***		
		(-0.0064)				(-0.0045)		
TFI (g)	0.8451***	1.2871**	1.3145***	1.2817***	1.2245***	1.3117***	1.5574**	1.3923***
	(0.0067)	(-0.0044)	(-0.0047)	(-0.0015)	(-0.0019)	(-0.0035)	(-0.0016)	(-0.0028)
		0.9823**				0.84521**		
		(-0.0015)				(-0.0052)		
TFI (h)	1.7842***	1.5201***	1.6503***	1.4218***	1.9821**	1.6326**	1.8552***	1.5231**
	(-0.0072)	(-0.0072)	(-0.0094)	(-0.0073)	(-0.0071)	(-0.0034)	(-0.0026)	(-0.0054)
		1.3451***				1.4237***		
		(-0.0181)				(-0.0012)		
TFI (i)	-0.0543	-0.0267**	0.1432	0.0856*	-0.2148*	0.2213	-0.1193	0.0982
	(-0.0076)	(-0.0456)	(-0.0045)	(-0.0076)	(-0.0052)	(-0.0043)	(-0.0083)	(-0.0034)
		-0.4912				-0.4517*		
		(-0.0076)				(-0.0026)		
TFI (j)	-0.3261	-0.2781**	-0.3812**	0.2117	-0.1523*	0.0267	-0.0567	0.1191**
	(-0.0014)	(-0.0023)	(-0.0051)	(-0.0059)	(-0.0015)	(-0.0037)	(-0.0029)	(-0.0054)
		0.5711				0.4591		
		(-0.0081)				(-0.0014)		
TFI (l)	0.4321***	0.5114**	0.4573**	0.5114***	0.3912**	0.4111*	0.3873*	0.4532***
	(-0.0035)	(-0.0074)	(-0.0045)	(-0.0053)	(-0.0071)	(-0.0012)	(-0.0078)	(-0.0013)
		0.8142**				0.9216		
		(-0.0023)				(-0.0068)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses; distance etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 50-65%.

Annex Table A5.12 Foreign value added embodied in gross exports (Low-tech origin and medium-low tech destination) (2)

Destination country sample	OECD				OECD			
Destination sector	Medium-low tech				Medium-low tech			
Origin country sample	OECD				All TiVA			
Origin sector	Low-tech				Low-tech			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.9614***	0.8521***	0.9827**	1.1054***	1.1186**	0.8438**	1.1134**	0.9627***
	(-0.0063)	(-0.0059)	(-0.0048)	(-0.0039)	(-0.0048)	(-0.0067)	(-0.0041)	(-0.0054)
		1.1135***				0.7387**		
		(-0.0073)				(-0.0065)		
TFI (b)	0.7851***	0.7119**	0.9248**	0.7423***	0.8935**	0.6311***	0.8129*	0.8863**
	(-0.0056)	(-0.0024)	(-0.0038)	(-0.0052)	(-0.0044)	(-0.0072)	(-0.0027)	(-0.0052)
		0.9533**				0.7856		
		(-0.0058)				(-0.0051)		
TFI (c)	1.0038**	1.2540***	0.9631**	0.8112***	0.9156***	0.9751**	1.1158***	0.8519***
	(-0.0061)	(-0.0037)	(-0.0054)	(-0.0081)	(-0.0033)	(-0.0037)	(-0.0065)	(-0.0044)
		1.4215***				1.2415***		
		(-0.0043)				(-0.0048)		
TFI (d)	0.4118*	0.3274**	0.5118*	0.4091**	0.3056***	0.4127**	0.2633**	0.3812*
	(-0.0046)	(-0.0061)	(-0.0038)	(-0.0073)	(-0.0077)	(-0.0053)	(-0.0045)	(-0.0091)
		0.7543***				0.7920**		
		(-0.0059)				(-0.0068)		
TFI (e)	0.8619**	1.1562**	1.0038**	0.9126***	0.9231**	0.6315***	0.7114**	0.7932**
	(-0.0025)	(-0.0011)	(-0.0075)	(-0.0083)	(-0.0078)	(-0.0081)	(-0.0058)	(-0.0044)
		1.2528**				1.1123**		
		(-0.0094)				(-0.0038)		
TFI (f)	0.9823***	1.0925***	1.2588***	0.9627**	0.9612***	0.9812***	1.1539***	0.9744***
	(-0.0089)	(-0.0081)	(-0.0034)	(-0.0063)	(-0.0038)	(-0.0053)	(-0.0048)	(-0.0056)
		0.9529***				1.1081***		
		(-0.0073)				(-0.0058)		
TFI (g)	1.0321**	1.1125***	1.2271***	1.2812**	1.3198***	0.9631**	1.1085***	1.2563***
	(-0.0057)	(-0.0075)	(-0.0068)	(-0.0071)	(-0.0105)	(-0.0055)	(-0.0037)	(-0.0048)
		0.9614***				0.8433***		
		(-0.0077)				(-0.0082)		
TFI (h)	1.3228***	1.2071***	1.3899**	1.2824**	1.5185***	1.2493***	1.3551***	1.4185***
	(-0.0047)	(-0.0091)	(-0.0112)	(-0.0092)	(-0.0063)	(-0.0057)	(-0.0048)	(-0.0085)
		1.4215***				0.7452***		
		(-0.0058)				(-0.0052)		
TFI (i)	-0.7108***	-0.7819***	-0.3175***	-0.1146	0.0236	-0.0129	-0.4517***	0.1311
	(-0.0125)	(-0.0107)	(-0.0052)	(-0.0084)	(-0.0138)	(-0.0186)	(-0.0029)	(-0.0102)
		-0.4526				0.0851**		
		(-0.0098)				(-0.0035)		
TFI (j)	-0.5107***	-0.6214**	-0.2311	0.2941	0.1234	0.2518*	-0.2215	-0.6012*
	(-0.0036)	(-0.0047)	(-0.0062)	(-0.0058)	(-0.0067)	(-0.0051)	(-0.0093)	(-0.0015)
		-0.1528				-0.3911		
		(-0.0092)				(-0.0087)		
TFI (l)	0.4839***	0.6951***	0.6823***	0.3114	0.3115***	0.3277***	1.3872***	0.8753
	(-0.0024)	(-0.0077)	(-0.0053)	(-0.0127)	(-0.0054)	(-0.0091)	(-0.0082)	(-0.0116)
		0.7612***				0.9604***		
		(-0.0012)				(-0.0083)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses, distance, etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. Sector fixed effects are included. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 60-65%.

