Paper published in: Badia-Miró, M., Carreras-Marín, A., and Meissner, C.M., 2018. Geography, policy, or productivity? Regional trade in five South American countries, 1910–50. *The Economic History Review*, 71 (1), 236–266.

Geography, policy, or productivity? Regional trade in five South American countries, 1910–50[1]

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Abstract

Regional trade in South America since independence has long been much smaller than would be expected if geography were the only constraint on trade. Several potential explanations exist, including low technological and demand complementarities; low productivity; and high natural and policy barriers to trade. Focusing on the latter explanations, policy makers have long advocated a South American/Southern Cone Free Trade Area—proposed as early as 1889. Would reductions in trade costs have been sufficient to raise trade significantly, or was trade low for other reasons? We study bilateral trade between 1910 and 1950, when large external shocks altered global supply and demand. These shocks help us show that intra-regional trade could have been boosted by reductions in trade costs. South American regional trade could have benefited from more benign trade policies or better infrastructure. Regional trade in textiles, which took off from the 1930s, supports our argument that trade improved when trade costs fell.

Introduction

Regional trade in South America since independence has long been much smaller than would be expected if the simple measures of geographic propinquity that proxy for transport and information costs, and which are so often favoured in the empirical literature, were the only constraint on trade.[4] Several potential explanations exist. First, factor endowments were potentially sufficiently similar and goods so homogeneous that foreign competition could easily be driven out of domestic markets. A Ricardian view suggests an international division of labour

[1] The authors appreciate comments received from the editor and three anonymous referees. They are also indebted to Alfonso Herranz-Loncán, Antonio Tena-Junguito, Sandra Kuntz, Vicente Pinilla, Luis Bértola, Michael Huberman, Henry Willebald, and J. A. Peres-Cajías. Participants at conferences and seminars in València (Frontier Research in Economic and Social History, 2013), London (European Historical Economics Society, 2013), Madrid (Asociación Española de Historia Económica, 2014) and Bogotá (Latin American Congress of Economic History, 2014), Peterborough (Canadian Network for Economic History, 2014), the Shanghai University of Economics and Finance, and the University of Sydney also gave us valuable feedback. The authors remain solely responsible for remaining errors. This research has received financial support from the Spanish Government, research projects ECO2015-65049-C2-2-P and ECO2012-39169-C03-03, and the Catalan Government, research group 2014SGR1345.

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[4] (Bulmer-Thomas 2014, 72); for the long trends on integration from Independence, see (Restrepo-Estrada and Tena-Junguito, 2018)

driven by comparative advantage. Western Europe and the US specialized in manufactures while South America specialized in commodities, driving down the incentives for regional trade. Low levels of per capita income could matter if richer countries are more likely to engage in intra-industry trade. Finally, high regional trade costs may be to blame. Poor transport due to challenging geographic conditions, low population density, a lack of knowledge of local markets, political instability, poor financial infrastructure, and even preferences biased towards European goods may have limited the scope for Latin American trade. What do we know about how much trade costs mattered for regional trade integration?

To provide a credible answer to this question, it is necessary to isolate periods when trade costs changed in an exogenous way. The two world wars provide such variation due to disruptions in global markets which made it relatively less costly to trade within the region. We leverage these shocks to improve our understanding of *how much* reasonable reductions in (relative) regional trade costs could have promoted regional trade. At the same time, if we find that trade costs do not matter, then we might infer that other structural forces on the supply or demand side might have been responsible for keeping trade down in this region.

An early report by the United Nations Economic Commission for Latin America (ECLA) suggested that increased regional trade during the Second World War 'revealed a remarkable capacity for (trade) expansion'.[5] On the other hand, Prebisch, Singer, and the viewpoint most often associated with ECLA held that the international division of labour forced Latin America into commodity production and supplying basic industrial inputs. Close neighbours would have limited demand for regional output in such a division of labour. Some evidence that trade costs matter comes from the vast literature on interwar and post-war policies. These often discriminated against foreign producers and national primary producers alike.[6] These policies tended to diminish integration with the rest of the world and within the region compared with efforts in south-east Asia. In this article, we focus on the potential for lower trade costs to generate greater regional trade in the period 1910–50. If trade costs matter, then the ideation of an international division of labour as the only explanation for low regional trade would seem to lose some of its lustre.

We present evidence on the level and evolution of international integration for five South American nations comparing their regional trade flows against those with a set of countries outside the region. To do this, we first consider the evolution of trade shares. We then present information on regional trade costs as defined by (Jacks, Meissner, and Novy 2011).[7] This measure captures a broad range of barriers to trade, including freight rates, tariffs, non-tariff barriers, information costs, consumer preferences, and beachhead costs of establishing new markets. In contrast with the work of (Jacks, Meissner, and Novy 2011), who studied integration over the long run for a set of leading countries, we focus on a set of less developed countries in a period of de-globalization with several sizeable shocks to the world economy (Jacks, Meissner, and Novy 2011). Using this methodology, we

[5] United Nations, Department of Economic Affairs, Secretariat of the Economic Commission for Latin America (ECLA). See (ECLAC 1956).

[6] (Bértola and Ocampo 2012; Bulmer-Thomas 2014; Hirschman 1968; Jose Antonio Ocampo and Ros 2011; Taylor 1998; Pinilla and Aparicio 2015) extensively discussed the impact of import substitution industrialization policies on the primary sector. On the contrary, (Debowicz and Segal 2014), emphasize the impact of closing the frontier and the costs of ISI on the non-traded service sector.

[7] (Jacks, Meissner, and Novy 2008; Jacks, Meissner, and Novy 2011).

are able to quantify the idea that South American nations had much higher trade costs between themselves than with their non-South American trade partners in almost every year between 1910 and 1950.

Moreover, despite these high levels, there are interesting periods in our sample when regional integration rose and regional trade costs fell in relative terms, with the causes being external to structural and policy changes in these economies. In this context, the shocks of the world wars made for a more favourable environment for regional economic integration.[8] We consider the war periods as 'natural experiments' that can help provide clues as to whether trade costs were an important driver of regional integration. This plausibly exogenous variation in trade shares allows us to evaluate, under limited, albeit potentially non-innocuous assumptions, *how much* trade could be expected to rise for a given fall in trade costs. In other words, while ECLA was optimistic in 1957 that lower trade costs could help raise regional trade, one question left unanswered is: by exactly how much?[9]

We focus on a difference-in-differences-in-differences specification based on a theoretically grounded gravity model of trade. We study changes in trade during the wars among a set of five South American trade partners relative to the changes in exports from those countries to non-South American partners and relative to changes in exports of a group of eight non-South American exporters. Our third difference relies on comparing these flows to domestic trade or expenditure. Our gravity approach allows us to control for supply and demand shocks and to isolate the impact of trade cost shocks on regional integration emanating from these wartime market disruptions (Head and Mayer 2015).

In identifying whether trade costs mattered for regional integration, we must note that supply and demand changes, as opposed to trade costs, could be behind the observed rise in regional trade. A lack of competition from European imports might have allowed regional producers, who typically produced at a higher cost or with lower quality, temporarily to satisfy domestic and regional demand. After controlling for these shocks, it appears that higher physical trade costs associated with disruptions to international shipping to Europe appear to have *diverted* trade into the region. The idea that (relative) trade costs mattered is validated.

We also approach this issue with direct evidence on observable trade costs, such as freight rates and diplomatic initiatives. We also have detailed information on international trade and production in the textile sector. Evidence from Brazil in the 1930s and 1940s reveals that trade costs, broadly defined, limited regional trade in these types of industrial goods.

We have little light to shed on the political economy of trade policy in South America at this time and how these debates were settled. The likelihood of policy changes and investments in trade-promoting infrastructure to promote regional trade is beyond the scope of this article. Still, we do provide some evidence that a strategy promoting regional or international integration with lower costs of doing trade might have had some success in generating regional trade had it been tried with greater vigour.

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[8] In most cases, as in Argentina, Bolivia, Chile, or Peru, this pattern was reinforced by an increase in the terms of trade and revenues due to the positive evolution of export prices (Bulmer-Thomas 2014).

[9] (ECLAC 1956).

Our starting point—empirical models based on modern trade theory—may seem anachronistic and even ahistorical. Nevertheless, they are quite adaptable and general. We explain below the virtues of applying this kind of structure to the data. Furthermore, analysis of these issues through this lens dates back to contemporaries such as John A. Hopkins, a US economist, who authored a report in 1944 for the Argentinian Trade Promotion Corporation (Corporación para la Promoción del Intercambio). There he discussed the importance of market size, spillovers, and other forces that are still emphasized today in the new economic geography literature.

In what follows, we capitalize on modern econometric and economic methodology to assess whether regional trade had any prospects based on changes in trade costs. Along the way, we attempt to eliminate factor endowments and low incomes as two factors that might have limited trade. What we are left with is a view of international trade and development, well before the post-Second World War period, that is amenable to analysis using the tools of modern trade theory.

Part I

Regional trade in Latin America has long been low, especially when compared to regional trade in Europe, North America, and even Asia (see figure 1). Figure 2 shows the share of exports among Argentina, Bolivia, Brazil, Chile, and Peru (hereafter SA5) over total exports for these five countries. The First World War brought an increase from around 5 per cent to a maximum of almost 8 per cent in 1918. The global crisis of the 1930s produced a drop to 4.6 per cent in 1931. However, it was during the Second World War that regional trade expanded significantly, to 13.5 per cent by 1945. By way of comparison, for Belgium, France, Germany, Italy, and the Netherlands, the regional share was roughly 23 per cent in 1930. Maizels reports a similar figure for total intra-European trade shares of 34 per cent in 1929.[10]

One other question could be asked at this point: how much of this regional trade increase can be attributed to any given country? Figure 3 shows the share of each SA5 country in total imports for the four other neighbours. Argentina was dominant until the Second World War, with a minimum share of 3.5 per cent in 1920 to a maximum of 15.5 per cent in 1932, but from 1941 onwards Brazil clearly surpassed Argentina. In 1944 Brazil had a share of 18 per cent, far higher than that of Argentina, which was less than 7 per cent. Peru and Chile were also fighting for a second position in regional markets. Both countries had a share of close to 4 per cent in regional markets during the Second World War. Finally, Bolivia never represented more than 0.3 per cent. Surprisingly, the regional trade share of Argentina declined in the Second World War period, which has often been attributed to close connections with British as well as German markets.[11]

A closely related view of the changes is evident in figure 4, which shows the share of total exports for each of our SA5 countries destined for the remaining four countries. Peru stands out, with a secularly rising trade share after the First World War. For most of the other countries the export shares remain low throughout the period with the exception of the wars. Chile and Brazil register short-lived blips upward *c.* 1918–19. Brazil, Chile, and Peru see more sustained rises in the Second

[10] (Maizels 1965, 92).

[11] Argentina declared the intention of intensifying regional trade as a way to overcome dependence on Europe (Castillo 1979).

World War period, at least doubling their export shares to the region relative to the immediate prewar experience.

