

Nazif, Mehmet; Jenkins, Glenn P.

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Evaluation of the economic welfare gains from reducing trade administration costs in Mercosur

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Evaluation of the Economic Welfare Gains from Reducing Trade Administration Costs in Mercosur

Mehmet Nazif

Department of Economics, Eastern Mediterranean University, Famagusta, Northern
Cyprus via Mersin 10, Turkey

Glenn Jenkins

Queen's University

Department of Economics
Queen's University
94 University Avenue
Kingston, Ontario, Canada
K7L 3N6

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Mehmet Nazif

Department of Economics, Eastern Mediterranean University, Famagusta, Northern Cyprus via
Mersin 10, Turkey

E-mail: mehmetnazif1@gmail.com

Glenn P. Jenkins

Department of Economics Queen's University Canada
Cambridge Resources International Inc.

Email: jenkinsg@queensu.ca

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ABSTRACT

This paper evaluates the potential welfare gains in the Mercosur region of South America as a benefit of improvement to the trade administrations. Improvements to border procedures and processes leading to border procedures can save billions of dollars for the region, create markets for exporters and enhance trade diversification for both imports and exports. Using a microeconomic model, we establish the benefit of improvement to trade administration processes by comparing the cost structures of Mercosur member states to two reference countries, Chile and Canada. We estimate that with recent trade figures, the region would benefit by in excess of USD 15 billion annually from reducing both the import and export sides of the trade administration costs to the level now enjoyed by these two reference countries.

Keywords: trade facilitation, international trade, trade administration costs, trade transaction costs, Latin America, Mercosur

JEL Classification: F14, F13, D60

1. Introduction

The Mercosur bloc region, like many other developing regions, suffers from the high administrative costs of trade faced by importers and exporters within the region. Many factors contribute to these costs. Although having zero administrative costs associated with international trade is desirable, that goal is not attainable. It is possible, however, to cut back a substantial amount of these costs by investing and reforming precise pressure points within the international trading system. Close examination shows that the factors contributing to unnecessary trade costs are mostly related to the public sector's wasteful bureaucracy.

The inefficient structure of governmental institutions and their administrative policies place a heavy burden on economic transactions, creating unnecessary trade costs. These excess costs and lost opportunities directly translate into a welfare cost burden on the population of a region. This study is a quantitative analysis to establish the potential economic welfare gains from eliminating some of the preventable transaction costs to trade. By bringing their trade administration costs to the level of a set of reference countries, namely Chile and Canada, Mercosur member nations can expect to save billions of US dollars 'worth of resources every year. These savings are on top of the creation of a more welcoming economic environment for fostering innovation and sustainability. As the exporters and importers in the Mercosur region are striving to improve their position in the global value chains (GVCs) of their products, the last thing they need is to face unnecessary extra burdens created by their own home country's bureaucracies. In the past decade, countries in the region have progressed towards a more friendly trading environment by bringing down their average tariff rates and establishing trade agreements (TAs). However, the preventable transaction costs to trade can be reduced further to save a substantial amount of economic resources.

2. Literature review

As defined by the World Trade Organization (WTO), excessive trade costs are burdens on an economy, making exports uncompetitive and preventing firms from accessing inputs with ease (WTO, 2015a). WTO has stressed the positive impact of policy reforms on trade facilitation. Their study points out that the lowest-income countries are likely to gain most from such reforms. WTO (2015a) also states that developing countries with higher trade costs (measured by the number of days required to export) tend to have a higher share of the population living on less than USD 2 per day.

With the ratification of the WTO's Trade Facilitation Agreement (TFA) in 2017, the governments of the region have placed trade facilitation protocols on their agendas (WTO, 2014). Since talks among WTO members on a comprehensive TFA began in 2004, the number of regional TAs that contain trade facilitation components has almost doubled (WTO, 2015b). This landmark amendment to the Marrakesh protocol has been signed and ratified by a very large majority of WTO members.

Although trade offsetting effects of costs to trade have been established throughout the literature, the welfare effects of such costs have not been as examined as much (Willie and Chikabwi, 2018).

A pioneering study in comparing the trade offsetting effects of transaction costs in trade is that by Finger and Yeats (2018). In this study, the authors compare ad-valorem equivalents of transport and insurance costs to the effective tariff rates at the time. The data set was on United States imports in 1965, around the time of the Kennedy Round, the sixth session of the General Agreement on Tariffs and Trade. The authors remark that even though the negotiations on tariff reductions took effect, the rising transport costs had the potential to undermine the benefits.

The literature on trade facilitation has grown since global tariff reductions have become the primary policy decision in the past several decades. In the past two decades, the literature has gained a rich collection of studies investigating the effects of TAs using various methodologies. Two of the most common methods used in these studies are computable general equilibrium (CGE) and the gravity model of trade. The study by Anderson and Wincoop (2001) was one of the first to utilize a CGE model. Border barriers as tariff equivalents have been estimated to potentially increase trade between the US and the rest of the world (US–RoW) by 150%, where the tariff equivalent border barriers were estimated to be 52% for the US–RoW pair. Anderson and Wincoop (2001) also find that further integrations such as a monetary union have a significant effect on welfare.

Estevadeordal (2017) points out that in the 1990s, Latin America and the Caribbean (LAC) embraced the trade liberalization trend, a time frame that also corresponds to the founding of Mercosur. This trend was preceded by a period of relatively higher protectionism in the LAC region (Loser and Guerguil, 1999). Tariffs were cut and a number of free trade agreements (FTAs) were established. But Estevadeordal (2017) further points out that recent

times require that attention is given to extended trade policy beyond the regular global trade policy agenda. This is because the FTAs made within the region cannot properly deal with customs-related costs, regulatory costs, informational trade barriers and other related costs.

Cai and Li (2020), using a general equilibrium model based on Caliendo et al. (2015), looked at the welfare effects of trade liberalization in the region. Using a data set from 1990 to 2015, the authors conclude that most Latin American countries benefited from a reduction in tariff rates. In terms of trade transaction costs, the same study suggests that Venezuela has a very high potential to gain by reducing trade costs: according to this study, non-tariff trade costs imposed in Venezuela account for 93% and 89% of the total trade costs for agriculture and manufacturing, respectively.

