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Estimation of Economic Welfare Gains from Trade Facilitation in the Andean Community

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Abstract: Border procedures around the globe can act as barriers hindering international trade. Another impact of these procedures relates to their economic resource costs. In this study, using a microeconomic framework of international trade, the potential economic gains are estimated for reductions in trade administration costs related to sea border trade in the Andean Community (CAN) as well as for the increase in import and export trades that are stimulated as a consequence of the reduction in trade administration costs. The potential cost reductions are estimated separately for import and export trade. The estimates are made with respect to the existing levels of trade flows. We measure the excess economic cost of the current trade administration procedures in CAN with respect to two benchmark levels of trade administration costs, namely those for Chile and Singapore. Our results suggest that improving the trade administration cost levels to match those of the reference countries will enable CAN countries to enjoy economic resource savings of between USD 1.25 billion and 1.5 billion annually, corresponding to 0.19% to 0.23% of their gross domestic product. Given the current trade environment of CAN nations, relevant policy and reform options are suggested. The key policy recommendation is to improve the electronic single window system for trade administration and in particular, the interconnectivity of information flows between the member countries of CAN. Maintaining the port infrastructure is also critical for the delivery of efficient services for the movement of goods.

Keywords: international trade; trade facilitation; trade administration cost; trade transaction costs; economic gain; welfare gain; Andean Community; Latin America

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1. Introduction

Over the past three decades, there has been a series of trade reforms in the Americas that concentrated on harmonizing and reducing tariffs. Various regional groupings have been formed to promote such policies, such as Mercosur (Argentina, Brazil, Paraguay, and Uruguay) in 1994, NAFTA (US, Mexico, and Canada) in 1994, and the Andean Community (Bolivia, Colombia, Ecuador, and Peru) in 1996 [1]. With the reduction of import tariff rates, the attention has shifted to other impediments to international trade that exist in countries concerning the management of their international trade flows. From the experience of many countries, many of these administrative costs and time delays can be reduced. When such costs are more than their most efficient level, they have a direct effect to reduce the level of economic welfare in a country.

The realization of the economic importance of reducing trade administration costs prompted the World Trade Organization (WTO) during the first WTO Ministerial Conference in Singapore in 1996 to initiate a discussion on trade facilitation. Following acceptance by two-thirds of WTO members, the Trade Facilitation Agreement (TFA) came into force in 2017. Since that time, there have been many trade facilitation initiatives undertaken by

countries around the world. Trade facilitation can be defined as the simplification, standardization, and harmonization of procedures and associated information flows required to move goods from sellers to buyers and to make payments.

All member states of CAN are members of the World Trade Organization (WTO) and have ratified the WTO's Trade Facilitation Agreement (TFA). According to the WTO [2], the CAN bloc countries have a TFA implementation rate of 87.7 as of 5 December 2022. Although the implementation rate of CAN is above the global average, the costs associated with trading operations need improvement so that CAN nations can benefit from the potential economic welfare gains estimated in this paper.

This paper analyses the economic costs associated with the public sector's administration of trade flows in the Andean Community (CAN). Estimates are made of the potential economic welfare gain from reducing these costs through trade facilitation measures. Inefficient and complicated procedures during and leading to import/export operations can be improved to create a more efficient and simple system of trade administration. This will allow a reduction in the costs of both imports and exports. Our research hypothesis is that the quantitative monetary estimates of the gains from trade facilitation interventions in CAN will be very substantial. Estimates of such gains in the billions of USD per year should be a powerful catalyst for reform by CAN countries of such procedures [3]. In addition, policy options are discussed, as means of achieving the estimated potential gains. Trade facilitation measures that attempt to reduce the cost of trade administration rely heavily on the applications of information technology. The single window systems that have been highly effective at reducing such costs have been based on an integrated information system. The emerging advanced technologies of blockchain and AI will no doubt enhance issues of security and risk assessment with respect to cross-border trade while saving time and costs for all involved parties [4–6].

With a population of over 100 million, CAN countries have a lot to gain from improving their trade administrations. As a bloc, CAN countries trade in large quantities with other members of the bloc, and even more trade takes place with the rest of the world. In 2020, bloc members collectively had an import volume of over USD 150 billion CIF. Using a microeconomic framework, we analyse the potential economic gains if the CAN countries improve their costs associated with import/export operations to meet the standard of a benchmark reference country. The impact of better trading procedures is not only limited to quantifiable economic gains. Effective trade facilitation measures also result in a greater variety of imported and exported goods, enable firms to participate in global value chains (GVCs) and the transfer of know-how, and create more business opportunities in general.

2. Literature Review

Trade facilitation initiatives have been associated in the literature with increased trade flows, improved import/export diversification, and economic growth.

It has been reported by Anderson and Van Wincoop that border barriers or non-tariff barriers hinder trade [7]. An econometric study using regression simulations to find the effects of improving logistics, customs environment, and e-business usage standards of APEC countries, finds that intra-APEC trade would increase by 21%, and the gain from improving behind the border regulatory harmonization and e-business usage is USD 116 billion [8]. In their simulation, Wilson et al. find that trade facilitation has the potential to increase the trade of the 75 studied countries by USD 377 billion, which represents 10% of the total trade of the studied nations [9]. In their 2009 study, Portugal-Perez and Wilson find that trade facilitation can have significantly more benefits than trade liberalization. They give the example of Ethiopia, where, if it were able to improve its trade cost efficiency so that the gap between Ethiopia and Mauritius in costs were reduced by half, the response in the volume of imports would be equivalent to that produced by a 7.8% reduction in the tariffs [10]. Once again, Portugal-Perez and Wilson state that improvement to the trading regime, specifically in the areas of infrastructure and border efficiency, can have substantial benefits [11]. Moïse and Le Bris, in their 2013 report, discuss the trade facilitation initiatives

and cite a study wherein a 1% reduction in trade costs can result in USD 40 billion in welfare gains globally. The authors further underline that some trade facilitation initiatives have the potential of having immediate positive effects [12]. An extensive literature review by the World Bank summarized the impacts of trade facilitation interventions as trade cost reducing, trade enhancing, trade diversifying, and trade enabling outcomes, the latter being particularly important for smaller firms [13].

Although Latin American countries have managed to record progress in the field of trade facilitation, there are still many challenges and plenty of room for improvement [14]. According to the World Bank's *Doing Business 2020* report, countries in Latin America and the Caribbean (LAC) lag behind high-income members of the Organisation for Economic Co-operation and Development (OECD) by a significant margin in terms of the Trading Across Borders component of the report [15].

Using firm-level data from Peruvian exporters, Lee et al. found that trade facilitation measures and trade facilitation provisions in Preferential Trade Agreements of which Peru is a member have a positive effect on exporting firms, in particular GVC firms [16]. The main channel in which this benefit surfaces is efficiency gains in Peru's domestic border operations. The estimated benefit of trade facilitation measures is not only limited to Peruvian firms, but also applies to their trading partners [16].

In a CGE analysis, possible welfare gains associated with removing non-tariff barriers (NTBs) were estimated. This study by Fugazza and Maur estimated that CAN countries have the potential to gain 0.1% to 1.2% of their gross domestic product (GDP) as welfare gains from removing all NTBs during importing [17]. The same study, using NTBs while exporting as ad valorem tax on exports, found that removing them altogether would result in 0.1% of GDP gain for the bloc.