While the regional trade boom during the Second World War was largely a Brazilian/Argentinian story, about 55 per cent of the rise in regional trade was evenly spread across the other smaller partners. Figure 5 shows the share of the rise of total regional imports for each SA5 country accounted for by each of the other four South American source countries. To eliminate noise, we take the three-year centred averages for each of the endpoints (1939 and 1945). The height of the bars in figure 5 represents the percentage share of the total change in imports from the South American region accounted for by a particular source country. We then break these percentage shares down by the four possible destinations. For example, Brazilian exports to Argentina, Chile, Peru, and Bolivia account for 55 per cent of the total rise in imports from sample South American partners. Roughly 80 per cent of this share is accounted for by Argentina's imports from Brazil. Chile contributed 21 per cent to the total rise in imports from the region and Argentina for nearly 8 per cent.

Not all of these changes were driven by traditional commodity exports. In fact, manufactures represented almost 57 per cent of Argentinian exports to Bolivia, 44 per cent to Peru (1943), 33 per cent to Chile (1941), and 31 per cent to Brazil (1946). Brazilian exports of manufactures to Argentina reached 43 per cent in 1945. Moreover, the weight of manufactures in regional trade for Chilean imports increased from 6.7 per cent in 1936 to 35.7 per cent in 1943. Clearly this was a significant increase in manufacturing exports over historical trade patterns, whereby these nations previously relied heavily on Europe and the US for such products.

Figure 6 shows a measure of regional trade intensity for Chile in textile goods. This measure compares the share of Chilean imports for textiles from four regions (South America, Europe, the UK, and the US) in total imports of that industry to the share of total Chilean imports coming from that region. Regional integration was generally low in textiles, but near the end of Second World War, by this measure, regional integration almost surpassed that of the US and continental Europe, although it never reached the levels observed for the UK. During the war, the US did not entirely fill in for the missing European trade. Greater regional integration, even in manufactures, was far from categorically impossible.

Part II

We now turn away from looking at trade shares and instead examine the Head–Ries measure of trade costs, a theoretically motivated measure of bilateral trade integration. The Head–Ries measure is inversely related to the ratio of bilateral trade to total expenditure on domestic output.[12] The trade cost measure is high when bilateral trade is low *relative* to the domestic benchmark. Trade diversion or third country effects and general equilibrium effects are accounted for by the domestic trade benchmark, as discussed in (Jacks, Meissner, and Novy 2011). Trade costs, in *ad valorem* equivalent percentage terms, are given by:

[12] This approach to trade integration has been studied by Jacks et al. It is closely related to the measure developed by Head and Ries, who studied a Krugman model of trade with monopolistic competition and a love of variety. See (Head and Ries 2001; Jacks, Meissner, and Novy 2008; Jacks, Meissner, and Novy 2011).

$$\tau_{sd} = \left(\frac{x_{ss} \cdot x_{dd}}{x_{sd} \cdot x_{ds}} \right)^{\frac{1}{2 \cdot (\sigma - 1)}} - 1 \quad (1)$$

where s indexes a source/exporting country, d indexes a destination/importer, and x_{dd} denotes domestic absorption (proxied by GDP_{ss} – $exports_{ss}$), x_{sd} is exports from s to d, and σ *is* the elasticity of substitution across all goods. We assume that σ equals 8, as in (Jacks, Meissner, and Novy 2011). Various underlying structures of trade, including a constant elasticity of substitution (CES) demand system with the Armington assumption (that is, each product is differentiated based on its origin), a Ricardian model of trade in 'homogeneous' goods, and a trade model of firms with heterogeneous levels of productivity, give rise to identical measures of trade costs. Reallocation of a constant value of exports from one partner to another partner will lower the bilateral trade cost measure even in the absence of real changes in the cost of doing trade with the partner to which trade is re-allocated. By definition, trade costs are a relative measure, with the benchmark being the costs of domestic trade. Domestic trade costs are assumed to be the same across countries, which is an obvious simplification but not overly problematic. In any case, our regression results later will relax this constraint.

Figure 7 shows that this comprehensive measure of trade costs for our South American sample was higher than between our sample and six trade partners in Europe, Japan, and the US.

After controlling for economic size (a function of the endowment of factors of production as well as total factor productivity), the South American countries in our sample seemed to face high barriers to trade in the region. Despite the fact that South American nations are on average half the distance from their European trade partners, average trade costs were roughly 30 per cent higher within the region.

Two periods of sharply lower trade costs for South America stand out, and these coincide directly with the wars. There is also a narrowing between the two lines from the early 1930s. All of this suggests that major economic shocks such as the Depression and the world wars may have facilitated trade in South America, at least in relative terms. Based on the assumed elasticity of substitution 8, trade costs fell for South American country pairs by about 12 per cent 1913–18 and 1938–44.[13] An elasticity of 3.78 yields a fall of 29 per cent in both periods and an elasticity of 12 yields declines of about 8.5 per cent. All of these regional declines are much larger than the declines for country pairs where only one partner is in South America.[14] In addition we note a secular rise in trade costs against non-South American partners from the early 1920s. This rise could be explained, in

[13] Specifically, this is the geometric average of the ad valorem equivalent, as outlined in (Jacks, Meissner, and Novy 2010).

[14] These changes in trade costs are for a balanced panel of country-pairs where both countries are in our Latin American sample and for pairs where only one country was in Latin America (and where trade is not zero). Since the trade cost measure imposes an elasticity of substitution, about which we have no reliable information, we provide three estimates corresponding to elasticities which fall within the range of plausible estimates in the literature. Our preferred elasticity, in line with (Jacks, Meissner, and Novy 2011), is 8. (Federico and Tena-Junguito 2017), use an elasticity of 3.78 which is the median in a meta-study of the recent literature by (Head and Mayer 2015). We also provide estimates with a very conservative elasticity of 12.

part, by rising protectionism in our South American countries which discriminated in favour of South American partners.

The accelerated decline of trade costs during the wars has many potential explanations. Tariffs, non-tariff barriers, and exchange controls might have favoured regional trade. Some anecdotal evidence is available to suggest this was the case. Likewise, improved domestic and international transport links might also have made commerce between these nations easier. Equally, the trade cost measure can also fall when it becomes *relatively* easy to trade such that trade is 'diverted' into the region, whether 'away' from domestic markets or from exports that would have otherwise gone outside the region. For example, wartime disruptions to trade networks (beyond supply and demand changes) and the autarkic policies of the 1930s in Europe may also be associated with higher regional trade integration and hence lower regional trade costs when measured this way. Other forces for which we have no direct evidence, but which seem less plausible, might be an increased difficulty of trading domestically, which would spur international trade. A rise in the elasticity of substitution, or lower mark-ups, could also give rise to greater integration. If the latter were true, then it would suggest a stiffening of competition over time as goods became better substitutes for each other, perhaps as industrialization took hold and so forth. While this latter force is an interesting possibility, we have no reason to believe that the preference structure and the industrial organization changed so dramatically within the region over such a short time, and economists generally believe such variables are fairly stable.

There are multiple other potential explanations for the generally high level of trade costs prior to 1950. One common argument is that South American nations lacked technological complementarity, perhaps because of too great of a similarity in factor endowments. This view is hard to sustain, at least within our five-nation sample. First, it is unlikely that the factor endowments of countries with such disparate climates and resource endowments as Brazil, Peru, and Argentina were so similar so as to negate trade. While it is true that land/labour ratios were elevated in all cases, the primary products of each country were highly differentiated from each other. It was not uncommon for Brazil to export coffee, cotton, and *mate* in exchange for Argentinian wheat and hides. More broadly, in 1913 the main export of Brazil was coffee, for Argentina it was corn, for Chile it was nitrate, for Bolivia it was tin, and for Peru it was copper (Bulmer-Thomas 2014). A 'love of variety' in such goods could have easily generated demand for regional goods. The best possible explanation for low regional integration under our assumptions seems to be high trade costs.

Differences in GDP per capita (in absolute values) have been used to test for the nature of international trade. A positive relationship to bilateral would suggest inter-industry trade. A negative sign would be consistent with the Linder hypothesis predicting that countries with similar levels of GDP per capita will trade more. Accordingly, we ran, but do not report, two gravity regressions that include the absolute value of the log differences in GDP per capita. The first model follows the gravity approach in Jacks et al. and allows for multilateral resistance with a control for GDP minus total exports. The second model is a standard gravity model that includes three new variables: first, a size measure; second, similarity in size; and third, differences in the log of GDP per capita. In neither specification was the term involving (absolute) differences in GDP per capita statistically significant. On the other hand, overall size of the two partners and similarity in size of GDP are statistically significant. These results are evidence in favour of an

Armington approach which identifies goods with their origin and considers trade in differentiated goods.

Yet another possible explanation is that European producers supplied higher quality goods, eliminating South American trade in industrial goods. This is plausible, but unfortunately, we have no good way of measuring quality per se, given the available data. It is worthwhile noting that the trade costs measure is based on two-way trade. If trade costs are high, it is because imports and exports alike are low. Low quality would have dissuaded foreign consumers *anywhere* in the world from purchasing South American exports. Instead we see that after controlling for the size of supply and demand, the South American nations in our sample had a relatively difficult time gaining market share close to home but not abroad.[15]

Part III

In this section we explore the determinants of South American regional trade and trade costs with the help of a novel dataset on bilateral trade for five South American countries with eight European and North American trade partners between 1910 and 1950.[16] We use a gravity model of trade consistent with many different modern models of international trade. The gravity model attempts to explain variation in bilateral exports, as opposed to seeking an explanation for patterns of specialization. We rely on gravity rather than pursuing the determinants of the Head–Ries trade cost measure because the latter are only defined when there is positive trade. In many instances in our sample, especially during the world wars, trade fell to zero, implying infinite (variable) trade costs or at least significant fixed costs of bilateral trade. Instead, our gravity models do not ignore zero observations. We use the Poisson pseudo-maximum likelihood (PPML) estimator as suggested by Santos Silva and Tenreyro and by (Head and Mayer 2015; Silva and Tenreyro 2006).

Our baseline estimating equation is:

$$x_{sdt} = exp\left[\beta_1\left(SA_{sd}\right) + \beta_2\left(SA_{sd} \cdot WAR_t\right) + X'_{sdt}\theta + s_{dt} + d_{dt}\right] + \grave{o}_{sdt} \quad (2)$$

where, x_{sd} is nominal exports between a source (s) and a destination (d), SA is an indicator equal to one if both countries in the pair are located in South America, WAR is an indicator for the periods comprising either the First World War or the Second World War, and X includes a set of traditional gravity variables that proxy

[15] Non-homotheticities might be a problem too. If South American consumers were too poor to demand local finished goods or could only do so at some threshold level of income, then regional trade would be reduced. We have no reason to believe this might be the case since local consumers were able to import consumer goods from European countries and the US.

