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ESTIMATING TRANSPORT AND INSURANCE COSTS OF INTERNATIONAL TRADE

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ABSTRACT / RÉSUMÉ

Although the costs associated with the international transport and insurance of merchandise trade are an important determinant of the volume and geography of international trade, remarkably little (official) data exist. Combining the largest and most detailed cross-country sample of official national statistics on explicit CIF-FOB margins to date with estimates from an econometric gravity model, and using a novel approach to pool product codes across HS vintages, this paper presents the new OECD Database on International Transport and Insurance Costs (ITIC) that aims to fill this gap, and describes the methodology used in its construction. The database details the bilateral, product level international trade and insurance costs for more than 180 countries and partners, over 1 000 individual products, for the 1995-2014 time period, and provides an important new tool to further our understanding of global value chains, whilst also forming an important statistical input to the development of coherent and balanced bilateral trade statistics and to the TiVA database. In particular the database provides potential new insights on how distance, natural barriers such as mountain ranges, and inadequate infrastructure, shape regional (and global) value chains.

Keywords: International merchandise trade, International transport and insurance costs, CIF-FOB margins

JEL Classification: F10, F14

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Bien que les coûts liés au transport et à l'assurance du commerce international de marchandises constituent un déterminant important du volume et de la géographie du commerce international, remarquablement peu de données (officielles) existent. Combinant le plus grand et le plus détaillé échantillon par pays de statistiques nationales officielles sur les marges explicites CAF-FAB à ce jour avec des estimations basées sur un modèle économétrique de gravité, et utilisant une nouvelle approche pour mettre en commun les codes de produit selon les millésimes HS, ce document présente la nouvelle base de données de l'OCDE sur le transport international et les coûts d'assurance (ITIC) qui vise à combler cette lacune, et décrit la méthodologie utilisée dans sa construction. La base de données détaille le commerce bilatéral, le commerce international au niveau des produits et les coûts d'assurance pour plus de 180 pays et partenaires, plus de 1 000 produits individuels, pour la période temporelle 1995-2014, et fournit un nouvel outil important pour approfondir notre compréhension des chaînes de valeur mondiales, tandis qu'elle forme également une base statistique importante pour le développement de statistiques du commerce bilatéral cohérentes et équilibrées et pour la base de données TiVA. En particulier, la base de données fournit de nouvelles perspectives potentielles sur la façon dont la distance, les barrières naturelles telles que les chaînes de montagnes, et l'insuffisance des infrastructures, modifient les chaînes de valeur régionales (et mondiales).

Mots-clés : commerce international de marchandises, coûts d'assurance et de transport international, marges CAF-FAB

Classification JEL : F10, F14

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1. Introduction

1. The costs associated with the transport and insurance of merchandise across borders are an important determinant of the volume and geography of international trade. While certainly not the only barrier to trade, transport and insurance costs are not insignificant and can pose barriers similar in size and effect to import tariffs (Hummels, 1999), which highlights how the costs associated with for example poor quality infrastructure (ports, roads), geographical distance to market, and oil prices, continue to shape global production networks and the integration of countries into global value chains.

2. However, remarkably little (official) data is available on the size and trends in transport and insurance costs of international trade, and certainly not by detailed product and partner country. At most, and still rarely, countries publish highly aggregated information in for example their Supply-Use tables or auxiliary tables for Balance of Payment statistics. This paper presents work undertaken at the OECD to estimate these costs and the new OECD Database on International Transport and Insurance Costs by partner country (ITIC) that aims to fill this gap.

3. In addition to providing a better understanding on the developments of international transport and insurance costs over time, and across countries and products, the new OECD ITIC dataset also has an important direct and related application in the context of the OECD-WTO Trade in Value Added (TiVA) initiative. The global (inter-country) input-output table that underpins TiVA contains, by design, a balanced view of international trade (i.e., in which trade asymmetries are reconciled).[1] Such a balanced view necessarily requires a consistent price basis for exports and imports but also production and exports, which is why the TiVA system is built on a *basic price* basis (the *Free On Board* (FOB), equivalent for trade data).

4. However, while merchandise export figures are typically reported on a FOB basis, merchandise import figures are usually reported with international transport and insurance costs included (referred to as CIF prices, *Cost, Insurance and Freight*). Indeed this is one of the (many) reasons why asymmetries in bilateral trade data exist. A pre-requisite of resolving these asymmetries therefore is to first estimate imports on a FOB basisIn other words to estimate the international transport and insurance costs included in CIF values; referred to as the CIF-FOB margin when expressed as a percent of the import value in FOB.

5. In the absence of detailed data on transport and insurance costs for international merchandise trade, existing research has used analytical approaches (cf. the work of CEPII, WIOD, and others, reviewed in Section 2). Typically, either information from one or a few countries is generalised to cover all global merchandise trade flows (USA is often used as they have very detailed data available), or bilateral mirror data from UN Comtrade is used (which is less precise but has the advantage of covering more countries).

6. The new OECD ITIC database partly follows in these footsteps, in that it contains a combination of explicitly reported data and model-based estimates of CIF-FOB margins. However, one of the main improvements compared to earlier studies is that the econometric model undrerpinning the estimates is based on the largest and most detailed cross-country sample of official national statistics on explicit CIF-FOB margins to date used in these kinds of analyses, and which will be extended if and when more countries develop similar data; which this initiative hopes to provide momentum to. The econometric

1 The OECD will release a new dataset of balanced international merchandise trade statistics towards the end of 2016 at the 6 digit Harmonised System product level that capitalises on CIF-FOB margins calculated at the same level of product and partner detail (see Fortanier and Sarrazin, forthcoming). In addition, estimated CIF-FOB margins on imports also provide the basis for improving the corresponding trade in *services* estimates used in TiVA and an on-going OECD-WTO initiative to produce a coherent database of bilateral trade in services statistics (see Fortanier et al., 2016).

model developed is tested for robustness using a variety of specifications, and is further validated using a larger – but often considered less reliable – dataset of CIF-FOB values, indirectly derived from those mirror trade flows reported in the UN Comtrade database (with a good match when reported in quantities and where the the underlying asymmetries fall within a range that can be realistically ascribed to CIF-FOB differences in valuation).

7. This paper describes in detail the methodology underpinning the new OECD dataset, and is organised as follows. Section 2 below reviews the existing literature on estimating transport and insurance costs on international merchandise trade (CIF-FOB margins). Section 3 subsequently describes the data and methodology used in the OECD dataset. Section 4 gives a detailed descriptive overview of the most important patterns and trends that can be observed from the explicit CIF-FOB margin data, in order to provide a good overview of the levels of, and variations in, reported CIF-FOB margins across countries and products, and over time. Section 5 presents the results of the regression analysis, and describes further adjustments that are made (e.g. calculations of CIF-FOB margins for trade flows where either the product or geographical partner area is not specified due to e.g. confidentiality). Section 6 presents more detailed descriptive statistics for the final dataset and Section 7 discusses the findings and concludes.

2. Literature review: existing work on estimating transport and insurance costs on international merchandise trade[2]

8. In the academic literature, several datasets on CIF-FOB margins by product and partner country have already been produced, mostly with the aim of explaining the size, trends, and drivers of trade costs and the importance of trade facilitation (see e.g. Limao and Venables (2001), Hummels and Skiba (2004), Hummels and Lugovskyy (2006), Pomfret and Sourdin (2010), and Sourdin and Pomfret (2012) for some of the most prominent examples of this literature). Others have undertaken similar work in the context of developing international trade statistics more generally, such as Gaulier and Zignago (2008, 2010) for CEPII, or more recently Timmer et al. (2012) and Streicher and Stehrer (2013) in the context of the creation of international input-output tables (e.g. WIOD and GTAP).

9. Overall, the literature can be divided into a group of papers that uses what is often referred to as *explicit* data on transport costs, published by statistical offices (e.g. the United States), and a group of papers that uses the differences between mirrored flows (imports CIF and exports FOB), generally drawing on UN Comtrade data, to *implicitly* derive transport costs. These two strands are reviewed in more detail below. As further background, Box 1 provides an overview of the definitions of both CIF and FOB valuations, as well as of several other price bases that are used in international merchandise trade.

2 These focused studies should not be confused with other initiatives that study international (maritime) transport more broadly. UNCTAD's annual *Review of Maritime Transport,* for example is accompanied by a database with information on fleet types, ship sizes, mode of transport information, and the connectivity of ports (but not on detailed international transport and insurance costs). Similarly, the OECD has developed a Maritime Transport Costs (MTC) database with information up to 2007 (see Korinek, 2011), combining official customs information on CIF-FOB margins with other sources on freight rates for 43 importing countries. While part of these data (the officially published figures) are also used in this study, it is important to note that the MTC database did not cover trade via non-maritime modes.

Box 1. Common price valuations for international merchandise trade

Free on board (FOB). This term means that the seller's obligation to deliver is fulfilled when the goods have passed over the ship's rail at the named port of shipment. This means that the buyer has to bear all costs and risks of loss or of damage to the goods from that point. The FOB term requires the seller to clear the goods for exports. This term can only be used for sea or inland waterway transport.

Cost, insurance and freight (CIF). The seller has the same obligations as under CFR, but with the addition that he/she has to procure marine insurance against the buyer's risk of loss of or damage to the goods during the carriage. The seller contracts for insurance and pays the insurance premium. The buyer should note that, under the CIF term, the seller is required to obtain insurance only on minimum coverage. The CIF term requires the seller to clear the goods for export. This term can only be used for sea and inland waterway transport.

Free alongside ship (FAS). This term means that the seller's obligation to deliver is fulfilled when the goods have been placed alongside the vessel on the quay or in lighters at the named port of shipment. The buyer must bear all costs and risks of loss or of damage to the goods from that moment. The FAS term requires the seller to clear the goods for exports. This term can only be used for sea or inland waterway transport.

Cost and freight (CFR). This term means that the seller's obligation to deliver is fulfilled when the goods have passed over the ship's rail in the port of shipment. The seller must pay the costs and freight necessary to bring the goods to the named port of destination, but the risk of loss or of damage to the goods, as well as any additional costs due to events occurring after the time of delivery, are transferred from the seller to the buyer. The CFR term requires the seller to clear the goods for export. This term can only be used for sea and inland waterway transport.

Source : IMTS, 2010

2.1 Studies using explicit data on CIF-FOB margins

10. Although the analysis of CIF-FOB margins, and transportation costs more generally, have been on the academic agenda for a long time (see e.g. Moneta (1959) and Geraci and Prewo (1977)) it was only in the mid-to-late nineties that larger and more detailed international datasets became available to facilitate estimation on a large scale. Hummels (1999) and Limão and Venables (2001) were among the first to exploit such sources. Hummels (1999), aiming to measure trade barriers that separate countries, used bilateral CIF-FOB margins at the product level provided by the United States, New Zealand, and five Latin American countries (Argentina, Brazil, Chile, Paraguay and Uruguay) for 1994. He found trade-weighted CIF-FOB rates ranging from 3.8% for the United States to around 7-8% for New Zealand, Chile and Argentina and 13.3% for land-locked Paraguay. This dataset was later also used in Hummels and Skiba (2006).

