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Abstract

We estimate the impact of MERCOSUR on trade flows and on gains from trade for its member countries using a standard modern general equilibrium quantitative structural gravity model. We find a highly heterogeneous impact on bilateral trade flows and gains from trade. We estimate that gains from trade attributable to MERCOSUR are equivalent to a 4.0 % increase in per-capita consumption for Argentina. For the other countries, gains from trade are smaller: 0.8 % for Uruguay, 0.5 % for Paraguay, and 0.3 % for Brazil. We study whether Brazil would benefit from withdrawing from MERCOSUR and signing a trade agreement with a different trade bloc but conclude that net gains from such a switch would be small, if any.

Keywords: general equilibrium, international trade, MERCOSUR, structural gravity model, trade agreements.

JEL classification: F13, F14, F15, F62.

Resumen

Este artículo estima el impacto del MERCOSUR sobre los flujos comerciales y el bienestar usando un modelo de gravedad estructural cuantitativo estándar. El impacto sobre los flujos de comercio bilateral y sobre el bienestar es altamente heterogéneo entre los países del MERCOSUR. El aumento de bienestar atribuible al MERCOSUR equivale a un incremento del 4,0 % del consumo per cápita en el caso de Argentina, mientras que para los otros integrantes del acuerdo el efecto es inferior: el 0,8 % en el caso de Uruguay, el 0,5 % en Paraguay y el 0,3 % en Brasil. Un cálculo estimativo del efecto sobre el bienestar para Brasil de abandonar el MERCOSUR, y firmar un acuerdo con otro bloque comercial, arroja un resultado neto muy reducido o incluso nulo.

Palabras clave: equilibrio general, comercio internacional, MERCOSUR, modelo de gravedad estructural, tratados de comercio.

Códigos JEL: F13, F14, F15, F62.

1 Introduction

Countries do not benefit equally from signing a trade agreement. Recent research (e.g., Kohl, 2014; Baier et al., 2019b; El Dahrawy Sánchez-Albornoz and Timini, 2020) reports estimates of the impact of trade agreements on trade flows that differ widely, both between and within trade agreements. Usually, welfare gains from trade also differ substantially between trade partners, possibly leading to conflict within a trade bloc, or ex-post renegotiation attempts by countries that sign a trade agreement. In this paper we study MERCOSUR, a trade bloc established by Argentina, Brazil, Paraguay and Uruguay in 1991, and estimate the impact on trade and welfare for its members within a structural gravity model framework, using modern methods, and allowing for heterogeneity within the trade bloc.

Mercosur serves as an interesting case study for various reasons. First, countries are of very different sizes, a circumstance that is likely to lead to heterogeneity in trade flows and in gains from trade. Second, as with other trade blocs, some of its members have occasionally flirted with abandoning the trade bloc, and our estimates will serve to compute the impact on welfare of such a move.[1] Third, although MERCOSUR has received a moderate amount of attention in the past, it has not been studied to the same extent as the European Union or the North American Free Trade Agreement (NAFTA); in particular, the study of this particular trade bloc—the fourth largest in the world—lags behind in the use of the most recent methodological advances. To our knowledge, ours is the first paper to study the impact of MERCOSUR specifically using a modern medium-sized quantitative structural gravity model and data on intra-national trade flows that are constructed in a consistent way.[2]

To draw conclusions that are unencumbered by specific model details, we employ a general structural gravity framework that encompasses a large set of individual models that have been proposed to explain bilateral trade flows in the past. After estimating the parameters of the model in a theory-consistent way, we calculate gains from trade in general equilibrium using a sufficient statistics formula à la Arkolakis et al. (2012), which requires information on just two sufficient statistics: the change in the share of internal trade and an elasticity parameter. This implies that our results on welfare do not depend on the exact details of an underlying model, as long as it fits into the structural gravity framework, as defined by Head and Mayer (2014).