[16] The countries are Argentina, Brazil, Bolivia, Chile, and Peru. Outside South America we have the US, the UK, Belgium, Germany, Italy, Spain, France, and Japan, which were their main trade partners. Our dataset relies on (Peres Cajias, Badia-Miró, and Carreras-Marín 2012), expanded with new trade figures for South American trade with Japan, Spain, Belgium, and Italy. We have considered official South American sources which include trade data during the wars. That is an important novelty as many international trade datasets are simply composed of zeros for the war periods. We also consider the recent literature on the accuracy of official South American trade statistics (Carreras-Marín and Badia-Miró 2008; Carreras-Marín and Rayes 2015; Federico and Tena-Junguito 1991; Tena-Junguito and Willebald 2013). For trade among European countries and the US, we have relied on (Jacks, Meissner, and Novy 2011). Online app. S1 gives more information.

for several significant trade costs highlighted in the literature: the logarithm of shipping distance in nautical miles between principal ports (time-varying due to the opening of the Panama Canal), a shared language dummy, a common land border indicator, and an indicator equal to one if both countries are on the gold standard. The last set of variables includes period-specific exporter (*s*) and importer (*d*) dummies which control both for economic size as well as what (Anderson and van Wincoop 2003). Time dummies are subsumed by the year-specific constant/exporter reference country along with the country–time interactions. These fixed effects control for factors that shape trade with all trade partners relative to the dyad in question, as well as productivity and demand shocks affecting trade and production for both the producer and consumer country. These dummies and their interactions with the year variables make it possible to use nominal instead of real trade. Finally, we also include a pair-specific error term.

Regressions of this form will allow a difference-in-differences-in-differences interpretation of the impact of trade cost changes during and due to the world wars. Additionally, if we assume a particular elasticity of substitution, we can recover an estimate of the size of the trade cost shock of the war. We emphasize the following two points.

First, β_1 allows us to know whether after controlling for geography, other observable trade costs, economic size, and productivity, South American nations export less to each other. If this coefficient is negative and statistically significant, it is consistent with high regional trade costs in South America.

Second, we would like to know whether a decline in (relative) trade costs allows South American countries to trade more. Since trade cost changes are typically endogenous to pre-existing trends and unobservable policy, we focus on the wartime shocks to isolate a plausibly exogenous shock to such costs. Specifically, β_2 is the difference-in-differences-in-differences coefficient of interest, which measures the rise in intra-South American trade (the treatment group) during a given war relative to both non-South American destinations and non-South American exports to all destinations in our sample (the control group). The third difference is the comparison to changes in domestic trade. We use the world wars as a natural experiment. These shocks are not obviously contemporaneously associated with or caused by shocks to South American productivity, supply, or demand. Moreover, we assume that trade policy and other trade costs in South American nations did not react directly, in expectation of or concurrently to the shock of the wars. Instead we rely on a global shock to trade that changed the relative costs of engaging in international trade. Finally, we assume that in the absence of the shock trade patterns for South American pair countries and non-South American pairs would have evolved (conditional on observables) in a similar way.

While regional trade shares seem to have risen during the wars, it is impossible to know whether this is because South American nations became globally more competitive as foreign suppliers went offline, or whether the *relative* cost of regional trade fell. However, we can discriminate between these forces with the structure of the gravity model. The time-varying importer and exporter fixed effects control for supply and demand shocks affecting trade levels across all partners. For instance, if nations become more competitive, or if demand falls across all partners, trade should change equally across all partners conditional on other observables.

If the coefficients on the interaction terms on South America and the wars are insignificant *after* including these controls for supply and demand, then we can argue that the rise in trade shares during the wars is very likely attributable to changes in competitiveness, supply, demand, or trade diversion. This implies that nascent South American industry could produce for the regional market if global supply conditions were favourable or if producers could lower their output prices.

Assume instead that we find the coefficient to be positive and significant, *even after including time-varying country fixed effects*. This is consistent with the idea that regional trade could have advanced with policies and other actions that reduced trade costs between nations in the region. Such a finding would validate the proposals of various policy players in the early twentieth century, including the Pan-American Union and Federico Pinedo, finance minister of Argentina, who lobbied extensively but unsuccessfully for a regional free-trade area in the late 1930s and the early 1940s.

Part IV

Table 1 investigates the results of a difference-in-difference-in-differences strategy. We present various specifications including a subsample for the years 1910–18 (column 1), 1935–45 (column 2), and the entire sample 1910–50 (column 3). In columns 6 and 7 we include controls for other periods as placebos and to control for pre-existing trends.

The first row of table 1 shows that, in all specifications and after controlling for a number of other determinants, the South American countries exported less to each other. In column 1 this decrease is about 77 per cent; in column 2 it is 88 per cent; in column 3 it is valued at 74 per cent. Columns 1, 2, and 3 show evidence consistent with the idea that during both wars (relative) trade costs between the South American countries in our sample fell, causing trade to be higher in the region by about 80 per cent. All coefficients on the interaction terms of wars and South America are statistically significant. With an elasticity of substitution of 8, the average (relative) decline in the trade cost factor is equal to 11 per cent during the First World War and 13 per cent during the Second World War. These correspond very closely to the estimates in section I, based on values underlying figure 7. The difference here is that we do not impose unit income elasticities and we carefully delineate the 'control' and 'treatment' groups. As all regressions control for supply, demand, and trade diversion effects, we find strong evidence that the higher trade shares witnessed during the wars appear to have been driven by declines in regional trade costs. These declines should be interpreted as relative declines in trade costs, given our set-up.

Part V

We proceed with a number of robustness checks. Results in table 1, column 3 are qualitatively robust to omitting the dyads that include either Brazil or Argentina (columns 4 and 5). Our results do not rely solely on either country whose leaders attempted closer trade relations in the late 1930s and early 1940s. Columns 6 and 7 check whether trade was abnormally high between South American pairs during the 1920s (1922–9) or the Great Depression (1929–38). We do not expect trade to be abnormally high or low in the 1920s, so we include this indicator in the spirit of a placebo test. Inspection of the trade shares in the 1930s reveals a potential rise in regional trade from the mid-1930s, pre-dating the Second World War. However, in neither case are the coefficients on these terms significant.

We explore pre-existing trends further in table 2. Here we include an interaction between South American country pairs and a simple linear time trend (that is, the sample year minus 1909). Both time trends are positive and significant in the 1910–18 and 1935–45 subsamples. Still, our wartime shocks are associated with significant coefficients. In column 1, the First World War is associated with higher trade in South America, though the point estimate is smaller than in table 1 (0.49 vs. 0.72). In column 2, covering 1935–45, the coefficient of interest on the interaction term is no longer significant. In column 3 of table 2, which includes all years, 1910–50, the coefficient on the Second World War/South America interaction is significant again and of nearly the same magnitude as in column 3 of table 1.

In table 3 we continue the analysis with different comparison groups. Columns 1–3 use the US as the only other exporter in the sample besides the five South American countries. Comparing South American export success to the US is a more punishing test since continental European trade would have been low during the wars. In columns 4–6, we use the UK as the comparison country. While the UK was potentially more directly exposed to both wars, it is a natural comparison country, since outside wartime it was a leading exporter to South America. In columns 7–9, we use the US and the UK together as the only other comparison exporters. We split the samples over time, as above, and present results for 1910–50 as well. In nearly all cases, our results are qualitatively similar to those from table 1. The exceptions are when we use the UK as the only comparison country and look at the entire period or the 1935–45 period. Here it appears that intra-South American exports did not grow much faster than exports to the UK and UK exports to other destinations during the Second World War—even after controlling for supply and demand shocks. Special shipping and wartime supply lines aimed at supplying the Allied war effort, thereby lowering trade costs, may help explain this result. Overall, tables 1 to 3 suggest that trade costs played a role in determining the level of South American integration.

Part VI

Assume now, following the prescription and hopes of the economic report on trade from ECLA and earlier policy makers, that our South American country pairs could have enacted a regional free trade agreement (ECLAC 1956). To conduct such a counterfactual, we simplify by restricting our analysis to partial equilibrium. Doing so probably biases the expected rise in trade slightly upwards. We will assume that all tariffs within our South American sample are eliminated. What would be the impact on regional trade under such a scenario compared to the impact of the wars, which were mainly short-run reductions in trade costs? While we make no claim for the political feasibility of this counterfactual, this analysis, paired with our previous results, allows us to gauge how much trade costs mattered for trade.

ECLA and Blattman et al. provide indications of average tariff rates in *ad valorem* equivalents for several South American countries (Blattman, Hwang, and Williamson 2003). For Argentina for the years 1936–40, the value reported by ECLA was 28.2 per cent, which is the total tariff revenue divided by dutiable imports and dutiable imports accounted for 52 per cent of all imports (ECLAC 1956). Blattman et al. report a value of 20 per cent for Argentina in the same years. For Brazil the number based on ECLA data is 25.6 per cent for the year 1936 (ECLAC 1956). Blattman et al. report 20.9 per cent. We have no data from ECLA for Chile and Peru, but Blattman et al. report values of 32.06 per cent and 17.36 per cent respectively. Using these values as representative for our five nations, a reduction of tariffs from an average of, say, 25 per cent to zero would reduce the

relative price of imports by 1–(1/1.25) or 20 per cent. The percentage reduction in trade costs would have been in the order of 15 per cent, since in figure 7 we see that the average South American *ad valorem* trade cost is 180 per cent in 1913 and 1945. With a trade elasticity of 8 and an average decline in trade costs of 15 per cent, a standard gravity model like that in (Anderson and van Wincoop 2003)'s equation 13 would predict exports to within-region partners to be 1.05 log points or 185 per cent higher (Anderson and van Wincoop 2003, 175). In general equilibrium the effect would be smaller, although very comparable.[17] Keeping in mind that our South American regional trade levels were relatively small suggests that such economically large effects are quite plausible. With an elasticity of 3.78, the expected increase in exports would be about 57 per cent (Head and Mayer 2015). With an elasticity of 12, the rise in trade could have been as high as 497 per cent. It would appear that reductions in (relative) regional trade costs, whether via policy or better infrastructure, could have done much to boost regional trade significantly, even with low trade elasticities. Whether these changes were economically feasible is decidedly not a question we can answer in this article.

For a comparison, focus on 1939–45 and use the assumptions of (Anderson and van Wincoop 2003) or the theory outlined above to generate the Head–Ries measure. On average the ratio of bilateral exports to the product of pair-GDPs rose by a factor of 1.85 or 285 per cent (median factor, 1.51) between 1939 and 1945 in SA5. Assuming an elasticity of substitution of 8 and using the standard gravity equation formula from (Anderson and van Wincoop 2003), the implied decline in relative trade costs within SA5 would be in the order of 9.5 per cent (Anderson and van Wincoop 2003, 175). An elasticity of 3.78 yields a decline of 20 per cent and an elasticity of 12 yields a decline of 5.5 per cent. As noted above, our Head–Ries trade cost measure yields change of *c.* 13 per cent during the Second World War. All of this suggests that the relative trade costs between regional partners during the Second World War declined by slightly less than 15 per cent and promoted an economically significant rise in trade. Though free trade areas were historically planned, and sometimes considerable progress was made in their direction, they ultimately never came to fruition.[18] Abolishing tariffs on regional partners was ostensibly politically infeasible in the 1940s. Our results highlight that had such negotiations succeeded and had other factors been held constant, regional trade could have increased significantly simply due to lower trade costs.

Part VII

We now decompose changes in SA5 bilateral trade in order to assess the importance of trade costs versus supply, demand, and third market effects. One drawback is that zero trade flows cannot be used. Following Jacks et al., the log point change in trade for a dyad is given as:

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[17] For example (Irwin 1998) studies a computable general equilibrium calibration of the Smoot–Hawley Tariff and concludes that "when the elasticities are comparable across approaches, the general equilibrium calculation of the tariff's impact on trade volume is reasonably close to that of the partial equilibrium estimate".