11. Limao and Venables (2001) presented two approaches that highlighted the importance of geography (distance, landlockedness, island status) and infrastructure (quality of transport and communications infrastructure) for transport costs. The first was based on shipping company data on US container exports to selected destinations (with average transport costs of 6.6%). The second used CIF-FOB margins derived from bilateral trade data reported by the IMF (without product detail), using data for 103 countries for the year 1990. Although they removed those observations where CIF values were smaller than FOB values, and values estimated by the IMF, the median CIF-FOB rate in this dataset remained relatively high (28%),

illustrating the care needed when estimating CIF-FOB margins from observed asymmetries in merchandise trade data.

12. Later work by e.g. Clark et al. (2004) used US import data by partner and detailed product from the Department of Transportation, for the years 1996, 1998 and 2000. This allowed them to identify the effect of the mode of transport and port efficiency on the transport costs for imports, while controlling for GDP per capita (correlated with infrastructure), and the unit value of products (correlated with insurance costs). They recorded average CIF-FOB margins on imports to the United States of 5.2%, with important variation across exporting regions (e.g. imports from Oceania and Africa had a CIF-FOB margin of around 12%).

13. Similar US data were used by Wang et al. (2007) in their corrections for China-Hong Kong-United States trade relationships for GTAP.[3] In contrast to Clark et al. (2004), they found that higher unit value products have lower overall CIF-FOB margins. They applied the US rates (distinguishing between contiguous and non-contiguous countries) to the Chinese and HK trade relationships.

14. Finally, the CHELEM database by CEPII[4] (De Saint Vaulry, 2008) used an unspecified data source of marine transport costs of 1969 (for 32 geographic zones and 12 product groups), which was indexed over time to obtain a global average CIF-FOB margin of roughly 6%.

2.2 Studies using implicit data on CIF-FOB margins

15. A second strand of literature uses differences between imports (CIF) and the mirror export data (reported FOB) to obtain estimates of the CIF-FOB margin. Data are often sourced from the UN Comtrade or the IMF Direction of Trade Statistics databases. While substantially increasing the sample size, the downside of this approach is that the estimates are often considered much less reliable, indeed Hummels and Lugovskyy (2006) concluded that such data are "error-ridden in levels and contain no useful information for time-series or cross-commodity variation". It should be noted however that the data they examined were rather old (e.g. 1974-1983 for UN Comtrade) and that sources, quality and coverage have improved significantly in the past 30 years. In addition, the most recent applications of this approach carefully edit the data to only consider (or to give more weight to) those observations that can be seen as most reliable.

16. Ghelhar (1996) was among the first to produce reconciled data based on UN Comtrade information, for GTAP. He estimated CIF-FOB margins at the product level, first, for all transactions, by comparing exports FOB and imports CIF, and, subsequently, using only the data for the most reliable "reporters to arrive at an average 4% trade-weighted average CIF-FOB margin". Streicher (2012) and Timmer et al. (2012) also used UN Comtrade data to make CIF-FOB estimations for WIOD, using the ratio of import unit values over export unit values as a dependent variable, and standard gravity variables (distance, landlockedness, part of same continent) as independents. They only considered flows with *kilogram* as a quantity unit, whose mirror flows deviated less than 5% (in quantity), and where the CIF value was larger than the FOB value. They established CIF-FOB margins in the range of 5-7%.

17. CEPII presented two very similar reports on estimating CIF-FOB margins, one for the purposes of their balanced trade dataset (Gaulier and Zignago, 2010), and a second for the explicit purpose of an estimated CIF-FOB margins database (Gaulier et al., 2008). Like others, both studies used a gravity approach using

[3] Global Trade Analysis Project, a global network of researchers and policy makers coordinated by the Center for Global Trade Analysis at Purdue University.

[4] The CHELEM database (*Comptes Harmonisés sur les Échanges et L'Économie Mondiale*) is published by CEPII (Centre d'Études Prospectives et d'Informations Internationales), a France-based research center on international economics.

CIF-FOB margins derived from mirror flows from UN Comtrade, with explanatory variables including distance, distance squared, contiguity, landlockedness (reporter and partner) and the median unit value of each product (to account for higher costs of trading heavier commodities). Gaulier et al. (2008) also added GDP and GDP-per-capita to account for economies of scale and for infrastructure and quality, respectively. They also attempted to control for methodological differences in recording trade statistics across countries by including a set of dummy variables e.g. the use of customs data as a main source.

18. Gaulier and Zignago (2010), using UN Comtrade, measured the CIF-FOB margin by using the ratio in unit value between imports and exports, assuming that recorded unit value ratios are typically less prone to problems caused by asymmetries. They estimated the average world CIF-FOB margin to be around 3%. Gaulier et al. (2008) found a similar overall average percentage (2%). Both seem surprisingly low when compared to values estimated by studies using explicit CIF-FOB rates. This is very likely due to the fact that neither of the two studies excluded incorrect observations (most notably negative CIF-FOB margins). For example, the 10^{th} percentile of the sample used in Gaulier et al. (2008) had an average CIF-FOB margin of -7%.

3. Data and methodology

19. The approach used to develop the OECD database on trade and insurance costs for international trade, and that forms part of the OECD's coordinated approach to developing coherent international trade statistics, replicates some of the characteristics of the above approaches. In summary the method uses a gravity type approach, described in detail below, whose parameters are determined using, information from the 16 countries (reflecting nearly 20% of global imports) that currently publish or have published detailed bilateral product-level information on the CIF-FOB margin on their imports. This sample is the largest and most detailed cross-country sample of official national statistics on explicit CIF-FOB margins to date used in this type of analyses[5], and will be extended if and when more countries develop similar data. It thereby gives important insights into the levels and developments of actual CIF-FOB margins across countries, partners, products, and over time and provides a solid platform for model development. The model is tested for further robustness across a broader set of countries, using implicit unit value CIF-FOB margins derived from the UN Comtrade database (for those cases where the CIF-FOB margin is likely to explain (most or all) of the underlying asymmetry between reporters).

20. The following sections provide an overview of the data sources used in both steps, including the 'cleaning and screening' process, followed by a description of the model.

3.1 Data collection and harmonisation: explicit CIF-FOB margins reported by NSOs

21. A variety of official national sources were combined in order to construct a dataset of explicit CIF-FOB margins, described in more detail in Annex I. Data on imports valued CIF *and* FOB for the following countries and years were available in the OECD's International Trade by Commodity Statistics (ITCS) database, (fully synchronised with the UN Comtrade database), by partner and detailed product: Luxembourg (2008-2011), Chile (2003-2013), Iceland (2001-2011, and 2013), the Czech Republic (2011 and 2013), Slovakia (2012-2013), the United States (2002-2012), New Zealand (2000-2012) and Australia (1995-2006). In addition, the OECD Maritime Transport Costs database, containing explicit CIF-FOB margins, was used for the following countries and years (see also Karine, 2011): Argentina (1995-2007), Bolivia (1995-2000), Brazil (1997-2007), Colombia (1995-2007), Ecuador (2000-2007), Paraguay (1995), Peru (1995-2007), Uruguay (1995-2007), the United States (1995-2001), Chile (1995-2002), New Zealand (1995-1999) and Australia (2007).

5 The nearest match is Hummels and Skiba (2004), who used bilateral 6-digit product information for 6 countries for 1 year (1994).

Dealing with different vintages of HS classifications

22. A key issue when combining these data sources is that they cover a variety of HS product classifications, ranging from HS1988 (all the data in the Maritime Transport Cost database) to the most recent HS2012, reflecting the continued updating of classifications. Table 1 gives an overview of the data availability across countries, years and HS classification.

Table 1. Overview of data availability by HS classification, importing country and over time

	ARG	AUS	BOL	BRA	CHL	COL	CZE	ECU	ISL	LUX	NZL	PER	PRY	SVK	URY	USA
1995	HS88	HS88	HS88	-	HS88	HS88	-	-	-	-	HS88	HS88	HS88	-	HS88	HS88
1996	HS88	HS96	HS88	-	HS88	HS88	-	-	-	-	HS88	HS88	-	-	HS88	HS88
1997	HS88	HS96	HS88	HS88	HS88	HS88	-	-	-	-	HS88	HS88	-	-	HS88	HS88
1998	HS88	HS96	HS88	HS88	HS88	HS88	-	-	-	-	HS88	HS88	-	-	HS88	HS88
1999	HS88	HS96	HS88	HS88	HS88	HS88	-	-	-	-	HS88	HS88	-	-	HS88	HS88
2000	HS88	HS96	HS88	HS88	HS88	HS88	-	HS88	-	-	HS96	HS88	-	-	HS88	HS88
2001	HS88	HS96	-	HS88	HS88	HS88	-	HS88	HS96	-	HS96	HS88	-	-	HS88	HS88
2002	HS88	HS02	-	HS88	HS88	HS88	-	HS88	HS02	-	HS02	HS88	-	-	HS88	HS02
2003	HS88	HS02	-	HS88	HS02	HS88	-	HS88	HS02	-	HS02	HS88	-	-	HS88	HS02
2004	HS88	HS02	-	HS88	HS02	HS88	-	HS88	HS02	-	HS02	HS88	-	-	HS88	HS02
2005	HS88	HS02	-	HS88	HS02	HS88	-	HS88	HS02	-	HS02	HS88	-	-	HS88	HS02
2006	HS88	HS02	-	HS88	HS02	HS88	-	HS88	HS02	-	HS02	HS88	-	-	HS88	HS02
2007	HS88	HS88	-	HS88	HS07	HS88	-	HS88	HS07	-	HS07	HS88	-	-	HS88	HS07
2008	-	-	-	-	HS07	-	-	-	HS07	HS07	HS07	-	-	-	-	HS07
2009	-	-	-	-	HS07	-	-	-	HS07	HS07	HS07	-	-	-	-	HS07
2010	-	-	-	-	HS07	-	-	-	HS07	HS07	HS07	-	-	-	-	HS07
2011	-	-	-	-	HS07	-	HS07	-	HS07	HS07	HS07	-	-	-	-	HS07
2012	-	-	-	-	HS12	-	-	-	-	-	HS12	-	-	HS12	-	HS12
2013	-	-	-	-	HS12	-	HS12	-	HS12	-	HS12	-	-	HS12	-	HS12

23. Rather than converting all data to a common HS classification, which may introduce errors, the problem of different classifications is resolved using auxiliary product codes, which track the consistency of products across all HS vintages. This means that the panel nature of the product codes is maintained as much as possible across HS classifications, and that the model can be used to simultaneously produce estimates for all HS vintages.

24. Table 2 gives examples of this procedure. It shows that product codes whose definition has remained constant across time, can be used across all HS classifications, with dummy entries of 1 for each HS classification (see for example product code HS88 640110, waterproof footware with protective metal toe cap). However, HS88 code 640191 (waterproof footwear product covering the knee), which was consistently defined in HS88, HS96, and HS02, was merged with product 641099 in HS07 onwards and thereafter ceased to exist. In parallel, while product 640199 existed throughout HS classifications, the change in definition due to the merger with 640191 means that the product code cannot be used consistently over time, hence the creation of a new auxiliary code HS code 640199a in HS07 and HS12, and corresponding dummy entries of 1 for these last two classifications only.