Annex Table A5.13 Foreign value added embodied in gross exports
(Medium-low tech origin and High and medium-high tech destination) (2)

Destination country sample	OECD				OECD			
Destination sector	High and medium-high tech				High and medium-high tech			
Origin country sample	OECD				All TiVA			
Origin sector	Medium-low tech				Medium-low tech			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.5114***	0.5982**	0.7523**	0.6918***	0.6413**	0.6311**	0.6877**	0.7321***
	(-0.0039)	(-0.0044)	(-0.0062)	(-0.0095)	(-0.0055)	(-0.0067)	(-0.0058)	(-0.0077)
		0.5137**				-0.1481		
		(-0.0058)				(-0.0082)		
TFI (b)	0.4325**	0.5388**	0.4108***	0.5563**	0.6103**	0.4328**	0.5911**	0.5126***
	(-0.0061)	(-0.0071)	(-0.0082)	(-0.0058)	(-0.0046)	(-0.0044)	(-0.0083)	(-0.0033)
		0.4516**				0.2274***		
		(-0.0083)				(-0.0056)		
TFI (c)	0.7317***	0.6421***	0.8724**	0.7388***	0.8626**	0.5213**	0.6517	0.7928***
	(-0.0035)	(-0.0029)	(-0.0058)	(-0.0085)	(-0.0075)	(-0.0044)	(-0.0085)	(-0.0055)
		1.1128**				1.1098		
		(-0.0092)				(-0.0104)		
TFI (d)	0.0488	0.0856	0.0544**	0.2082*	0.2151	0.3087	0.2283*	0.2116*
	(-0.0291)	(-0.0103)	(-0.0043)	(-0.0076)	(-0.0105)	(-0.0098)	(-0.0077)	(-0.0065)
		0.1031**				0.3733		
		(-0.0083)				(-0.0114)		
TFI (e)	0.9238***	0.8554***	0.7226**	-0.4981	1.1038**	0.9832**	0.9526**	0.7318**
	(-0.0043)	(-0.0068)	(-0.0095)	(-0.0045)	(-0.0077)	(-0.0083)	(-0.0081)	(-0.00101)
		0.6109***				1.0288***		
		(-0.0073)				(-0.0048)		
TFI (f)	0.5844***	0.7318**	0.9772***	1.3119***	0.9622**	0.5193**	0.6133**	1.2131**
	(-0.0058)	(-0.0083)	(-0.0038)	(-0.0063)	(-0.0035)	(-0.0085)	(-0.0037)	(-0.0054)
		0.5122***				0.4615***		
		(-0.0077)				(-0.0067)		
TFI (g)	1.0034**	1.1277**	1.2716***	0.9643***	1.3512***	1.3811***	1.3148***	1.2237***
	(-0.0055)	(-0.0068)	(-0.0081)	(-0.0029)	(-0.0091)	(-0.0084)	(-0.0067)	(-0.0056)
		1.1431**				1.1183***		
		(-0.0056)				(-0.0068)		
TFI (h)	1.5093***	1.3875***	1.4482***	1.6519***	1.3521**	1.2514**	1.4188**	1.6215***
	(-0.0072)	(-0.0085)	(-0.0103)	(-0.0088)	(-0.0091)	(-0.0058)	(-0.0089)	(-0.0083)
		1.2218***				1.5122***		
		(-0.0054)				(-0.0076)		
TFI (i)	0.0213	0.0455	0.0593	0.0712	0.1561	0.2127	0.0155	0.2033
	(-0.0104)	(-0.0112)	(-0.0081)	(-0.0523)	(-0.0118)	(-0.0095)	(-0.0098)	(-0.0067)
		0.0752				0.0558		
		(-0.0084)				(-0.0103)		
TFI (j)	-0.0488	0.1615	-0.1973	0.1409	0.0456	-0.0203	-0.2511	-0.2118
	(-0.0112)	(-0.0087)	(-0.0105)	(-0.0388)	(-0.0118)	(-0.0095)	(-0.0051)	(-0.0108)
		0.0765				-0.3144*		
		(-0.0108)				(-0.0038)		
TFI (l)	0.2103***	0.2516**	0.1943**	0.6119**	0.1923**	0.2314**	0.4277***	0.3211***
	(-0.0047)	(-0.0029)	(-0.0081)	(-0.0055)	(-0.0083)	(-0.0053)	(-0.0094)	(-0.0056)
		0.5612**				0.1518**		
		(-0.0065)				(-0.0091)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses; distance etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. Sector fixed effects are included. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 60-70%.