Otsuki used a gravity model analysis and reported that progress in the trade facilitation fields of port efficiency, customs environment, regulatory environment, and service sector infrastructure can lead to great increases in trade volume [18]. Improvement toward the halfway point of the global average is estimated to create around USD 100 billion of trade volume as a result of trade facilitation in the LAC region.

In a study estimating the effects of customs reform in Albania, Fernandes et al. found that a 0.36% tariff equivalent reduction in trade costs yielded savings of USD 12 million in 2012 [19].

According to estimations from OECD's METRO simulation model, trade facilitation reforms can create additional gains of 0.04% to 0.41% for a country's GDP [20]. For Latin America, the estimated welfare gains amount to 0.2%, while the welfare gain estimation for Central America and the Caribbean is around 0.4%.

A study by Choi et al. suggested that the low-value exports that are more likely to be exported by a developing nation are undermined by export costs as much as by export delays [21]. The study reported that for the period 2006–2011, the mean trade delay and trade costs (cargo documentation filing, shipment inspection, and other related costs, including handling at the ports) in the CAN region were 23.7 days and USD 1375.3, respectively, while for the EU the delay and costs were 10.8 days and USD 903.1. Choi et al. argued that developing nations have managed to bring down these delays but at the cost of increasing the fees associated with trade [21].

A recent study looking into the African trade bloc ECOWAS has found that the economic welfare cost of an inefficient trade administration system is much larger than the impact tariffs have on welfare. Improving the standard of the trade-costs regime in ECOWAS is expected to yield positive welfare gains that are 2.5 to 4.4 times greater than the expected gains from removing tariffs completely [22]. Furthermore, the total potential welfare gains in the region are estimated to be between USD 1.56 billion and 2.69 billion, amounting to 0.24% to 0.42% of their GDP. Using a similar methodology, Jenkins and Safaeimanesh have reported that the potential economic gains in the South Africa Customs Union (SACU) amount to USD 2.2–3.7 billion in 2018 prices [23]. In this study, the authors include a well-structured single window system amongst the suggested policy options to be implemented in this customs union.

Jiahao et al. also found significant evidence relating trade facilitation to sustainable economic growth [24]. 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.

CAN countries are estimated to increase their intra-agreement trade significantly as a result of trade liberalisation policies in [25]. Although LAC countries' behaviours are not homogeneous, in general, the poor intra-regional trade performance of LAC is explained by high costs to trade. The authors found evidence for complementarity of trade facilitation measures with trade liberalisation policies in terms of their effectiveness in reducing trade costs [25].

Recently, a study investigating central Asian countries concluded that improving hard infrastructure is very important in terms of trade creation [26]. The authors also make the case for trade facilitation, stating the need for soft measures to accompany the hard infrastructure improvements. In their econometric study, they found that increasing the speed of cargo in transit or across borders by 1% may enhance the studied nations' exports by 0.93%. This increase in cargo transport speeds may be achieved by both improving physical infrastructure and improving border operations [26].

Research completed to date on the potential economic welfare gains because of trade facilitation is very limited. Most of the research in the field of trade facilitation and its outcomes has been undertaken using computable general equilibrium (CGE) and gravity models that were designed to measure the impact on trade flows [13]. This article augments the existing literature by providing a practical micro-based approach, to quantify in monetary terms the economic welfare gains from trade facilitation.

3. Model and Methodology

A microeconomic model is the primary methodology used in this paper. Surpluses associated with reducing the price of imports and increasing the price of exports are calculated separately. As a result of changing trade administration procedures in the sense of improving efficiency and hence reducing the costs associated with trading, the consequent reduction and increments in prices of imports and exports (each treated as a composite good) will create consumer and producer surpluses, respectively. These surpluses at the national level translate into market economic gains in which a positive welfare effect is the expected outcome. This positive effect comes in different forms. The biggest impact comes as a result of the direct effect of reducing the costs of imports and exports in which more is imported/consumed, and more is exported/produced. It is useful to consider these costs associated with importing and exporting operations as a tax on trade in which a deadweight loss is created as a result of this tax, while eliminating part of deadweight losses constitutes the second biggest area of welfare gains. In the case of imports, another positive welfare gain of reducing trade costs is the increase in tariff revenue because of increased import volumes.

The taxing nature of the costs associated with trading is inevitable, as resources need to be used to organize and administer every step of any given operation, and this is true for trading as well. However, inefficient operations and burdensome regulations act as an excess amount of tax, which in turn creates an excess amount of welfare losses. To analyse the potential welfare gains from improving trade administration costs, we treat these costs as ad valorem taxes on total import/export volumes and build our model on various price levels arising from these costs.

An important aspect of this research is the use of import demand and export supply elasticities. With the model at hand, finding the change in volume of trade from current levels necessitates the use of import demand and export supply elasticities. The reactive change in quantities that is necessary to find the surpluses and losses will be found by using elasticities. These country-specific import elasticity values are taken from Grübler et al. [27], and for the export elasticities, from Tokarick [28]. The country-specific import demand functions reported in [27] are based on a semiflexible translog GDP maximization function

outlined by Kohli [29], while the country-specific export price elasticities data are based on a standard general equilibrium methodology.

To determine what constitutes an efficient trade administration, ad valorem trade cost values of two selected countries are used as benchmarks. The usage of a benchmark reference enables us to have a figure for potential welfare gains if the countries under investigation meet the level of the benchmark. These reference countries need to possess at least some resemblance to the countries under investigation, and must also have a successful history in trade facilitation to be able to stand as a meaningful reference. In this regard, Chile is selected as the first reference benchmark trade-costs regime because of its geographical, historical, and cultural similarity to the CAN bloc. Another important criterion is the fact that important and effective trade facilitation reforms have enabled Chile to have an efficient trade-costs regime [15]. The other benchmark trade-costs regime selected is Singapore. Singapore is an obvious reference benchmark because, through the development of its TradeNet system, it was able to dramatically lower its costs of trade administration [12]. Since that time, the Singapore government has inspired some countries to implement trade facilitation measures, especially digitalization measures [30]. It currently stands as a global reference benchmark with an efficient trade-costs regime ranking second in the world in the Ease of Doing Business global list [15].

The trade costs data used in this study are from the latest available *Doing Business* report, which was published annually by the World Bank Group until 2021 [15]. The World Bank Group announced that the *Doing Business* report will be discontinued, and a new report will be published under the name *Business Enabling Environment* (BEE) [31]. This new report will include new ways and methods to measure the metrics used by the *Doing Business* report. For the Trading Across Borders component of the *Doing Business* report, a qualitative enhancement is expected to be included in the BEE report [31]. The trade-cost data in the *Doing Business* report are based on surveys conducted with the trading agents, including importers/exporters, freight forwarders, and customs agents, and is reported in the Trading Across Borders section of the report. It can be classified as a disaggregate set of data and enables us to study the effects of trade administration through a bottom-up approach in terms of data. However, our model takes the import and export functions as aggregate for the whole market and uses real-world trade volume data (CIF and FOB) (Cost, Insurance and Freight [CIF] and Free on Board [FOB] are standard incoterms for defining import and export volumes, respectively) to determine the current positions of the reporting nations. The reporting nations are taken as price takers in the global markets.

4. CAN Sea Trade

There are several seaports in Colombia, Ecuador, and Peru where the majority of trade to and from CAN takes place. Bolivia, being a landlocked nation, trades via land borders with neighbouring countries, and its overseas trade takes place through transits from neighbouring nations' seaports. Our data source, *Doing Business*, reports that Bolivian overseas trade takes place primarily through Chile [15]. This is mostly because the transit import and export happen via the seaports of Arica and Iquique in northern Chile, with relatively good land connectivity and a convenient 3 h drive from the closest border towns. Chile also has agreements and preferential treatment for Bolivia, providing ease when conducting overseas trade, while similar measures from other neighbouring nations in recent years have increased the number of trade routes for Bolivian traders [32].