Table 2. Examples of evolving HS classifications

HS code	HS vintage (when code first appeared)	Dummy variable coding				
		HS88	HS96	HS02	HS07	HS12
640110	HS1988	1	1	1	1	1
640191	HS1988	1	1	1	0	0
640199	HS1988	1	1	1	0	0
640199a	HS2007	0	0	0	1	1

Harmonising quantity units

25. Quantity units are recorded and coded differently across countries and have to be harmonised to the international common standards (as used in UN Comtrade) to facilitate the calculation and comparability of unit values (as independent variables in the model). To do this, concordances were developed between national quantity units and the international standards. For example, energy reported in gigajoules was converted to thousands of kilowatt-hours, and weights in tonne to kilograms.[6] The primary reported quantity unit was used as the main source for information, and only supplemented with the secondary quantity unit (often in "weight in kilograms") when the first was not available. Data from the Maritime Transport Costs database are all reported as "*weight in kilograms"*. The results of this harmonisation exercise are displayed in Table 3, highlighting that "weight in kilograms", and "number of items", are the two most frequently used quantity units, representing 85% of total observations. The number of observations without quantity information is limited to 455 thousand (including those few observations where quantity units did not align with international standards, see Footnote 6).

Outliers

26. Not surprisingly, nationally reported CIF-FOB margins contained significantly fewer extreme values (outliers) compared to those seen when implicitly derived (using UN Comtrade data, see below). However, to avoid introducing distortionary effects in estimating the parameters in the model, excessively high values (2% of all observations) were removed from the analysis.

[6] Some country and product specific quantity unit classifications have been converted to their closest possible match after carefully examining the nature of the products. For example, New Zealand reports a few observations in "hanks", which have been changed to "*Number of items*". In the US data, "*doses*" and "*squares*" are changed into "*Number of items*" and "*Area in square meters*". Some units used by the US, such as Gross Lines, Jewel, Megabecquerels and Ozone Depletion Equivalent, turned out to be difficult to match with any standard quantity unit. Given that these quantity units only applied to very few transactions, these observations were removed from the analysis ("*No quantity*").

Table 3. Harmonised quantity units and data distribution

Quantity unit	Number of observations
Area in square meters	216 777
Dozens of items	146 015
Electrical energy in thousands of kilowatt-hours	105
Length in meters	18 569
Number of items	1 178 265
Number of packages	1 189
Number of pairs	62 034
Thousands of items	10 274
Volume in cubic meters	23 037
Volume in litres	63 292
Weight in carats	3 383
Weight in kilograms	4 338 076
No quantity	455 260
Total	**6 516 276**

3.2 Checking robustness: implicit CIF-FOB margins derived from UN Comtrade

27. To test the robustness of the analysis, and results, based on the explicitly reported CIF-FOB margins, an additional analysis is conducted using implicit CIF-FOB margins derived from UNComtrade. For this analysis, only data reported in the HS2007 classification were used (to avoid introducing possible errors related to conversion of data across classifications). Countries that report imports to UN Comtrade (only) at FOB (Australia, Brazil, Canada, Mexico and South Africa) were excluded from the sample.

28. The ratio between the reported import unit values and the mirror export unit values was used as a proxy for the CIF-FOB margin, calculated at the HS 6 digit level. After matching import flows with their mirror exports, and following the approaches used in earlier studies, observations were retained only if a) the reported quantity units were the same; b) the differences in reported quantities was less than 5%; and c) the ratio between import unit values and export unit values was between 1 and 2.[7] As Annex II shows, this editing substantially reduces the number of valid observations: from 48 million to just over 900 000.

3.3 Model specification

29. The aim of this study is to estimate or predict CIF-FOB margins for those reporters, partners and products where information is not currently available. Therefore, we used a straightforward OLS gravity estimation, without specific treatment of error-term heterogeneity (as corrections for these would not affect the coefficient estimates).[8] The gravity model includes various independent variables identified as relevant in earlier studies (see Table 4), including the geographical distance between trading partners, the infrastructure quality of importing and exporting country, the median unit value of each 6-digit product, dummies for partner contiguity and for partners being on the same continent, the oil price, a set of

7 Although in principle this introduces an upper bound on the estimated CIF-FOB margin, in practice it is designed to counteract distortions that may be introduced through transfer pricing and to avoid including within the CIF-FOB margin any differences in price that may reflect merchanting transactions and additions in value that reflect the subsequent embodiment of intellectual property, such as branding. In practice therefore, because of the relatively wide range (1 to 2 times the UV value for exports) the final estimates are more likely than not to be biased upwards.

8 Alternative specification, such as Poisson regressions were tested as well, yielding virtually similar results.

dummies related to the HS vintage within which an HS code can be interpreted, as well as a set of product and partner dummies.

Table 4. Overview of independent variable definitions

Code	Description
Dist	Natural log of the weighted geographical distance between the country pair
$dist^2$	Square of the natural log weighted geographical distance between the country pair
$gdppc_i$	Natural log of GDP per capita of the importing country *i*
$gdppc_j$	Natural log of GDP per capita of the exporting country *j*
$infstr_i$	Infrastructure index of the importing country *i*
$infstr_j$	Infrastructure index of the exporting country *j*
Uvmdn	Natural log of median product unit value
contig	Dummy = 1 if importing and exporting country are contiguous
conti	Dummy = 1 if importing and exporting country are on the same continent
Poil	Natural log of average crude oil price, annual data
H0	Dummy = 1 if the 6-digit HS code can be interpreted within HS1988
H1	Dummy = 1 if the 6-digit HS code can be interpreted within HS1996
H2	Dummy = 1 if the 6-digit HS code can be interpreted within HS2002
H3	Dummy = 1 if the 6-digit HS code can be interpreted within HS2007
H4	Dummy = 1 if the 6-digit HS code can be interpreted within HS2012

30. The data on geographical distance, contiguity and continent are taken from the CEPII database. Geographical distance is expected to increase CIF-FOB margins (although the effect may be non-linear), as while contiguity is expected to lower the trade and insurance costs.[9] If both countries are on the same continent, land transport may be be used as compared to sea transport, which may result in a relatively higher CIF-FOB margin.

31. Infrastructure quality of both exporting and importing partner is expected to reduce the CIF-FOB margin. Two measures of infrastructure quality are tested. First, a measure is constructed that mimics the Infrastructure Quality Index of Limao and Venables (2001), an average of four normalised variables including kilometres of rail lines, number of fixed telephone subscriptions, the quality of port infrastructure, and the logistics performance index (all from the World Bank Development Indicators). Secondly, to ensure wider country coverage, GDP per capita data (also from World Bank) is used, which has been found to be highly correlated with infrastructure quality (see Clark et al., 2004). While estimations were run for each measures, the results presented in Section 5.1 only provide the restuls for GDP-per-capita, which we preferred given its wider coverage and the virtual similarity of the results as compared to the Infrastrucure Quality Index.

32. The worldwide median unit value for each 6-digit product *by each quantity unit* (value/quantity) is included to capture the relation between unit values and transportation costs – reflecting the a priori expectation (supported by the literature) that higher unit values imply higher insurance costs.

9 Note that theoretically, the CIF-FOB margin between two contiguous countries should be zero, but in practice this is not always the case. This is due to a number of factors including the mode of transport (such as air transport) and the exact route taken. For example trade between two contiguous countries may still pass through a third country, see also Table 7.

33. Finally, the model accounts for the average annual oil price, and includes product dummies at the HS 4-digit group, a time trend variable, and dummies by partner country. It is specified as follows:

$$Y_{ijkt} = \alpha + \beta_1 dist_{ij} + \beta_2 dist_{ij}^2 + \beta_{3u} uvmdn_{ktu} + \beta_4 contiguity_{ij} + \beta_5 poil_t + +\beta_6 conti_{ij} + \beta_7 gdppc_{it} + \beta_8 gdppc_{jt} + \beta_9 infstr_{it} + \beta_{10} infstr_{jt} + \beta_{11} yr_t + \delta_{k4} + \delta_j + \varepsilon_{ijkt}$$

where Y_{ijkt} represents the natural log of the CIF-FOB margin of a specific product *k* imported by country *i* from country *j* at a given year *t*; $dist_{ij}$ is the natural log of the geographical distance between countries *i* and *j*; $uvmdn_{ktu}$ represents the natural log of median unit value of each HS 6-digit product *k* with the same unit quantity code *u* in year *t*; $contiguity_{ij,}$ and $conti_{ij}$ indicate the geographical situation of country *i* relative to country *j* as explained above; $gdppc_{it}$ and $gdppc_{it}$ represent the natural log of GDP per capita of countries *i* and *j*; $infstr_{it}$ and $infstr_{jt}$ reflect the infrastructure indices; $poil_t$ represents the natural log of the average annual price of crude oil (in USD per barrel); yr_t reflects the time trend variable, δ_j partner country dummies, and δ_{k4} the product dummies at HS 4-digt level.

34. The model does not include landlockness of importers and exporters, even if this has regularly been included by others, for two reasons. First, the number of observations for landlocked importing countries in the explicit dataset is small and strongly biased towards European countries (see also below in Section 5). Secondly, the inclusion of partner fixed effects ensures that effects of partner landlockedness are in any case captured.

4. Descriptive statistics: the development of CIF-FOB margins over time

4.1 CIF-FOB margins across importing countries

35. Table 5 summarises the annual trade weighted CIF-FOB margins for those countries where explicit data are available. It shows substantial cross-country variation but a declining trend overall. Of note is the observation of relatively high (albeit declining) CIF costs in Latin American countries compared to imports by Europe and the United States; which may be at least partly explained by the relatively low degree of regional integration (intra-regional trade) in Latin America, unlike the EU and NAFTA. Australia, New Zealand and Iceland also report high CIF-FOB margins, reflecting in part their geographical location. Slovakia, the Czech Republic and Luxembourg – in the middle of the Europe and with high intra-regional trade – show very low CIF-FOB margins of 3 percent or lower.

36. Another interesting observation apparent from Table 5 is that 5 out of 16 countries (Paraguay, Slovakia, Luxembourg, the Czech Republic, and Bolivia) in the data set are landlocked. Of note, are the relatively low margins for the Czech Republic, Slovak Republic and Luxembourg, contradicting the general expectation that landlockedness necessarily increases transportation costs. This, to some extent, reflects the ability of (some) landlocked countries to develop specialised activities within regional value chains and, in doing so, overcome competitive disadvantages (caused by higher transportation prices) that they would have incurred outside of these regional chains. Also noteworthy are the relatively high values for Argentina in 2007, Bolivia during 1998-2000, Paraguay in 1995, and Peru in 1995, which mainly reflect only a limited number of product observations for these countries and years (see the table in Annex I).