Annex Table A5.14. Foreign value added embodied in gross exports (Low-tech origin and High and medium-high tech destination) (2)

Destination country sample	OECD				OECD			
Destination sector	High and medium-high tech				High and medium-high tech			
Origin country sample	OECD				All TiVA			
Origin sector	Low-tech				Low-tech			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.6144***	0.6921***	0.6114***	0.8323***	0.6877***	0.6421***	0.7724***	0.9775***
	(-0.0068)	(-0.0045)	(-0.0068)	(-0.0062)	(0.0089)	(-0.0095)	(-0.0065)	(-0.0068)
		0.5312**				1.1885***		
		(-0.0081)				(-0.0048)		
TFI (b)	0.5291***	0.4118**	0.4562**	0.4431**	0.5874***	0.4083***	0.5235***	0.4751***
	(-0.0085)	(-0.0056)	(-0.0088)	(-0.0057)	(-0.0078)	(-0.0023)	(-0.0047)	(-0.0056)
		0.6523***				0.7815**		
		(-0.0082)				(-0.0088)		
TFI (c)	0.5825***	0.5732**	0.7925***	0.8826***	0.8013***	0.6114***	0.6542**	0.5723***
	(-0.0058)	(-0.0051)	(-0.0082)	(-0.0035)	(-0.0048)	(-0.0083)	(-0.0115)	(-0.0057)
		1.1108**				1.0058***		
		(-0.0048)				(-0.0063)		
TFI (d)	0.3018**	0.3925*	0.3281**	0.3922***	0.3041***	0.4827***	0.3851***	0.4431**
	(-0.0058)	(-0.0037)	(-0.0063)	(-0.0055)	(-0.0062)	(-0.0083)	(-0.0038)	(-0.0071)
		0.1216**				0.9154**		
		(-0.0054)				(-0.0087)		
TFI (e)	0.4855***	0.5910***	0.5672***	0.5648***	0.5623***	0.4119***	0.5381***	0.6138***
	(-0.0068)	(-0.0105)	(-0.0095)	(-0.0035)	(-0.0073)	(-0.0071)	(-0.0048)	(-0.0095)
		0.4731***				1.1291***		
		(-0.0037)				(-0.0073)		
TFI (f)	0.7433***	0.7825**	0.7218***	0.9872***	1.0082**	0.8514***	0.8523**	1.1568***
	(-0.0076)	(-0.0093)	(-0.0046)	(-0.0075)	(-0.0105)	(-0.0056)	(-0.0077)	(-0.0063)
		0.5728***				0.6827***		
		(-0.0077)				(-0.0081)		
TFI (g)	0.8125***	1.2518**	1.1259***	1.1577***	1.1180***	1.2913***	1.3472**	1.2812***
	(0.0082)	(-0.0089)	(-0.0084)	(-0.0039)	(-0.0042)	(-0.0028)	(-0.0055)	(-0.0056)
		0.9651**				0.8219**		
		(-0.0038)				(-0.0064)		
TFI (h)	1.5681***	1.4319***	1.5641***	1.3872***	1.7725**	1.5218**	1.7819***	1.4853**
	(-0.0083)	(-0.0088)	(-0.0099)	(-0.0103)	(-0.0091)	(-0.0067)	(-0.0073)	(-0.0095)
		1.3502***				1.3877***		
		(-0.0125)				(-0.0058)		
TFI (i)	-0.0619	-0.0305**	0.1311	0.0753*	-0.2088*	0.2105	-0.0984	0.0975
	(-0.0112)	(-0.0408)	(-0.0102)	(-0.0095)	(-0.0078)	(-0.0047)	(-0.0117)	(-0.0088)
		-0.4723				-0.4403*		
		(-0.0099)				(-0.0085)		
TFI (j)	-0.3104	-0.2513**	-0.3622**	0.2011	-0.1344*	0.0255	-0.0488	0.1058**
	(-0.0053)	(-0.0058)	(-0.0078)	(-0.0108)	(-0.0068)	(-0.0085)	(-0.0079)	(-0.0110)
		0.5625				0.4416		
		(-0.0094)				(-0.0103)		
TFI (l)	0.4137***	0.4952**	0.4329**	0.4892***	0.3726**	0.4033*	0.3562*	0.4311***
	(-0.0068)	(-0.0081)	(-0.0073)	(-0.0067)	(-0.0085)	(-0.0029)	(-0.0074)	(-0.0045)
		0.8033**				0.9112		
		(-0.0045)				(-0.0115)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses; distance etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. Sector fixed effects are included. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 60-70%.

Gravity Results: "Exports" Of Value Added

Annex Table A5.15. "Exports" of value added (Total)