We find that MERCOSUR has had a very heterogeneous impact on trade flows between its members. Argentina plays a central role, with trade flows attributed to MERCOSUR into and out of Argentina rising more than for the other trade relationships within the bloc. In fact, the bilateral trade flows between Argentina and Brazil strengthened substantially, as did trade flows between other bloc members and Argentina—but not between other bloc members and Brazil. These results explain why we find the largest gains from trade for Argentina.

Brazil is the member of MERCOSUR with the lowest gains from trade. This begs the question of whether Brazil would be better off by withdrawing from the agreement and joining a different trade bloc. We explore this question through a series of counterfactual scenarios and find that

[1] Newspaper coverage on countries' threats to withdraw from MERCOSUR is abundant, for example, The Economist (2012), Preissler Iglesias and Gamarski (2019), and Nessi (2020).

[2] Intra-national trade flows are desirable for theoretical reasons in a structural gravity model and, in our case, they are a necessary input to calculate effects on welfare.

gains from trade for Brazil of switching into other trade agreements would be small, and therefore likely to be outweighed by switching costs associated to exiting the old treaty (e.g., increased uncertainty, disruptions in global and regional value chains) or entering the new one (use of political capital for negotiations and approval of the treaty), other economic factors (economic benefits from further integration within MERCOSUR) and domestic considerations distinct from gains from trade (e.g., the democratic clause or the migratory regulations embedded in the MERCOSUR treaty).

Prior work that has studied the impact of MERCOSUR on trade flows within a structural gravity framework consistently finds that MERCOSUR has led to an increase of intra-bloc trade. For example, Baier et al. (2007) report a large positive impact on trade flows and Magee (2008) and Baier et al. (2018) find that the impact of MERCOSUR on trade flows exceeds that of other regional trade agreements.[3] Closer to our work is the recent paper by Baier et al. (2019b), which estimates a structural gravity model allowing for heterogeneous impacts on trade bloc members, and using data that include intra-national trade flows. It finds that the trade impact of MERCOSUR is on the high end of the distribution of regional trade agreements.[4]

Our empirical strategy differs from prior work in that we employ more flexible specifications to explore whether the impact of MERCOSUR changes over time, or is heterogeneous between MERCOSUR members, and that we also focus on gains from trade. We proceed in two steps. In a first step we use a specification in which MERCOSUR is allowed to have a fully flexible impact on trade costs and trade flows along the temporal dimension. The results from this first part confirm historical details known about MERCOSUR and show a distinction between two periods: a transitional period between 1991 and 1994 with a rising impact on trade flows and a second period that starts in 1995 during which the impact on trade settles at a higher level. In a second step, we study heterogeneity between bloc members in each of these two periods.

A paper that comes close in spirit to our general question and to our focus on the computation of gains from trade is a recent article by Baier et al. (2019a), who study the impact of a hypothetical dissolution of NAFTA. Apart from the fact that we analyze a different trade agreement, our papers also differ in their methodology. Whereas they identify the partial equilibrium impact used as an input for the general equilibrium computations from the estimation of a common free trade agreement dummy variable plus a symmetric fixed effect, we allow the partial equilibrium impact to be specific to MERCOSUR, to evolve over time (before and after 1995, when MERCOSUR officially became a customs union), and to differ within country pairs depending on the direction of trade flows. In fact, we find that this second point is an important distinction, given that the heterogeneity in the partial equilibrium estimates is substantial in the case of MERCOSUR.

The paper is structured as follows. We review the theory used to interpret our results and the empirical strategy employed in Section 2. Lengthy theoretical derivations are relegated to an appendix (Appendix A). In Section 3 we report our findings for trade flows and in Section 4 the results for gains from trade. We conclude in Section 5.

[3] A few papers do not find clear evidence. For example, Kohl (2014) finds a large but imprecisely estimated point estimate and Carrère (2006) finds conflicting evidence for MERCOSUR, although for data ending in 1996.

[4] This result is confirmed by El Dahrawy Sánchez-Albornoz and Timini (2020), who use a different database and focus on Latin American countries.