Table 5. Reported CIF-FOB margin (%)

Country Name	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13
Argentina	8.2	7.6	6.6	5.9	5.6	5.7	6.0	6.3	5.1	5.2	4.7	4.3	7.8						
Australia	7.2	7.1	7.1	7.1	6.3	6.4	6.4	5.5	5.6	6.1	6.0	5.6	7.4						
Bolivia	15.1	13.5	12.7	25.2	26.3	27.6													
Brazil			5.9	6.0	5.6	5.3	5.4	4.9	4.8	5.2	4.8	4.2	4.4						
Chile	8.5	8.0	7.8	8.2	8.5	10.3	10.4	9.0	7.7	8.1	7.4	7.0	7.1	7.4	6.7	6.9	6.1	6.2	6.2
Colombia	8.4	7.8	7.4	7.6	7.4	7.4	7.8	7.8	7.0	7.8	7.5	6.6	6.7						
Czech Rep.																	3.0		3.0
Ecuador						9.3	8.7	7.8	7.2	7.9	7.3	6.9	7.3						
Iceland							8.8	8.6	8.5	8.4	8.6	7.9	8.1	8.7	8.7	8.3	7.4		7.9
Luxembourg														1.7	0.9	2.4	1.2		
New Zealand	8.3	7.9	7.7	8.0	6.8	6.5	7.0	6.6	6.6	6.7	6.9	6.7	6.2	6.3	5.6	5.9	5.3	5.3	
Peru	2.6	8.4	8.4	8.4	8.4	7.8	8.5	7.7	6.9	8.0	8.3	7.9	7.3						
Paraguay	16.0																		
Slovakia																		2.4	2.3
Uruguay	8.0	8.3	8.2	8.6	7.0	5.5	6.2	5.4	4.6	4.8	4.9	4.6	5.6						
United states	4.2	3.8	3.8	4.2	4.5	4.6	4.6	3.3	3.6	3.8	3.7	3.5	3.3	3.1	2.9	2.9	2.6	3.1	

Note: grey-shaded cells are derived from the MTC database

37. For Australia, Chile, New Zealand and the United States, some care is needed when looking at the observations over time as the source data (Maritime Transport Costs (MTC) database and Customs data) varies by year. The number of observations in the Maritime Transport Costs database is much less than the Customs source in each respective country (see the table in Annex I), since only sea freight is captured. For Paraguay (1995) and Bolivia (1998-2000), the MTC data are influcenced by a small sample size, causing relatively high (Paragay) or volatile (Bolivia) average CIF-FOB margins in Table 5. However, the observations were included in the regression model since it aimed to capture (mostly) cross-sectional variation by product and country pairs.

4.2 CIF-FOB margins across HS chapters

38. There are also significant differences in the CIF-FOB margin across products. Table 6 provides an overview of the average trade-weighted CIF-FOB margin by HS chapter (pooling data across all countries, partners and 6 digit product categories). For Chapter 25 (salt, sulphur, earth & stone, lime & cement), the average CIF-FOB margin is 28% with values varying from 0.1% to as high as 47.6% depending on the detailed 6 digit product and importing and exporting country involved. On the other side of the spectrum, Chapter 30 (pharmaceutical products), has a CIF-FOB margin of only 3 percent on average, with relatively little variation.

Table 6. CIF-FOB margins by HS chapter

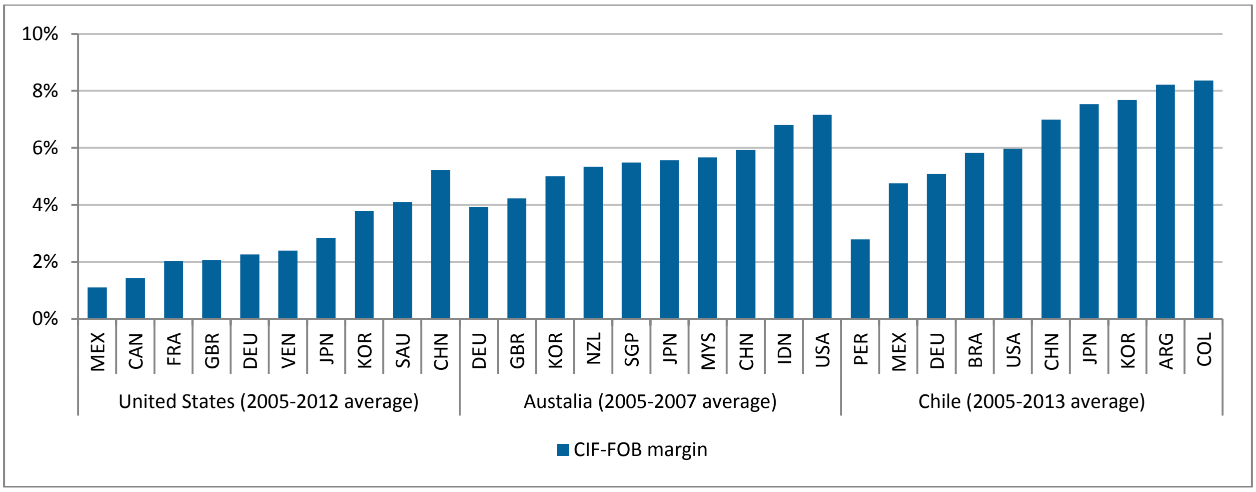
HS chapters with highest average CIF-FOB margins			HS chapters with lowest average CIF-FOB margins		
HS Chapter	Mean CIF-FOB %	St.dev	HS2	Mean CIF-FOB %	St.dev
25	28.0	9.2	37	3.3	1.7
26	17.2	12.8	74	3.2	2.3
46	16.7	5.3	30	3.0	2.4
06	14.9	7.1	71	2.9	2.5
07	14.7	5.5	75	2.7	2.4

4.3 CIF-FOB margins across trading partners

39. CIF-FOB margins vary not only by importing country but also by trading partner, largely reflecting geographical distance. Figure 1 illustrate this for the United States, Australia and Chile. For the United

States, the CIF-FOB margin on imports from Canada and Mexico is much lower than comparable margins on imports from European markets. Imports from the Middle East and Asian trade partners have the highest CIF-FOB margins. For Australia, however, although the overall CIF-FOB margin on imports is much higher than that of the United States, there seems to be much less of a correlation between distance and transport and insurance costs: for example, the CIF-FOB margin on imports from Germany and the UK is lower than that on flows from Japan, although this partly reflects compositional effects. Finally, for Chile, CIF-FOB margins on imports from Peru, Brazil and Mexico are relatively low, while those on imports from Colombia and Argentina (separated by the Andes) are much higher.

Figure 1. Trade-weighted CIF-FOB margins with top 10 trading partners, for the US, Australia and Chile



4.4 CIF-FOB margins with neighbouring countries

40. As mentioned before, if the exporting and importing countries are contiguous, the CIF-FOB margin should theoretically be equivalent to zero. In reality this is not always the case, as illustrated above in the case of US trade with Canada and Mexico, because transport charges and insurance costs may be recorded e.g. in the case of air and maritime transport, or indeed where trade passes through other contiguous countries. The Czech Republic is the only country in the sample that reports zero CIF-FOB margins for trade with neighbouring countries. Table 7 compares countries' overall CIF-FOB margin on imports with those on imports from neighbouring (contiguous) partners. It shows that while the overall CIF-FOB margin on trade with neighbouring countries is lower than the overall CIF-FOB margin, it is not zero, and may sometimes be higher, for example in Chile, where trade with neighbours is affected by the Andes.

Table 7. Reported CIF-FOB margins for trade with neighbouring (contiguous) partners, selected reporters (%)

Reporting country	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13
Chile – all partners	8.5	8.0	7.8	8.2	8.5	10.3	10.4	9.0	7.7	8.1	7.4	7.0	7.1	7.4	6.7	6.9	6.1	6.2	6.2
Chile – neighbours	7.7	7.4	7.9	9.0	10.1	9.7	10.1	8.0	8.3	8.0	7.2	7.3	7.3	7.1	7.5	6.6	6.0	6.6	6.6
Peru – all partners	2.6	8.4	8.4	8.4	8.4	7.8	8.5	7.7	6.9	8.0	8.3	7.9	7.3						
Peru – neighbours		6.0	5.5	6.2	5.2	5.0	6.1	5.8	4.9	6.1	5.8	5.3	4.4						
Uruguay– all partners	8.0	8.3	8.2	8.6	7.0	5.5	6.2	5.4	4.6	4.8	4.9	4.6	5.6						
Uruguay – neighbours	5.4	5.0	4.9	5.3	5.0	5.1	4.7	4.8	4.0	4.5	4.5	4.4	3.6						
United States – all partners	4.2	3.8	3.8	4.2	4.5	4.6	4.6	3.3	3.6	3.8	3.7	3.5	3.3	3.1	2.9	2.9	2.6	3.1	
United States – neighbours	5.1	3.9	4.2	4.7	4.0	2.8	2.8	1.4	1.4	1.4	1.4	1.3	1.2	1.1	1.3	1.2	1.1	1.6	

5. Regression results

5.1 Using explicit CIF-FOB margins

41. In building the model to estimate CIF-FOB margins by country, partner and product, a variety of specifications were tested. The results are displayed in Table 8. In the first model (1), all independent variables described in Section 3.3 are included, with GDP per capita proxying infrastructure quality (the infrastructure quality variable, that similar.

42. The model was subsequently extended (model 2) to include the interaction effects between distance and countries being on the same continent, in order to examine to what extent the effect of distance on CIF-FOB margins could vary depending on the (implicit) mode of transport. The final model (3) also includes fixed effects by trading partner. This final model was subsequently run on the five (overlapping) subsets of data representing all HS codes applicable to HS1998 to HS2012 (see Section 3.1).

43. The coefficients for the independent variables remain stable across all model specifications and generally have the signs that would have been expected a priori. Infrastructure quality (GDP per capita) is negatively correlated with CIF-FOB margins. The time trend variable reveals that CIF-FOB rates have been declining (modestly) over time. Higher median unit values of a product are generally associated with lower CIF-FOB margins, and CIF-FOB margins are lower between contiguous countries.

