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

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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

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

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ABSTRACT

This paper evaluates potential welfare gains in the Mercosur region from improvements to trade administration. Streamlined border procedures and related processes could save billions, open markets for exporters, and promote trade diversification. Using a microeconomic model with country-specific trade elasticities, we compare the trade cost structures of Mercosur member states to those of Chile and Canada. The analysis distinguishes between land and sea borders, highlighting cost differences in these trade mediums. A unique case – the Argentinian export tax regime – is examined, revealing welfare losses from this tax that outweigh the benefits of reducing Argentina's trade costs. Our estimates suggest that if Mercosur's trade administration costs were reduced to the levels of the reference countries, the region could gain over USD 15 billion annually. This work underscores the substantial economic benefits of improved trade facilitation in the region.

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KEYWORDS
Trade facilitation; international trade; export tax; Mercosur

1. Introduction

The Mercosur trade agreement in 1991 between Argentina, Brazil, Paraguay, Uruguay and with the expansion to Bolivia in 2024 was designed to lower the barriers for trade between the countries of the region. A further objective was to make the region more competitive with respect to trade between the Mercosur countries and third countries. The main emphasis has been to create a customs union with tariff reductions for goods being traded between the countries along with a common external tariff. While the harmonization of the tariff systems to create a customs union has progressed quickly, there remains a formidable array of non-tariff barriers that add to the costs of international trade within the region and with countries abroad. One such barrier is the cost of complying with the trade administration procedures and regulations that are borne by the importers and exporters when moving goods across borders.

In this regard, the firms trading in the Mercosur region face significant administrative costs impacting both the costs of importing as well as exporting by firms in these countries. In the analysis carried out in this paper, compliance costs associated with

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the trade administration are quantified and include the cost of the time involved, the compliance cost for documentary completion and processing, and the fees associated with border operations.

As countries in the region seek to enhance their participation in global value chains (GVCs), reducing these costs becomes a critical area of focus. This study estimates the excessive trade administration costs by comparing the trade administrative costs incurred by importers and exporters of the Mercosur countries with two benchmark countries whose level of efficiency should be quite possible for the Mercosur countries to achieve. Chile is used as the benchmark for measuring the excess trade administration costs associated with sea border trade by Mercosur, while Canada is used as the benchmark for land border trade.

This paper investigates the potential economic welfare gains from reducing these trade-related compliance costs in the Mercosur region. The results of this analysis indicate very substantial economic savings could be realized that would improve the business environment for the firms engaging in international trade.

A key aspect of this study is the use of country-specific import demand and export supply elasticities, rather than a common trade elasticity, to estimate these gains. This approach contrasts with the standard practice of the structural gravity literature, which often employs a single trade elasticity across countries. The use of a single trade elasticity which may not fully capture the nuances of different countries' trade responses to changes in country-specific trade administration costs.

Previous studies have identified the role of administrative processes in contributing to trade costs and have highlighted the potential for significant cost reductions through trade facilitation reforms. This study makes two key contributions. First, it provides a quantitative analysis of the welfare gains from reducing trade costs in the Mercosur region. The potential gains in economic welfare are substantial, amounting to more than USD 15 billion annually. Second, it discusses the implications of Argentinian export taxation. This analysis provides insights into the welfare effects of the interaction of both export taxes as well as import tariffs with the reduction in trade administration costs.

The paper is organized as follows: Section 2 reviews the existing literature on trade costs, elasticities, and administrative processes and potential welfare gains because of trade facilitation primarily in the LAC region. Section 3 details the methodology used. Section 4 presents the current cost structures in the region, making a distinction between land and sea border crossings. Findings are presented in Section 5 highlighting the welfare gains and the special case of Argentina in terms of export tax effect. Section 6 discusses the implications for policy and suggests directions for future research. It concludes by summarizing the study's key contributions and their relevance to economic strategies in the Mercosur region.

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 (OECD/WTO, 2015). The WTO has stressed the positive impact of reforms that improve trade facilitation. Their study points out that the lowest-income countries are likely to gain most from such reforms. OECD/WTO (2015) 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 World Trade Organization, 2014). Since talks began in 2004 among WTO members on a comprehensive TFA, the number of regional trade agreements (TAs) that contain trade facilitation components has almost doubled (World Trade Organization [WTO], 2015). The landmark TFA amendment to the Marrakesh protocol has now been signed and ratified by a very large majority of WTO members.