[18] Argentina negotiated a customs union with Uruguay (1940), and Chile and Paraguay (1943). A treaty with Brazil (1941) aimed for 'the progressive establishment of such a free-trade system as … would permit "the constitution of a customs union … where to adjacent countries should have the right of accession"'; (ECLAC 1956, 67). The report goes on to note that these agreements were not ratified and had no impact on trade.

$$\Delta \ln\left(x_{sdt} \cdot x_{dst}\right) = 2\Delta \ln\left(y_{st} + y_{dt}\right) + \Delta \ln\left(\theta_{st} \cdot \theta_{dt}\right) + 2\left(1-\sigma\right)\Delta \ln\left(1+\tau_{sdt}\right) + \Delta \ln\left(\frac{x_{sst} \cdot x_{ddt}}{y_{st} \cdot y_{dt}}\right) \quad (3)$$

where $\theta_{st} = y_{st}/(y_{st} + y_{dt})$ is the country s share of pair GDP, Δ denotes that we take differences between period t and the base year, and we use the fact that $y_{st}y_{dt} = (y_{st} + y_{dt})^2\theta_{st}\theta_{dt}$ (Jacks, Meissner, and Novy 2011).

This decomposition tracks the changes in trade due to changes in output arising from higher inputs or greater productivity (the first term), similarity in size of GDP (the second term), trade costs (the third term), and multilateral effects (the fourth term) that change trade with all partners. The latter explain changes in domestic trade relative to total output, such that if the ratio is constant, domestic trade expands at the same pace as international trade with all partners and overall production. We take a weighted average of the decomposition equation for all observations of the South American dyads using the sum of the partners' GDP relative to the total sample GDP as weights.

Table 4 presents results for the two war periods. In each instance, the bulk of the changes are explained by output and trade costs. Changes in multilateral forces explain less than 4 per cent of changes during the First World War and almost nothing during the Second World War. Similarity in economic size is also a minor player. Trade costs (which are falling) play a larger role in the Second World War period (53 per cent) than during the First World War. Consequently, the change in output explains a greater proportion of the rise in trade among our South American countries in the First World War period.

We interpret these findings as evidence supporting the idea that wartime disruptions to global markets made bilateral trade within South America significantly less costly in relative terms. Trade costs mattered for regional integration. Second, boosting output by adding factors of production, or (less plausibly in these years) raising productivity, could also have contributed substantially to intra-South American trade. This finding holds constant what is happening in world markets. This suggests a role for competitiveness in boosting regional trade. After accounting for the size terms, multilateral forces play a very small role. We conclude that it was not simply the disappearance of European competitors that allowed for greater integration in our South American countries. For multilateral effects to have been important, exports to all partners would have had to change faster than total output. While South America gained market share with some partners, trade plummeted in others—especially in Europe. The structure of the demand system forces us to attribute changes in trade to changes in trade costs and economic size as the leading explanations for rising trade shares in South America rather than third market effects.

Part VIII

As argued above, there is some evidence that trade costs mattered for South American integration. Despite geographic proximity and shared institutional backgrounds, many of these countries traded more heavily with distant industrial powerhouses such as the US, the UK, France, and Germany. Shipping between Europe and South America seems to have been less costly than international shipping within the region.

For Brazil in 1910 freight rates per ton of cotton goods via the English-flagged Booth Lines or the Lloyd Brazileiro were quoted as follows: Liverpool–Belem (Para) (4,290 miles) $12.76; New York–Belem (3,380 miles) $14.52; and Rio de Janeiro–Belem (2,406 miles) $12.27. Freight rates per ton of cotton goods via ship to Manaus were as follows: Liverpool–Manaus (5,150 miles) $16.04; New York–Manaus (4,240 miles) $17.16; and Rio de Janeiro–Manaus (3,266 miles) $34.16 (Clark 1909).

International shipping companies provided high tonnage shipping services with or without fixed timetables but charged anti-competitive rates in the so-called conference agreements. Still, no country in South America had any significant merchant marine fleet and this raised rates even more.[19] Most trade between nations such as Brazil and Argentina would have had to have been carried by European or American vessels stopping in Brazilian ports and then carrying on to Argentinian or Uruguayan ports. Not all American or European freight companies travelled such routes. Otherwise, regional trade relied on infrequent departures of small-tonnage vessels flying regional flags.[20]

The low level of regional trade due to the low capacity of local shipping is also evident in Brazilian trade statistics from 1903, slightly before our period (IBGE 2013). In a regression of the logarithm of tons shipped on the logarithm of shipping distance, the coefficient on distance is 0.96 (standard error of 0.46, p-value = 0.06). We can then decompose total tons shipped into the number of ships landed and the number of tons per landing. In a regression of the logarithm of the number of ships landed on distance, the coefficient on distance is small (0.04, standard error of 0.39) and not statistically significant. The number of tons per ship landed is still (strongly) positively correlated with distance (coefficient = 0.92, standard error = 0.16, p-value = 0.00). In effect, European landings involved larger vessels, which presumably pushed down the ton-kilometre unit shipping costs.[21]

Although intra-South American freight rates might have been high, the world wars changed relative freight rates dramatically. The US Bureau of Foreign Commerce studied shipping at the outbreak of the Second World War, noting that the rise in freight rates from the US to the east coast of South America was only a fraction of the rise in European freights to the same area. In particular, freights on liners from the US rose 20 per cent, and tramp freights for coal (on non-US and non-Brazilian flagged vessels) bound for the east coast of South America rose 260 per cent (Sanderson 1940). The rise in freight rates on automobiles (boxed) between July 1939 and April 1940 from the US Atlantic ports to Antwerp was 706 per cent. Between US Atlantic ports and Rio, it was 22 per cent. On tobacco the rises were 329 per cent versus 12 per cent. For Le Havre the increases were 158 per cent (automobiles) and 185 per cent (tobacco); for London the rises were 150 per cent

[19] (Sanderson 1940), reported that 'with the exception of a few Argentine ships which operate between Argentina and Paraguay, Uruguay and Brazil, the country's foreign trade is transported by ships of other nationalities. Chilean official trade statistics showed that for 1912 less than 10% of total tonnage was on South American ships and less than 20% of the vessels were from South America.

[20] During the Second World War, freights and other transport costs for Argentina–Brazil trade were around 25% of the export value, while for UK–Brazil and US–Brazil trade such costs were around 20%; (IBGE 1970).

[21] Chilean trade was carried mainly by European ships, which were bigger than South American ships. German and British ships transported, on average, more than 3,000 tons per shipment compared to the 1,500 tons carried by Chilean ships, 1,600 tons by Argentinian ships, and 2,600 tons by Peruvian ships (OCE 1925).

(automobiles) and 200 per cent (tobacco). Automobile freight rates to Valparaiso from US Gulf ports had not moved between these two dates. Meanwhile canned goods freights from the US west coast to London had risen 50 per cent, while those to Buenos Aires had risen only 11 per cent. It was also observed that 'compared with ships of other nationalities, American vessels since the outbreak … have been fairly plentiful on the River Plate, and rates to the US are said not to have been abnormally high' (Sanderson 1940). Based on this, it is very likely that relative freight costs had risen much more on European–South American and American–European routes than on US–South American routes and regional routes.

Quantity rationing in shipping also occurred, which added non-pecuniary and indirect costs to shipping and hence to trade. On the Argentine-British routes, many ships were given official rates and essentially commandeered. On neutral vessels, rates were even higher, but delays and inspections caused logistical problems. Insurance charges for boats not travelling in convoy also contributed to high trade costs. In Peru, where time charters and liners dominated, a number of the shipping conferences that had previously served Peru (for example, European/South Pacific Magellan) ceased to function. The disappearance of anti-competitive pricing did not mean lower rates, though. This route reported rate rises of 50 per cent to 400 per cent. On the other hand, traffic between Peru and the US witnessed rate rises of 20 per cent. Since the liners that served Peru from the US often served other nations such as Chile and also the Rio de la Plata, regional rates would be expected to rise much more modestly than on the European routes (Sanderson 1940).

In terms of trade policy, many significant changes took place in the 1910–50 period. Chile raised tariff rates on a host of industrial products, beginning in the 1920s, which depressed trade. The Great Depression led to the imposition of long-lasting exchange controls. Brazil ordered exporters to sell 30 per cent of earnings to the government at the official (overvalued) exchange rate. The executive in Brazil exercised considerable discretion in granting reductions and permits to importers (Bulmer-Thomas 2014). Argentina and Chile also implemented exchange controls in the 1930s that were equally protective of domestic producers in selected industries.[22]

Contrary to these forces which suppressed South American trade, many attempts were made to improve trade relations in the 1930s and onwards.[23] We explore whether some of these policy changes are associated with higher trade. To do so, we have collected and digitized new data on commercial and diplomatic ties for Argentina and 19 of its trade partners.[24] Our new variable includes a wide variety of diplomatic initiatives, such as friendship agreements, trade facilities, regulations on migration, railway connections at the border, diplomatic post exchanges, and mutual recognition of professional training levels or cultural promotion (Ministerior de Relaciones Exteriores y Culto (República Argentina) 2014). The pace at which Argentina signed these treaties increased from the mid-1930s, with a much stronger rise with Latin American trade partners than with non-Latin American countries. From the 1930s onwards, ECLA described trade

[22] For Chile, see (Díaz and Wagner 2004); for Argentina, see (Taylor 2014).

[23] The numerous trade agreements concluded by Argentina … before the Great Depression … seem as a general rule to have had a favourable effect upon the expansion of its trade' (ECLAC 1956).

[24] These are Belgium, Bolivia, Brazil, Canada, Chile, Denmark, France, Germany, Italy, Japan, the Netherlands, Norway, Peru, Portugal, Spain, Sweden, Switzerland, the UK, and the US.

policy as 'bilateral reciprocity' rather than the nineteenth-century multilateral approach (ECLAC 1956). We have counted the cumulative number of treaties signed with each partner and used this as an explanatory variable in a PPML regression of Argentina's exports to and imports from each of these partners between 1910 and 1950. Table 5 presents our results.

Table 5, column 1 shows that the cumulative number of treaties was a positive and statistically significant determinant of trade. Columns 2 and 3 show that the South American/Second World War interaction term captures some of the reduction in trade costs due to closer diplomatic ties, since the addition of the treaty variable to the regression in column 3 reduces the magnitude of the interaction term for the Second World War. This is consistent with the idea that changes in Argentinean trade policy, 'aimed at the consolidation of the new trade channels' (that is, regional trade), occurred during the 1930s and the 1940s (ECLAC 1956). This point reveals two things. The first is that despite this concurrent re-orientation of trade policy in the 'event window' that we study, which could affect our assessment of changes in relative trade costs during the war, there is still a positive rise in regional trade during the war. The second concerns the endogeneity of trade policy. When we allow for country-pair specific fixed effects. We find a positive point estimate on the cumulative treaty indicator of 0.003, but it is not statistically significant. Trade treaties were potentially endogenous and merely codifying economic forces already in play. It is plausible to conclude that Argentina's diplomatic relations had little effect on the direction of trade and that greater trade during the dislocations of the 1930s and 1940s led to a higher likelihood of signing a treaty. This is reassuring in the context of our research design using the shock of the wars, since those shocks are much more plausibly exogenous.