Table 8. Estimated parameters, explicit data

	(1)	(2)	(3)	(3_HS1988)	(3_HS1996)	(3_HS2002)	(3_HS2007)	(3_HS2012)
Intercept	-0.2023 ***	0.5163 ***	0.5956 ***	0.6918 ***	0.6670 ***	0.6565 ***	0.5912 ***	0.5700 ***
	(-93.79)	*(29.72)*	*(32.39)*	*(33.68)*	*(33.47)*	*(33.38)*	*(30.65)*	*(29.11)*
Gdppci	-0.0018 ***	-0.0016 ***	-0.0017 ***	-0.0018 ***	-0.0018 ***	-0.0018 ***	-0.0019 ***	-0.0016 ***
	(-50.38)	*(-44.41)*	*(-45.03)*	*(-44.96)*	*(-44.83)*	*(-45.25)*	*(-45.58)*	*(-38.24)*
Gdppcj	-0.0030 ***	-0.0030 ***	-0.0142 ***	-0.0139 ***	-0.0142 ***	-0.0143 ***	-0.0145 ***	-0.0146 ***
	(-128.13)	*(-129.1)*	*(-95.44)*	*(-86.34)*	*(-89.3)*	*(-89.98)*	*(-89.93)*	*(-88.98)*
dist	0.0453 ***	-0.1155 ***	-0.1120 ***	-0.1274 ***	-0.1216 ***	-0.1196 ***	-0.1060 ***	-0.1022 ***
	(119.64)	*(-30.86)*	*(-28.41)*	*(-28.93)*	*(-28.46)*	*(-28.37)*	*(-25.63)*	*(-24.35)*
$dist^2$	-0.0020 ***	0.0070 ***	0.0068 ***	0.0077 ***	0.0073 ***	0.0072 ***	0.0065 ***	0.0063 ***
	(-81.98)	*(34.63)*	*(32.19)*	*(32.25)*	*(31.86)*	*(31.81)*	*(29.27)*	*(28.02)*
Poil	0.0090 ***	0.0091 ***	0.0126 ***	0.0126 ***	0.0125 ***	0.0128 ***	0.0127 ***	0.0126 ***
	(60.33)	*(61.17)*	*(81.44)*	*(74.98)*	*(75.77)*	*(77.85)*	*(76.2)*	*(73.73)*
uvmdn_m2	-0.0017 ***	-0.0016 ***	-0.0013 ***	-0.0011 ***	-0.0015 ***	-0.0016 ***	-0.0015 ***	-0.0015 ***
	(-16.44)	*(-15.02)*	*(-12.84)*	*(-9.2)*	*(-13.47)*	*(-14.74)*	*(-13.87)*	*(-13.61)*
uvmdn_i12	-0.0001 ***	0.0002 ***	0.0002 ***	0.0001 **	0.0003 ***	0.0003 ***	0.0004 ***	0.0004 ***
	(-2.69)	*(4.33)*	*(4.4)*	*(1.66)*	*(5.33)*	*(5.66)*	*(7.16)*	*(7.96)*
uvmdn_kwt	-0.0029 ***	-0.0030 ***	-0.0027 ***	-0.0027 ***	-0.0027 ***	-0.0027 ***	-0.0026 ***	-0.0026 ***
	(-6.02)	*(-6.25)*	*(-5.75)*	*(-5.83)*	*(-5.81)*	*(-5.74)*	*(-5.58)*	*(-5.56)*
uvmdn_m	-0.0018 ***	-0.0020 ***	-0.0021 ***	-0.0021 ***	-0.0019 ***	-0.0035 ***	-0.0034 ***	-0.0033 ***
	(-5.43)	*(-6.27)*	*(-6.62)*	*(-4.37)*	*(-5.08)*	*(-10.39)*	*(-9.83)*	*(-9.75)*
uvmdn_i	-0.0021 ***	-0.0021 ***	-0.0021 ***	-0.0022 ***	-0.0022 ***	-0.0022 ***	-0.0021 ***	-0.0021 ***
	(-83.73)	*(-81.92)*	*(-83.37)*	*(-81.9)*	*(-81.78)*	*(-82.72)*	*(-77.72)*	*(-76.34)*
uvmdn_pkg	-0.0053 ***	-0.0052 ***	-0.0052 ***	-0.0054 ***	-0.0051 ***	-0.0052 ***	-0.0052 ***	-0.0053 ***
	(-5.79)	*(-5.7)*	*(-5.73)*	*(-5.86)*	*(-5.55)*	*(-5.65)*	*(-5.64)*	*(-5.77)*
uvmdn_p	-0.0021 ***	-0.0020 ***	-0.0016 ***	-0.0013 ***	-0.0024 ***	-0.0023 ***	-0.0034 ***	-0.0036 ***
	(-12.59)	*(-11.89)*	*(-9.75)*	*(-6.67)*	*(-13.51)*	*(-12.53)*	*(-18.3)*	*(-18.96)*
uvmdn_i1000	-0.0005 ***	-0.0005 ***	-0.0006 ***	-0.0007 ***	-0.0005 ***	-0.0006 ***	-0.0006 ***	-0.0006 ***
	(-4.71)	*(-4.77)*	*(-5.01)*	*(-6.01)*	*(-4.56)*	*(-4.99)*	*(-4.99)*	*(-4.9)*
uvmdn_m3	-0.0016 ***	-0.0016 ***	-0.0015 ***	-0.0012 ***	-0.0012 ***	-0.0012 ***	-0.0014 ***	-0.0014 ***
	(-19.22)	*(-18.78)*	*(-18.12)*	*(-11.81)*	*(-11.96)*	*(-12.47)*	*(-14.06)*	*(-14.08)*
uvmdn_l	-0.0061 ***	-0.0064 ***	-0.0063 ***	-0.0073 ***	-0.0066 ***	-0.0065 ***	-0.0062 ***	-0.0065 ***
	(-21.85)	*(-22.72)*	*(-22.7)*	*(-23.14)*	*(-22.04)*	*(-22.01)*	*(-21.14)*	*(-21.62)*
uvmdn_c	-0.0045 ***	-0.0045 ***	-0.0042 ***	-0.0046 ***	-0.0043 ***	-0.0042 ***	-0.0040 ***	-0.0040 ***
	(-11.31)	*(-11.22)*	*(-10.72)*	*(-11.6)*	*(-10.85)*	*(-10.64)*	*(-10.18)*	*(-10.12)*
uvmdn_k	-0.0007 ***	-0.0009 ***	-0.0008 ***	-0.0014 ***	-0.0009 ***	-0.0008 ***	-0.0005 ***	-0.0004 ***
	(-21.28)	*(-24.56)*	*(-21.88)*	*(-35.3)*	*(-24.05)*	*(-21.09)*	*(-12.77)*	*(-11.46)*
Contig	-0.0347 ***	-0.0379 ***	-0.0392 ***	-0.0392 ***	-0.0403 ***	-0.0409 ***	-0.0390 ***	-0.0383 ***
	(-235.83)	*(-251.53)*	*(-220.86)*	*(-203.26)*	*(-211.73)*	*(-215.92)*	*(-204.58)*	*(-198.1)*
Conti	0.0198 ***	-0.8433 ***	-0.9273 ***	-1.0262 ***	-0.9881 ***	-0.9743 ***	-0.8820 ***	-0.8614 ***
	(171.46)	*(-48.37)*	*(-50.35)*	*(-49.88)*	*(-49.52)*	*(-49.49)*	*(-45.7)*	*(-43.97)*
Yrsq	-0.0002 ***	-0.0003 ***	-0.0001 ***	-0.0001 ***	-0.0001 ***	-0.0001 ***	0.0000 ***	0.0000 ***
	(-12.88)	*(-16.45)*	*(-4.03)*	*(-4.22)*	*(-3.19)*	*(-4.72)*	*(-2.39)*	*(-2.04)*
dist_conti		0.2036 ***	0.2279 ***	0.2516 ***	0.2426 ***	0.2391 ***	0.216 ***	0.2115 ***
		(53.83)	*(57.01)*	*(56.37)*	*(56.03)*	*(55.97)*	*(51.53)*	*(49.71)*
$dist^2$_conti		-0.012 ***	-0.0137 ***	-0.0152 ***	-0.0146 ***	-0.0144 ***	-0.013 ***	-0.0127 ***
		(-58.53)	*(-63.24)*	*(-62.61)*	*(-62.21)*	*(-62.07)*	*(-56.82)*	*(-54.92)*
Product FE	YES	YES	YES	YES	YES	YES	YES	YES
Partner FE	NO	NO	YES	YES	YES	YES	YES	YES
N	6,280,989	6,280,989	6,280,989	5,302,589	5,525,890	5,650,064	5445679	5259975
R-Square	0.1223	0.124	0.1358	0.1395	0.1377	0.1373	0.1352	0.1343
Root MSE	0.074	0.074	0.073	0.073	0.073	0.073	0.0734	0.073
F Value	678.84	688.51	665.81	590.84	605.65	616.82	594.15	568.13

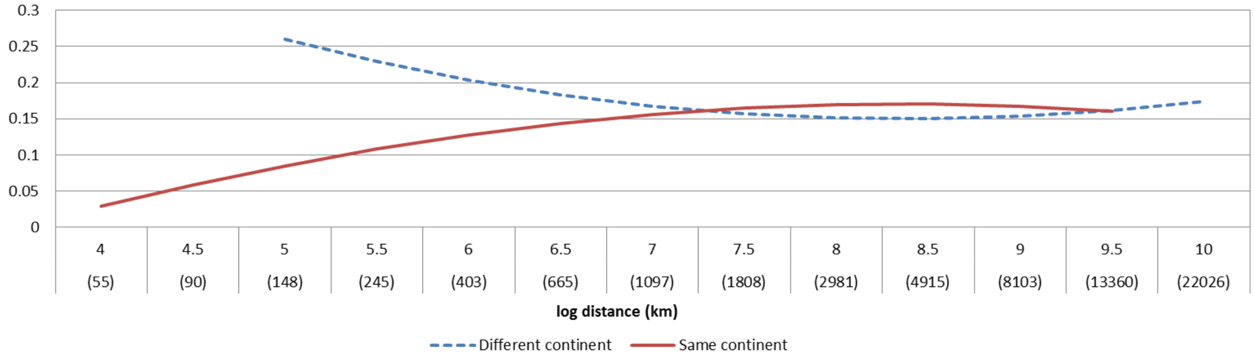
Note: t-values in parentheses below the coefficients. *** p<0.05; ** p<0.10

44. The assumption that if the trading countries are on the same continent, transportation costs (after controlling for distance) would be higher, as it is more likely that land transport would be used, is supported by model 1. Model 1 also confirms that geographical distance is positively related to the CIF-FOB margin, with a convex nature that suggests diminishing marginal costs to additional distance.

45. While the interaction effect introduced in model 2 between distance (including squared distance) and countries being on the same continent appears to change the signs of the relationship between distance and CIF-FOB margins, Figure 2 shows that when considering interactions of all variables, the overall relationship between distance and CIF-FOB margins does not change substantially, although the

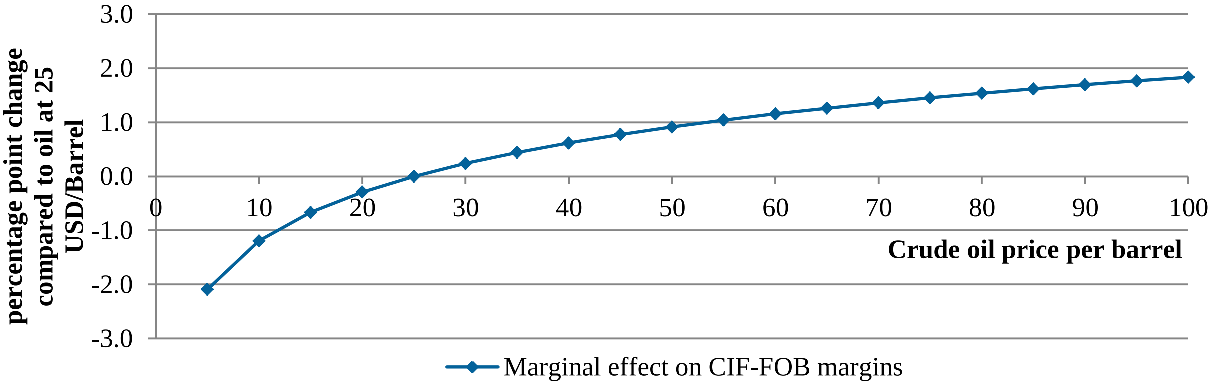
introduction of the interaction effect does control for the higher transportation costs on trade between a very specific subset of countries that are geographically very close but on different continents.[10]

Figure 2. Model predicted CIF-FOB margin as a function of distance, based on explicit input data



46. Finally, the model also confirms the anticipated positive effect of crude oil prices on transport and insurance costs of merchandise trade. When examining the marginal impact of an oil price change, Figure 3 shows that a rise in oil prices from 25 to 75 USD per barrel increases the CIF-FOB margin by 1.41 percentage point, (e.g. from for example 5%, to 6.41%, all else remaining equal). Similarly, a reduction in oil prices from, for example 100 USD per barrel to 50 USD (which is approximately what happened in 2015, when oil prices dropped from 93 to 48 USD per barrel), implies a reduction in the CIF-FOB margin of 0.92 percentage point.