A case study by Volpe Martincus (2016) that investigated Peruvian import times finds that an increase of 10% in border times leads to a decline of 2.4% in import volumes.

Portugal-Perez and Wilson (2012), in their gravity model study, find evidence for physical infrastructure being the most significant element of trading costs in terms of potential for increasing exports. They also point out the high initial investment required for such an investment and underline the possibility of smaller investment options on border efficiency with potential for immediate and significant returns.

Moïsé et al. (2011) estimate that a 10% reduction in trade costs is possible for OECD countries, following WTO TFA Trade Facilitation Indicators. The figure is higher for non-OECD countries. Moïse and Le Bris (2013) find this to be in the lower bound of the real costs to trade. Lesser and Moïse-Leeman (2009) report on a CGE model that estimates that a 1% reduction in trade costs can translate to an aggregate of USD 40 billion welfare gains worldwide. The same study reports that a 1% decrease in LAC trade transaction costs can result in an increase in GDP in the region by 0.12%–0.36%, varying by different scenarios. OECD (2009) further identifies a study that estimates an elasticity coefficient for a number of importing border operations such as the number of signatures and documents required. In this gravity model type analysis, it is estimated that a 10% decrease in days at the border, in the number of signatures required and in the number of documents required can result in increased trade volumes of 6.3%, 9.9% and 11.1%, respectively. El Dahrawy Sánchez-Albornoz and Timini (2020) performed a CGE analysis, concluding that TAs between Latin American countries, as well Latin America and RoW pairs, have a positive effect on trade. The study

reports an approximate 10% increase in trade achieved by TAs, which the study finds to be in line with the previous literature. The analysis on welfare uses an approach to apply a 'best performer' narrative to conduct CGE simulations in different scenarios. The report estimates a significant gain in welfare for Latin American countries from reducing bilateral trade costs to that of the best performer.

Wilmsmeier et al. (2006) looked at the intra-Latin American maritime trade costs. They estimate that among all variables included in the study, port efficiency has the highest elasticity among the port-related variables. The study, which looked at 16 LAC countries, reports that doubling the port efficiency on both sides of the importer–exporter equation has the same impact as halving the distance between traders.

The 2015 World Trade Report (WTO, 2015b) illustrates a model to estimate the welfare effects of cutting costs to trade. The section on the effect of inefficient customs procedures on an economy uses a similar microeconomic model to this study. Although there are some differences in our approach, which mainly focuses on individual economies and treats import and export sides separately, the WTO report uses an approach that is fundamentally identical but that treats the import side of an economy together with the export side of the partner economy. Thus, the report maintains that multilateral agreements, in this case the TFA, are the most sensible way to introduce an effective method of benefiting both parties of an import–export relationship. The report applies the prisoner's dilemma to international trade theory, in which the cost associated with implementing an effective trade facilitation agenda would only benefit the parties if incurred collectively. Hence, it is argued that the necessity of a multilateral agreement ensuring collective risk taking and the implementation of a such facilitation policy is the most fair and sound way forward.

Abrego et al. (2021) report that for the African continent, reducing non-tariff barriers (NTBs) has a much larger welfare effect than reducing tariffs alone. The study, which uses a CGE model, further states that the effects of lowering NTBs are strongly non-linear, with a reduction of 35% in NTBs resulting in welfare gains of 1.7% for the whole continent and a reduction of 45% in NTBs resulting in almost 4% of positive welfare effect.

Tariff application is considered international trade's 'enemy number one', and an important study assessing the effect of tariffs on a nation's welfare was conducted by Francois and Hall (2002). They estimate the effect of tariff reductions using the partial equilibrium

framework, and with detailed microeconomic theory, explain the basis of the working principles of the simulation model.

Jiahao et al. (2022) also found significant evidence relating trade facilitation to sustainable economic growth. In their study of Sub-Saharan African countries, the impact of improving importation costs and document simplification is estimated to result in an increase in sustainable economic growth.

In their novel mixture of econometric estimations, structural gravity and general equilibrium models, Beverelli, Cosimo et al. (2023) have estimated trade and welfare effects of TFA implementation. The region of LAC has been found to have the potential to increase its real GDP by 0.11% upon full implementation of the TFA. The figure of real GDP gain potential for least developed nations is 0.28%.

3. Methodology

The current study uses a microeconomic partial equilibrium framework to analyse the economic losses and potential welfare gains of eliminating the preventable amount of trade compliance costs. The import and export sides are approached individually. In line with the *Doing Business* report, the average value of USD 50,000 per shipment is used (World Bank, 2020a). This will manifest itself as a unit price in our model, with transaction costs and tariffs added on ad valorem to this level. This will allow us to eliminate sophistication that would otherwise arise if we were to examine each and every bilateral trade relationships of each Mercosur member state.

A shipment's cost, insurance and freight (CIF) value for imports and free on board (FOB) value of exports are a given standard in the literature. Our model takes these CIF and FOB values and builds costs to trade and tariffs associated with these operations, on top of the base price, as ad valorem. This gives us multiple price levels to analyse the economic effect of costs to trade (transaction costs) within our framework. For imports, Figure 1 lays out the partial equilibrium framework of our model. As our scope covers the costs related to import/export activities, the price of domestically produced substitutes to imports is not included in our model. The model is concerned with two main price levels, namely the price of imports/exports subject to current cost regimes and the price of imports/exports subject to cost regimes after reducing the administrative transaction cost. The difference in the current and improved cost regime is referred to as preventable costs to trade (PCT). We use a set of

reference countries to compare and contrast the Mercosur member states. The cost of trading in the benchmark reference countries is used as the improved cost regime for Mercosur member countries. The difference in the cost amounts of reference countries and the countries under investigation is used to calculate the potential welfare gains from improving the cost regimes to match those of the reference countries.