Although the trade-reducing effects of higher trade costs have been examined throughout the literature, the welfare effects of such costs have been studied less (Willie & Chikabwi, 2018). Therefore, the literature review will be presented in two sections. The first section lays out a collection of studies which show the trade enhancing effects of trade facilitation. Secondly, studies which identify the positive welfare effects of trade facilitation are presented.

2.1. Trade enhancing effects of trade facilitation

A pioneering study in comparing the trade offsetting effects of transaction costs in trade is that by Finger and Yeats (1976). 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, at the time of 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 been implemented since the early 1980s. In the past two decades, the literature has gained a rich collection of studies investigating the effects of these TAs. Two of the most common methods used in these studies to quantify the potential impacts are computable general equilibrium (CGE) models and the gravity model of trade.

The study by Anderson and van Wincoop (2001) was one of the first to analyze the economic welfare effects of trade barriers. They estimated the non-tariff border barriers were equivalent to a 52% tariff on goods traded between the USA and the Rest of the World. The estimated impact of removing these non-tariff barriers would be to increase the volume of trade between the USA and the Rest of the World by 150%. They also find that further integrations such as monetary unions have a significant effect on increasing the economic welfare through increasing international trade.

Estevadeordal (2017) points out that in the 1990s, a time frame that also corresponds to the founding of Mercosur, Latin America and the Caribbean (LAC) embraced the trade liberalization trend. Tariffs were cut, and several free trade agreements (FTAs) were established. This trend was preceded by a period of relatively high protectionism in the LAC region (Loser & Guerguil, 1999). While tariff reform has been quite successful, for further improvements to the trading system attention must be given to extended trade policies beyond reducing import tariffs. This is because the historical FTAs made within the region were not designed to deal with country-specific customs-related costs, regulatory costs, informational trade barriers and other non-tariff barriers.

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 trade response 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 on the volume of trade as halving the distance between the trading countries.

The OECD (2009) also identifies a study that estimates an elasticity coefficient for the volume of trade and the number of border operations such as the number of signatures and documents required for importing goods. In this gravity model type analysis, it is estimated that a 10% decrease in the number of days waiting 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.

Moïsé et al. (2011) estimate that a 10% reduction in trade transactions costs is possible for OECD countries, following WTO TFA Trade Facilitation Indicators. The figure is higher for non-OECD countries. Lesser and Moise-Leeman (2009) find this to be in the lower bound of the unnecessary real trade administration costs.

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.

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

El Dahrawy Sánchez-Albornoz and Timini (2020) performed a CGE analysis, concluding that TAs between Latin American countries, as well as between Latin America and the Rest of the World, have a positive effect on the quantity of 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.

2.2. Economic welfare enhancing effects of trade facilitation

Lesser and Moise-Leeman (2009) report on the results of their analysis using a CGE model that a 1% reduction in trade costs can translate into an annual worldwide aggregate welfare gain of USD 40 billion. 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.

The 2015 World Trade Report (WTO 2015) employs a model to estimate the welfare effects of cutting trade costs. The section on the effect of inefficient customs procedures uses a microeconomic model similar to the one employed by this study. The report maintains that multilateral TFA agreements are the most sensible way to introduce an effective method of benefiting both parties of an import–export relationship. The report argues that the implementation of an agreement on a multilateral basis, hence ensuring collective risk taking and the implementation of trade facilitation policies, is the most fair and sound way forward.

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. eUsing 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.

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.

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 et al. (2023) have estimated the 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 in 0.28%.

3. Methodology

The current study uses a microeconomic partial equilibrium framework to analyze 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 an ad valorem basis to this level.