Figure 3. Marginal effect of oil prices on CIF-FOB margins compared to a crude oil price of 25 USD per barrel

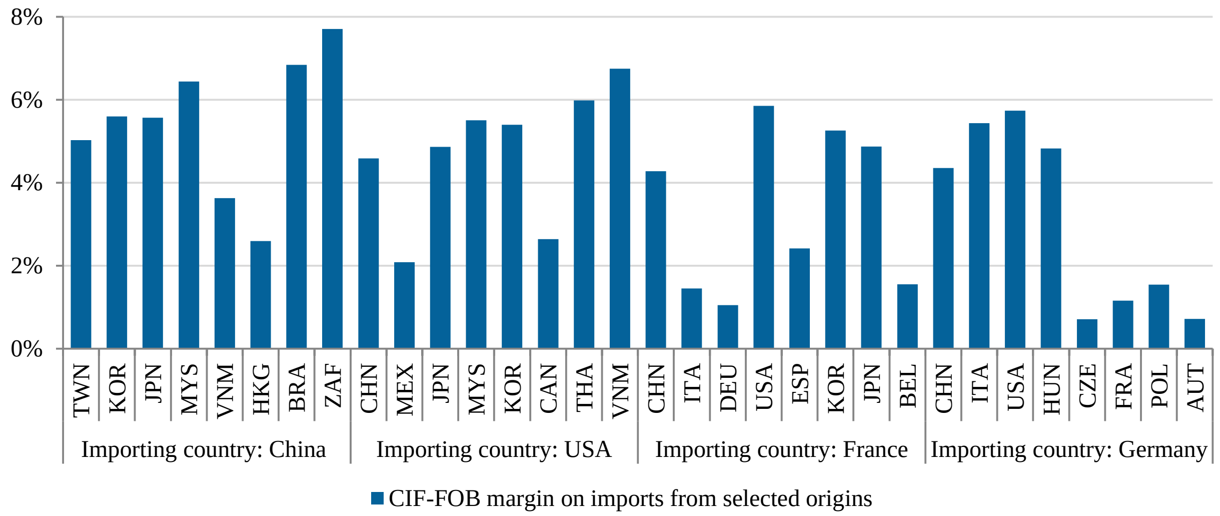


10 This mostly involves trade among Lebanon, Israel, Malta, Tunisia, Jordan, Egypt and Turkey.

47. Overall, the CIF-FOB margins predicted by the model illustrate how geography and distance continue to matter for international trade. Notwithstanding the role of other factors such as costs of production, government policy, and just-in-time production methods, the positive relationship between distance and CIF-FOB margins helps to explain why global value chains still retain strong regional dimensions, as witnessed in 'Factory Asia', and the production hubs in Europe and in NAFTA. Using the model estimates for 2013, Figure 6 shows for example how it is generally cheaper to import *electrical machinery and part thereof* (Chapter 85 in the 2007 HS classification) from origins relatively close to home: CIF-FOB margins are lower for Chinese imports from Vietnam and Hong Kong than from other Asian countries, and imports from Brazil or South Africa are even more costly to transport to China. Similarly, American imports from Mexico and Canada have much lower CIF-FOB margins than those from other trading partners, as do French imports from European partners as compared to those from Asia.

48. The estimated CIF-FOB margins also highlight how natural geographical barriers, such as the Andes mountain range in Latin America, and poor intra-regional infrastructure, such as in Africa, may impose barriers to the development of regional production chains (although again, other factors, including 'behind-the-border' constraints, will also play a significant role). The data in Figure 4 for Germany illustrate this point further. In this case the Alpine mountain range in Switzerland and Austria that separates Germany from Italy appears to increase CIF-FOB margins substantially: German imports from Italy have a CIF-FOB margin equal to that of imports from the US for example. Clearly such cost structures provide *de facto* barriers to global integration, and help explain the continued strong regional focus of value chains.

Figure 4. Trade weighted average CIF-FOB margins on imports of electrical machinery and parts to China, USA, France and Germany, from key partner countries (model-based estimates)



5.2 Robustness checks

49. To test the robustness of the model specification, a variety of checks were performed, in addition to the already mentioned test regarding the measurement of infrastructure quality. First, the sample was split into two groups, comparing trade in primary products with trade in non-primary products, as CIF-FOB margins on these two sets are likely to behave quite differently. Primary products are defined using the Broad Economic Categories (BEC) classification and cover primary products of food and beverages (11), primary products for industrial supplies (21), and primary products of fuels and lubricants (31). All other products (including confidential codes) are considered non-primary products. The results are displayed in Annex III.

Overall, the model shows a better fit for primary products than for non-primary products, but the estimated coefficients do not change substantially across the two sets of models.

50. More importantly, a more elaborate test of the final model presented in Section 5.1 (model 3) was performed by running the same regressions on a dataset using the implicit CIF-FOB margins derived from the UN Comtrade database. Two samples were selected: first, the full dataset of cleaned, implicit CIF-FOB margins (as described in 4.2), and second, only the implicit margins for those reporters, partners and products that were also included in the explicit dataset, to facilitate an even closer comparison.

51. The results of these tests are displayed in Annex IV. Particularly for the full implicit dataset, the model has less explanatory power as compared to those run on the explicitly reported data. While overall, the results for the independent variables are consistent with those generated with explicit data (albeit less significant), several counter-intuitive results also arise from the analysis on UN Comtrade data. For example, the results suggest that oil prices are negatively correlated with CIF-FOB margins, and in the matched sample, high GDP per capita (infrastructure quality) is associated with higher CIF-FOB margins. Hence, the model developed using the explicit datasets seems to perform better and more consistently, and more in line with a priori expectations. Further the results reinforce the caution needed in using UN Comtrade data to generate CIF-FOB margins (even with a restrictive sub-sample).

6. The OECD dataset on International Transport and Insurance Costs

52. The final model (model 3 by HS vintage in Table 8) was used to predict CIF-FOB margins for all imports of all reporters by all partners at the 6-digit level. Estimates of CIF-FOB margins below zero or above 20 percent (2% of all estimates) were removed, and the 6-digit estimates margins were subsequently aggregated to the HS 4-digit product level (trade weighted). Overall, the estimated trade-weighted average CIF-FOB margin is 6.2% for all countries across the period 1995 to 2014.

53. The final dataset of CIF-FOB margins published in the OECD International Transport and Insurance Costs database, and which is also used in the production of the forthcoming OECD Balanced International Merchandise Trade Dataset, includes a mix of the officially reported data, and estimates derived from the model. Clearly, for those countries that already report their imports to UN Comtrade in FOB values in certain years (including for example Australia, Brazil, Canada and South Africa), no conversion is necessary.

54. For those countries where explicitly reported CIF-FOB ratios were available for selected years, but not the full 1995-2014 period, CIF-FOB ratios estimated with the regression model were used to complete the time series. For these cases, to avoid breaks in series, the model-based estimates were calibrated to the reported data for the first (respectively last) year of the explicitly reported series. This was done by calculating, for these years, the ratio between the estimated values and the explicitly reported values, and correcting the estimated values used in earlier (respectively later) years with this ratio.

55. For a few product and country groupings , specific additional treatments were necessary:

- For trade reported under confidential product codes at the chapter level (e.g. code 28CF00, confidential trade in Chapter 28), a trade-weighted average CIF-FOB ratio was calculated across all products of the chapter, and applied (detailed by reporter, partner and year).
- For not-geographically specified partners (DUC), a trade-weighted average CIF-FOB ratio was calculated across all partners within a specific product, and applied (detailed by reporter, year and product).

- For trade reported in Chapter 99 (confidential trade), a trade-weighted average CIF-FOB ratio across all other 2-digit commodity chapters was calculated and applied (detailed by reporter, year and partner).
- For trade reported in Chapter 99 (confidential trade) that is *also* not geographally specified (DUC), a trade-weighted average across all commodities and partners was calculated and applied (detailed by reporter and year). Finally, for a limited set of (partner) countries for which trade data is available in UN Comtrade, no CIF-FOB values could be estimated because some of the independent variables in the regression model (e.g. GDP, or geographical distance) were not available. This was only the case for very minor countries, including for example Antarctica, Andorra, Mayotte, Guam, Saint Helena and Anguilla. Imports from these countries were adjusted to FOB values using a global (i.e. across reporters and partners) trade-weighted average by 2-digit product.

7. Conclusions

56. The results in this paper and the new OECD Dataset on International Transport and Insurance Costs on merchandise trade (ITIC) show that the costs of transport and insurance are not insignificant. With *inter*-continental trade increasing transport and insurance costs by 2 to 4% as compared to comparable *intra*-continental trade, these costs in part explain why global value chains retain strong regional dimensions. The data also reveal that natural barriers, such as mountain ranges, continue to shape regional (and global) value chains. In addition, inadequate infrastructure, such as poor quality roads or ports, remains a barrier to efficient trade; as witnessed for example by the relatively large margins for intra-Latin American trade.

57. While not the first of its kind, one of the main improvements in the ITIC database relative to other efforts, is the construction and the use of much more extensive bilateral CIF-FOB datasets published by national statistical authorities at the 6-digit level. This has made it possible to build a model to estimate CIF-FOB margins that moves away from predictions based on either single-country data (which may not be representative), or from the often used method to implicitly derive CIF-FOB margins from mirror trade statistics (which have been shown, including in this paper, as less suitable for statistical modelling).

58. In addition, a special and novel treatment of product codes across HS vintages has allowed for the pooling of data over time to the greatest extent possible, without having to convert the data to a single classification, therefore maintaining the flexibility to consistently predict CIF-FOB margins across all HS classifications. Finally, unit value measures of products were differentiated by quantity unit, which increased the number of useable observations further.

59. This dataset has formed the basis to develop a gravity-type model that takes into account the effects of distance, geographical situation (contiguous partners, partners on the same continent), infrastructure quality, oil prices, product unit values and time effect on the CIF-FOB margin. A variety of robustness tests were conducted, such as the use of alternative measures for infrastructure quality and splitting the sample into primary and other products. As a final test, the model was applied to a dataset of implicitly derived CIF-FOB values, which showed that although the overall results were consistent with those established using the explicit CIF-FOB margins, several counter-intuitive results were obtained, implying that the model developed using the explicit datasets is superior.