Assuming that the reference benchmark levels of trade costs are attainable, the amount of imported/exported shipments will increase in accordance with the import demand and export supply elasticities of the home country. In line with our model, this will result in increased consumer surplus (in the case of imports), increased tariff revenues (in the case of imports), increased producer surplus (in the case of exports) and decreased efficiency losses in both cases. Overall, this will result in net welfare gains in the amounts of aforementioned surpluses. Furthermore, the trade diversification effect, opportunities in the GVC, more competitive export portfolios and, hence, an easier transfer of technology are expected to be among the benefits of such facilitation reforms.

Our model is similar to the World Integrated Trade Solution (WITS) trade policy simulator, the methodology of which is described by Laird and Yeats (1986). A key point in our model is the use of elasticities specific to each country. For imports, the elasticities employed in the WITS simulator vary for different sets of products but are not country-specific (World Bank, 2010). Meanwhile, elasticities used for exports are given as infinite by the simulator model. The elasticities used in this study are aggregated for both imports and exports and are country-specific. The import elasticities used are from Ghodsi et al. (2016), and follow the methodology outlined by Kee et al. (2008), a semiflexible translog GDP maximization function based on Kohli (1991). Export supply elasticities used in this study are sourced from a standard general equilibrium model by Tokarick (2010). These country-specific import demand and export supply elasticities play a central role in our quantitative model.

3.1 Model for evaluating potential welfare gains from reducing importing costs

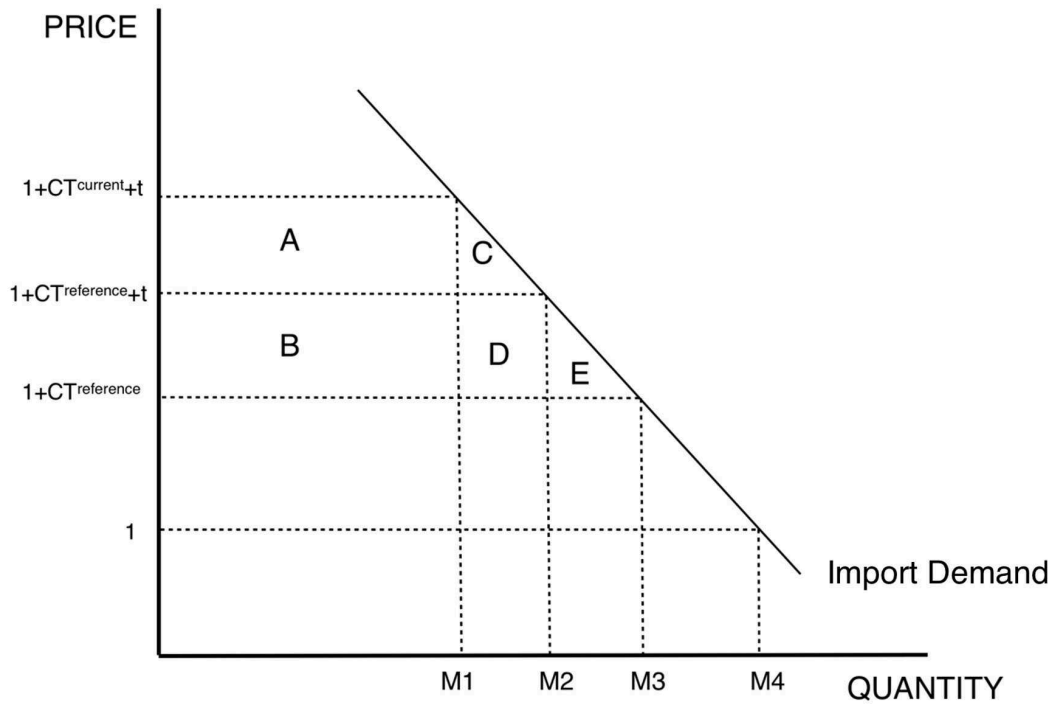


Figure 1: Representative import demand function of an importing country

In Figure 1, the highest price level, $CT^{\text{current}+t}$, refers to the home country's current regime of trade transaction costs plus the tariff rate for a standard shipment of USD 50,000, which is simplified to 1. In other words, the price level of 1 in Figure 1 is a standard CIF shipment price. Therefore, the cost components CT^{current} and $CT^{\text{reference}}$ are the ratio of total costs to trade to a standard shipment value of USD 50,000. These costs are given in the *Doing Business* report, in the section on trading across borders, and the detailed category of costs are given in Table 3 of this study (World Bank, 2020a). For import analysis, we use Canada and Chile as references for comparison with the bloc. The reference countries were selected on the basis that they provide a similar environment to the countries under investigation. Furthermore, importing by land and sea are treated separately, as the costs associated with each medium differ significantly. Chile was selected as a reference benchmark for importing through a sea border crossing because it is geographically located in the same continent as Mercosur, creating a comparable country in terms of global location, the culture of residents and the nature of traded goods. Meanwhile, Canada was selected on the basis of it being member of a regional trade bloc (NAFTA) and importing by land, which three out of four Mercosur nations are reported to do in the *Doing Business* report.

The total rates of costs to trade (total costs to trade / value of shipment) of both the home country and the reference country are taken in to account when estimating the potential amount of economic welfare gains that can be realized by trying and approaching a more efficient rate like those of the reference countries. Assuming the home country reduces the current costs to trade to the level of those in the reference country, the welfare gain in the economy would be equal to Areas A, C and D in Figure 1. These areas are translated as consumer surplus and added tariff revenue in our microeconomic model. Following the abovementioned rationale, it is convenient to set out our model with the definition of PCT:

$$PCT(\%) = CosttoTrade(current)\% - CosttoTrade(reference)\% \quad [1]$$

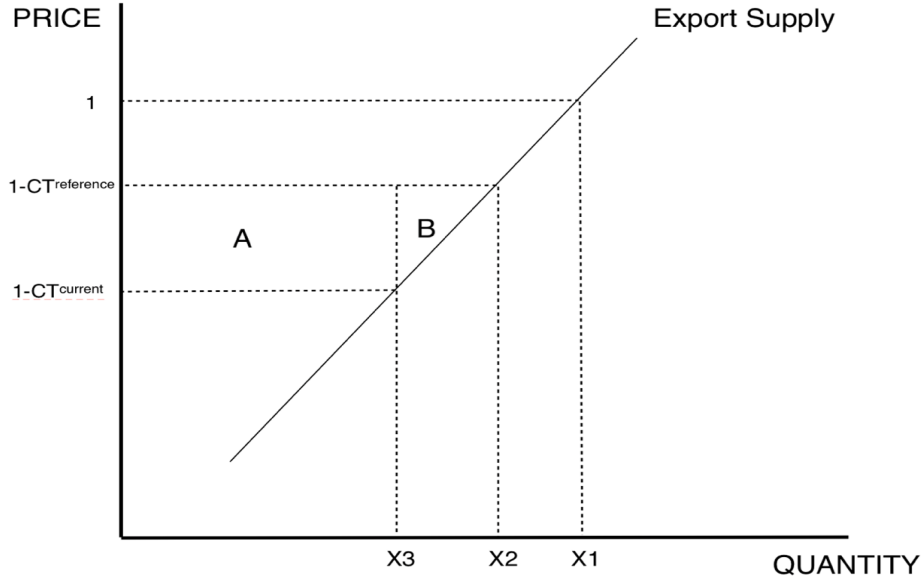
As we normalize the CIF price to 1 and accumulate the costs on top of this base price in ratios, the ratio of costs is calculated by using the average shipment value as the denominator. This approach is used for the sake of simplicity and for its suitability for the available data. This study treats all countries as price takers in the world goods trade market. Therefore, both the CIF and FOB prices can be assumed to be world prices and normalized to 1.

An important central element of this microeconomic model are the elasticities of import demand (ε^{ID}) for the importing countries. Elasticities are used to calculate the reactionary change in import or export quantities to a change in price. This change in price is the proposition of eliminating PCT. For the import case, the calculation to find the change in import volumes ($\Delta M1$) in response to a price change will be:

$$\Delta M1 = M1 \times \varepsilon^{ID} \times PCT(Current - Reference) \quad [2]$$

$\Delta M1$ is $M2 - M1$ in terms of Figure 1. After finding the reactionary changes in quantity of import demanded, we can find the economic welfare effects of reducing the costs of importing. Area A in Figure 1 is the direct positive effect of reaching the point of the reference benchmark country cost rate. In other words, Area A in Figure 1 is the direct gain in consumer surplus of eliminating PCT. It is calculated as:

$$A = M1 \times PCT \quad [3]$$



Area C of Figure 1 is the excess burden created by the PCT, and it will have a positive effect on welfare if PCT are eliminated. It is calculated as follows:

$$C = \frac{1}{2} \times \Delta M1 \times PCT \quad [4]$$

Another addition to the welfare effects will arise from increased tariff revenue after improvements are made to the current cost regime. Reducing the cost of imports will create an increase in the demand for imports, leading to increased tariff revenues. This is captured as follows:

$$D = \Delta M1 \times TARIFF \quad [5]$$

After computing all of the areas, we can calculate the welfare effect of eliminating PCT. By summing all components of Figure 1, which has a positive impact on welfare and did not exist before the reform, we have A+C+D as the positive welfare effect of eliminating PCT.

3.2. Model for evaluating potential welfare gains from reducing exporting costs

Figure 2: Representative export supply function of an exporting country

Figure 2 shows the model being used for the economic effects of compliance costs associated with exports. In other words, Figure 2 represents the export supply function of the

home country. In the case of exports, the higher the costs to trade, the less the producer surplus. The areas labelled as A and B in Figure 2 represents the gain in producer surplus if the home country reduces the costs associated with exports to match the rate of the reference country.

With the basic model shown in Figure 2, a similar approach to the previous one for imports is used to compute the potential welfare gains associated with reducing the current exporting regime. The trapezoid area of Figure 2 (rectangle A and triangle B, forming the trapezoid) is the possible amount of welfare gain if PCT are eliminated. PCT are calculated by simply taking the difference between the rates of costs associated with the exports of economies under investigation those of a reference, given by equation [1]. In the case of exports, Chile is the reference economy; unlike for imports, we have only one reference benchmark because Chile provides us with a regional benchmark for sea exports and the current exporting regime via land presents very little room for improvement, according to our data. Thus, this study rules out land border exports from its scope to focus on providing a more realistic goal for the countries under investigation.

To calculate the welfare losses resulting from inefficient export operations costs, the areas A and B of Figure 2 is calculated. This is done by finding the producer surplus directly associated with lowering costs to export and adding it to the excess burden imposed on exporters (triangle B of the trapezoid in Figure 2). Triangle B in Figure 2 is found in a similar way to the import calculations. The elasticity of export supply (ϵ_x) is used to determine the difference between X_3 and X_2 (ΔX_1), in other words the amount of increase in exports supplied if the rate of costs associated with exports improves to match those of the reference country. This is done as follows:

$$\Delta X_1 = \epsilon_x \times PCT \times X_3 \quad [6]$$

As was the case with imports, X_3 , the current amount of exports in USD, is an observed variable. After finding ΔX_1 , we can find the area of the trapezoid A+B in Figure 2. We approach this with a two-step calculation. First, the direct economic loss as a result of excess cost to export (rectangle A of the trapezoid) is computed using:

$$X_3 \times PCT \quad [7]$$

and added to the area of triangle, which is:

$$\Delta X1 \times PCT \times \frac{1}{2} \quad [8]$$

Real-world data is assigned to the model. As discussed earlier, cost parameters for the operations are used to deduce current and reference cost rates. Furthermore, real-world import and export figures are used to assign a recent import and export figure to M1 and X3, respectively. For tariffs, the weighted average tariff rate is used for each country. This study differentiates between trade made through a land border crossing and sea border crossing and uses identical methods to assess the potential impact of improving operations for both of the mediums. The volume of trade made in services is excluded from this study to suit the relevant data on costs. The sea–land distinction and goods–service differencing are explained in the following sections of this paper.