Part IX

The textile industry can shed some light on regional trade via reduced trade costs and/or improved competitiveness.[25] During the wars, production and intra-regional trade in these goods expanded significantly.[26] Figure 8 shows the shares for Chilean textile importation. Over the long run, British imports tended to fall while the US increased its market share in Chile. Japanese imports increased after the Great Depression but collapsed during the war. South American countries increased their share during the First World War, but a stronger boom occurred in the 1940s. Although Argentina was predominant during the First World War, during the 1940s it was dramatically replaced by Brazil. International trade in the region has sometimes been described as a battle between Argentina and Brazil for regional political and economic hegemony, both trying to escape from the domination of the UK and the US. From the 1930s, both competed for regional market share by signing bilateral treaties and through ad hoc incentives embedded in exchange controls and micro-changes to tariff lines. Whatever the case, Brazil clearly had a leg up in the textile industry, and its local industry had long been

[25] Textile production is a quintessential leading sector in a nascent industrialization process. Textiles represented an opportunity to move away from commodities to higher value-added exports. A product-cycle trend might have left space for competition from regional producers. Brazil had the most sophisticated and largest textile industry in Latin America, with a domestic textile industry ranked seventh in terms of production in 1918. See (Huberman 2013). Additionally, according to (Betrán and Huberman 2016), Brazil reportedly had 50,000 looms, the tenth-largest figure in the world in 1913.

[26] On expansion during the First World War, see (Albert and Henderson 1981).

able to compete (that is, from the First World War) against European competitors in its domestic market in the coarser grades (Clark 1909).

British textiles collapsed after 1941, providing an opportunity for US and regional exporters to increase their market share. However, far from providing a long-lasting boost to industry, any gains were temporary. Import shares from non-traditional supplies declined swiftly when the conflict ended.

Argentina and Brazil account for the greater part of South American trade. Even nowadays their bilateral trade is the most important part of Mercosur. Figure 9 shows how, during both wars, Brazil clearly increased its exports to the Argentinean market.

Figure 10 shows that prior to the 1930s, Brazilian exports to Argentina were mainly of *mate de hierba buena*. *Mate*'s trade share fell, and that of Brazilian textiles increased. *Mate* had no easily substitutable foreign goods. On the contrary, textiles were probably easily substitutable for foreign goods.

As an indication of Brazilian competitiveness, figure 11 shows the share of output going to the domestic market, the share for export, and the value of imports. Data are expressed in quantities (metres of fabric). The left vertical axis shows data for industrial production and apparent consumption (domestic production – exports + imports). The right vertical axis shows the trade data. Eighty per cent of domestic consumption was covered by domestic production during the entire period. Imports were around 15 per cent before the First World War, falling to around 5 per cent during the conflict and remaining at that level during the 1920s. After the early 1930s, textile imports dropped, ultimately claiming an insignificant share of the domestic market. Significant declines in international trade costs are visible. While production in metres increased by about 70 per cent between 1932 and 1945, exports rose 292 per cent between 1932 and 1945. Between 1939 and 1945 the figures are 21 per cent for production and a growth factor of 12 for exports. Textile exports were less than 1 per cent of domestic production until 1939. By 1942 Brazil exported 14 per cent of domestic production—half to Argentina.[27]

The First World War also led to a significant increase in exports, but imports from abroad were greater and increasing in the early 1920s. According to Huberman, the period before 1925 was one of increasing capital investments and an upward trend in the quality of textile production, associated with stricter labour regulation (Huberman 2013). Starting from 1925, foreign markets collapsed and the country began to adopt an inward-looking development strategy, leading to lower imports and a higher share of national production in the total consumption of textiles.

Brazil's path to success might also have been founded on an improvement in quality, rather than simply on price competition. Unit export values, shown in table 6, can be used as an indirect approach. From 1934 to 1946, the trend was upwards, despite uneven global demand during the war years. This evidence fits well with Huberman's explanation, but goes beyond it by providing some evidence from the 1930s and beyond.

[27] A similar pattern is observed in the case of Chile during the First World War and the 1920s. Most domestic production of textiles stagnated and the imports' importance in total consumption remained stable. See (Palma 1979).

Part X

Viewed from a long-run perspective, greater regional trade in Latin America seems to be Sisyphean. Its historical trajectory is currently part of many international debates on the merits of regional trade. Liberalization efforts since the 1990s have not been sufficient to promote strong regional integration. In 2000 the share of total imports for Argentina, Brazil, Chile, and Uruguay coming from other regional countries equalled 18 per cent, versus a share of 27 per cent coming from the NAFTA countries. Between 1910 and 1950 our data show that the share of imports from South America averaged 11 per cent, with a maximum of 24.5 per cent in 1944. While some progress has been made, more distant trade partners remain more important than neighbouring countries in this region. Recently some authors have argued that more attention should be paid to reducing trade costs by raising investment in regional transport infrastructure (Mesquita Moreira et al. 2008).

Our results from the past affirm that trade costs mattered historically. We find that trade costs were always higher between these countries than with more distant partners, but that during the wars these fell sharply. These shocks made it relatively more costly to trade with those nations directly involved in the war. We estimate that under a free trade scenario, comparable to the decline in trade costs from the war, the countries in our sample might have been able to double exports to each regional partner. Other policies to improve transport and communication links could have had similar effects, given our direct evidence.

We also take an approach to this question using data from the textiles industry. During the First World War, substitution was mainly focused on the domestic market. However, during the Second World War, South America increased exports to close neighbours. Nevertheless, this increase was not persistent. Once the war was over, these gains in market share were surrendered. South American nations failed to commit to permanently low trade barriers by signing a definitive regional trade agreement, much less going in for a full-fledged customs union. Without these incentives, the necessary investments required to establish export links to these markets were not made. Without lower trade costs, the entry of firms producing new products that could compete with extra-regional substitutes was limited. Again, relative trade costs seem to have been the drivers here. It remains to be seen whether greater regional market access could have provided the foundation for enhanced productivity performance or whether trade policy to shelter domestic producers might have produced successful productivity growth.

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Tables

Table 1. Bilateral exports, 1910–50

	Nominal exports						
	13-country sample, 1910–18	13-country sample, 1935–45	13-country sample, 1910–50	12-country sample (Brazil omitted), 1910–50	12-country sample (Argentina omitted), 1910–50	13-country sample, 1910–50	13-country sample, 1910–50
Both countries in Latin America	−1.48**	−2.15**	−1.38**	−1.36***	−1.41**	−1.38**	−1.37**
	(0.41)	(0.66)	(0.37)	(0.37)	(0.35)	(0.37)	(0.37)
Both in Latin America x First World War	0.85***	–-	0.60***	0.52**	0.44*	0.60**	0.59**
	(0.18)		(0.23)	(0.25)	(0.23)	(0.24)	(0.25)
Both in Latin America x 1920s	–	–	–	–	–	–	−0.05
							(0.17)
Both in Latin America x Great Depression (1929–38)	–	–	–	–	–	−0.02	–
						(0.15)	
Both in Latin America x Second World War	–	1.07***	1.17***	0.73*	1.61***	1.16***	1.15***
		(0.31)	(0.24)	(0.39)	(0.32)	(0.24)	(0.23)
ln(distance)	−0.27**	−0.33**	−0.31**	−0.26**	−0.40***	−0.31**	−0.31**
	(0.09)	(0.13)	(0.10)	(0.11)	(0.08)	(0.10)	(0.10)
Both on the gold standard	−0.80**	0.74*	−0.05	−0.07	−0.06	−0.05	−0.05
	(0.22)	(0.42)	(0.10)	(0.11)	(0.09)	(0.10)	(0.10)
Shared border	0.80***	1.22**	0.78***	0.77***	0.75***	0.78***	0.78***
	(0.17)	(0.56)	(0.22)	(0.23)	(0.20)	(0.22)	(0.22)
Shared language	0.14	0.72***	0.28*	0.29*	0.34**	0.28*	0.28*
	(0.14)	(0.21)	(0.17)	(0.17)	(0.14)	(0.17)	(0.17)
No. of observations	1,296	1,584	5,904	5,412	5,412	5,904	5,904
Year x country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors clustered on country pairs are reported in parentheses. Time-varying country fixed effects are included in all columns. Method of estimation is PPML. ***p-value <0.01, **p-value <0.05, *p-value <0.1. Shipping distance is in nautical miles between principal ports (time-varying due to the opening of the Panama Canal).

Sources: Our dataset relies on (Carreras-Marín, Badia-Miró, and Peres Cajías 2013; Jacks, Meissner, and Novy 2011).

Table 2. Bilateral exports, 13 countries, 1910–50, allowing for pre-trends

		Nominal exports	
	13-country sample, 1910–18	13-country sample, 1935–45	13-country sample, 1910–50
Both countries in Latin America x trend	0.08*	0.18***	0.00
	(0.05)	(0.05)	(0.01)
Both in Latin America	–1.70***	–7.26***	–1.44***
	(0.48)	(1.63)	(0.47)
Both in Latin America x First World War	0.46***	–	0.65***
	(0.16)		(0.16)
Both in Latin America x Second World War	–	0.07	1.15***
		(0.32)	(0.23)
ln(distance)	–0.27***	–0.33***	–0.31***
	(0.09)	(0.13)	(0.10)
Both on the gold standard	–0.80***	0.75*	–0.05
	(0.22)	(0.42)	(0.10)
Shared border	0.80***	1.22**	0.78***
	(0.17)	(0.56)	(0.22)
Shared language	0.14	0.72***	0.28*
	(0.14)	(0.21)	(0.17)
No. of observations	1,296	1,584	5,904
Year x country fixed effects	Yes	Yes	Yes

Notes: As for tab. 1.

Sources: As for tab. 1.

Table 3. Bilateral exports for South American countries, US, and UK, 1910–50

	Value of nominal exports								
	SA5 + US	SA5+ US	SA5 + US	SA5+UK	SA5 + UK	SA5+UK	SA5+US & UK	SA5 +US & UK	SA5+US & UK
Both countries in Latin America	–2.15***	–0.73**	–0.63	–2.44***	–1.60***	–1.16**	–2.02***	–0.89***	–0.70*
	(0.23)	(0.34)	(0.41)	(0.47)	(0.48)	(0.47)	(0.22)	(0.31)	(0.38)
Both in Latin America x First World War	0.82***	–-	0.94***	0.44**	–	0.50*	0.63***	–	0.70***
	(0.12)		(0.20)	(0.20)		(0.26)	(0.17)		(0.21)
Both in Latin America x Second World War	–	1.25***	1.54***	–	–0.09	–0.17	–	1.10***	1.29***
		(0.26)	(0.22)		(0.38)	(0.29)		(0.21)	(0.20)
ln(distance)	–1.08***	–0.93***	–0.74**	–0.30**	–0.40***	–0.25**	–0.26***	–0.27**	–0.16*
	(0.24)	(0.33)	(0.34)	(0.15)	(0.14)	(0.12)	(0.10)	(0.12)	(0.10)
Both on the gold standard	–0.24	–0.01	–0.1	–0.51*		0.06	–0.70**	0.15	–0.08
	(0.36)	(0.26)	(0.13)	(0.27)		(0.15)	(0.29)	(0.21)	(0.11)
Shared border	1.49***	–0.35	0.08	2.11***	0	0.46	2.17***	0.36	0.69
	(0.28)	(0.47)	(0.56)	(0.25)	(0.28)	(0.38)	(0.25)	(0.30)	(0.44)
Shared language	–0.25	0.37	–0.14	–0.55*	0.32	–0.18	–0.36**	0.27	–0.23
	(0.21)	(0.30)	(0.26)	(0.31)	(0.28)	(0.27)	(0.18)	(0.24)	(0.21)
No. of observations	720	792	2,952	720	792	2,952	840	924	3,444
Year x country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: SA5 includes five different South American countries. Robust standard errors clustered on the country pair are reported in parentheses. Time-varying country fixed effects are included in all specifications. ***p-value <0.01, **p-value <0.05, *p-value <0.1. Shipping distance is in nautical miles between principal ports (time-varying due to the opening of the Panama Canal).