60. Clearly there remain possibilities to extend this work. For example, by allowing commodity-specific distance impacts on cost (e.g. Hummels, 1999) pointed out that these impacts were tightly clustered together), which will be developed when a larger dataset of explicitly reported CIF-FOB margins becomes available. In addition, transport and insurance costs are known to vary by mode of transport. This has not been addressed in this dataset due to the very limited availability of such data, and we have preferred to give more weights to the cross-country coverage. But the US, for example, does provide such information, and the plan is to explore how this and similar data dould be leveraged for future versions of the OECD ITIC database. Finally, information on total CIF-FOB margins is available for a few countries as part ot the auxiliary tables to the BOP. Benchmarking the current estimates to such values may further improve the data.

61. Notwithstanding these possible future improvements, the OECD ITIC database will be used for a variety of analytical and statistical purposes, in particular in relation to the OECD-WTO work on developing Trade in Value Added estimates.

- First of all, the availability of detailed data on CIF-FOB margins by product is an essential pre-requisite for a **balanced view of international trade**, and as such a key component in the OECD's work, with partners, to develop a transparent and structured approach to balancing trade data and TiVA estimates.

- Secondly, the database hopes to instigate the **increased availability of official CIF-FOB margin information.** Although analytical in nature, with an a priori selection of factors that drive CIF-FOB margins, the approach developed here demonstrates that robust and meaningful estimates of CIF-FOB margins are obtainable. Clearly, as more countries provide the necessary information the quality of the model will itself improve. Indeed, ideally, in time, the model would itself become redundant as countries provided the necessary data directly.
- Thirdly, the data will **enhance TiVA estimates** but also provide an ability to augment TiVA. For example whilst TiVA has helped to transform our understanding of GVCs, in its construction, and through necessity, it breaks the link between the transportation costs of a given product and the provision of that product itself, meaning that an important part of the GVC chain is hidden from view. A database of CIF margins can help to recreate that view and directly inform policy-making across a wide range of areas. For example current estimates of CO2 emissions embodied in the *basic price* of a product are not able to reveal the additional emissions generated in the international transportation of that product to the final consumer, and instead show these emissions as a separate item of consumption. The OECD ITIC database provides the means to generate estimates that recreate those links.

62. The final OECD dataset on CIF-FOB margins is available online on OECD.Stat via the following direct link: http://stats.oecd.org/Index.aspx?DataSetCode=CIF_FOB_ITIC.

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ANNEX I. DATA SOURCES FOR EXPLICIT CIF-FOB STATISTICS

OECD International Trade by Commodity Statistics

Imports valued at CIF and at FOB for Australia, New Zealand, the United States, Luxembourg, Chile, Iceland, the Czech Republic and Slovakia were obtained from the OECD International Trade by Commodity Statistics data collection, as described in more detail in Table A1.

Table A1. ITCS sources and methodology

Country	Description	Quantity information
United States	The United States Census Bureau makes data available at the HS 10 digit level by mode of transport, valued at both FAS (customs value) and CIF (including cost, insurance and freight) prices. The import charges represent the aggregate cost of all freight, insurance and other charges (excluding import duties) incurred in bringing the merchandise from alongside the carrier at the port of exportation and placing it alongside the carrier at the first port of entry in the United States. Coverage of year 2012 may be partial.	The United States reports 40 different quantity unit types. The primary quantity unit and quantity information is selected by default. Quantity units such as Megabecquerels, Gigabecquerels, Gross Lines, Jewel, Ozone Depletion Equivalent that did not align with UN Comtrade, were recoded to “No quantity”.
New Zealand	Statistics New Zealand and New Zealand Customs Services make data available at the HS 10 digit level, valued at CIF (i.e. including insurance and freight to New Zealand) and VFD (value for duty, i.e. the value of imports before insurance and freight costs are added) prices.	New Zealand has 23 different quantity unit types convertible to international standards. Quantity and weight in kilograms are both recorded, the former is used if the quantity unit is missing, in which case the “weight in kilograms” is selected.
Australia	The Australian Bureau of Statistics has made data available at the HS 6-digit level for all goods transported via sea freight (no data are available for other modes of transport, i.e. air or land), valued at FOB customs value and CIF.	The Australian quantity unit types are fully convertible to international standards.
Chile	The Central Bank of Chile produces monthly customs data at HS 8 digit level including both CIF and FOB values.	The Chilean quality unit types are fully convertible to international standards.
Iceland	Icelandic data are available at HS 8 digit level including both CIF and FOB values.	Iceland has limited quantity information available. Quantity units are missing up to 2013, after which they can be convertible to international standards. When the first quantity type is not available, the second quantity type, weight in kilograms is used.
Czech Republic	Data are available at HS 6-digit level by mode of transport. Both Country of Origin and Country of Consignment are available.	Two separate units of quantity information are provided. When the first quantity type is not available, the second quantity type, weight in kilograms is used.
Luxembourg	Data are available at HS 6 digit level by mode of transport.	Two separate units of quantity information are provided. When the first quantity type is not available, the second quantity type, weight in kilograms is used.
Slovakia	Monthly data are available at HS 8 digit level by mode of transport. Both Country of Origin and Country of Consignment are available.	Two separate units of quantity information are provided. When the first quantity type is not available, the second quantity type, weight in kilograms is used.

Maritime Transport Costs Data

Transports costs data for Australia in 2007, New Zealand from 1995 to 1999 and the United States from 1995 to 2001 are sourced from the OECD Maritime Transport Costs database (sea freight only), are used to supplement the data series received from Customs offices.

Data for Chile (1995 to 2002), and Bolivia, Colombia, Ecuador, Uruguay, Peru and Paraguay for all years shown below are originally sourced from the Latin-American Integration Association (ALADI). Argentina and Brazil data were originally obtained through national statistics offices.

Table A2. Total number of observations, *in thousands*, at HS 6 digit

	ARG	AUS	BOL	BRA	CHL	COL	CZE	ECU	ISL	LUX	NZL	PER	PRY	SVK	URU	USA
1995	18.1	59.5	5.6		16.6	12.9					21.9	0.0	0.2		7.9	39.4
1996	18.6	51.9	5.1		17.5	12.9					22.9	14.0			9.0	39.9
1997	19.9	63.6	5.1	24.1	17.7	14.2					23.5	11.0			9.5	41.5
1998	19.3	62.1	0.1	23.5	17.1	14.6					23.5	3.5			10.1	42.9
1999	18.5	60.7	0.1	20.8	13.4	14.3					24.6	18.6			9.4	44.3
2000	17.7	60.7	0.2	21.4	9.5	14.9		13.6			61.3	19.1			9.0	46.8
2001	16.7	60.4		21.7	8.9	16.6		16.3	41.8		63.1	19.5			9.0	47.6
2002	11.2	63.8		21.3	11.7	16.2		17.8	41.8		66.9	20.5			7.3	135.5
2003	13.2	66.5		21.0	53.7	16.8		19.4	43.6		69.3	20.6			7.2	137.6
2004	15.5	67.5		22.3	55.3	17.9		20.5	46.6		71.6	21.7			8.3	140.1
2005	17.1	68.5		23.5	56.7	19.2		21.0	49.0		73.8	16.5			9.0	142.8
2006	17.8	63.3		24.5	58.6	20.4		20.5	50.3		74.5	9.2			9.7	144.5
2007	4.2	13.1		25.6	58.6	21.9		20.8	50.8		76.1	23.1			10.4	143.2
2008					59.1				48.5	44.2	76.1					140.0
2009					57.8				45.3	44.5	73.9					134.7
2010					62.5				47.3	45.6	75.6					138.4
2011					67.7		99.6		46.4	46.7	70.5					141.4
2012					69.5						79.5			68.6		92.1

ANNEX II. DATA AVAILABILITY FOR IMPLICIT CIF-FOB MARGINS

Table A3. Descriptive statistics for CIF-FOB unit value ratio estimated by using mirrored flows, by reporting country (top 30 countries with highest number of trade transitions) (all period)

Ctry	N Total	N with mirror data of right quantity	N with CIF-FOB in selected range [1,2]	Selected n as % total	Median CIF FOB unit value ratio
DEU	985678	31510	15288	1.6	1.013
FRA	968093	29133	14503	1.5	1.016
USA	903703	36305	18167	2.0	1.005
GBR	867130	28486	15336	1.8	1.032
ITA	864928	50396	27198	3.1	1.015
BEL	862701	22411	11550	1.3	1.017
ESP	858243	30083	16601	1.9	1.028
AUT	790779	19670	9676	1.2	1.016
POL	767510	28095	16232	2.1	1.022
CHN	755203	21573	12396	1.6	1.054
NOR	754126	21069	12844	1.7	1.049
CHE	737962	44728	26869	3.6	1.025
CZE	706437	24369	13395	1.9	1.025
RUS	701085	37266	19783	2.8	1.019
NLD	686729	15852	6835	1.0	1.001
DNK	647027	20825	11403	1.8	1.015
SWE	646968	20608	11435	1.8	1.023
TUR	639302	27719	20076	3.1	1.084
KOR	616797	19469	12883	2.1	1.053
FIN	614482	20832	12421	2.0	1.028
SVN	592951	22684	12314	2.1	1.021
THA	583578	16889	10695	1.8	1.050
SGP	553003	14255	8295	1.5	1.041
ROM	541089	36187	21135	3.9	1.028
NZL	525762	9297	5445	1.0	1.095
GRC	508194	23433	13425	2.6	1.028
JPN	497857	21718	15198	3.1	1.059
IND	497244	9068	4595	0.9	1.042
SVK	496147	13378	6808	1.4	1.013
PRT	490636	17457	10113	2.1	1.028