Origin country sample	OECD				OECD			
Origin sector	Total				Total			
Destination country sample	OECD				All TiVA			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.4952***	0.4832	0.6148***	0.5037**	0.3182*	0.4523**	0.7832**	0.5953**
	(-0.0152)	(-0.0213)	(-0.0871)	(-0.0034)	(-0.8712)	(-0.1261)	(-0.0071)	(-0.0052)
		0.6592***				0.8765**		
		(-0.0918)				(-0.0356)		
TFI (b)	0.4532**	0.3872**	0.4153**	0.4982*	0.3552	0.6214***	0.4891*	0.5032**
	(-0.0617)	(-0.3521)	(-0.0651)	(-0.0028)	(-0.1145)	(-0.0237)	(-0.1982)	(-0.0018)
		0.4329				0.5938		
		(-0.0711)				(-0.0341)		
TFI (c)	0.4685***	0.5367***	0.7563***	0.4268***	0.6932*	0.4256***	0.5415**	0.6788***
	(-0.0051)	(-0.0546)	(-0.1281)	(-0.0981)	(-0.0612)	(-0.0032)	(-0.0238)	(-0.0201)
		0.4253***				0.8774**		
		(-0.0245)				(-0.0078)		
TFI (d)	0.0912	0.1154	0.2215**	0.9453***	0.3435	0.3332	0.4743**	0.4882**
	(-0.0512)	(-0.0341)	(-0.0128)	(-0.0067)	(-0.0045)	(-.0.0028)	(-0.0172)	(-0.1821)
		0.2367***				0.5445**		
		(-0.0.456)				(-0.0038)		
TFI (e)	0.7821**	0.8726**	0.6583***	0.5231	0.6783**	0.9763*	0.5543*	0.8921**
	(-0.8712)	(-0.0128)	(-0.0812)	(-0.2617)	(-0.0651)	(-0.0671)	(-0.1131)	(-0.0123)
		0.6168***				1.0265**		
		(-0.0451)				(-0.7621)		
TFI (f)	0.6115**	0.5142**	0.7536**	0.5952*	0.4102*	0.3725**	0.5528*	0.7112**
	(-0.7612)	(-0.0891)	(-0.1821)	(-0.0045)	(-0.0117)	(-0.0127)	(-0.0045)	(-0.0011)
		0.7823**				0.6829*		
		(-0.0451)				(-0.0327)		
TFI (g)	0.9487**	0.8562**	1.0125*	0.7562*	1.0184**	0.7823*	0.9673**	1.1143**
	(-0.0041)	(-0.0871)	(-0.0046)	(-0.8712)	(-0.0087)	(-0.0671)	(-0.0028)	(-0.0451)
		1.1174**				0.6523**		
		(-0.0031)				(-0.0561)		
TFI (h)	1.3218**	1.2145*	1.4321**	1.2353*	1.1145*	1.0145*	0.9763**	1.4238**
	(-0.0921)	(-0.0071)	(-0.0051)	(-0.0056)	(-0.0027)	(-0.0321)	(-0.0051)	(-0.5551)
		0.8672**				0.7682**		
		(-0.0378)				(-0.1120)		
TFI (i)	-0.0211	-0.0317	0.1152	0.1167*	0.2519	0.2434	0.1583	0.2315
	(-0.0241)	(-0.2711)	(-0.0981)	(-0.0712)	(-0.0512)	(-0.0045)	(-0.0031)	(-0.0361)
		-0.4621				-0.0653		
		(-0.8712)				(-0.0912)		
TFI (j)	0.3614	0.4127	0.4128*	0.0325	0.1275	0.0145	-0.2516	0.3051
	(-0.0091)	(-0.7612)	(-0.0056)	(-0.0067)	(-0.0235)	(-0.0076)	(-0.0044)	(-0.1511)
		-0.0551				-0.3326		
		(-0.3081)				(-0.0023)		
TFI (l)	0.3081*	0.3582***	0.5238**	0.4681**	0.2152*	0.2915	0.3829*	0.3345*
	(-0.0651)	(-0.0781)	(-0.0091)	(-0.0412)	(-0.0416)	(-0.0056)	(-0.0051)	(-0.4516)
		0.2412*				0.5583*		
		(-0.0267)				(-0.0081)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses; distance etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 48-60%.

Annex Table A5.16. "Exports" of value added (Low-tech sectors)

Origin country sample	OECD				OECD			
Origin sector	Low-tech				Low-tech			
Destination country sample	OECD				All TiVA			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.5016**	0.6172**	0.6718**	0.6591**	0.5542**	0.7031**	0.7045**	0.5281**
	(-0.0024)	(-0.0028)	(0.0051)	(0.0091)	(-0.0098)	(-0.0027)	(-0.0078)	(-0.0023)
		0.4833*				0.4523***		
		(-0.0232)				(-0.0091)		
TFI (b)	0.3651***	0.4156*	0.3251***	0.4095**	0.3814	0.4815***	0.4815***	0.3667**
	(-0.0048)	(-0.0052)	(-0.0065)	(-0.0038)	(-0.0518)	(-0.0009)	(-0.0067)	(-0.0051)
		0.4775***				0.3302*		
		(-0.0078)				(-0.0091)		
TFI (c)	0.8552**	0.5812***	0.7537***	0.9717**	0.6774**	0.7532**	0.6278***	0.8125**
	(-0.0046)	(-0.0017)	(-0.0028)	(-0.0072)	(-0.0042)	(-0.0012)	(-0.0082)	(-0.0012)
		1.0058**				1.1164***		
		(-0.0024)				(-0.0078)		
TFI (d)	0.3523**	0.4439**	0.2246**	0.4453***	0.4117	0.3554	0.4518***	0.3611**
	(-0.0038)	(-0.0039)	(-0.0021)	(-0.0051)	(-0.0012)	(-0.0085)	(-0.0029)	(-0.0059)
		0.3512**				0.6641***		
		(-0.0045)				(-0.0072)		
TFI (e)	0.4521***	0.3441***	0.5483***	0.4435	0.3911***	0.4122***	0.6553***	0.4923*
	(-0.0013)	(-0.0113)	(-0.0081)	(-0.0024)	(-0.0027)	(-0.0018)	(-0.0076)	(-0.0013)
		0.6156***				0.7215***		
		(-0.0022)				(-0.0078)		
TFI (f)	0.7714**	0.6123**	0.6923**	0.8527***	0.6529**	0.4423*	0.7123**	0.6943***
	(-0.0045)	(-0.0081)	(-0.0024)	(-0.0047)	(-0.0021)	(-0.0051)	(-0.0018)	(-0.0008)
		0.8725**				1.0125**		
		(-0.0062)				(-0.0024)		
TFI (g)	0.6314***	0.5211**	0.7125***	0.6921**	0.5523	0.6029**	0.5238***	0.6521**
	(-0.0026)	(-0.0044)	(-0.0047)	(-0.0003)	(-0.1018)	(-0.0021)	(-0.0091)	(-0.0076)
		0.4381***				0.7428***		
		(-0.0013)				(-0.0068)		
TFI (h)	1.2115**	0.6523**	1.3156*	1.4627***	0.9182***	0.5114***	1.1176**	1.3142**
	(-0.0087)	(-0.0072)	(-0.0009)	(-0.0072)	(-0.0016)	(-0.0019)	(-0.0003)	(-0.0018)
		0.4321*				0.6723*		
		(-0.0038)				(-0.0023)		
TFI (i)	0.1256*	-0.0256**	0.2582	0.1955	-0.1355**	0.2236	0.1233*	0.1514
	(-0.0076)	(-0.0034)	(-0.005)	(-0.0167)	(-0.0089)	(-0.0235)	(-0.0019)	(-0.0223)
		0.2456*				-0.1575**		
		(-0.0092)				(-0.0023)		
TFI (j)	-0.0644*	0.3551*	0.1127*	0.1325	-0.0738	0.2782	0.3122	-0.2182
	(-0.0062)	(-0.0062)	(-0.0015)	(-0.0143)	(-0.0321)	(-0.0372)	(-0.0229)	(-0.0127)
		-0.0722				0.1285**		
		(-0.0138)				(-0.0036)		
TFI (l)	0.2874**	0.1255**	0.3092**	0.2951***	0.3846***	0.2911***	0.4512***	0.2853**
	(-0.0012)	(-0.0071)	(-0.0042)	(-0.0041)	(-0.0037)	(-0.0024)	(-0.0081)	(-0.0078)
		0.2374***				0.3421**		
		(-0.0028)				(-0.0081)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses; distance etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 50-58%.