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. 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

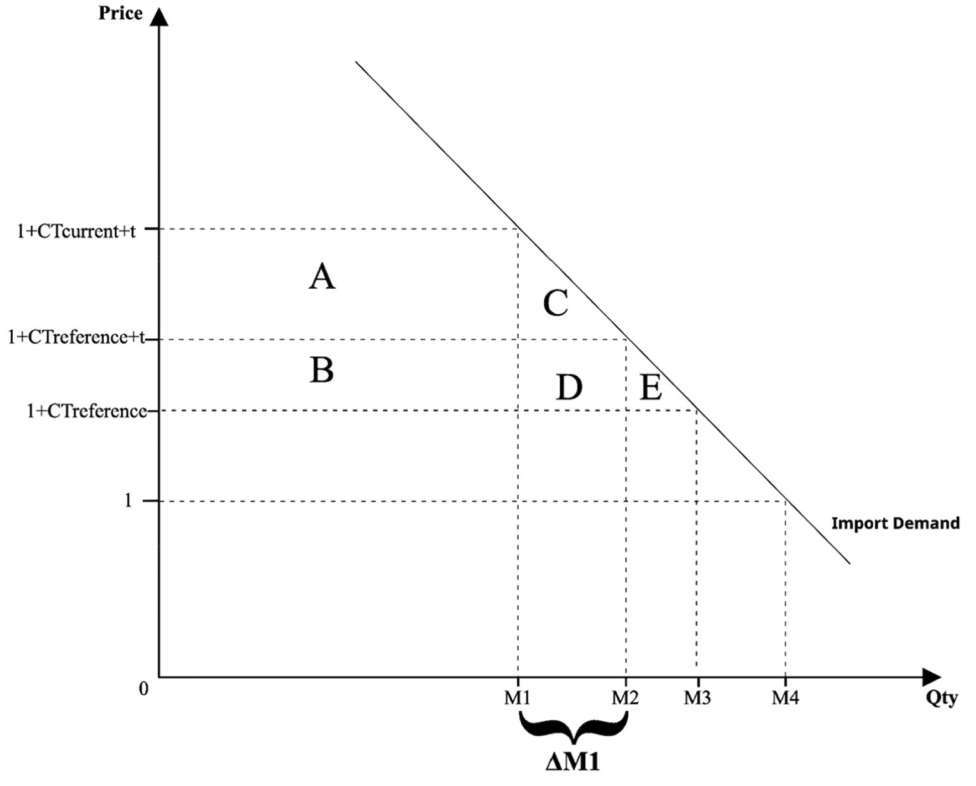

Figure 1. Representative import demand function of an importing country.

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 these 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 for that model 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, the elasticities used for exports are given as being 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 Grübler et al. (2022) 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

In Figure 1, the highest price level, $CT^{current}$+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 $CT^{reference}$ 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 a member of a regional trade bloc (NAFTA) and reported as being 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 into 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 this rationale, it is convenient to set out our model with the definition of preventable cost to trade, PCT:

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

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 change in import or export quantities as a reaction to a change in price. This change in price is the result of eliminating PCT. For the import case, the calculation to find the change in import volumes (ΔM1) 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 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 welfare effect will arise from the increase in 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 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 that 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 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 PCTs are eliminated. PCTs are calculated by simply taking the difference between the rates of costs associated with the exports of economies under investigation with 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, as the calculated land crossing export costs of studied countries in the Mercosur and those of reference countries are very similar, giving very little, if any, potential for economic welfare gain if the Mercosur countries are to improve to the reference cost rates. Thus, this study rules out land border exports from its scope to focus on providing a more realistic goal for the countries under investigation.