Sources: As for tab. 1.

Table 4. Decomposition of trade changes in South America during two world wars

Variable	Avg. change, 1913–19	Contribution from each variable % x 100	Avg. change, 1939–45	Contribution from each variable % x 100
Total trade growth =	1.75	100	1.95	100
Change in output +	1.35	77.29	0.89	45.69
Change in trade costs +	0.32	18.26	1.05	53.53
Change in income similarity +	0.02	0.86	0.01	0.74
Change in multilateral factor	0.06	3.59	0.00	0.04

Notes: Changes are calculated as the average of the change in the logarithms of each variable. They are presented in log points. These changes are weighted averages for nine South American dyads (1913–19) and 10 South American dyads (1939–45). Weights are the sum of the dyad's GDP values.

Sources: As for tab. 1.

Table 5. Argentina, bilateral imports and exports with cumulative treaties signed, 1910–50

	Nominal exports of Argentina or imports to Argentina			
Partner in Latin America	−0.65*	−0.89*	−0.87**	–
	[0.393]	[0.462]	[0.402]	
Partner in Latin America x First World War	–	0.33	0.98**	0.69**
		[0.242]	[0.393]	[0.316]
Partner in Latin America x 1929–38	–	−0.18*	0.22	−0.1
		[0.100]	[0.215]	[0.113]
Exporter in Latin America x Second World War	–	0.90***	0.48*	0.86***
		[0.215]	[0.272]	[0.191]
Cumulative treaties	0.04**	–	0.04**	0.003
	[0.017]		[0.019]	[0.009]
ln(distance)	−1.28*	−1.21	−1.28**	–
	[0.656]	[0.810]	[0.651]	
Shared border	−1.87*	−0.7	−1.88*	–
	[0.991]	[0.906]	[0.982]	
Both on the gold standard	0.60**	0.51**	0.59**	0.13
	[0.259]	[0.251]	[0.252]	[0.180]
Shared language	−0.61**	−0.27	−0.62**	–
	[0.285]	[0.252]	[0.297]	
ln(GDP) exporter	0.62***	0.69***	0.62***	1.30***
	[0.080]	[0.074]	[0.082]	[0.204]
ln (GDP) importer	0.59***	0.66***	0.59***	1.27***
	[0.134]	[0.142]	[0.135]	[0.249]
No. of observations	1,546	1,546	1,546	1,546
Year fixed effects	Yes	Yes	Yes	Yes
Country-pair fixed effects	No	No	No	Yes

Notes: Estimation is by PPML. Source countries include five South American countries and 15 non-South American countries. Robust standard errors clustered by country pair are reported in brackets. Time dummies are included but not reported. ***p-value <0.01, **p-

value <0.05, *p-value < 0.1. Shipping distance is in nautical miles between principal ports (time-varying due to the opening of the Panama Canal).

Sources: Our dataset relies on (Carreras-Marín, Badia-Miró, and Peres Cajías 2013; Jacks, Meissner, and Novy 2011). For the treaties, see (Ministerio de Relaciones Exteriores).

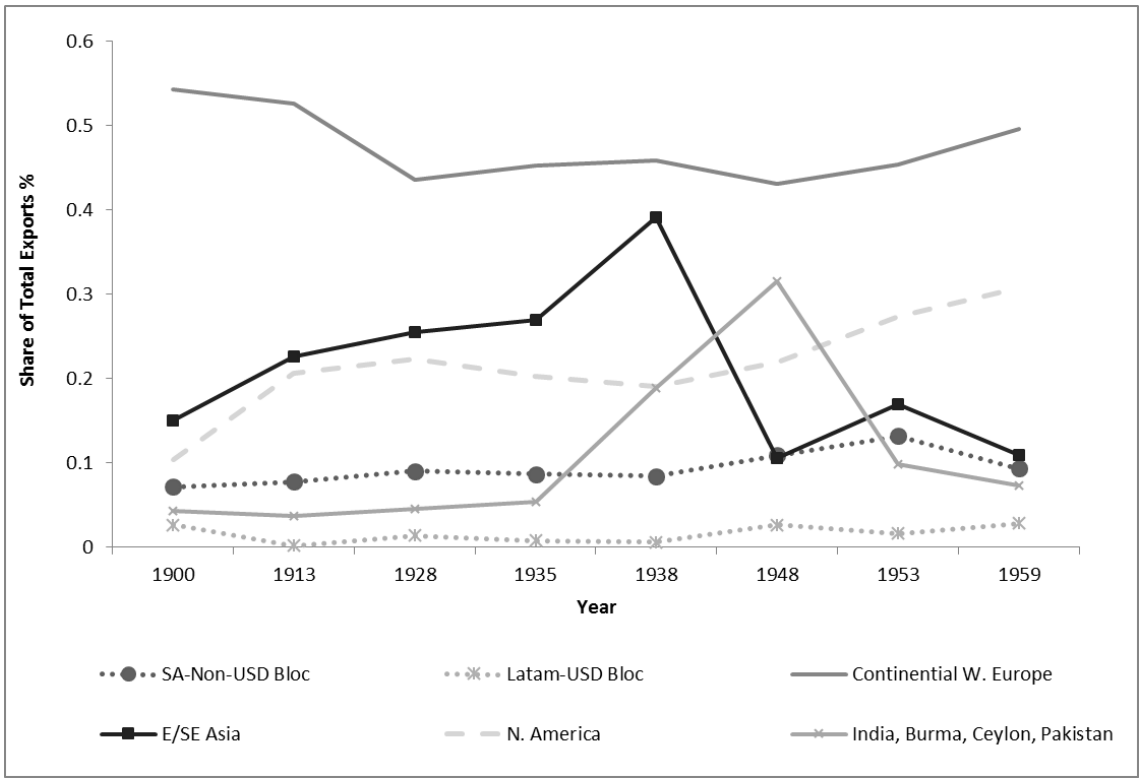
Table 6. Index of unit values for Brazilian exports of cotton fabrics (constant local currency prices 1970 = 100 per ton)

Year	Unit values	Year	Unit values
1915	1.305	1932	8.202
1916	1.498	1933	3.545
1917	1.945	1934	8.424
1918	3.230	1935	10.890
1919	3.622	1936	17.537
1920	5.985	1937	19.638
1921	4.449	1938	22.076
1922	4.545	1939	18.385
1923	8.934	1940	22.475
1924	10.602	1941	30.039
1925	9.890	1942	48.701
1926	13.263	1943	71.015
1927	10.073	1944	111.031
1928	8.633	1945	154.965
1929	8.742	1946	164.502
1930	8.345	1947	304.172
1931	7.581		

Sources: Official Brazilian trade statistics, various years.

Figures

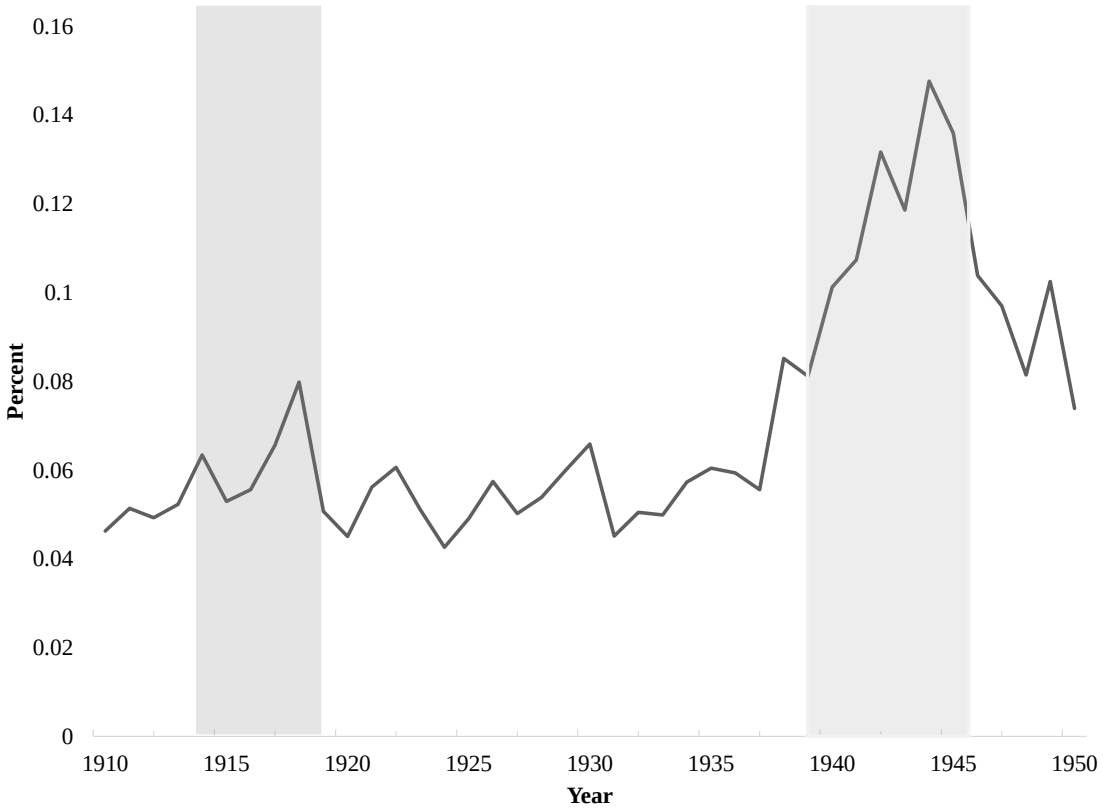
Figure 1. Share of intra-regional trade in various regions, 1900–59



Notes: South America, non-USD bloc: Argentina, Brazil, Chile, Paraguay, Peru, and Uruguay. Latam-USD bloc: Bolivia, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Venezuela, and Virgin Islands. Continental Europe: Austria, Belgium–Luxembourg, Denmark, France, Germany (beginning 1948 data for the Federal Republic), Greece, Italy, Netherlands, Norway, Portugal, Sweden, Switzerland, and Turkey. East/south-east Asia: China, Japan, Afghanistan, Taiwan, Korea, Philippines, Ryukyu Islands, and Thailand. North America: US and Canada.

Source: United Nations, International Trade Statistics.