4. Current cost structures

As reported in the *Doing Business* report, costs to trade associated with imports consist of the border compliance cost and documentary compliance cost (World Bank, 2020a). Cost of capital (CoC) is added to the costs to trade using waiting times provided again by the World Bank (2020a). The data is reported annually and the relevant data can be found in the section of the report on trading across borders. The report was discontinued in 2021, with the World Bank announcing that it will be replaced with another business climate analysing report called *Business Enabling Environment* (World Bank, 2022).

Unlike the rest of the cost components, CoC for imports is not reported in the *Doing Business* report and is estimated by finding the CoC for one hour of waiting time for the shipment. The total time for waiting is obtained by adding the time taken (in hours) for border and documentary compliances. It is assumed that for LAC, the CoC is 10%. Each imported and exported shipment has an average economical value of USD 50,000, according to the World Bank (2020a). Given that there are 8,760 hours in a year, the time CoC for both imports and exports becomes:

$$CoC = \frac{Timetoimport \times Costofcapital(annual) \times Shipmentvalue}{8760} \quad [9]$$

Table 1: Current compliance costs for imports

		Total time to import (hours) ¹	Cost of capital (\$) ²	Cost to import: Document ary compliance (\$) ¹	Cost to import: Border compliance (\$) ¹	Total cost to import (\$) ³	Rate of total cost to import ⁴	Import mode ⁵
Nation		1	2	3	4	5	6	7
1	Argentina	226	129	120	1,200	1,449	2.90%	SEA
2	Uruguay	54	31	285	500	816	1.63%	LAND
3	Paraguay	60	34	135	500	669	1.34%	LAND
4	Brazil	54	31	107	375	513	1.03%	LAND

Notes:^{1&5}Reported in World Bank (2020). ²Authors' calculation using equation [9]. ³Total of columns 2, 3 and 4. ⁴Division of column 5 by a standard shipment value of USD 50,000.

Table 2: Current compliance costs for exports

		Total time to export (hours) ¹	Cost of capital (\$) ²	Cost to export: Document ary compliance (\$) ¹	Cost to export: Border compliance (\$) ¹	Total cost to export (\$) ³	Rate of total cost to export ⁴	Export mode ⁵
Nation		1	2	3	4	5	6	7
1	Argentina	46	26	60	150	236	0.47%	LAND
2	Brazil	61	35	226	862	1,123	2.25%	SEA
3	Paraguay	144	82	120	815	1,017	2.03%	SEA
4	Uruguay	120	68	231	1,038	1,337	2.67%	SEA

Note:^{1&5}World Bank (2020). ²Authors' calculation using equation [9]. ³Total of columns 2, 3 and 4. ⁴Division of column 5 by a standard shipment value of USD 50,000.

Table 3: Complete table of import and export total cost rates for Mercosur member nations and reference nations

		Import		Export	
		1	2	3	4
		Land	Sea	Land	Sea
1	Argentina	1.33%	2.90%	0.47%	2.32%
2	Brazil	1.03%	2.81%	0.36%	2.25%
3	Paraguay	1.34%	2.53%	0.47%	2.03%
4	Uruguay	1.63%	3.33%	0.57%	2.67%
5	Chile		0.78% ¹		0.78% ¹
6	Canada	0.67%		-	

Note: Summary table of current cost structures as described in Table 1 and Table 2. ^{1&2}Rate of total cost for the reference countries, calculated using identical methodology as Tables 1 and 2.

Adding the calculated CoC and the rest of the costs obtained from the report, we obtain the total amount of costs for a single imported shipment valued at USD 50,000. The ad-valorem amount of costs associated with imports, which is reported as a percentage, is the central element of this study investigating the effects of mitigating the preventable cost to import. In other words, following the nomenclature of Figure 1, Compliance (current) is reported as Rate of total cost to import in Table 1. Parallel to Compliance (current) in Figure 1, Compliance (reference) refers to Chile and Canada's Total Rate of Trade Costs for Imported Shipment.

We are assuming that the countries under investigation can reduce their transaction costs to trade, in terms of percentages, to those of the corresponding reference country.

For both imports and exports, a detailed empirical analysis is presented separately for each case. Real-world values of import and export volume, import demand/export supply elasticities and compliance costs are used to carry forward the quantitative effects of compliance costs on trade.

4.1. Land versus sea

It is clear in our data that there is a significant difference between trading through a land border and trading through a sea border. Hence, we analyse the cost structures associated with trading by making the difference between goods entering by land and the goods entering by sea. Table 4 below shows the intraregional (Latin American continent) import modes and export modes of Mercosur member states for 2014–2017 (Cepal, 2019). This indicates that

Latin American trade in the Mercosur region contains at least 47% of land border crossings. It is also reported that there are trace amounts of air and rail modes in the region, but the amounts are negligible. Excluding the trade on rail and airway transfers leaves the total trade to be shared between the waterborne and road modes. Therefore, we round up the percentages of these modes so that we can assume the existence of only two mediums in the region with which all the trade is made.

Table 4: Intraregional (Latin American) import modes for Mercosur member states

Nation		Import modes			
		1	2	3	4
		Waterborne	Road	Rail	Air
1	Argentina	53%	47%	<i>negligible</i>	<i>negligible</i>
2	Brazil	53%	47%	<i>negligible</i>	<i>negligible</i>
3	Uruguay	13%	87%	<i>negligible</i>	<i>negligible</i>
4	Paraguay	6%	94%	<i>negligible</i>	<i>negligible</i>

Note: Constructed using data from CEPAL (2019).

Table 5: Intraregional (Latin American) export modes for Mercosur member states

Nation		Export modes			
		1	2	3	4
		Waterborne	Road	Rail	Air
1	Argentina	42%	58%	<i>negligible</i>	<i>negligible</i>
2	Brazil	53%	47%	<i>negligible</i>	<i>negligible</i>
3	Uruguay	30%	70%	<i>negligible</i>	<i>negligible</i>
4	Paraguay	35%	65%	<i>negligible</i>	<i>negligible</i>

Note: Constructed using data from CEPAL (2019).