Annex Table A5.17. "Exports" of value added
(Medium-low tech sectors)

Origin country sample	OECD				OECD			
Origin sector	Medium-low tech				Medium-low tech			
Destination country sample	OECD				All TiVA			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.5184***	0.4745***	0.4429***	0.5823**	0.3689	0.4855	0.4414**	0.5124***
	(-0.0681)	(-0.0722)	(-0.0956)	(-0.0033)	(-0.1821)	(-0.0712)	(-0.0041)	(-0.0032)
		-0.2548				0.6117***		
		(-0.3999)				(-0.0092)		
TFI (b)	0.2767**	0.3128***	0.4024**	0.4874***	0.3555**	0.2326*	0.3912***	0.4592***
	(-0.0053)	(-0.0019)	(-0.0177)	(-0.0029)	(-0.0062)	(-0.0021)	(-0.0091)	(-0.0022)
		0.3624***				0.1981***		
		(-0.0064)				(-0.0024)		
TFI (c)	0.8219***	0.7340***	0.9288***	0.8427***	0.9662**	0.8312***	0.9562**	0.9582***
	(-0.0075)	(-0.0017)	(-0.0034)	(-0.0039)	(-0.0056)	(-0.0021)	(-0.0068)	(-0.0046)
		1.0390***				1.2551***		
		(-0.0042)				(-0.0041)		
TFI (d)	0.2632**	0.3251**	0.4416*	0.2819*	0.3754**	-0.3318	0.5562***	0.4115**
	(-0.0025)	(-0.0042)	(-0.0016)	(-0.0038)	(-0.0052)	(-0.0034)	(-0.0015)	(-0.0023)
		0.3813*				0.2171***		
		(-0.0017)				(-0.0065)		
TFI (e)	0.7108***	0.6421***	0.8510***	0.6911**	0.6541***	0.5673**	0.5972*	0.7783***
	(-0.0046)	(-0.0018)	(-0.0006)	(-0.0013)	(-0.0026)	(-0.0065)	(-0.0023)	(-0.0029)
		0.9190***				0.9115***		
		(-0.0049)				(-0.0011)		
TFI (f)	0.6593***	0.5120**	0.6459***	0.7421***	0.5265	0.4045*	0.6143**	0.5538***
	(-0.0076)	(-0.0016)	(-0.0007)	(-0.0047)	(-0.0433)	(-0.0078)	(-0.0045)	(-0.0036)
		0.8210***				0.9542***		
		(-0.0005)				(-0.0008)		
TFI (g)	1.3455***	1.2413**	1.4112***	1.3961***	1.2326**	1.4481***	1.1108***	1.3552**
	(-0.0027)	(-0.0007)	(-0.0039)	(-0.0005)	(-0.0081)	(-0.0054)	(-0.0019)	(-0.0083)
		0.8862***				0.9126***		
		(-0.0014)				(-0.0016)		
TFI (h)	1.2563***	1.1277***	1.1091***	1.2739**	1.3236***	1.2761*	1.0082***	1.2923***
	(-0.0035)	(-0.0008)	(-0.0048)	(-0.0005)	(-0.0051)	(-0.0091)	(-0.0023)	(-0.0059)
		1.4315***				1.0142**		
		(-0.0065)				(-0.0032)		
TFI (i)	-0.3336	-0.4190***	0.1727	0.2193	-0.1786*	0.1302	0.1657	0.2053
	(-0.0842)	(-0.0006)	(-0.0288)	(-0.0359)	(-0.0078)	(-0.0154)	(-0.0133)	(-0.0231)
		0.1682				0.1512**		
		(-0.0174)				(-0.0012)		
TFI (j)	0.3455	-0.6561	-0.2523*	0.2663*	0.1081	-0.1652	0.2156	0.1537
	(-0.0519)	(-0.0209)	(-0.0081)	(-0.0056)	(-0.0131)	(-0.0007)	(-0.0229)	(-0.0131)
		0.1556**				0.3512***		
		(-0.0037)				(-0.0023)		
TFI (l)	0.2519***	0.3473***	0.3276**	0.2978**	0.2486**	0.3572***	0.4891	0.3967**
	(-0.0011)	(-0.0703)	(-0.0014)	(-0.0052)	(-0.0024)	(-0.0007)	(-0.0344)	(-0.0032)
		0.4037***				0.4123***		
		(-0.0067)				(-0.0038)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses; distance etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 50-60%.