The focus of this study is limited to the costs associated with sea border trading, and more specifically, sea border trading for containerized shipments. Therefore, all trade values for Bolivia are excluded, as there needs to be a third country between the trading partners, which complicates the estimation of the potential economic benefits from improvements to the sea border trading costs. Furthermore, some of Bolivia's top exports, petroleum gas and metal ores, are not containerized and are shipped in bulk, while the data regarding the costs do not fully cover such shipments.

The remaining CAN members also trade non-containerized goods to and from countries in the rest of the world. Crude petroleum (HS 2709), petroleum gas (HS 2711), and copper ore (HS 2603) have been identified as the most significant goods of CAN trade, in terms of value, that are not shipped in a container. Therefore, all trade figures that are used in the empirical part exclude the trade of those goods.

In order to find the amount of land trade that takes place, we use data from UN Comtrade [33]. UN Comtrade includes the mode of transport for imports and exports. Although information on transport modes is reported for most nations, data on the transport modes of trade volumes for Peru is missing from the most recent data. Therefore, we use the ratio of sea imports and exports as a percentage of total imports and exports from 2019 (the most recent year that gives the modal split for transport) and imposed it on the most recent data.

5. Estimating Potential Economic Welfare Gains from Import Operations

The import demand function of a given country is represented in Figure 1.

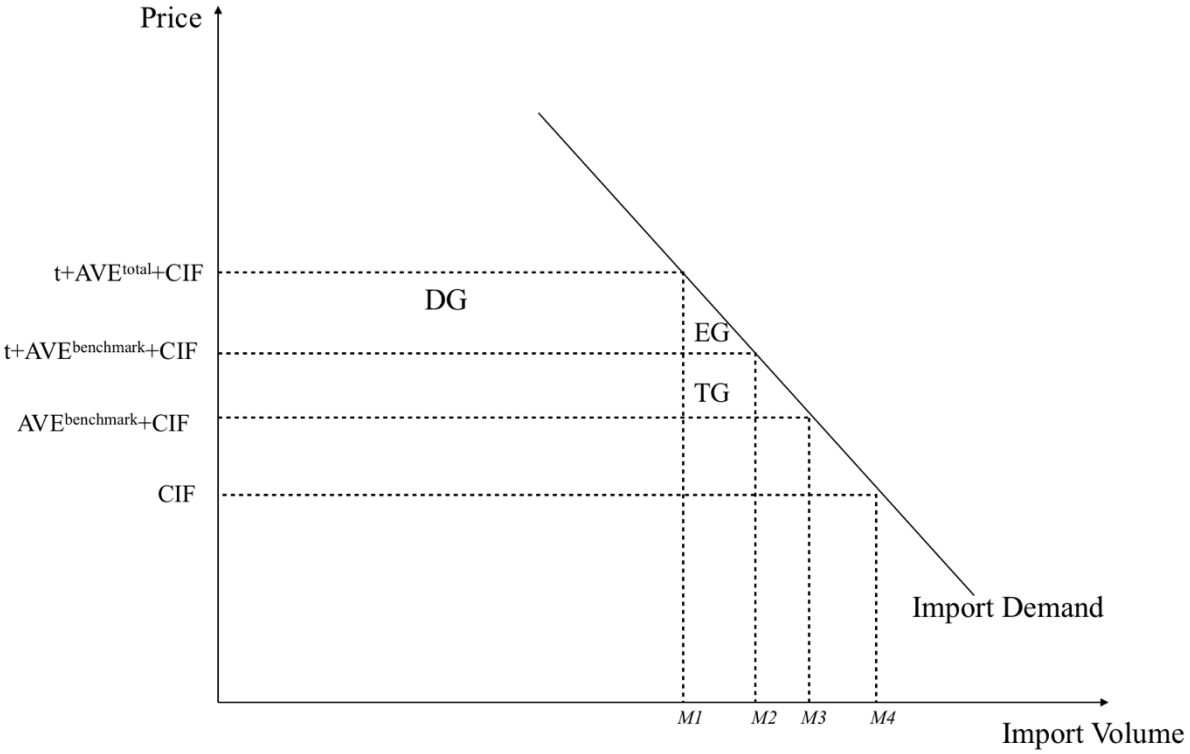

Figure 1. Representative import demand function of an importing country. Notes: The potential economic efficiency gains associated with reducing trade costs from AVE^{total} to $AVE^{benchmark}$ for the existing level of imports is denoted by the area of the rectangle (DG), and the increased efficiency gains from the response to expanding imports with the lower costs are denoted by the area of the triangle (EG). The increase in tariff revenues due to the increase in imports is (TG). The volume of imports demanded when the price of imports includes tariffs and excessive trade transaction costs is denoted as M1. The import volume when the price includes just the normal trade costs plus the tariff rates is denoted by M2. The import volumes when there are no tariffs but normal trade costs and the price is just the basic CIF price are denoted as M3 and M4, respectively. Ad valorem equivalent trade costs (AVE) and tariffs are surcharged on the basic CIF price. Sources: authors' own work.

The reported costs to import values are divided in two, as documentary and border compliance costs [15]. These costs arise from border procedures such as customs declarations and clearance, freight declarations, health and safety regulations, and other types of procedures that take place for compliance with the law. The data also include the waiting times (in hours) for documentary and border procedures. The waiting times during import-

ing or exporting operations harm trade flows and, more relevantly to our scope, border delays have economic opportunity costs for traders [34]. The border and documentary operations waiting times are incorporated into our model to account for the costs of the delays. The average annual economic discount rate now used by CAN countries is 10%. Hence, it is appropriate to use this rate for this evaluation of changes in economic welfare due to changes in waiting time [35]. The economic cost of waiting time is estimated in terms of the economic cost of time defined in terms of hours as shown in Equation (1). This is the standard approach used for estimating the value of time lost from tying up cargo by inefficient administrative procedures. The 10% annual cost of capital for each shipment is defined in terms of hours, by simply dividing the cost by the number of hours in a year:

$$Economic\ Cost\ of\ Waiting\ (ECW) = \frac{Waiting\ time\ \times\ Cost\ of\ Capital\ \times\ Shipment\ Value}{Number\ of\ Hours\ in\ a\ Year} \quad (1)$$

In this study, the value of a standard shipment is taken as USD 50,000. This figure is used to find the ad valorem value of trade costs as a percentage of this standard shipment value. The standard shipment value is used in Equation (1) together with the number of hours in a year, which is 8760, to find the ECW.

Total cost as presented in Table 1, Column 6, is the sum of border compliance cost, documentary cost, and ECW for imports. It will be represented by an ad valorem equivalent throughout this paper, and this value represents the total cost over the standard shipment value of USD 50,000, as given in Column 7 of Table 1. The usage of the ad valorem percentage value enables us to treat the trade costs as a tax on trade and allows us to find the welfare gain from the surpluses associated with reducing these costs. The ad valorem equivalent of the trade costs in Table 1 shows a clear difference between Bolivia and Ecuador on the one hand and Colombia and Peru on the other. The main reason for this difference is that *Doing Business* reports the trade costs for a land border crossing for Bolivia and Ecuador, where the former is a landlocked nation [15].

Table 1. Cost components and ad valorem representation of total import costs.