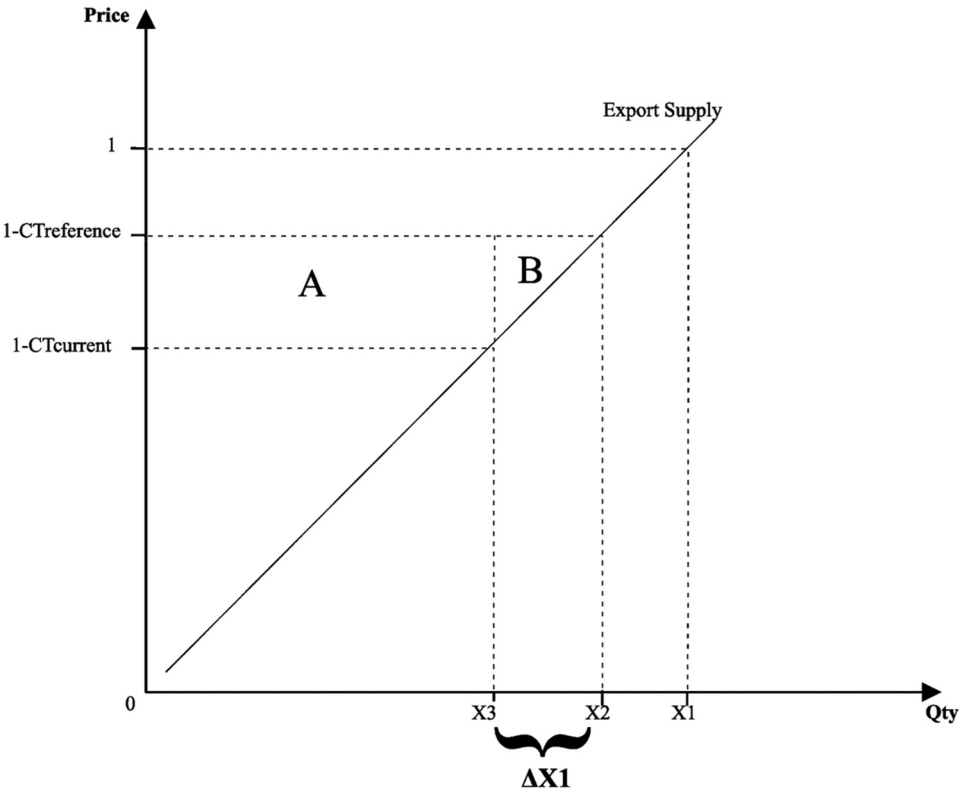

Figure 2. Representative export supply function of an exporting country.

To calculate the welfare losses resulting from excess export transactions 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 X3 and X2 (ΔX1), 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:

$$\Delta X1 = \varepsilon^X \times PCT \times X3 \quad [6]$$

As was the case with imports, X3, the current amount of exports in USD, is an observed variable. After finding ΔX1, 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:

$$X3 \times PCT \quad [7]$$

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 modes of transportation. The volume of trade made in services is excluded from this study to match the relevant data on costs.

4. Current cost structures

As reported in the *Doing Business* report, trade administration costs associated with imports/exports consist of the border compliance cost and documentary compliance cost (World Bank, 2020a). The time value, or cost of capital (CoC), for the investment tied up in the process 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 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. The CoC in LAC is taken as 10%. This value is based on Moore et al. (2020). 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 CoC for both imports and exports becomes:

$$CoC = \frac{Time\ to\ import \times Cost\ of\ capital(annual) \times Shipment\ value}{8760} \quad [9]$$

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.

Table 1. Current compliance costs for imports.

	Nation	Total time to import (hours)[1] (1)	Cost of capital ($)[2] (2)	Documentary compliance ($)[1] (3)	Border compliance ($)[1] (4)	Total cost to import ($)[3] (5)	Rate of total cost to import[4] (6)	Import mode[5] (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

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

Table 2. Current compliance costs for exports.

Nation		Total time to export (hours)[1] (1)	Cost of capital ($)[2] (2)	Documentary compliance ($)[1] (3)	Border compliance ($)[1] (4)	Total cost to export ($)[3] (5)	Rate of total cost to export [4] (6)	Export mode[5] (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

[1&5]World Bank (2020a). [2]Authors' calculation using equation [9]. [3]Total of columns 2, 3 and 4. [4]Division 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) Land	(2) Sea	(3) Land	(4) 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%		-	

Summary table of current cost structures as described in Tables 1 and 2.
[1&2]Rate of total cost for the reference countries, calculated using identical methodology as Tables 1 and 2.

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

The data used in this study clearly demonstrates a significant difference between trading via land borders and trading via sea borders. 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

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

		Import modes			
Nation		(1) Waterborne	(2) Road	(3) Rail	(4) Air
1	Argentina	53%	47%	*negligible*	*negligible*
2	Brazil	53%	47%	*negligible*	*negligible*
3	Uruguay	13%	87%	*negligible*	*negligible*
4	Paraguay	6%	94%	*negligible*	*negligible*

Constructed using data from CEPAL (2019).