Annex Table A5.18. "Exports" of value added
(High and medium-high tech sectors)

Origin country sample	OECD				OECD			
Origin sector	High and medium-high tech				High and medium-high tech			
Destination country sample	OECD				All TiVA			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.6710***	0.5593***	0.7019***	0.6346**	0.5321**	0.4562**	0.6495***	0.6825**
	(-0.0044)	(-0.0018)	(-0.0071)	(-0.0061)	(-0.0027)	(-0.0052)	(-0.0056)	(-0.0017)
		0.6581				0.7896***		
		(-0.0025)				(-0.0008)		
TFI (b)	0.4091***	0.4485***	0.5263***	0.3961**	0.4562	0.3114	0.4251***	0.3228*
	(-0.0023)	(-0.0007)	(-0.0029)	(-0.0051)	(-0.0416)	(-0.0087)	(-0.0046)	(-0.0041)
		0.2848***				0.4708***		
		(-0.0031)				(-0.0039)		
TFI (c)	0.8024***	0.6187***	0.6596***	0.6912*	0.8620*	0.6743	0.7690***	0.8418**
	(-0.0037)	(-0.0063)	(-0.0081)	(-0.0043)	(-0.0049)	(-0.0323)	(-0.0046)	(-0.0051)
		0.7390***				0.5586***		
		(-0.0025)				(-0.0105)		
TFI (d)	-0.3117	-0.3569	0.2562	0.3120*	0.4804	0.2716*	0.3181	0.4511
	(-0.0208)	(-0.0254)	(-0.0147)	(-0.0043)	(-0.0316)	(-0.0046)	(-0.0209)	(-0.0031)
		0.4189**				-0.5672***		
		(-0.0006)				(-0.0411)		
TFI (e)	0.6225***	0.4330***	0.5295***	0.7081*	0.7452**	0.6159	0.5367**	0.8299*
	(-0.0018)	(-0.0035)	(-0.0005)	(-0.0070)	(-0.0031)	(-0.0108)	(-0.0068)	(-0.0017)
		0.5425**				0.7282*		
		(-0.0081)				(-0.0051)		
TFI (f)	0.6912***	0.7231***	0.8456***	0.7914***	0.8256	0.5082**	0.5529**	0.6711***
	(-0.0008)	(-0.0019)	(-0.0024)	(-0.0009)	(-0.0410)	(-0.0062)	(-0.0004)	(-0.0062)
		0.5312***				0.4311		
		(-0.0065)				(-0.1080)		
TFI (g)	1.2016***	0.8963***	1.2399***	1.3184**	1.2578**	0.7364	1.3516***	1.2636**
	(-0.0015)	(-0.0048)	(-0.0217)	(-0.0043)	(-0.0026)	(-0.0209)	(-0.004)	(-0.0025)
		0.7921***				0.8109***		
		(-0.0051)				(-0.0018)		
TFI (h)	1.1423***	0.9563***	1.1610***	0.9759***	1.1715**	1.1401**	0.9965***	1.0521***
	(-0.0032)	(-0.0061)	(-0.0008)	(-0.0258)	(-0.0063)	(-0.0040)	(-0.00086)	(-0.0031)
		1.0409				0.8870***		
		(-0.0244)				(-0.0002)		
TFI (i)	-0.0965*	-0.0204**	0.2086***	0.1941	0.0715*	0.1668	-0.2744**	0.1992**
	(-0.0031)	(-0.0068)	(-0.0091)	(-0.0315)	(-0.0038)	(-0.0054)	(-0.0103)	(-0.0225)
		0.0226				0.2640***		
		(-0.0241)				(-0.0060)		
TFI (j)	-0.3512	-0.2871	-0.1817	0.2413*	0.0715**	0.1255**	-0.1516***	0.1126
	(-0.0318)	(-0.0156)	(-0.0415)	(-0.0071)	(-0.0083)	(-0.0052)	(-0.0037)	(-0.0322)
		0.1318				-0.0693***		
		(-0.0235)				(-0.0045)		
TFI (l)	0.2507***	0.1971***	0.3173***	0.4255***	0.2349**	0.2742**	0.3548*	0.2138**
	(-0.0013)	(-0.0093)	(-0.0053)	(-0.0007)	(-0.0214)	(-0.0038)	(-0.0051)	(-0.0047)
		0.1406***				0.1679***		
		(-0.0075)				(-0.0019)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses; distance etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 50-60%.

Annex Table A5.19. "Exports" of value added (Low-tech sectors) (2)

Origin country sample	OECD				OECD			
Origin sector	Low-tech				Low-tech			
Destination country sample	OECD				All TiVA			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.4823**	0.6015**	0.6583**	0.6311**	0.5112**	0.6941**	0.6834**	0.5161**
	(-0.0047)	(-0.0045)	(0.0067)	(0.0075)	(-0.0103)	(-0.0043)	(-0.0085)	(-0.0048)
		0.4712*				0.4432***		
		(-0.0105)				(-0.0095)		
TFI (b)	0.3382***	0.3917*	0.3112***	0.3822**	0.3623	0.4591***	0.4675***	0.3518**
	(-0.0048)	(-0.0061)	(-0.0088)	(-0.0056)	(-0.0205)	(-0.0022)	(-0.0068)	(-0.0082)
		0.4588***				0.3188*		
		(-0.0085)				(-0.0073)		
TFI (c)	0.8321**	0.5548***	0.7311***	0.9534**	0.6528**	0.7455**	0.6119***	0.8014**
	(-0.0063)	(-0.0067)	(-0.0078)	(-0.0081)	(-0.0068)	(-0.0037)	(-0.0085)	(-0.0027)
		1.1128**				1.1123***		
		(-0.0055)				(-0.0095)		
TFI (d)	0.3411**	0.4217**	0.2153**	0.4381***	0.3908	0.3485	0.4274***	0.3486**
	(-0.0055)	(-0.0084)	(-0.0056)	(-0.0082)	(-0.0103)	(-0.0118)	(-0.0045)	(-0.0098)
		0.3483**				0.6517***		
		(-0.0068)				(-0.0083)		
TFI (e)	0.4348***	0.3317***	0.5316***	0.4156	0.3821***	0.4082***	0.6231***	0.4732*
	(-0.0057)	(-0.0105)	(-0.0095)	(-0.0103)	(-0.0044)	(-0.0058)	(-0.0088)	(-0.0013)
		0.6065***				0.7119***		
		(-0.0081)				(-0.0085)		
TFI (f)	0.7561**	0.6014**	0.6753**	0.8413***	0.6318**	0.4372*	0.7182**	0.6815***
	(-0.0058)	(-0.0093)	(-0.0059)	(-0.0078)	(-0.0033)	(-0.0055)	(-0.0078)	(-0.0025)
		0.8594**				1.1138**		
		(-0.0077)				(-0.0056)		
TFI (g)	0.6244***	0.5164**	0.7015***	0.6831**	0.5129	0.6114**	0.5195***	0.6418**
	(-0.0078)	(-0.0055)	(-0.0071)	(-0.0011)	(-0.0255)	(-0.0057)	(-0.0103)	(-0.0082)
		0.4217***				0.7322***		
		(-0.0082)				(-0.0073)		
TFI (h)	1.1092**	0.6433**	1.2517*	1.4688***	0.9055***	0.5067***	1.1035**	1.3082***
	(-0.0093)	(-0.0095)	(-0.0085)	(-0.0083)	(-0.0038)	(-0.0074)	(-0.0019)	(-0.0025)
		0.4128*				0.6519*		
		(-0.0047)				(-0.0038)		
TFI (i)	0.1135*	-0.0211**	0.2433	0.1842	-0.1273**	0.2129	0.1118*	0.1388
	(-0.0078)	(-0.0113)	(-0.0099)	(-0.0188)	(-0.0093)	(-0.0277)	(-0.0045)	(-0.0257)
		0.2153*				-0.1341**		
		(-0.0098)				(-0.0073)		
TFI (j)	-0.0514*	0.3418*	0.1058*	0.1217	-0.0705	0.2541	0.3015	-0.2144
	(-0.0083)	(-0.0071)	(-0.0068)	(-0.0138)	(-0.0382)	(-0.0395)	(-0.0253)	(-0.0182)
		-0.0563				0.1113*		
		(-0.0175)				(-0.0057)		
TFI (l)	0.2513**	0.1138**	0.3118**	0.2714***	0.3755***	0.2825***	0.4328***	0.2735**
	(-0.0077)	(-0.0092)	(-0.0058)	(-0.0056)	(-0.0068)	(-0.0047)	(-0.0092)	(-0.0093)
		0.2273***				0.3318**		
		(-0.0035)				(-0.0092)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses, distance etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. Sector fixed effects are included. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 60-65%.