		[1] Time to Import: Documentary Compliance (Hours)	[2] Time to Import: Border Compliance (Hours)	[3] Cost to Import: Documentary Compliance (USD)	[4] Cost to Import: Border Compliance (USD)	[5] Cost of Waiting Time for Imports (USD)	[6] Total Cost of Imports (USD)	[7] Ad Valorem Equivalent (AVE^M)
		1	**2**	**3**	**4**	**5**	**6**	**7**
1	Bolivia	72	114	30	315	106	451	0.90%
2	Colombia	64	112	50	545	100	695	1.39%
3	Ecuador	120	24	75	540	82	697	1.39%
4	Peru	48	72	80	700	68	848	1.70%
5	***Chile***	***36***	***54***	***50***	***290***	***51***	***388***	***0.78%***
6	***Singapore***	***3***	***33***	***40***	***220***	***21***	***281***	***0.56%***

Sources: [1–4], reported by *Doing Business* Report [15]; [5–7], authors' calculations. Notes: Column 5 is calculated using Equation (1). Rows 5 and 6 represent the reference benchmark countries' values.

Furthermore, the remaining CAN countries' crude oil, copper ore, and gas imports and exports are excluded from the total trade volumes. The motive for this decision is that the aforementioned goods are traded in bulk on vessels and are subject to a different set of import and export procedures from those of regular containerized goods.

Table 2 summarizes the total and excess costs, import volume, tariff rates, and elasticities. Excess cost for imports is calculated using Equation (2):

$$Excess\ Cost^{M\&X} = AVE^{total} - AVE^{benchmark} \quad (2)$$

Table 2. Summary table of the data to be used in Equations (3)–(6).

		[1] Import Cost (AVE^M)	[2] Excess $Cost^M_{Chile}$	[3] Excess $Cost^M_{Singapore}$	[4] Current Volume of Imports (M1) in million USD	[5] Weighted Average Tariff Rate	[6] Elasticity of Import Demand (εID)
		1	2	3	4	5	6
1	Colombia	1.39%	0.61%	0.83%	41,209.39	2.40%	−1.524
2	Ecuador	1.39%	0.61%	0.83%	18,961.90	6.20%	−1.248
3	Peru	1.70%	0.92%	1.14%	41,111.57	0.70%	−1.458

Sources: [1], Authors' calculation as reported in Table 1 Column 7; [2,3] authors' calculation using Equation (2); [4], UN Comtrade Database [33]; [5], World Bank [36]; [6], Grübler et al. [27]. Notes: [3], the current volume of imports excludes crude oil (HS 2709), copper ore (HS 2603), petroleum gas (HS 2711), and any imports that are not waterborne. Columns 2 and 3 are calculated using Equation (2). Column 1 is sourced from the authors' calculation as given in Table 1.

Using the same method as Table 1, Column 6, the total cost estimate for Chilean imports is 0.78% and for Singapore 0.56% of the standard shipment value. This ad valorem equivalent of total costs is named $AVE^{benchmark}(M)$ in Equation (2), while $AVE^{total}(M)$ is used to describe the ad valorem equivalent of the total import cost for the CAN countries under investigation (Table 2, Column 1). Hence, the excess cost is described as the difference between the AVE cost of CAN nations with the benchmark AVE. The percentage figure of the excess cost found using Equation (2) is used in Equation (3) to find the direct effect of reducing the price of imports. The direct gain from reducing costs is depicted as DG in Figure 1. The result of improving trade costs to the level of Chile or Singapore would mean the price of the imports would be reduced to t + $AVE^{benchmark}$ + CIF, and the new level of demanded imports would be at the M2 level in Figure 1. The area DG can be calculated using Equation (3):

$$DG = Excess\ Cost^M \times M1 \tag{3}$$

DG, as described in Equation (3), yields the greatest economic gain. Eliminating excess trade costs has the effect of reducing taxes on imported goods. As it has been studied extensively in the literature, tariff cuts have the effect of increasing trade volumes but the welfare effect associated with trade liberalization is limited to the efficiency gain, which can be thought of as the area of the triangle EG in Figure 1 [13]. The tariff revenues do not contribute to losses; however, excess trade costs create a loss of real resources, as high trade transaction costs are due to the existence of inefficient and burdensome procedures and operations. Equation (3) uses real-world values of import volumes. These values are reported in Table 2, Column 3, and this corresponds to M1 in Figure 1 as the current quantity demanded.

In order to find the reactionary shift from M1 to M2 ($\Delta M1$), import demand elasticity is used. Equation (4) is used to find the M2 level so that the areas of EG and TG can be found:

$$\Delta M1 = Excess\ Cost^M \times M1 \times E^M \tag{4}$$

$\Delta M1$'s absolute value is added to M1 to find the M2 level of import volumes. $\Delta M1$ comes out as a negative value from our formula since the excess cost component is positive, but in practice, the amount of excess cost is to be deducted from the current price level. This leads us to the calculation of the deadweight loss created by the excess cost, which is the triangle labelled EG:

$$EG = Excess\ Cost^M \times \Delta M1 \times \frac{1}{2} \tag{5}$$

The trapezoid formed by DG and EG together is the amount of economic gains that directly translate as saved resources. The increase in trade volumes as a result of this price change creates additional tariff revenue for the government. This extra tariff revenue will

also count toward the potential welfare gains of improving trade costs. The tariff revenue is depicted as TG in Figure 1 and is calculated by Equation (6):

$$TG = \Delta M1 \times t \quad (6)$$

The total of TG, EG, and DG gives us the potential economic welfare gains of improving the trade costs to the benchmark level.

6. Estimating Potential Economic Welfare Gains from Export Operations

Reducing the transaction costs of international trade will also benefit a country if it is engaged in exporting. In this case, it will be the producers of exports who will be the primary beneficiaries. The approach taken for estimating potential welfare gains due to improving exporting costs is the same as was taken with imports.

The FOB price of exports is normalized to 1 and the costs are expressed as ad valorem equivalent (AVE^X) on top of the normalized value. The difference between the current total cost to export and the benchmark creates a price increase, as the costs associated with trade are borne by the producers in the microeconomic model. This increase in the partial equilibrium increases the producer surplus. Figure 2 represents the potential welfare gain from reducing trade costs. The existence of excess costs creates an economic situation caused by a price ceiling for exports.