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

Nation		Export modes (1) Waterborne	(2) Road	(3) Rail	(4) Air
1	Argentina	42%	58%	*negligible*	*negligible*
2	Brazil	53%	47%	*negligible*	*negligible*
3	Uruguay	30%	70%	*negligible*	*negligible*
4	Paraguay	35%	65%	*negligible*	*negligible*

Constructed using data from CEPAL (2019).

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

Nation		LAC exports (m$) (1)	LAC imports (m$) (2)	Total exports (m$) (3)	Total imports (m$) (4)	% of LAC for exports (5)	% of LAC for imports (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%

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 (2022). [1]World Bank (2019a), [2]World Bank (2019b), [3]World Bank (2019c), [4]World Bank (2019d).

(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 small 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.

Given the nature of trading through a land border crossing, we can assume that all trade via land occurs only regionally. As shown in Tables 4 and 5, there are substantial amounts of intraregional waterborne trade taking place between Mercosur members. 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.

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.

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 differ 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% of the value of standard shipment 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% of the value of a standard shipment. 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 the Mercosur countries. 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 7. Table 7 values are the X3 and M1 in our export supply and import demand models, respectively. For instance, ΔM1 in Table 8 is obtained using equation [2] and M1 in equation [2] is taken from Table 7, column 2, for waterborne imports. Likewise, the M1 value for land border imports is taken from Table 7, column 1. The tariff rate used in determining the fiscal transfers from increased tariff revenue is a weighted average tariff rate for each nation. Using equations [3], [4] and [5], the total welfare gains are reported in column 8 in Table 8.

A potential annual welfare gain of more than USD 9 billion is expected if the current trade costs regimes for importing operations are improved to match those of the reference countries. It depends mainly on the volume of import trade and the amount of difference between the rates of current and reference country costs. 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

Table 7. Total volume of trade by land and sea.

		Import		Export	
	Nation	(1) Land (m$)	(2) Sea (m$)	(3) Land (m$)	(4) Sea (m$)
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

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).

Table 8. Potential annual welfare gains from improving land and sea border operations when importing.

		Preventable rate of compliance[1] (1)	Tariff rate[2] (2)	Import demand elasticity (ε^{ID})[3] (3)	ΔM1 (m $)[4] (4)	A (m$)[5] (5)	C (m $)[6] (6)	D (m $)[7] (7)	TOTAL (m$)[8] (8)
Sea border									
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									
1	Argentina	0.66%	6.90%	−1.757	127.18	72.39	0.84	9.41	82.64
2	Brazil	0.36%	8.40%	−1.903	99.95	52.52	0.36	8.00	60.88
3	Paraguay	0.67%	4.00%	−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

[1]Using equation [1], [2]World Bank (2020b), [3]Grübler et al. (2022), [4]Authors' calculation using equation [2], [5]Authors' calculation using equation [3], [6]Authors' calculation using equation [4], [7]Authors' calculation using equation [5], Total of columns 5, 6 & 7.

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 8, 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. The total potential annual welfare gains from improving import side amounts to 0.33% of the Mercosur GDP.

5.2. Estimating the potential welfare gain from improving export operations

As previously discussed, the potential welfare gains because 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 9. Potential annual welfare gain from improving sea border operations when exporting.

		Preventable rate of compliance[1] (1)	Export supply elasticity (ε^{X})[2] (2)	ΔX1 (m $)[3] (3)	A (m$)[4] (4)	B (m $)[5] (5)	TOTAL (m $)[6] (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

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

Table 9. This rate is calculated using equation [1]. Unlike importing operations, exporting is not related to domestic tariff rates in our model. Hence, the reduction in trade administration costs with respect to export 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 9. The value of X3 in Figure 2 for this section is the total amount of goods exported via a sea border crossing. Column 3 of Table 9 uses this X3 value to compute ΔX1 using equation [6]. After finding the amount of increase in exports due to a price decrease (ΔX1), the welfare gains of A and B can be calculated using equations [7] and [8].