2 Theory and empirical strategy

2.1 Structural gravity

We interpret our results through the lens of a generic structural gravity model. Let $X_{ij} \geq 0$ denote trade flows from country i (the exporter) to country j (the importer). The case $i = j$ denotes intra-national (domestic) trade flows and $i \neq j$ denotes international trade flows. A standard definition of a structural gravity model of trade (e.g., Head and Mayer, 2014) is a model where bilateral trade flows satisfy the following multiplicative relationship

$$X_{ij} = \frac{Y_i}{\Omega_i} \frac{E_j}{\Pi_j} \theta_{ij}, \tag{1}$$

where production in country i is $Y_i \overset{\text{def}}{=} \sum_j X_{ij}$ and expenditure in country j is $E_j \overset{\text{def}}{=} \sum_i X_{ij}$. Structural gravity models also satisfy two additional conditions:

$$\Omega_i = \sum_k \frac{E_k}{\Pi_k} \theta_{ik} \tag{2}$$

and

$$\Pi_j = \sum_k \frac{Y_k}{\Omega_k} \theta_{kj}. \tag{3}$$

The term Ω_i is an outward resistance term. It is specific to the exporting country i and measures i's access to potential export markets. The term Π_j is an inward resistance term; it measures how much competition trade flows from any origin face in destination country j. Higher values of any of these terms lead to lower bilateral trade flows, which is why they are called multilateral resistance terms. The remaining element in the equation is θ_{ij}, which captures all bilateral details that affect trade flows from country i to j, such as geographical or cultural distance between countries, tariffs, and other bilateral non-tariff hindrances to trade. Higher bilateral trading costs correspond to lower values of θ_{ij}. Bilateral trade costs are fully described by the matrix $\theta \overset{\text{def}}{=} [\theta_{i,j}]_{N \times N}$, where N is the number of countries in the world.

Trade shares are defined as the ratio of trade that flows from country i to j to expenditure in the importing country:

$$\lambda_{ij} \overset{\text{def}}{=} \frac{X_{ij}}{E_j} \tag{4}$$

By definition, trade shares are non-negative and sum to 1 when summed over i. The trade share λ_{ii} is the fraction of goods imported by country i from itself. It is a measure of how closed to trade country i is.

The signature of a new trade agreement affects tariffs between countries, and therefore modifies entries in the matrix θ. This will affect trade flows and, in general, all the elements in the structural gravity relationship (1). With the usual hat-notation (for any variable x, we denote the change in this variable by $\hat{x} = \frac{x'}{x}$), the change in bilateral trade flows in response to the change $\hat{\theta} = \frac{\theta'}{\theta}$ is given by

$$\hat{X}_{ij} = \frac{\hat{Y}_i}{\hat{\Omega}_i} \frac{\hat{E}_j}{\hat{\Pi}_j} \hat{\theta}_{ij}. \tag{5}$$

It is not evident from (5) how equilibrium trade flows can be solved for because the change $\hat{\theta}$ produces an endogenous response of $\hat{Y}_i$ and $\hat{\Omega}_i$ for all exporters and $\hat{E}_j$ and $\hat{\Pi}_j$ for all importers. However, a combination of adding-up identities coupled with common patterns across various structural models yield a greatly simplified problem. In particular, assuming that an inelastic supply of labor is the only factor of production, and denoting the wage level in country i by w_i, the Armington, Eaton-Kortum, Melitz, etc, models all lead to the same recursive system of equations.[5] Denote the trade elasticity, which has a different interpretation in each of these models, by $\epsilon < 0$. The solution can then be obtained in two steps.[6] First, changes in wages are obtained as the solution to a fixed point problem, where all variables except wages are parameters or values that can be directly measured in the data:

$$\hat{w}_i = \frac{1}{Y_i} \sum_j \frac{\lambda_{ij}(\hat{w}_i)^\epsilon \hat{\theta}_{ij}}{\sum_k \lambda_{kj}(\hat{w}_k)^\epsilon \hat{\theta}_{kj}} E_j \hat{w}_j, \quad \forall i. \tag{6}$$