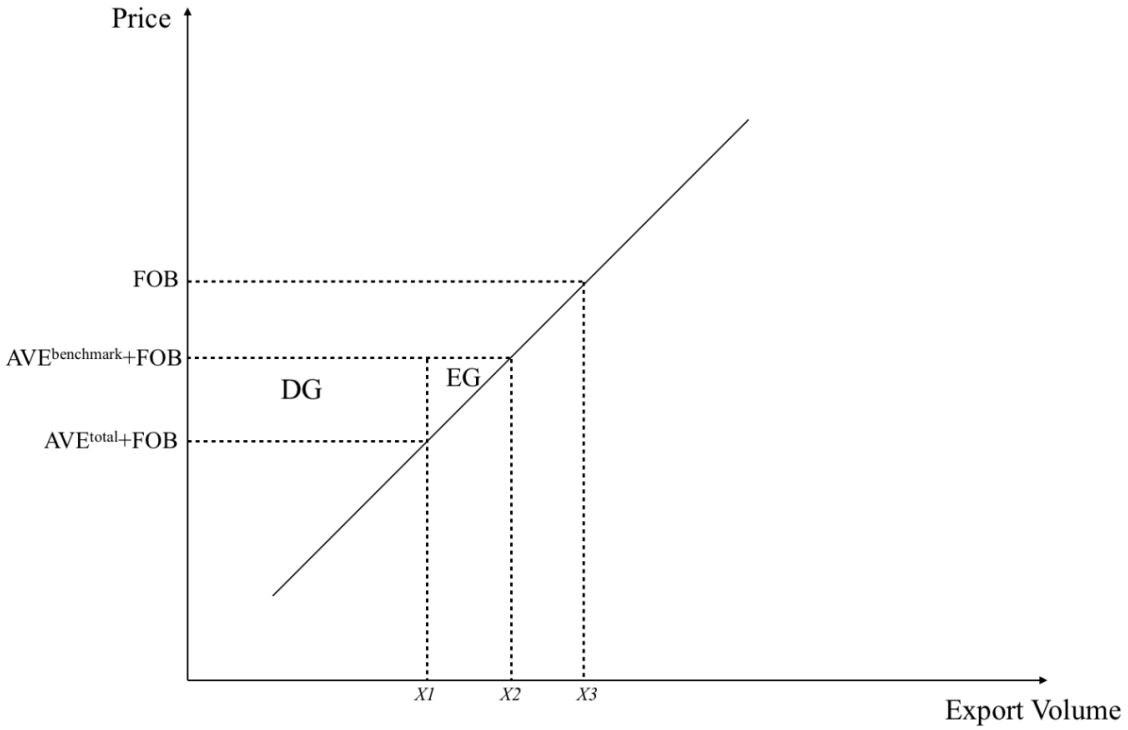

Figure 2. Representative export supply function of an exporting country. Potential gains associated with improving trade costs are the areas labelled as DG and EG. Note that decreasing the cost associated with trade increases the price of exports in the market.

The increase in trade volumes because of increasing the price of exports creates two areas of contribution to gains. The gain directly resulting from increased exports is measured by the area of DG. DG together with EG creates a trapezoid and represents the total potential economic gains associated with improving exporting costs. As stated, Chile and Singapore are selected to represent the benchmark values of costs to export, with AVE values of 0.78% and 0.76%, respectively. As discussed earlier, Bolivian trade, crude oil, copper ore, natural gas, and land trade as a whole are excluded from the empirical part of this study.

Equation (1) is used to calculate Column 5 in Table 3. The total costs are given in Column 6, and in Column 7 they are represented as percentage values of a standard shipment of USD 50,000. As discussed, Bolivia's reported land border operations amount to relatively small costs and in that sense are misleading. However, excluding Bolivian trade for both exports and imports and excluding crude oil, copper ore, and petroleum gas from the total trade volumes allows us to focus solely on sea border trade for the CAN countries.

Table 3. Cost components and ad valorem representation of total export costs.

		[1] Time to Export: Documentary Compliance (Hours)	[2] Time to Export: Border Compliance (Hours)	[3] Cost to Export: Documentary Compliance (USD)	[4] Cost to Export: Border Compliance (USD)	[5] Economic Cost of Waiting Time for Exports (USD)	[6] Total Cost of Exports (USD)	[7] Ad Valorem Equivalent (AVE^X)
		1	2	3	4	5	6	7
1	Bolivia	144	48	25	65	110	200	0.40%
2	Colombia	48	112	90	630	91	811	1.62%
3	Ecuador	24	96	60	560	68	688	1.38%
4	Peru	24	48	50	630	41	721	1.44%
5	***Chile***	***24***	***60***	***50***	***290***	***48***	***388***	***0.78%***
6	***Singapore***	***2***	***10***	***37***	***335***	***7***	***379***	***0.76%***

Sources: [1–4], reported by *Doing Business* Report [15]; [5–7], authors' calculations. Notes: Column 5 is calculated using Equation (1). Rows 5 and 6 represent the reference benchmark countries' values.

After calculating Excess $Cost^X$ using Equation (2), we can find the reactionary change in export volumes as a result of a price increase in the value of Excess Cost:

$$\Delta X1 = Excess\ Cost^X \times X1 \times E^X \tag{7}$$

With positive elasticity and a positive Excess Cost as reported in Table 4, the resulting $\Delta X1$ is also positive and represents X2 when added to the current level of export volume, which is denoted as X1 in Figure 2.

Table 4. Summary table of the data to be used in Equations (7)–(9).

		[1] Total Export Cost	[2] Excess $Cost^X_{Chile}$	[3] Excess $Cost^X_{Singapore}$	[4] Current Volume of Exports (X1) in million USD	[5] Elasticity of Export Supply
		1	2	3	4	5
1	Colombia	1.62%	0.84%	0.86%	31,056	0.76
2	Ecuador	1.38%	0.60%	0.62%	20,355	0.39
3	Peru	1.44%	0.66%	0.68%	38,757	0.73

Sources: [1–3], authors' calculations; [4], UN Comtrade Database [33]; [5], Tokarick [28]. Notes: [3], Current volume of exports (X1) excludes crude oil (HS 2709), copper ore (HS 2603), and petroleum gas (HS 2711). Equation (2) is used for columns 2 and 3. Column 1 is sourced from the authors' calculations as given in Table 1.

The area DG of Figure 2 is found using the formula:

$$DG = Excess\ Cost^X \times X1 \tag{8}$$

The triangle EG is considered an efficiency loss created by the existence of excess costs, which act as a price ceiling policy. To find the value of EG, Equation (9) is used:

$$EG = \Delta X1 \times Excess\ Cost^X \times \frac{1}{2} \tag{9}$$

The total of DG and EG, which forms a trapezoid, is the estimated economic gain from improving the export trade costs to match the benchmark value.

7. Results

The results calculated using the Equations (n) described in the earlier sections of this paper are presented in a set of tables in this section. The tables summarize the DG, EG,

and TG (only in the case of imports) and their total. The total of the gains is the estimated potential economic gains from improving the trade costs in the CAN bloc. The two different benchmark reference cases are presented separately.

The excess cost of importing found using Equation (2) creates a price difference for imports in our model of Figure 1. Due to this price difference, cheaper imports become available for consumers if the costs associated with importing decrease. The resulting increase in import demand is measured using Equation (4), in which import demand elasticity (E^M) plays an important role. The results of Equation (4) are reported as an absolute value in Column 3 of Tables 5 and 6, since the calculated Excess $Cost^M$ is reported as positive, although in practice the improvement to costs would mean that the price change would be negative. In our empirical results, the total of $\Delta M1$ ranges from USD 906 million to 1400 million for CAN. This expected increase in trade volumes because of improving importing costs demonstrates the potential trade-enhancing effect of reducing friction at the borders.

Table 5. Estimation of the potential economic gains from improving import costs (with Chile as the benchmark).

		[1] Excess $Cost^M$	[2] E^M	[3] $\Delta M1$ (million USD) (abs. v.)	[4] DG (million USD)	[5] EG (million USD)	[6] TG (million USD)	[7] Total (million USD)
		1	**2**	**3**	**4**	**5**	**6**	**7**
1	Colombia	0.61%	−1.524	383.10	251.38	1.168	9.19	261.74
2	Ecuador	0.61%	−1.248	144.35	115.67	0.440	8.95	125.06
3	Peru	0.92%	−1.458	378.23	378.23	2.537	3.86	384.62
							Total:	771.42

Sources: [1,3–7], authors' calculations; [2], Grübler et al. [27]. Notes: [2], Elasticity of import demand; [3], change in imports. DG, EG, and TG are the gains described in Section 5.