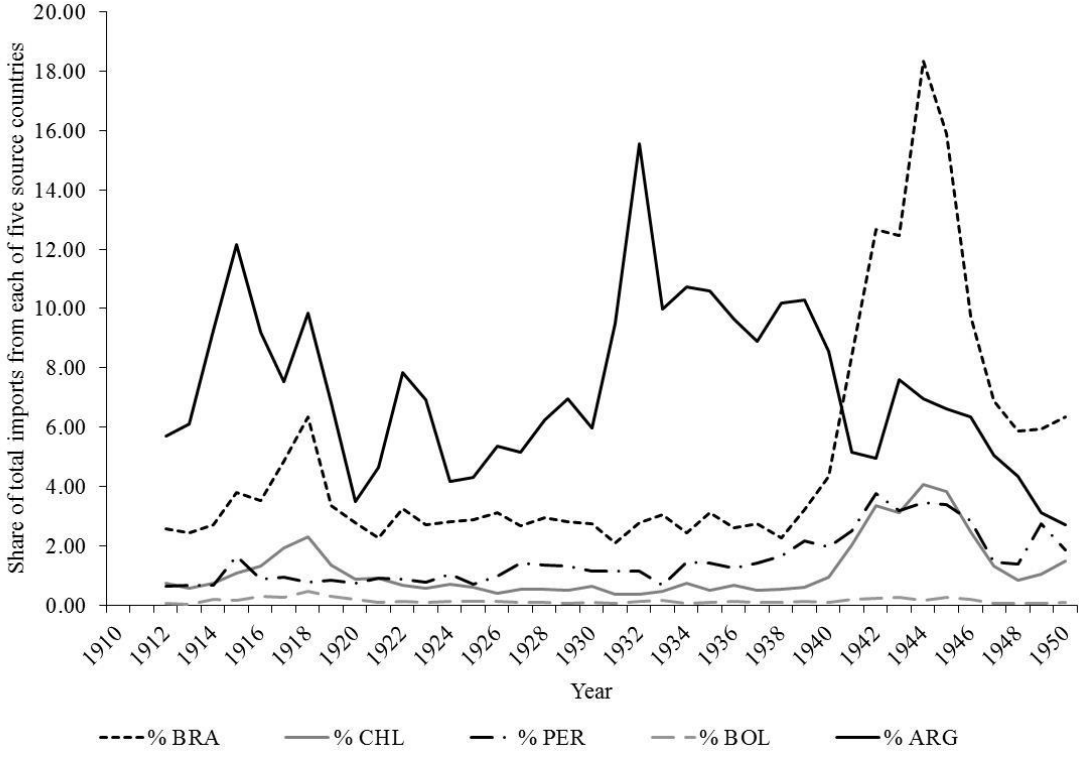
Figure 2. Exports to five South American nations relative to total exports for five South American source countries



Note: Shaded areas indicate world war periods, 1914–19 and 1939–45.

Source: (Carreras-Marín, Badia-Miró, and Peres Cajías 2013).

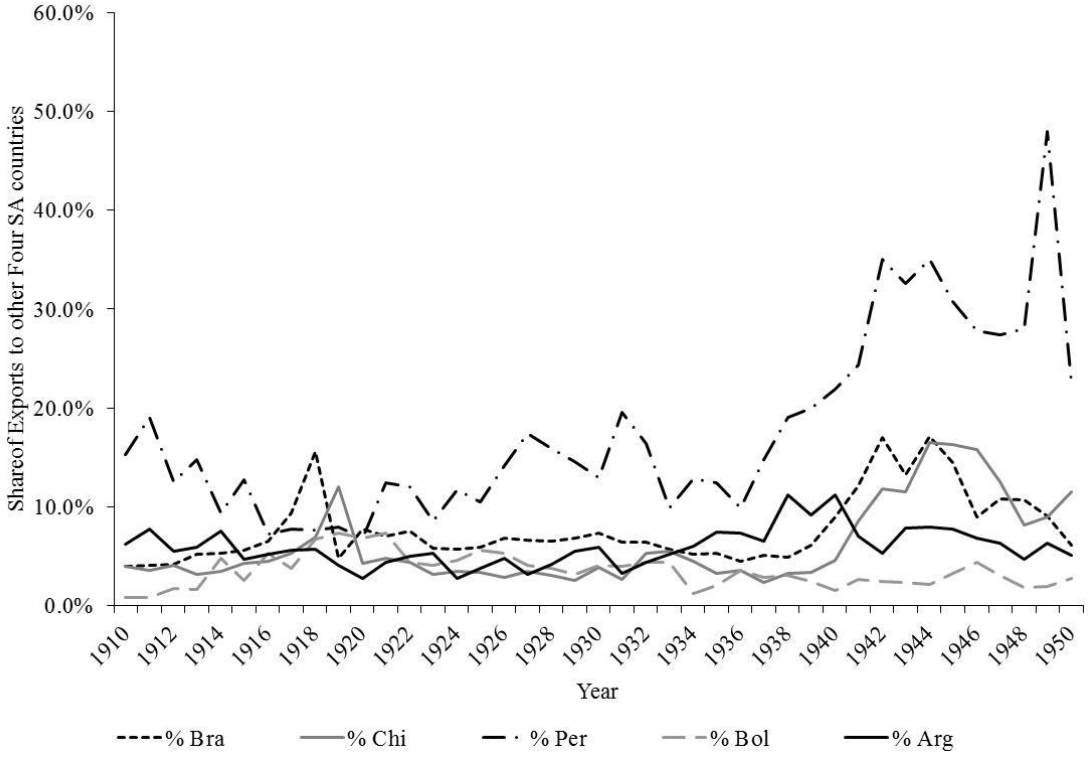
Figure 3. Share of each country in total imports of other four countries, 1912–50



Note: Figure shows the share of imports coming from each source country in the total imports of four other South American countries in our sample.

Sources: Each country's official trade statistics, various years. For details, see online app. S1.

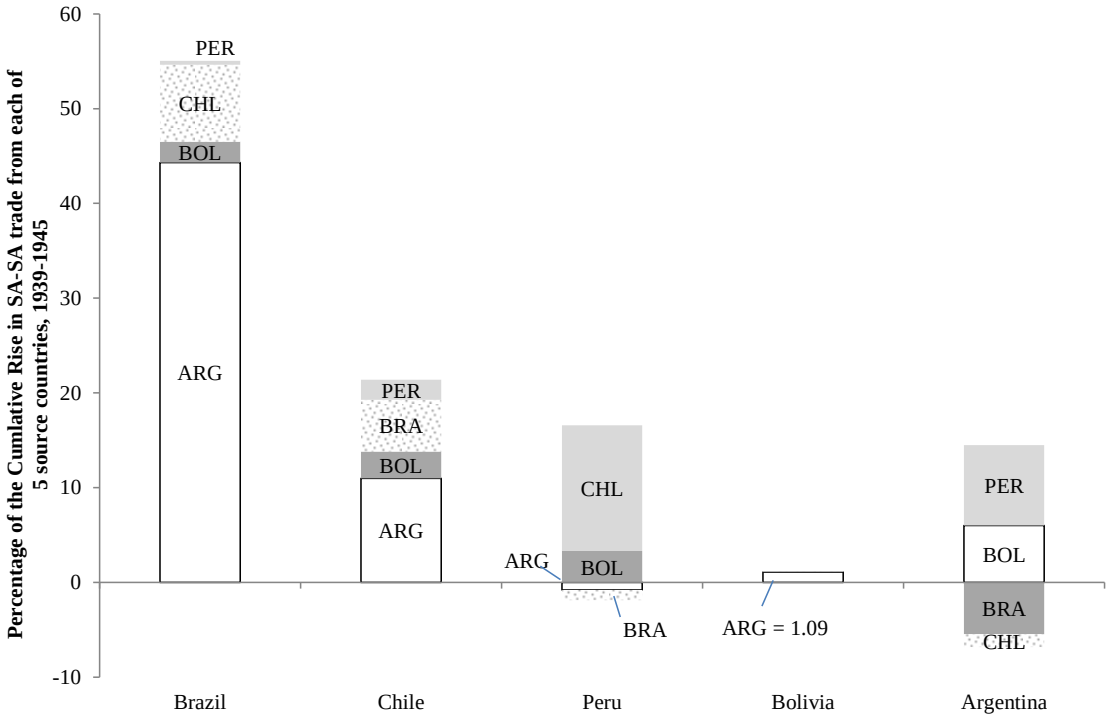
Figure 4. Export shares to South American destinations by source



Note: Figure shows the share of exports to the other four South American destinations in our sample.

Sources: Each country's official trade statistics, various years. For details, see online app. S1.

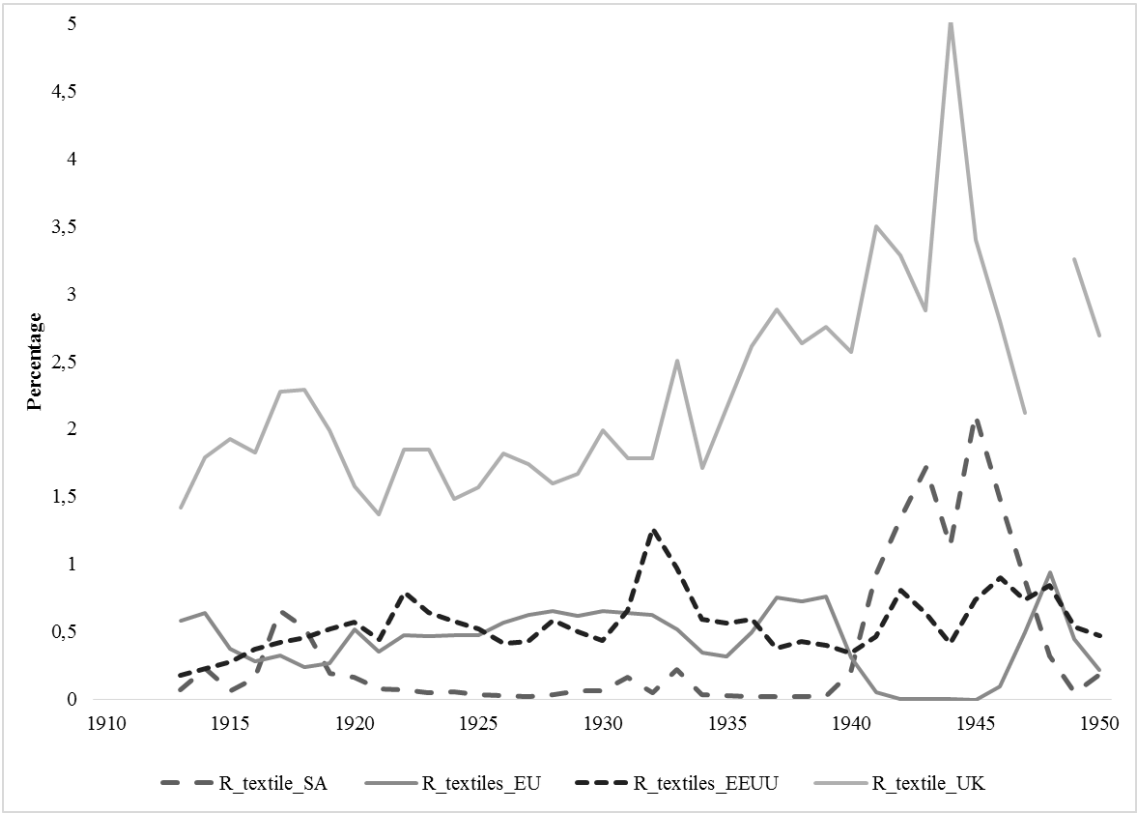
Figure 5. Shares of the total rise in South American exports to South American destinations by source and country destinations



Notes: The sum of the height of the bars is 100% and reflects the total percentage share of the exports from the country on the x-axis in the change in regional exports. For each country we calculate the three-year average of total exports to the other four countries in the region, centred on 1939 and 1945. We also calculate the three-year centred average of total exports from all five South American countries to the other four countries in the region for 1939 and 1945. Next we calculate the percentage of the cumulative rise in South American–South American trade from a source as the ratio of the latter to the former. This yields the height of each bar corresponding to the total share for each source country. Negative values indicate absolute declines in exports between two countries. Each source country's bar is broken into four parts reflecting the proportion of the total change in intra-South American trade accounted for by exports to a particular country from the given source on the x-axis. The large white bar for Argentina (ARG) in the column for Brazil suggests that 44% of the total rise in intra-South American trade between 1939 and 1945 is accounted for by the rise of exports from Brazil to Argentina.