Given the nature of trading through a land border crossing we can assume that all trade via land occurs only intraregionally. As shown in Tables 4 and 5, substantial amounts of intraregional waterborne trading for Mercosur members does take place. The total land and sea trade of the Mercosur member states can be found after accounting for the total intraregional trade as a percentage of the total trade for each member state (World Bank, 2019a).

According to WITS, the intraregional trade of the Mercosur member states for 2019 is as shown in Table 6.

Table 6: Latin American trade, total trade and their ratios

		LAC exports (m\$)	LAC imports (m\$)	Total exports (m\$)	Total imports (m\$)	% of LAC for exports	% of LAC for imports
Nation		1	2	3	4	5	6
1	Argentina ¹	25,924	23,335	88,445	81,523	29.31%	28.62%
2	Brazil ²	44,014	31,041	334,463	292,344	13.16%	10.62%
3	Paraguay ³	7,240	5,375	9,948	15,853	72.78%	33.91%
4	Uruguay ⁴	3,148	4,538	11,190	12,973	28.13%	34.98%

Notes: Columns 5 and 6 are calculated by dividing Latin American trade with total trade for each Mercosur member nation. Data used is from UN Comtrade. ¹World Bank (2019a), ²World Bank (2019b), ³World Bank (2019c), ⁴World Bank (2019d).

After accounting for the land and sea trade percentages for both imports and exports, we are presented with the following table which uses the DOTS (Directory of Trade Statistics) International Monetary Fund import–export data for 2018 and percentages obtained from the WITS data.

Table 7: Total volume of trade by land and sea

		Import		Export	
		1	2	3	4
	Nation	Land (m\$)	Sea (m\$)	Land (m\$)	Sea (m\$)
1	Argentina	10,967.45	70,555.55	15,035.92	73,409.08
2	Brazil	14,589.27	277,754.73	20,686.58	313,776.42
3	Paraguay	4,676.25	11,176.75	5,068.00	4,880.00
4	Uruguay	4,265.72	8,707.28	2,046.20	9,143.80

Notes: The percentages obtained in Table 6 are used to calculate the amount of trade in each medium. The trade volume data used is sourced from DOTS (2018).

5. Empirical analysis

5.1. Estimating the potential welfare gain from improving import operations

The focus of this study focuses on two major cost-generating operations, border and documentary compliance costs. These costs are country-specific and are obtained through surveys answered by importers and exporters who operate in the reporting countries (Okazaki,

2018). The bottom-up approach of the data collection enables us to focus solely on trade costs incurred during or leading to border operations. Exclusion of other costs such as transportation enables us to have only trading bureaucracy frictions in our scope. Another benefit of the employed data set is the distinction made between land and sea borders. The land and sea distinction serves as a measure of accuracy, as the costs associated with each vary considerably. This enables us to work with two benchmark references for trade costs.

Benchmarks have two main uses. First, a benchmark country demonstrates a real-world example of achievability as a target. Treating all global dynamics associated with trade costs equally, it creates the grounds for setting an example to other countries. In this case, Chile demonstrates a meaningful benchmark example for sea border trade. With a total trade cost rate of 0.78% for both sea imports and sea exports, Chile stands as an achievable goal definer for Mercosur member nations. Canada has been selected to act as a benchmark for land border importing. Being a NAFTA member and trading heavily via land with the member countries, Canada has achieved great efficiency in land border importing operations, with a total rate of 0.67%. Meeting Canada's standards would greatly benefit the Mercosur members. Another advantage of using Canada is that the trade between the US and Canada involves a large volume of trade in intermediate goods. This is similar to the composition of the trade between various countries and Mercosur. In such a circumstance, the reduction in trade costs brought about by trade facilitation will reduce the cost of production of a wide range of industries that utilize these intermediate goods.

After accounting for the land and sea trade volume in goods, we arrive at Table 9. Table 9 is the X3 and M1 in our export supply and import demand models, respectively. For instance, $\Delta M1$ in Table 10 is obtained using equation [2] and M1 in equation [2] is taken from Table 9, column 2, for waterborne imports. Likewise, the M1 value for land border imports is taken from Table 9, column 1. The tariff rate used in determining the fiscal transfers as a result of increased tariff revenue is a weighted average tariff rate for each nation. Using equations [3], [4] and [5], the total of welfare gains are reported in column 8 in Table 10.

Table 10: Potential welfare gains from improving land and sea border operations when importing

Sea border		Preventable rate of compliance ^{e1}	Tariff rate ²	Import demand elasticity (ϵ^{ID}) ³	$\Delta M1$ (m\$) ⁴	A (m\$) ⁵	C (m\$) ⁶	D (m\$) ⁷	TOTAL (m\$) ⁸
		1	2	3	4	5	6	7	8
1	Argentina	2.12%	6.90%	-1.757	2,628.08	1,495.78	27.86	181.34	1,704.97
2	Brazil	2.03%	8.40%	-1.903	10,729.92	5,638.42	108.91	901.31	6,648.64
3	Paraguay	1.75%	4.00%	-1.224	239.41	195.59	2.09	9.58	207.26
4	Uruguay	2.55%	5.30%	-1.260	279.76	222.04	3.57	14.83	240.43
									8,801.31
Land border		Preventable rate of compliance ^{e1}	Tariff rate ²	Import demand elasticity (ϵ^{ID}) ³	$\Delta M1$ (m\$) ⁴	A (m\$) ⁵	C (m\$) ⁶	D (m\$) ⁷	TOTAL (m\$) ⁸
		1	2	3	4	5	6	7	8
1	Argentina	0.66%	7.40%	-1.757	127.18	72.39	0.84	9.41	82.64
2	Brazil	0.36%	8.00%	-1.903	99.95	52.52	0.36	8.00	60.88
3	Paraguay	0.67%	5.00%	-1.224	38.35	31.33	0.26	1.92	33.51
4	Uruguay	0.96%	5.30%	-1.26	51.60	40.95	0.50	2.73	44.18
									221.20

Notes: ¹Using equation [1], ²World Bank (2020b), ³Ghodsi et al. (2016), ⁴Authors 'calculation using equation [2], ⁵Authors 'calculation using equation [3], ⁶Authors 'calculation using equation [4], ⁷Authors 'calculation using equation [5], Total of columns 5, 6 & 7.