Table 6. Estimation of the potential economic gains from improving import costs (with Singapore as the benchmark).

		[1] Excess $Cost^M$	[2] E^M	[3] $\Delta M1$ (million USD) (abs. v.)	[4] DG (million USD)	[5] EG (million USD)	[6] TG (million USD)	[7] Total (million USD)
		1	**2**	**3**	**4**	**5**	**6**	**7**
1	Colombia	0.83%	−1.524	521.27	342.04	2.163	12.51	356.71
2	Ecuador	0.83%	−1.248	196.41	157.38	0.815	12.18	170.38
3	Peru	1.14%	−1.458	683.32	468.67	3.895	4.78	477.35
							Total:	1004.44

Sources: [1,3–7], authors' calculations; [2], Grübler et al. [27]. Notes: [2], Elasticity of import demand; [3], change in imports. DG, EG, and TG are the gains described in Section 5.

More importantly, the amount of economic gain from improving the costs of importing amounts to between USD 771 million and 1004 million for the region. DG represents the biggest contribution to economic gains, and the DG component of gains corresponds to real resources saved at the current volume of imports. EG, on the other hand, is the elimination of the deadweight losses that are created by shifting between the benchmark and the current level of prices. An increase in tariff revenues is expected to be the second biggest component of economic gain. As a result of the relatively elastic import demand elasticities of CAN member countries, the increase in trade volume creates extra tariff revenues. Given the weighted average tariff rates in Table 2, there is a potential of more than USD 22 million of tariff revenue as a result of improving importing costs when Chile is taken as the reference. The potential tariff revenue arising from matching Singapore is USD 29.5 million. Tables 7 and 8 shows the potential gains calculations in terms of exports.

Table 7. Estimation of the potential economic gains from improving export costs (with Chile as the benchmark).

		[1] Excess Cost^X	[2] E^X	[3] $\Delta X1$ (million USD)	[4] DG (million USD)	[5] EG (million USD)	[6] Total (million USD)
		1	**2**	**3**	**4**	**5**	**6**
1	Colombia	0.84%	0.76	139.45	183.48	0.59	184.07
2	Ecuador	0.60%	0.39	36.96	94.76	0.11	94.87
3	Peru	0.66%	0.73	144.81	198.38	0.48	198.85
						Total:	477.79

Sources: [1,3–6], authors' calculations; [2], Tokarick [28]. Notes: [2], Elasticity of export supply; [3], change in exports. DG and EG are the gains described in Section 6.

Table 8. Estimation of the potential economic gains from improving export costs (with Singapore as the benchmark).

		[1] Excess Cost^X	[2] E^X	[3] $\Delta X1$ (million USD)	[4] DG (million USD)	[5] EG (million USD)	[6] Total (million USD)
		1	**2**	**3**	**4**	**5**	**6**
1	Colombia	0.86%	0.76	142.77	187.85	0.61	188.46
2	Ecuador	0.62%	0.39	38.19	97.92	0.12	98.04
3	Peru	0.68%	0.73	149.20	204.39	0.51	204.89
						Total:	491.40

Sources: [1,3–6], authors' calculations; [2], Tokarick [28]. Notes: [2], Elasticity of export supply; [3], change in exports. DG and EG are the gains described in Section 6.

The potential economic gains from improving export costs are estimated to be between USD 478 million and 491 million for the CAN bloc. The two gains contributing to the total are DG and EG, as discussed earlier. The expected export gains amount to between USD 321.22 million and 330 million for improving to the level of 0.78% and 0.76%, with respect to Chile and Singapore, respectively. As the smallest CAN country, Ecuador's export supply elasticity is inelastic, in contrast to that of the other countries in the bloc. This minimizes the potential increase in trade volumes as exports become more attractive for firms within Ecuador. However, the estimated trade increase and economic gain values are annual values, and over a period of time, the improvements to the exit points of goods in these countries are significant for even the least industrialized members.

The total amount of real resources to be saved by improving the trade costs is between USD 1.25 billion and 1.5 billion. Given that the GDP of the CAN bloc stands at USD 644 billion (excluding Bolivia), the total economic gains amount to 0.19–0.23% of GDP [37]. The amount of economic gains from improving trade costs presents a scenario in which the cost–benefit ratio of implementing a successful trade administration reform is greatly beneficial even in the short run.

8. Discussion

The results in the previous section demonstrate the potential of trade facilitation. Multiple core elements give rise to the differences in the potential economic welfare gains for different countries and different trade flow directions. An obvious one is the difference in trade costs for each member, which creates the different excess costs that are used to calculate the potential gains.

From Table 3, we can see that border compliance is more troublesome than documentary compliance. All border compliances for sea exporters are at least two times greater than documentary compliance. This is not the case for Bolivia, as the reported export medium for Bolivia is for a land border crossing, and land border crossings are in nature less troublesome than sea borders, hence the difference in the time taken for border compliance magnitudes. In the estimates of the costs of trade administration, an estimate has been made of the economic costs of waiting for the documentation and import and export procedures to be completed. This estimation is the basic cost of locking up capital during the waiting time of import or export operations. Other cost components, such as border

compliance and documentary compliance, are directly related to the border waiting times. For instance, to ship a container as an export from a Colombian sea border requires almost 7 full days (112 h) to complete, and considering that exporting requires less compliance at the border than importing does by nature, the border compliance time for imports is even longer at 114 h. The mean value for time required to complete an exporting border and documentary compliance for CAN is 5.66 days per shipment. The benchmark value reported for Chile is 3.5 days, measured using the same methodology. Border times as a trade barrier are well established in the literature [34,38]. Border times in this regard correlate with import and export costs, as reported in *Doing Business* [15].

Overall, out of the two biggest economies in CAN, Peru has lower trade administration costs than Colombia in terms of cost to export. On the other hand, Colombia is the better performer when dealing with importing procedures.

Another important factor explaining the differences in potential gains is the difference in import demand and export supply elasticities. Colombia's demand for imports is the most elastic in CAN, which can be interpreted as domestic firms in Colombia being better able to substitute imports. In this regard, Ecuador's import demand is the least elastic among the studied nations, indicating a less developed domestic industry. These results are consistent with the opposite direction of trade flows. Colombia and Peru rank first and second amongst CAN in terms of export supply elasticities, indicating their domestic production to be more responsive. However, the magnitudes of their export supply elasticities are both inelastic. Overall, from improving costs to import, Peru has the highest potential to gain. The potential economic welfare gains for Peru are estimated to be USD 384.62–477.35 million in terms of improving the cost to import. In the case of exports, Peru is estimated to have the potential of gains in the magnitude of USD 198.85–204.89 million. Colombia and Ecuador have the potential of gaining USD 184.07–188.46 million and 94.87–98.04 million, respectively.

9. Policy Implications

If the policy decisions and applications regarding trade facilitation are undertaken in a collective and synchronized manner, CAN could realize substantial real economic gains from trade facilitation [39].

Policymakers should attempt to reduce these border times to capitalize on the expected potential economic gains. We propose that meeting the benchmark level of costs is a plausible comparison tool; however, much greater progress can be achieved in terms of trade facilitation. For instance, the days required to export a shipment from Panama (the northern border neighbour of CAN) is only 1.25 days. Moreover, in Singapore, it is reported that only half a day is required to complete the export formalities [15]. The existence of better trade administration costs around the world represents a motivation for improvement for the CAN countries.