Annex Table A5.20. "Exports" of value added
(Medium-low tech sectors) (2)

Origin country sample	OECD				OECD			
Origin sector	Medium-low tech				Medium-low tech			
Destination country sample	OECD				All TiVA			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.5018***	0.4521***	0.4238***	0.5633**	0.3514	0.4567	0.4328**	0.4973***
	(-0.0215)	(-0.0218)	(-0.0305)	(-0.0048)	(-0.0823)	(-0.0613)	(-0.0076)	(-0.0088)
		-0.2352				0.6071***		
		(-0.1203)				(-0.0099)		
TFI (b)	0.2561**	0.3017***	0.3983**	0.4645***	0.3413**	0.2128*	0.3812***	0.4438***
	(-0.0085)	(-0.0053)	(-0.0104)	(-0.0048)	(-0.0078)	(-0.0047)	(-0.0102)	(-0.0057)
		0.3582***				0.1755***		
		(-0.0076)				(-0.0049)		
TFI (c)	0.8105***	0.7253***	0.9106***	0.8129***	0.9481**	0.8128***	0.9318**	0.9433***
	(-0.0083)	(-0.0049)	(-0.0088)	(-0.0045)	(-0.0087)	(-0.0059)	(-0.0073)	(-0.0081)
		1.1128***				1.1438***		
		(-0.0081)				(-0.0072)		
TFI (d)	0.2452**	0.3155**	0.4382*	0.2726*	0.3542**	-0.3105	0.5377***	0.4023*
	(-0.0087)	(-0.0028)	(-0.0073)	(-0.0091)	(-0.0068)	(-0.0048)	(-0.0059)	(-0.0094)
		0.3643*				0.2052***		
		(-0.0039)				(-0.0071)		
TFI (e)	0.7005***	0.6318***	0.8403***	0.6721**	0.6148***	0.5514**	0.5822*	0.7654***
	(-0.0053)	(-0.0048)	(-0.0011)	(-0.0027)	(-0.0041)	(-0.0077)	(-0.0045)	(-0.0089)
		0.9053***				0.8953***		
		(-0.0071)				(-0.0037)		
TFI (f)	0.6433***	0.5004**	0.6138***	0.7236***	0.5104	0.4112*	0.6035**	0.5217***
	(-0.0081)	(-0.0048)	(-0.0029)	(-0.0088)	(-0.0508)	(-0.0095)	(-0.0056)	(-0.0047)
		0.7938***				0.9122***		
		(-0.0037)				(-0.0051)		
TFI (g)	1.3211***	1.2253**	1.3556***	1.2117***	1.2350**	1.3568***	1.0235***	1.3418**
	(-0.0048)	(-0.0021)	(-0.0059)	(-0.0028)	(-0.0103)	(-0.0067)	(-0.0024)	(-0.0085)
		0.8513***				0.9110***		
		(-0.0049)				(-0.0038)		
TFI (h)	1.1178***	1.0561***	1.1143***	1.1658**	1.2106***	1.2514**	1.1541***	1.2566***
	(-0.0064)	(-0.0016)	(-0.0057)	(-0.0021)	(-0.0073)	(-0.0095)	(-0.0047)	(-0.0078)
		1.4201***				0.9872**		
		(-0.0078)				(-0.0055)		
TFI (i)	-0.3103	-0.3918***	0.1631	0.2144	-0.1540*	0.1083	0.1542	0.1982
	(-0.0744)	(-0.0104)	(-0.0315)	(-0.0511)	(-0.0095)	(-0.0176)	(-0.0215)	(-0.0247)
		0.1541				0.1542**		
		(-0.0205)				(-0.0037)		
TFI (j)	0.3158	-0.6418	-0.2341*	0.2452*	0.1128	-0.1563	0.2035	0.1415
	(-0.0543)	(-0.0253)	(-0.0095)	(-0.0077)	(-0.0144)	(-0.0021)	(-0.0248)	(-0.0159)
		0.1672**				0.3328***		
		(-0.0088)				(-0.0047)		
TFI (l)	0.2408***	0.3312***	0.3105**	0.2725**	0.2127**	0.3328***	0.4462	0.3638**
	(-0.0036)	(-0.0728)	(-0.0094)	(-0.0068)	(-0.0053)	(-0.0017)	(-0.0381)	(-0.0076)
		0.3952***				0.4053***		
		(-0.0088)				(-0.0019)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses; distance etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. Sector fixed effects are included. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 60-65%.