A potential welfare gain in excess of USD 9 billion is expected if the current trade costs regimes for importing operations are improved to match those of the reference countries. This estimation is an annual figure. It depends mainly on the volume of import trade and the amount of difference between current and reference costs rates. It can be expected that the biggest gains in the Mercosur region will be attained by Brazil and Argentina, as their trade is much larger than that of Paraguay and Uruguay. However, welfare gains as a percentage of GDP are much higher for smaller countries of the customs union. For instance, with a GDP of

USD 632 billion, Argentina's net welfare gains will amount to roughly 0.28% of its GDP. For Paraguay this figure is around 0.58% of its USD 41.7 billion GDP (World Bank, 2019c). This is in line with previous literature on trade facilitation, where bigger gainers from trade facilitation tend to be the less developed nations.

Welfare gains from improving importing operations translate mainly into cheaper imported goods for consumers to enjoy. This can be seen in Table 10, as the biggest welfare gain contribution is from Area A in Figure 1. This is the result of a direct effect on the consumer surplus of making imports cheaper. Even though the deadweight losses depicted as Area C in Figure 1 seem relatively more trivial, the total amount of roughly USD 144 million annually creates a great cost-benefit ratio for a mutual Mercosur single window project, where estimations on implementing a single window range from USD 11 million to USD 56 million (UNECE, 2013).

5.2. Estimating the potential welfare gain from improving export operations

As previously discussed, the potential welfare gains as a result of improving exporting operations are considered for waterborne exports only. Using Chile as the benchmark for this route, once again the PCT for exporting nations is reported in column 1 of Table 11. This rate is calculated using equation [1]. Unlike importing operations, exporting is not related to domestic tariff rates in our model. Hence, the improvement in exporting operations will yield two areas of gain in terms of consumer surplus. Areas A and B of Figure 2 for each Mercosur member are given in Table 11. The value of X3 in Figure 2 for this section is the total amount of goods exports made via a sea border crossing. Column 3 of Table 11 uses this X3 value to compute $\Delta X1$ using equation [6]. After finding the amount of increase in exports due to a price decrease ($\Delta X1$), the welfare gains of A and B can be calculated using equations [7] and [8].

Table 11: Potential welfare gain from improving sea border operations when exporting

		Preventable rate of compliance e^1	Export supply elasticity $(e^X)^2$	$\Delta X1$ (m\$) ³	A (m\$) ⁴	B (m\$) ⁵	TOTAL (m\$) ⁶
		1	2	3	4	5	6
1	Argentina	1.54%	0.64	723.52	1,130.50	5.57	1,136.07
2	Brazil	1.47%	0.81	3,736.14	4,612.51	27.46	4,639.97
3	Paraguay	1.25%	0.77	46.97	61.00	0.29	61.29
4	Uruguay	1.89%	0.78	134.80	172.82	1.27	174.09
							6,011.43

Notes: ¹PCT is obtained using equation [1]. ²Source for export supply elasticities for each Mercosur member is Tokarick (2014). ³Using equation [6]. ⁴Using equation [7]. ⁵Using equation [8]. Column 6 is the total of columns 4 and 5.

The potential net welfare gains from improving exporting operations yield to USD 6 billion for the Mercosur member states. Once again the biggest gainers in the customs union would be Argentina and Brazil. However, as part of a well-established customs union in the continent, the members of Mercosur trade heavily with each other. For instance, Argentina is in the top five for Brazil's import and export destinations. It is reported that Argentina's share in Brazil's exports is 4.34% of the total (World Bank, 2019b). Argentina's share in Brazil's imports is 5.95% (World Bank, 2019b). Such trade connections within Mercosur are more prominent for the other two members. It is reported that Uruguay exports 14.28% of its total exports to Brazil, and imports from Brazil and Argentina as a percentage of total imports are 19.87% and 12.35%, respectively (World Bank, 2019d). Improvement of trade administration costs in both import and export directions is a double benefit for the intra-Mercosur shipments.

5.2.1. Estimating the potential welfare gain from the export tax revenues for Argentina

Argentina stands out not only from the rest of the Mercosur members but from the majority of the world as well in regards to taxation of exports. Argentina has had a long history of export taxation policies starting from the mid-19th century up until today. According to an Argentine official report, Argentinian governments over the years used export taxation to control the trade of certain goods and to create revenue (Soltz et al., 2023). AFIP also reports that in recent years, taxes on exports have risen as the weighted average export tax is given as

14% for the year 2022. Although certain types of agricultural products are responsible for the majority of the tax revenue collected from exports, the weighted average is useful in the estimation of potential tax revenue gains from improving export operations. As given in Table 11 Argentina is expected to create USD 723.52 million more export trade as a result of improving the cost to export. This implies that the extra export tax revenue will be generated from this previously absent volume of trade.