The availability of a high-performing container port is another imperative for enabling cheaper entry and exit points for goods. Within Colombia, Ecuador, and Peru, only Cartagena port (Colombia) is among the world's high-performing container ports according to the Container Port Performance Index of the World Bank Group [40]. Although not much can be done to decrease transport costs for shipments, it is possible to influence port efficiency and reduce trade administration costs with the right policies and regulations. Rules and regulations governing a port should not be so cumbersome that they increase administration costs as well as port efficiency [41]. Seaport efficiency can be determined not only with the availability of physical infrastructure but also with certain trade facilitation measures like advance rulings and interoperation of the trade agencies with their foreign partners. Attaining efficiency in seaports should also be a continuous subject for trade policymakers, to achieve greater degrees of efficiency.

Digitalization of trade processes is a big contributor to the saving of economic resources during trading operations. The processes that can be digitized include customs formalities, logistics operations, and compliance operations with relevant agencies including the banks

for payment of taxes and service fees. Digitization also enables another important trade facilitation measure to foster benefits, namely the standardization of trade procedures. Electronic single window (ESW) is the most comprehensive trade digitization system that should be employed. All CAN countries employ an ESW system, but the degree of interoperability is not as advanced as it should be. In terms of trade facilitation, one of CAN's top priority tasks is the promotion of the interoperability of members' single window systems [42]. As of 18 August 2020, the inter-operability of ESWs of CAN countries was limited, but projects for full inter-operability were underway [43]. A regional successful single window experience has been the VUCE (Single Window for Foreign Trade) of the Pacific Alliance (PA). PA is made up of Chile, Colombia, Mexico, and Peru. The two biggest economies of CAN are also members of PA. Given the benefit of VUCE, the remaining members of the CAN may want to be integrated into this single window platform [44]. Needless to say, this integration requires diplomatic efforts and political will.

A good prospect for the digitalization of borders is the emergence of blockchain technology. Inherently a technology related to finance, blockchain can create an impact in areas like trade facilitation [5]. Cross-border cooperation involves businesses and government agencies engaging in communication and exchange of information. Since blockchain technology offers a fast, reliable, and secure flow of information, utilization of such a technology could reduce border times, compliance costs, and fraud significantly [5]. Blockchain can also have a positive effect in those countries where corruption is a difficult to measure barrier to trade. Payments between parties can take place through a blockchain network, making it possible to track the finances involved in any transaction.

Blockchain is particularly suited for tasks in which multiple actors are involved. This makes it very suitable for ESW applications. For instance, an exporter who is subject to authorization from multiple agencies would have to enter the required information into the system only once. Involved parties can then validate, confirm, and issue relevant permissions with all of the involved in real time [5]. The potential of blockchain should be studied further, and applications of this technology regarding trade facilitation should be given a chance wherever possible. International organizations that see blockchain as a prospective technology for trade facilitation are growing in numbers, and there are reports and whitepapers available specifically investigating the uses of blockchain in trade facilitation [6].

The relevance of trade facilitation for modern policymakers is not limited to enabling cheaper imports and exports, nor to increasing trade volumes. An even more immediate action-triggering motivation may be climate change. Sooner rather than later, policymakers around the globe will be under pressure to look for ways to address climate change without compromising voters' consumption habits. This will create an incentive to make everything more efficient, including trading operations.

10. Conclusions

The results of this study suggest that the potential benefits of trade facilitation initiatives should put trade facilitation at the top of the trade policy agenda. The existence of an increasing number of more efficient trade administrations around the globe serves as a model and hence stands as an attainable goal for countries and trade blocs alike. Our results are parallel to the existing literature findings, where the expected welfare gains as a result of trade facilitation are substantial and are usually in the range of 0.15–0.50% of the GDP [20,22].

In this regard, the Andean Community has great potential for improvement, and this study contributes to the literature in trade facilitation by providing solid evidence for CAN nations to take further action. The improvement to trade administration effects are not limited to annual gains in welfare. Improving the trading system in this region will also contribute towards sustainable economic growth [24]. Another positive aspect which should draw the attention of the CAN policymakers is the diversification effect of TF. Improving trading systems can create new markets for exporters and/or boost the product

portfolio of exports [5]. However, to realize these potential cost savings, it will be necessary for policymakers to make legislative changes and for public sector workers to be trained to work in new ways.

11. Limitations

Although *Doing Business* Trading Across Borders (TAB) data are a very important source of information prepared by the World Bank on the administration costs of international trade, there are some aspects of this data set that limit its general applicability. The TAB data are collected by a survey/questionnaire from a country's importers/exporters, freight forwarders, customs brokers, etc. This survey aims to report the cost, the time, and the specific number of documents required to perform an import/export operation. This provides a good estimation for trade costs of finished or semi-finished goods and a fair comparison across nations, as identical surveys are used in different sectors. Imports or exports of a country that involve significant bulk traded goods will have very different trade administration costs than finished or semi-finished goods. *Doing Business* does not include an analysis of bulk traded goods. Hence, we have eliminated bulk traded goods from our data on both the side of imports and exports. This creates a much more suitable base for comparison across countries when used in conjunction with the TAB data.

The microeconomic framework used in this study uses the assumption that the commodities produced in these countries under investigation are price takers in the world market. For these small countries, this assumption is a reasonable description of the reality. Although for some commodities the assumption might not hold, as a large proportion of the benefits of trade facilitation are enjoyed by the producers and consumers of the current volume of trade of these commodities, the results of this analysis for policymaking are likely to be very robust.

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References

1. Lopez, O.D.; Carvajal, A. The Trade Effects of Regional Agreements and Economic Integration Processes in Europe, South America, and North America. *Lat. Am. J. Trade Policy* **2020**, *3*, 32. [CrossRef]
2. WTO. Andean Community. Available online: https://tfadatabase.org/en/communities/can (accessed on 5 December 2022).
3. Walkenhorst, P.; Yasui, T. Benefits of trade facilitation: A quantitative assessment. In *Quantitative Methods for Assessing the Effects of Non-Tariff Measures and Trade Facilitation*; TD/TC/WP(2003)31/FINAL; Co-published with APEC Secretariat; World Scientific: Singapore, 2005; pp. 161–192. [CrossRef]
4. López-González, J.; García, I.O.; Ferencz, J. *Artificial Intelligence and International Trade: Some Preliminary Implications*; OECD: Paris, France, 2022. [CrossRef]
5. WTO. Can Blockchain Revolutionize International Trade? In *WTO Publications*; WTO: Geneva, Switzerland, 2018. [CrossRef]
6. UN. White Paper on Blockchain in Trade Facilitation. In *White Paper on Blockchain in Trade Facilitation*; United Nations: New York, NY, USA, 2020. [CrossRef]
7. Anderson, J.E.; Van Wincoop, E. Borders, Trade, and Welfare. *Brook. Trade Forum* **2001**, *2001*, 207–243. [CrossRef]
8. Wilson, J.S.; Mann, C.L.; Otsuki, T. Trade Facilitation and Economic Development: A New Approach to Quantifying the Impact. *World Bank Econ. Rev.* **2003**, *17*, 367–389. [CrossRef]