The potential net welfare gains from improving export 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 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.

The total potential annual welfare gains because of improving export operations in Mercosur amounts to 0.22% of the Mercosur GDP.

5.2.1. Estimating the potential economic welfare effects of export taxation by Argentina

Argentina stands out not only from the rest of the Mercosur members but from the majority of the world in regard to the 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). They also report 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 agricultural products bear the majority of the tax revenue collected from exports, the weighted average is useful in the estimation of the economic welfare impacts of export taxation in Argentina.

In the first instance, the taxation of exports has the same impact on the international trade of a country as a system of tariffs of equal average rate which is also known as the Lerner symmetry in the literature (Costinot & Werning, 2019). The loss in economic welfare is similar to the loss created by a set of tariffs with an average rate of 14%.

The combined impact of the export taxes and the excess administrative costs of international trade serve to restrain the volume of exports to X4 as illustrated in Figure 3. Areas A plus B represent the economic welfare loss created by the excess transactions costs alone. At this volume of trade, the amount of export taxes collected by the government is equal to the area E. The sum of the areas C, D represent an additional economic welfare loss created because of the combination of the distortions of

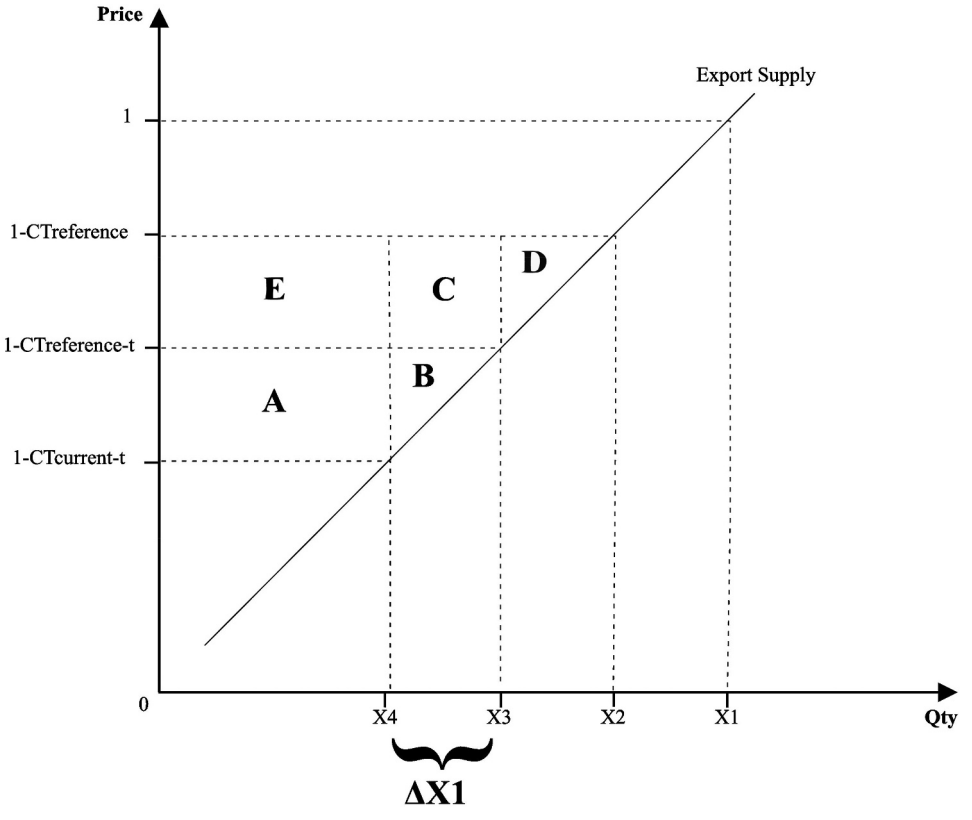

Figure 3. Representative export supply function of Argentina in which taxes are a part of export pricing.

the excessive trade transaction costs plus the export tax has restrained the volume of exports from X2 to X4.