ANNEX III. ROBUSTNESS CHECK, PRIMARY PRODUCTS

Table A4. Robustness checks regression results, by product type, explicit data

	Primary products		Non primary products	
	(1)	*(3)*	*(1)*	*(3)*
Intercept	-0.1520 ***	-0.3788 ***	-0.1878 ***	0.7025 ***
	(-12.42)	*(-4.05)*	*(-86.23)*	*(37.46)*
gdppci	-0.0056 ***	-0.0052 ***	-0.0017 ***	-0.0016 ***
	(-26.42)	*(-23.18)*	*(-46.56)*	*(-42.09)*
gdppcj	-0.0035 ***	-0.0221 ***	-0.0029 ***	-0.0135 ***
	(-28.55)	*(-27.83)*	*(-123.96)*	*(-90.18)*
dist1	0.0567 ***	0.1238 ***	0.0420 ***	-0.1342 ***
	(32.44)	*(6.12)*	*(107.93)*	*(-33.41)*
dist2	-0.0021 ***	-0.0055 ***	-0.0018 ***	0.0080 ***
	(-18.6)	*(-5.02)*	*(-73.05)*	*(37.05)*
poil	0.0167 ***	0.0213 ***	0.0085 ***	0.0121 ***
	(20.07)	*(24.92)*	*(56.64)*	*(76.95)*
uvmdn_m2	0.0216 ***	0.0219 ***	-0.0019 ***	-0.0015 ***
	(3.81)	*(3.92)*	*(-18.08)*	*(-14.21)*
uvmdn_i12	-0.0079 ***	-0.0099 ***	-0.0001 ***	0.0002 ***
	(-2.8)	*(-3.55)*	*(-2.75)*	*(5)*
uvmdn_kwt	-0.0016 ***	-0.0015 ***	-0.0025 ***	-0.0020 ***
	(-2.32)	*(-2.13)*	*(-2.93)*	*(-2.36)*
uvmdn_m	0.0062	0.0068 **	-0.0017 ***	-0.0021 ***
	(1.62)	*(1.79)*	*(-5.3)*	*(-6.55)*
uvmdn_i	-0.0025 ***	-0.0025 ***	-0.0021 ***	-0.0021 ***
	(-5.78)	*(-5.82)*	*(-83.97)*	*(-83.24)*
uvmdn_pkg			-0.0053 ***	-0.0052 ***
			(-5.85)	*(-5.76)*
uvmdn_p	-0.0082	-0.0072	-0.0022 ***	-0.0017 ***
	(-0.54)	*(-0.48)*	*(-13.35)*	*(-10.39)*
uvmdn_i1000	-0.0082 ***	-0.0081 ***	-0.0005 ***	-0.0005 ***
	(-3.24)	*(-3.23)*	*(-4.49)*	*(-4.73)*
uvmdn_m3	-0.0012 ***	-0.0011 ***	-0.0016 ***	-0.0015 ***
	(-3.11)	*(-2.87)*	*(-18.1)*	*(-17.03)*
uvmdn_l	-0.0052 ***	-0.0057 ***	-0.0063 ***	-0.0065 ***
	(-2.78)	*(-3.04)*	*(-22.39)*	*(-23.08)*
uvmdn_c	0.0018	0.0023 **	-0.0039 ***	-0.0037 ***
	(1.51)	*(1.96)*	*(-8.36)*	*(-7.84)*
uvmdn_k	-0.0054 ***	-0.0050 ***	-0.0006 ***	-0.0006 ***
	(-22.54)	*(-21.21)*	*(-16.03)*	*(-17.32)*
contig	-0.0436 ***	-0.0320 ***	-0.0337 ***	-0.0387 ***
	(-62.28)	*(-34.53)*	*(-224.34)*	*(-214.59)*
conti	0.034 ***	-0.0228	0.0188 ***	-1.0191 ***
	(57.07)	*(-0.24)*	*(160.31)*	*(-54.28)*
yrsq	-0.0031 ***	-0.0025 ***	-0.0001 ***	0.0001 ***
	(-31.12)	*(-23.92)*	*(-3.35)*	*(3.68)*
dist1_conti		0.0321		0.2478 ***
		(1.55)		*(60.84)*
dist2_conti		-0.0031 ***		-0.0148 ***
		(-2.69)		*(-67)*
Product FE	YES	YES	YES	YES
Partner FE	NO	YES	NO	YES
N	299453	299453	5981536	5981536
R-Square	0.2268	0.2476	0.1099	0.1238
Root MSE	0.0895	0.0883	0.0727	0.0721
F Value	370.26	228.8	662.06	645.95

Note: t-values in parentheses below the coefficients. *** p<0.05; ** p<0.10

ANNEX IV. ROBUSTNESS CHECKS REGRESSION RESULTS, IMPLICIT CIF-FOB DATA (UN COMTRADE)

Table A5. Robustness checks regression results, using implicit (UN Comtrade) data

	Full set of implicit data			Implicit data matched to explicit sample		
	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	0.3416 ***	-0.3384 ***	-0.0704 **	0.5294 ***	0.151	-1.1043 ***
	(12.16)	(-8.47)	(-1.7)	(6.88)	(0.96)	(-4.75)
Gdppci	-0.0026 ***	-0.0026 ***	-0.0033 ***	0.0021 ***	0.002 ***	-0.0004
	(-19.61)	(-19.49)	(-23.53)	(5.6)	(5.34)	(-0.99)
Gdppcj	0.0002	0.0001	-0.0113 ***	-0.0024 ***	-0.0027 ***	-0.0039
	(1.35)	(0.38)	(-7.86)	(-6.34)	(-6.89)	(-1.38)
dist1	-0.0407 ***	0.1211 ***	0.09 ***	-0.1023 ***	-0.017	0.2995 ***
	(-21.7)	(17.29)	(12.58)	(-21.18)	(-0.55)	(6.84)
dist2	0.0039 ***	-0.0057 ***	-0.0045 ***	0.0074 ***	0.0027	-0.0152 ***
	(31.55)	(-13.69)	(-10.6)	(23.46)	(1.57)	(-6.39)
poil	-0.0028 ***	-0.0026 ***	0.0002	-0.0074 ***	-0.0074 ***	-0.006 ***
	(-2.59)	(-2.41)	(0.19)	(-3.34)	(-3.31)	(-2.57)
uvmdn_m2	0	0	0	0	0	0.0001
	(-0.36)	(-0.34)	(-0.37)	(0.07)	(0.06)	(0.17)
uvmdn_kwt	0.0008	0.0008	0.001	-0.0057	-0.0057	-0.0051
	(0.52)	(0.52)	(0.68)	(-1.14)	(-1.14)	(-1.02)
uvmdn_m	-0.0004	-0.0004	-0.0004	-0.0002	-0.0002	-0.0004
	(-1.38)	(-1.38)	(-1.37)	(-0.24)	(-0.24)	(-0.4)
uvmdn_i	0	0	0	0 **	0 **	0
	(-0.59)	(-0.61)	(-1.12)	(1.67)	(1.66)	(1.24)
uvmdn_pkg	0.0005	0.0005	0.0003	0.0032	0.0032	0.0034
	(0.35)	(0.35)	(0.25)	(1.16)	(1.15)	(1.23)
uvmdn_p	0.0001	0.0001	0.0002	0.0005	0.0005	0.0006
	(0.6)	(0.63)	(1.29)	(1.1)	(1.11)	(1.48)
uvmdn_i1000	0.1682	0.1668	0.2284 ***	0.4219	0.4249	0.3601
	(1.5)	(1.49)	(2.06)	(1.4)	(1.41)	(1.21)
uvmdn_m3	-0.0001	-0.0001	-0.0001	0	0	-0.0001
	(-1.01)	(-1.03)	(-1.51)	(-0.27)	(-0.28)	(-0.68)
uvmdn_l	-0.0068 ***	-0.0068 ***	-0.0066 ***	-0.0105 ***	-0.0106 ***	-0.0089 ***
	(-4.22)	(-4.24)	(-4.12)	(-2.73)	(-2.75)	(-2.33)
uvmdn_c	0 ***	0 ***	0 ***	0	0	0
	(2.36)	(2.35)	(2.4)	(-0.77)	(-0.78)	(-1.07)
uvmdn_k	0 ***	0 ***	0 ***	0	0	0
	(-3.84)	(-3.85)	(-4.1)	(-0.85)	(-0.85)	(-0.47)
contig	-0.0274 ***	-0.0274 ***	-0.0243 ***	-0.0445 ***	-0.0443 ***	-0.0393 ***
	(-65.2)	(-64.85)	(-49.85)	(-50.34)	(-49.07)	(-32.13)
conti	-0.0072 ***	0.7527 ***	0.6853 ***	0.002	0.4241 ***	1.7623 ***
	(-15.81)	(24.13)	(21.26)	(1.46)	(2.96)	(8.64)
yrsq	-0.0026 ***	-0.0026 ***	-0.0025 ***	-0.0017 ***	-0.0017 ***	-0.0017 ***
	(-28.31)	(-28.05)	(-25.66)	(-9.16)	(-9.09)	(-7.58)
dist1_conti		-0.1838 ***	-0.1756 ***		-0.0963 ***	-0.3887 ***
		(-24.15)	(-22.38)		(-3.01)	(-8.71)
dist2_conti		0.011 ***	0.011 ***		0.0055 ***	0.0215 ***
		(23.76)	(22.97)		(3.07)	(8.78)
Product FE	YES	YES	YES	YES	YES	YES
Partner FE	NO	NO	YES	NO	NO	YES
N	919,209	919,209	919,209	177,601	177,601	177,601
R-Square	0.0956	0.0962	0.117	0.1426	0.1427	0.1625
Root MSE	0.1393	0.1392	0.1376	0.1285	0.1285	0.127
F Value	78.41	78.81	87.84	23.76	23.73	25.01

Note: t-values in parentheses below the coefficients. *** p<0.05; ** p<0.10

ANNEX V. ESTIMATED CIF-FOB MARGINS BY IMPORTING COUNTRY (AVERAGE OF 2007-2011 PERIOD)

Table A6. Estimated CIF-FOB margins by importing country (average across 2007-2011)

ISO code	Country Name	CIF-FOB margin	ISO code	Country Name	CIF-FOB margin
AUS	Australia	0.0%	TUR	Turkey	7.1%
AUT	Austria	3.7%	GBR	United Kingdom	6.0%
BEL	Belgium	4.2%	USA	United States	2.7%
CAN	Canada	0.0%	ARG	Argentina	5.1%
CHL	Chile	6.0%	BRA	Brazil	0.0%
CZE	Czech Republic	2.8%	CHN	China	7.3%
DNK	Denmark	5.5%	TWN	Taiwan	7.1%
EST	Estonia	5.9%	IND	India	7.1%
FIN	Finland	5.6%	IDN	Indonesia	7.8%
FRA	France	4.9%	RUS	Russian Federation	5.7%
DEU	Germany	4.6%	SGP	Singapore	6.3%
GRC	Greece	6.1%	ZAF	South Africa	0.0%
HUN	Hungary	5.3%	HKG	Hong Kong	3.6%
ISL	Iceland	8.0%	MYS	Malaysia	6.2%
IRL	Ireland	5.1%	PHL	Philippines	7.3%
ISR	Israel	6.1%	THA	Thailand	7.0%
ITA	Italy	6.1%	ROM	Romania	6.3%
JPN	Japan	7.8%	VNM	Viet Nam	6.6%
KOR	Korea	7.4%	SAU	Saudi Arabia	7.2%
LUX	Luxembourg	1.6%	BRN	Brunei Darussalam	6.8%
MEX	Mexico	6.1%	BGR	Bulgaria	6.2%
NLD	Netherlands	5.1%	CYP	Cyprus[11]	8.0%
NZL	New Zealand	5.2%	LVA	Latvia	5.2%
NOR	Norway	6.1%	LTU	Lithuania	5.2%
POL	Poland	5.0%	MLT	Malta	6.9%
PRT	Portugal	6.0%	KHM	Cambodia	7.7%
SVK	Slovakia	2.3%	COL	Colombia	5.8%
SVN	Slovenia	4.9%	CRI	Costa Rica	8.1%
ESP	Spain	6.6%	HRV	Croatia	5.2%
SWE	Sweden	6.1%	TUN	Tunisia	7.1%
CHE	Switzerland	3.2%			

Note: for countries reporting import data in FOB values, a 0% CIF-FOB margin is reported

[11] Note by Turkey: The information in this document with reference to “Cyprus” relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognizes the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of United Nations, Turkey shall preserve its position concerning the “Cyprus” issue.

Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognized by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.