9. Wilson, J.S.; Mann, C.L.; Otsuki, T. Assessing the potential benefit of trade facilitation: A global perspective. In *Quantitative Methods for Assessing the Effects of Non-Tariff Measures and Trade Facilitation*; Dee, P., Ferrantino, M., Eds.; World Scientific: Singapore, 2005; pp. 121–160. [CrossRef]
10. Portugal-Perez, A.; Wilson, J.S. Why trade facilitation matters to Africa. *World Trade Rev.* **2009**, *8*, 379–416. [CrossRef]
11. Portugal-Perez, A.; Wilson, J.S. Export performance and trade facilitation reform: Hard and soft infrastructure. *World Dev.* **2012**, *40*, 1295–1307. [CrossRef]
12. Moïse, E.; Le Bris, F. *Trade Costs: What Have We Learned? A Synthesis Report*; OECD Trade Policy Papers 150; OECD Publishing: Paris, France, 2013.
13. Go, E. *Contribution and Effectiveness of Trade Facilitation Measures: A Structured Literature Review*; World Bank Group: Washington, DC, USA, 2018.
14. Herreros, S. *Digital and Sustainable Trade Facilitation in Latin America and the Caribbean*; Regional Report 2021; ECLAC, United Nations: Santiago, Chile, 2021.
15. World Bank Group. *Doing Business 2020*; World Bank: Washington, DC, USA, 2020.
16. Lee, W.; Rocha, N.; Ruta, M. *Trade Facilitation Provisions in Preferential Trade Agreement: Impact on Peru's Exporters*; Policy Research Working Paper 9674; World Bank Group: Washington, DC, USA, 2021.
17. Fugazza, M.; Maur, J.C. Non-tariff barriers in CGE models: How useful for policy? *J. Policy Mod.* **2008**, *30*, 475–490. [CrossRef]
18. Otsuki, T. Quantifying the Benefits of Trade Facilitation in ASEAN. In *Toward a Competitive ASEAN Single Market: Sectoral Analysis*; ERIA Research Project Report 2010-03; Osaka School of International Public Policy: Osaka, Japan, 2011; pp. 280–321. Available online: http://www.osipp.osaka-u.ac.jp/archives/DP/2011/DP2011E006.pdf (accessed on 3 January 2023).
19. Fernandes, A.M.; Hillberry, R.; Alcántara, A.M. Trade Effects of Customs Reform: Evidence from Albania. *World Bank Econ. Rev.* **2021**, *35*, 34–57. [CrossRef]
20. OECD. *Trade Facilitation and the Global Economy*; OECD Publishing: Paris, France, 2018. [CrossRef]
21. Choi, H.; Mancuso, J.; Tombazos, C.G. Trade facilitation in the presence of non-independent impediments. *World Econ.* **2021**, *44*, 2604–2637. [CrossRef]
22. Safaeimanesh, S.; Jenkins, G.P. Trade Facilitation and Its Impacts on the Economic Welfare and Sustainable Development of the Ecowas Region. *Sustainability* **2021**, *13*, 164. [CrossRef]
23. Safaeimanesh, S.; Jenkins, G.P. Estimation of the Potential Economic Welfare to Be Gained by the South African Customs Union from Trade Facilitation. *S. Afr. J. Econ. Manag. Sci.* **2021**, *24*, a3796. [CrossRef]
24. Jiahao, S.; Ibrahim, R.L.; Bello, K.A.; Oke, D.M. Trade Facilitation, Institutions, and Sustainable Economic Growth. Empirical Evidence from Sub-Saharan Africa. *African Dev. Rev.* **2022**, *12630*, 201–214. [CrossRef]
25. Moncarz, P.E.; Flores, M.; Villano, S.; Vaillant, M. Intra- and Extra-regional Trade Costs: A Comparative Approach to Latin-American Performance. *World Econ.* **2023**. [CrossRef]
26. Karymshakov, K.; Sulaimanova, B. *Trade Facilitation, Infrastructure, and International Trade in Central Asian Countries*; Policy Commons: Manila, Philippines, 2023. [CrossRef]
27. Grübler, J.; Ghodsi, M.; Stehrer, R. Import demand elasticities revisited. *J. Int. Trade Econ. Dev.* **2022**, *31*, 46–74. [CrossRef]
28. Tokarick, S. A method for calculating export supply and import demand elasticities. *J. Int. Trade Econ. Dev.* **2014**, *23*, 1059–1087. [CrossRef]
29. Kohli, U. *Technology, Duality, and Foreign Trade: The GNP Function Approach to Modeling Imports and Exports*; Harvester Wheatsheaf: New York, NY, USA, 1991.
30. Grainger, A. Customs and Trade Facilitation: From Concepts to Implementation. *World Cust. J.* **2008**, *2*, 17–30.
31. Blasco, E.J.; Santana, C. Bolivia Reduces Its Dependence on Chile's Ports with Alternatives in Peru and the Atlantic Waterway. Universidad de Navarra, Global Affairs and Strategic Studies. Available online: https://en.unav.edu/web/global-affairs/bolivia-reduce-su-dependencia-de-los-puertos-de-chile-con-alternativas-en-peru-y-la-via-fluvial-atlantica (accessed on 7 January 2022).
32. World Bank. *Pre Concept Note of Business Enabling Environment*; World Bank: Washington, DC, USA, 2022; Available online: https://www.worldbank.org/en/programs/business-enabling-environment (accessed on 3 January 2023).
33. UN Comtrade. Trade Data. Available online: https://comtradeplus.un.org/TradeFlow (accessed on 25 December 2022).
34. Roberts, B.; Rose, A.; Heatwole, N.; Wei, D.; Avetisyan, M.; Chan, O.; Maya, I. The impact on the US economy of changes in wait times at ports of entry. *Transp. Policy* **2014**, *35*, 162–175. [CrossRef]
35. Moore, M.A.; Boardman, A.E.; Vining, A.R. Social Discount Rates for Seventeen Latin American Countries: Theory and Parameter Estimation. *Public Financ. Rev.* **2020**, *48*, 43–71. [CrossRef]
36. World Bank. Tariff Rate, Applied, Weighted Mean, All Products (%). Available online: https://data.worldbank.org/indicator/TM.TAX.MRCH.WM.AR.ZS?end=2020&start=2000 (accessed on 27 April 2022).
37. World Bank. GDP (Current US$). Available online: https://data.worldbank.org/indicator/NY.GDP.MKTP.CD (accessed on 26 December 2022).
38. Volpe Martincus, C. *Out of the Border Labyrinth: An Assessment of Trade Facilitation Initiatives in Latin America and the Caribbean*; Inter-American Development Bank: Washington, DC, USA, 2016. [CrossRef]
39. Willie, A.; Chikabwi, D. Impact of border delays and costs on COMESA cross border trade. In *Key Issues in Regional Integration*; COMESA: Lusaka, Zambia, 2018; Volume 6, pp. 67–86. [CrossRef]
40. World Bank Group. *Container Port Performance Index 2021*; World Bank Publications: Washington, DC, USA, 2022.

41. Clark, X.; Dollar, D.; Micco, A. *Maritime Transport Costs and Port Efficiency (Issue February)*; World Bank: Washington, DC, USA, 2022; Available online: http://econ.worldbank.org (accessed on 3 January 2023).
42. Pérez, G.; Suárez, D. Digitization of trade logistics in landlocked countries in South America. *FAL Bull.* **2021**, *385*, 1.
43. CEPAL. *América Latina y el Caribe (Países Seleccionados): Interoperabilidad en VUCE y PCS Existentes*; CEPAL: Santiago, Chile, 2020; Available online: https://www.cepal.org/es/notas/america-latina-caribe-paises-seleccionados-interoperabilidad-vuce-pcs-existentes-1 (accessed on 3 January 2023).
44. Bórquez, A. China's Trade Policy in Latin America. In *Contributions to International Relations*; López, D., Song, G., Bórquez, A., Muñoz, F., Eds.; Springer International Publishing: Cham, Switzerland, 2022. [CrossRef]