The reduction in the excess trade administration costs will result in an additional welfare benefit over and above what was reported in Table 9. The reduction in these costs and the resulting expansion in exports yield a welfare gain because the export tax has driven a wedge between the value to the country of the additional export earnings and the domestic resource costs of these additional exports. The greater benefit from export expansion than the cost of supply can also be measured by the increase in export taxes resulting from the increase in export sales. This incremental net benefit is shown as the area C in Figure 3.

The reduction of the trade administration cost from 1-CTcurrent-t to 1-CTreference-t, as shown in Figure 3, is estimated to increase the value of exports by USD 723.52 million. Given the average export tax in Argentina of 14% of the FOB value of exports, the estimated welfare gain to Argentina is USD 101.9 million annually, which is equal to the increase in the export tax revenues.

Even with the reduction in excess trade administration costs, the economic welfare loss from Argentina's export tax remains as shown by area D in Figure 3. This economic welfare loss amounts to approximately 545 million USD annually. This residual loss in

economic welfare is approximately 50% of economic welfare gained from the elimination of the excess trade administration costs for exports for Argentina (Table 9, row 1, col. 6). Although the economic welfare cost of the export tax is very substantial, the economic losses that would be incurred without the reduction in the excess trade administration costs are substantially larger.

6. Discussion and policy implications

The estimates of the potential economic welfare gain from reducing the compliance costs of trade administration have been made using individual country own-price elasticities of demand for imports and supply of exports, rather than region-wide averages.

Although the import weighted average of the own-price elasticity of demand for imports is −1.82 for the region, the estimates range across the countries of Mercosur from a low of −1.260 for Uruguay to a high of −1.903 for Brazil. Similarly, the exported weighted average own-price elasticity of supply is 0.77 for the region, while the estimates range from 0.64 for Argentina to 0.81 for Brazil. The use of price elasticities that are specific to the country adds a degree of accuracy to the final estimates of the potential economic welfare gains. This is particularly the case for the analysis for the Mercosur region as the international trade flows for Brazil make up more than 70% of the total of both the flows of imports and exports. Furthermore, the estimates of potential economic welfare improvements from a given degree of cost reduction are very much determined by the magnitude of these price elasticities as well as the initial volumes of import and export trade.

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. Operational single windows (SW)

enhance trade significantly, make exports more competitive, importing more efficient and this comes because of SWs having cost reducing effects, mainly by speeding up processes and reducing documentary compliance (Martínez-Zarzoso & Chelala, 2020). Although most members of the 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 export 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 relates to GDP per capita (Dennis & 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 phytosanitary 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 & 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 require serious attention.

7. Summary of the results and limitations

The formation of the Mercosur trade bloc has resulted in a major trade reform in terms of tariff rationalization by the countries who are members of this bloc. However, the findings of this study suggest that there are significant potential economic welfare gains for the Mercosur region if they were to undertake measures to reduce the administrative costs of international trading. The improvements proposed are ones that have already been implemented for many years by Chile and Canada. By meeting the levels of trade administration cost of these reference countries, the annual economic welfare gain for imports alone would amount to 0.33% of the Mercosur's GDP. Similarly, improving the administration costs for exporting has the potential economic gain of 0.22% of the GDP of Mercosur. Combined, the two components of the welfare gain potential amounts to 0.55% of the annual GDP of the countries of the trading bloc. The model used in this study displays these results in terms of the improvements in consumer and producer surpluses gained by the residents of these countries.

The models used to carry out this analysis are developed to focus clearly on the potential economic welfare impacts of the changes in the compliance costs from the introduction of more efficient border clearance practices in the Mercosur countries. The model used in this analysis is a partial equilibrium analysis. With the reduction in the resource costs of complying with the trade administration, there will be an expansion of the traded goods sector which is expected to require resources to move from the non-traded to the traded sectors. If there are taxes and subsidies in the non-traded sectors, then we should expect that there may be a difference between the financial and economic values of the resources that move to augment the production of the traded goods sectors. In the analysis presented in this article the impacts on the economic welfare of the non-traded sectors of the economy are assumed to be small or zero. However, a general equilibrium analysis would attempt to estimate these net benefits or costs arising from the shift of production resources from the non-traded sectors. An extension of the research carried out here would be to extend the analysis to include these potential general equilibrium adjustments.

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