Sources: Each country's official trade statistics, various years. For details, see online app. S1.

Figure 6. Regional trade intensity for imports of textile goods: Chile, 1913–50



Notes: Regional trade indicator 'R' is defined as the share of Chilean imports in a particular industry (in this case, textiles) from a given region in the total imports of that industry to the share of total Chilean imports coming from that region. These regions are South America, Europe (Germany, France, and Belgium), the UK, and the US.

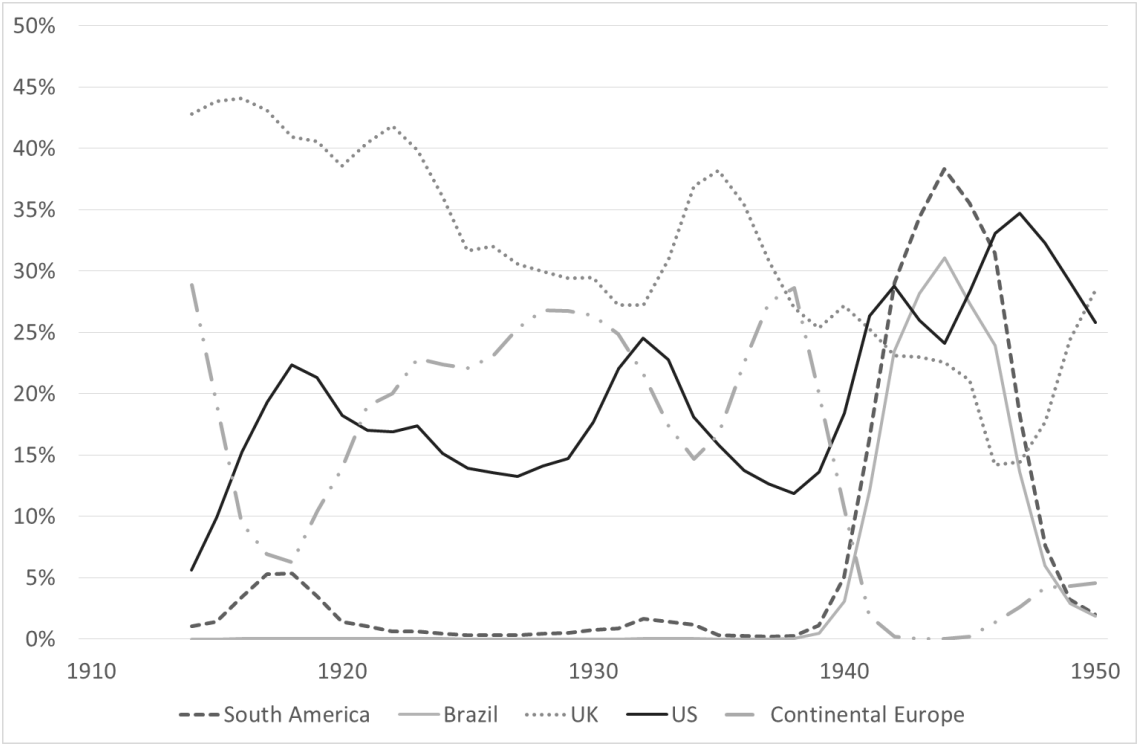
Sources: Chilean official trade statistics, various years.

Figure 7. Average trade costs for South American country pairs and South American/non-South American major trade partners, 1910–50

Notes: Trade costs are not defined when trade flows equal zero. We therefore include only data from a balanced sample of country pairs. Countries in South America include Argentina, Bolivia, Brazil, Chile, and Peru. Other countries are the US, the UK, Germany, France, Japan, Spain, and Italy.

Source: Trade costs are calculated as in (Jacks, Meissner, and Novy 2011).

Figure 8. Chilean textile import shares by source, 1916–50



Notes: Figures are three-year moving averages. Underlying data begin in 1913. Brazil is included in South American trade and then reported separately. Continental Europe includes Germany, France, and Belgium.

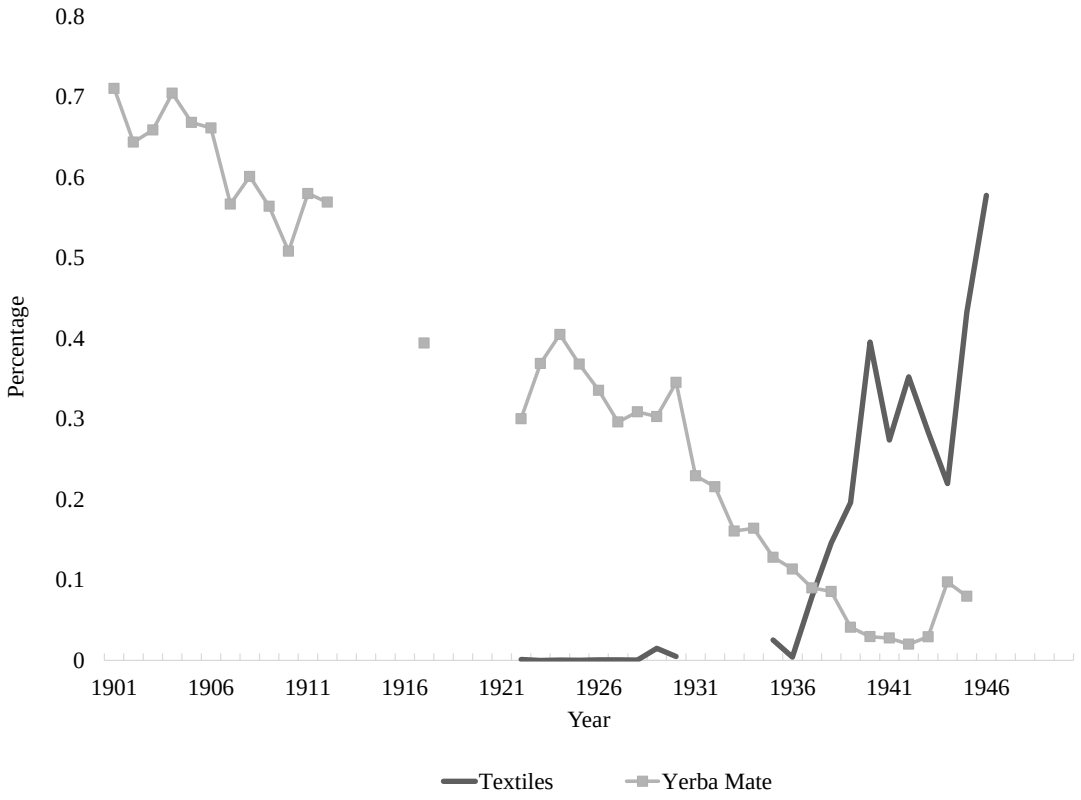
Sources: Trade statistical abstracts for various years.

Figure 9. Share of Argentina in Brazilian trade, 1871–1950

Notes: Figures represent Brazil's exports to Argentina as a share of total Brazilian exports and Brazil's imports from Argentina as a share of total Brazilian imports.

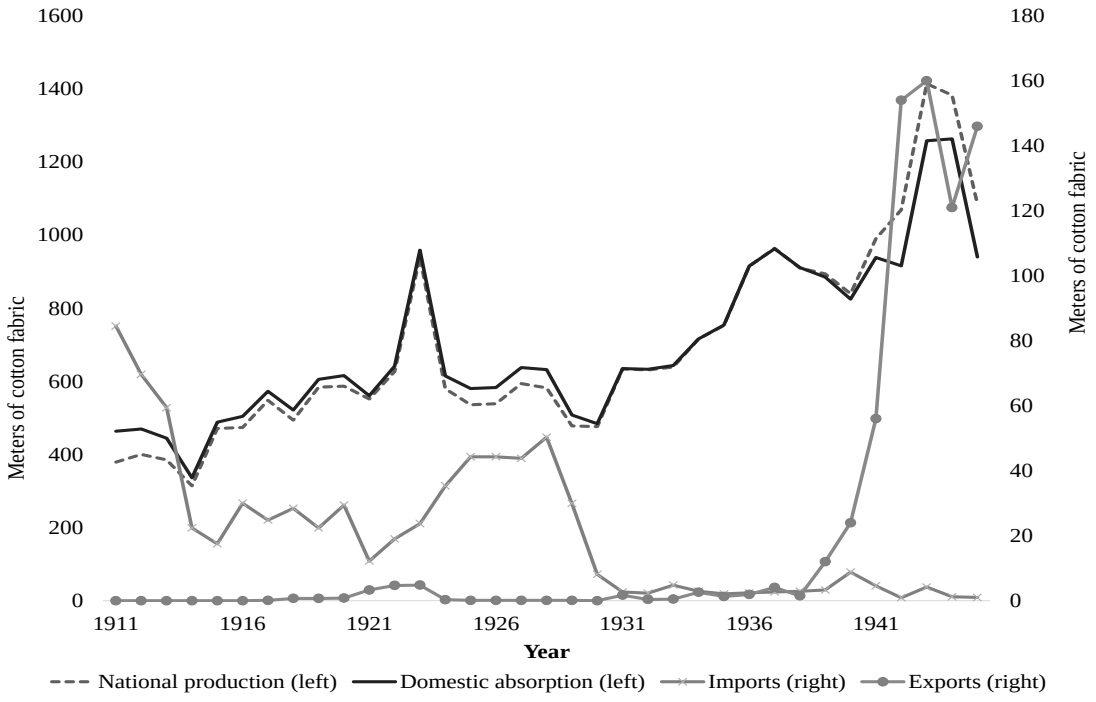
Sources: Foreign trade statistical abstracts, various years.

Figure 10. Share of Brazilian exports to Argentina, 1901–50, for two main products



Sources: Foreign trade statistical abstracts, various years.

Figure 11. Industrial textile production, domestic absorption, exports, and imports for Brazil, 1910–50



Note: Domestic absorption is defined as total domestic production + imports – exports.

Source: (Vilella and Suzigan 1973)