Annex Table A5.21. "Exports" of value added
(High and medium-high tech sectors) (2)

Origin country sample	OECD				OECD			
Origin sector	High and medium-high tech				High and medium-high tech			
Destination country sample	OECD				All TiVA			
	reg1	reg2	reg3	reg4	reg1_bis	reg2_bis	reg3_bis	reg4_bis
TFI (a)	0.6553***	0.5311***	0.6819***	0.6104**	0.5238**	0.4314**	0.6311***	0.6521**
	(-0.0087)	(-0.0034)	(-0.0085)	(-0.0077)	(-0.0043)	(-0.0061)	(-0.0072)	(-0.0038)
		0.6114				0.7712***		
		(-0.0105)				(-0.0029)		
TFI (b)	0.3819***	0.4273***	0.5123***	0.3817**	0.4105	0.3052	0.4118***	0.3109*
	(-0.0056)	(-0.0021)	(-0.0056)	(-0.0062)	(-0.0377)	(-0.0126)	(-0.0067)	(-0.0082)
		0.2735***				0.4512***		
		(-0.0042)				(-0.0058)		
TFI (c)	0.7815***	0.6055***	0.6213***	0.6724**	0.8515*	0.6426	0.7455***	0.8307**
	(-0.0039)	(-0.0074)	(-0.0096)	(-0.0037)	(-0.0058)	(-0.0382)	(-0.0063)	(-0.0078)
		0.7152***				0.5427***		
		(-0.0038)				(-0.0128)		
TFI (d)	-0.3056	-0.3411	0.2348	0.3047*	0.4652	0.2523*	0.2987	0.4481
	(-0.0235)	(-0.0278)	(-0.0156)	(-0.0075)	(-0.0386)	(-0.0068)	(-0.0285)	(-0.0039)
		0.3948**				-0.5113***		
		(-0.0104)				(-0.0489)		
TFI (e)	0.6114***	0.4128***	0.5119***	0.6723*	0.7163**	0.5877	0.5211**	0.8152*
	(-0.0036)	(-0.0059)	(-0.0034)	(-0.0081)	(-0.0093)	(-0.0152)	(-0.0088)	(-0.0039)
		0.5218**				0.6759*		
		(-0.0076)				(-0.0093)		
TFI (f)	0.6704***	0.7135***	0.8361***	0.7509***	0.8119	0.4827**	0.5233**	0.6563***
	(-0.0025)	(-0.0028)	(-0.0048)	(-0.0043)	(-0.0447)	(-0.0078)	(-0.0048)	(-0.0038)
		0.5156***				0.4056		
		(-0.0084)				(-0.0875)		
TFI (g)	1.1183***	0.8735***	1.2190***	1.2393**	1.2432**	0.7158	1.2399***	1.2167**
	(-0.0087)	(-0.0067)	(-0.0249)	(-0.0091)	(-0.0063)	(-0.0283)	(-0.0093)	(-0.0049)
		0.7613***				0.7855***		
		(-0.0082)				(-0.0047)		
TFI (h)	1.0348***	0.9155***	1.0782***	1.1993***	1.0825**	1.2503**	0.9561***	1.0087***
	(-0.0039)	(-0.0078)	(-0.0019)	(-0.0241)	(-0.0089)	(-0.0057)	(-0.0010)	(-0.0055)
		1.1553				0.8562***		
		(-0.0328)				(-0.0019)		
TFI (i)	-0.0815*	-0.0253**	0.1993***	0.1723	0.0721*	0.1237	-0.2513**	0.1773**
	(-0.0034)	(-0.0052)	(-0.0085)	(-0.0293)	(-0.0056)	(-0.0068)	(-0.0184)	(-0.0281)
		0.0204				0.2218***		
		(-0.0293)				(-0.0075)		
TFI (j)	-0.3405	-0.2512	-0.1504	0.2245*	0.0684**	0.1152**	-0.1338***	0.0982
	(-0.0376)	(-0.0185)	(-0.0483)	(-0.0101)	(-0.0091)	(-0.0078)	(-0.0045)	(-0.0347)
		0.1273				-0.0553***		
		(-0.0278)				(-0.0074)		
TFI (l)	0.2413***	0.1563***	0.3114***	0.4117***	0.2243**	0.2718**	0.3473*	0.2091**
	(-0.0049)	(-0.0087)	(-0.0073)	(-0.0038)	(-0.0256)	(-0.0039)	(-0.0068)	(-0.0053)
		0.1506***				0.1514***		
		(-0.0081)				(-0.0023)		

Note: (a) for Information availability, (b) for Involvement of trade community, (c) for Advance rulings, (d) for Appeal procedures, (e) for Fees and charges, (h) for Formalities - documents, (g) for Formalities - automation, (h) for Formalities - Procedures, (i) for Border agency Cooperation - internal, (j) for Border agency Co-operation - External, and (l) for Governance and Impartiality. The gravity variables (economic masses, distance, etc.) all have the expected signs and are significant; variables are not reported here for brevity. Gravity variables are adjusted for multilateral resistance. The variables for tariffs and RTAs are adjusted. Sector fixed effects are included. The TFIs are introduced individually. Robust standard errors are clustered by country pair (destination and origin). Significance levels are *** = 1%, ** = 5%, * = 10%. Values for R^2 range between 60-70%.