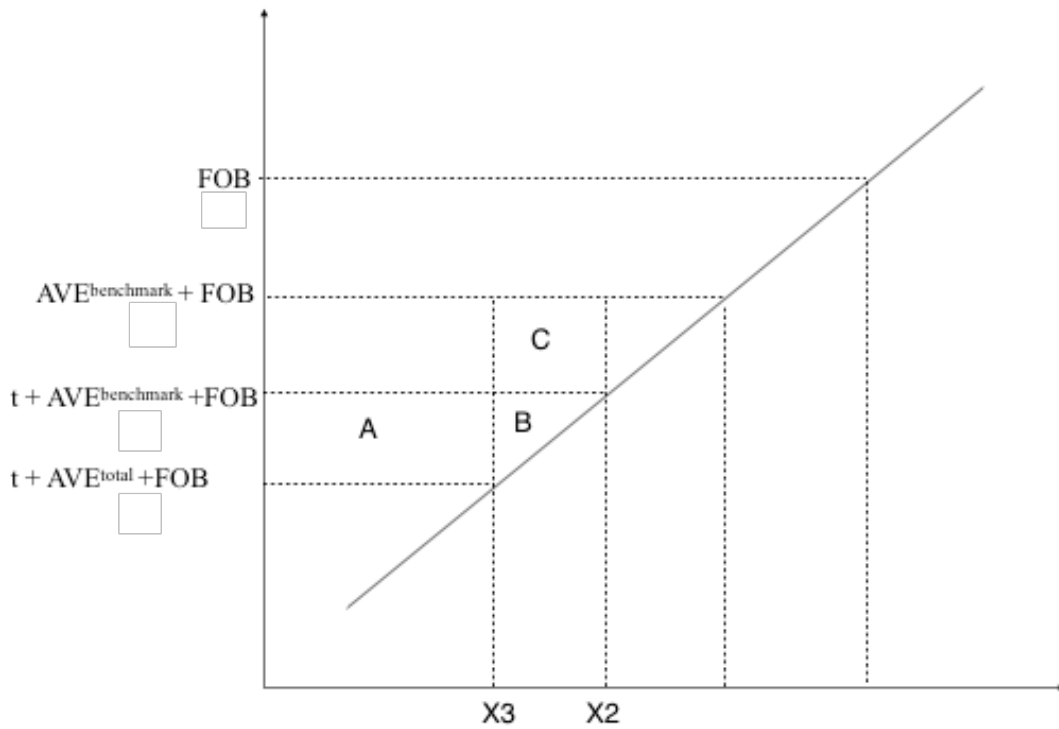


Figure 3: Representative export supply function of Argentina in which taxes are a part of export pricing. In addition to welfare gain areas described in Figure 2 the area of C is the additional tax revenue as a result of improving the trade cost from $t + AVE^{total} + FOB$ to $t + AVE^{benchmark} + FOB$.

Identical to the tariff revenue calculation in imports case using [5], the tax revenue from export operations can be defined as;

$$C = \Delta X1 \times EXPORTTAX \quad [10]$$

Using the figure of USD 723.52 million and 14% tax rate, the estimated welfare gain as tax revenue for the Argentinian government is USD 101.9 million

6. Discussion and policy implications

The amount of welfare gains promised with our model alone can be expected to direct investment into the areas where room for improvement is present. It should also be noted that there are no restrictions in any form for the countries of the bloc to go further than the reference figures for achieving greater efficiency in their trade costs regimes. Given that the figures in this study represent only the annual import/export volumes and hence annual welfare gains from more efficient trade cost regimes, the primary insight relates to the great potential of any type of reform in terms of cost-benefit ratio. The Mercosur bloc, with its vast and somewhat difficult terrain, will most certainly benefit from infrastructure investments that reduce transport costs. Like *Doing Business*, which does not include transport costs in cost calculations in its section on trading across borders, this study excludes transport costs and concentrates mainly on the costs arising during or leading to border operations. As Jenkins and Kuo (2006) set out, an infrastructural project in the form of a bridge on the River Plate connecting Argentina and Uruguay benefits both countries' traders as well as transits. Interestingly, Jenkins and Kuo (2006) also find Brazil to be the biggest net gainer in the Mercosur region, even though it was proposed that the bridge would be built between two other neighbouring countries. Despite our acknowledgement of the benefit of such infrastructural reforms in transportation, it would not be accurate to include those in our reform options. It is, however, also possible to lay out a wide range of policy reform options the successful implementation of which would most certainly benefit the country in achieving the potential gains in welfare calculated in previous sections.

In line with the TFA, an effective and comprehensive single window system is an essential tool for reducing trade costs. Although most members of WTO who have already signed and ratified the agreement have some form of single window, specific features of such a tool can maximize its effectiveness. A simple user interface is one of them. Continuous development and improvement of the system is another aspect that may increase the efficiency of such a system. Training of staff and/or issuance of user guidelines also should be done at regular intervals, in order to minimise the frequency of operator faults. South Korean customs authorities have reported that the introduction of a single window system for traders, other affiliated entities and border authorities brought a benefit of USD 18 million in the year of its introduction (UNECE, 2013). The same report also shows how great the return on investment

can be in such reforms. In Singapore, the introduction of TradeNet, the first system of its kind, resulted in a 9,900% benefit margin over the years (UNECE, 2013).

Export diversification is a direct effect of trade facilitation reforms. Following a cost reduction in exporting operations, goods that were not exportable because they are expensive can benefit from entering new markets. Furthermore, goods that were already being exported prior to a trade facilitation reform will be even more competitive in the world market. This edge has the potential to enable Mercosur member states to dampen the dependencies on a handful of commodities and create a much more varied portfolio of exports. The literature also indicates that export diversification is connected with GDP per capita (Dennis and Shepherd, 2011). Beverelli et al. (2015) report that meeting the average rate of WTO TFA implementation would benefit the LAC nations in terms of export diversification. The benefit is estimated to be a 12.2% increase in the number of products exported and an increase of 26.9% in the number of export destination countries.

As has been demonstrated, time is an important factor in cutting costs. Inspection of shipments that are actually low risk in terms of physio-sanitary or security causes shipments to queue at ports for many hours for an insignificant risk of hazard. Proper investigation and systematic labelling of shipments is essential to overcome these unnecessary wait times.

Reforming trade administration costs saves a significantly larger portion of real resources than trade liberation through tariff reforms. It is beneficial that firms and consumers fully digest the idea of trade facilitation to enable administrators to implement reforms in these areas, where there is great potential for welfare gains. North Cyprus, which has been subject to international trade embargoes, further suffers because of its inefficient internal trade administration costs (Berhan and Jenkins, 2012). This is a clear indication of how trade offsetting and welfare-depleting trade administrations can even be compared with global red tape in a specific region. Procedures that are not carefully planned and implemented will drain resources and prevent both importing and exporting firms from participating in GVCs. This extra burden translates directly to each and every citizen, and hence, unseen effects of excess trade transaction costs requires serious attention.

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