Once wages are solved for, changes in all other variables are determined by the following relationships:

$$\hat{Y}_i = \hat{w}_i \tag{7}$$

$$\hat{E}_i = \hat{w}_i \tag{8}$$

$$\hat{\Omega}_i = (\hat{w}_i)^{1-\epsilon} \tag{9}$$

$$\hat{\Pi}_j = \sum_k \lambda_{kj}(\hat{w}_k)^\epsilon \hat{\theta}_{kj} \tag{10}$$

$$\hat{\lambda}_{ij} = \frac{(\hat{w}_i)^\epsilon}{\hat{\Pi}_j} \hat{\theta}_{ij} \tag{11}$$

$$\hat{X}_{ij} = \hat{\lambda}_{ij} \hat{E}_j \tag{12}$$

In this framework, gains from trade are determined by the Arkolakis et al. (2012) formula, which requires only two sufficient statistics as inputs, the change in the share of internal trade of each particular country and the trade elasticity:

$$\hat{G}_i = \hat{\lambda}_{ii}^{1/\epsilon}. \tag{13}$$

The term $\hat{\lambda}_{ii}$ measures how closed an economy becomes relative to the situation before the change in $\hat{\theta}$. In structural gravity models an opening-up of a country to international trade ($\hat{\lambda}_{ii} < 1$) unambiguously leads to higher gains from trade because $\epsilon < 0$.

2.2 Theory-consistent estimation

It is straightforward to extend the static structural model in (1) to a dynamic setting by adding time subscripts t to all variables. A theory-consistent estimation of the structural gravity model is then achieved by specifications of the following form:

$$X_{ijt} = \exp(\eta_{it} + \psi_{jt} + b_{ijt}) + \nu_{ijt}. \tag{14}$$

[5] While our method of choice is fairly general in that it encompasses various well-known trade models, it does leave out some factors, such as some dynamic effects of trade agreements, varying input-output linkages, etc. However, it is usually considered a good benchmark for computing the general equilibrium effects of trade policies (Baier et al., 2019b).

[6] The derivation of this result is well-known, and can be found in the handbook chapter by Head and Mayer (2014). We also provide a derivation of this result in Appendix A.

On the right side, the terms η_{it} and ψ_{jt} are exporter-time and importer-time fixed effects. They capture the time-varying multilateral resistance terms $\frac{Y_{it}}{\Omega_{it}} = \exp(\eta_{it})$ and $\frac{E_{jt}}{\Pi_{jt}} = \exp(\psi_{jt})$. This implies that the third term is a measure of bilateral trade costs $\theta_{ijt} = \exp(b_{ijt})$. Finally ν_{ijt} is an error term. We estimate (14) via a Poisson Pseudo-Maximum-Likelihood (PPML) procedure (Santos Silva and Tenreyro, 2006) and compute standard errors by clustering on exporter, importer and year.[7]

All our estimations can be thought of as choosing different specifications for the bilateral term b_{ijt}. In all cases, we include either pair or directional fixed effects in b_{ijt} to capture the part of bilateral trade costs that stays constant through time (such as geographical distance). By adding dummy variables for the agreements in the Baier-Bergstrand EIA database we also introduce time-variation in b_{ijt}. The Baier-Bergstrand EIA database classifies trade agreements into six different types: non-reciprocal preferential trade agreement (denoted by GSP, the acronym for generalized system of preferences), preferential trade agreement (PTA), free trade agreement (FTA), customs union (CU), common market (CM), and economic union (ECU). At any point in time, a pair of countries can be in at most one of these categories. MERCOSUR is classified as a PTA until 1994 and as a CU starting in 1995. Because we focus on MERCOSUR separately, we remove this agreement from the Baier-Bergstrand database (set the dummy variables to zero) but include all other agreements.

Formally, the introduction of trade agreements can be described by defining time-indexed sets that contain all pairs of countries that participate in any given agreement. So, for example, FTA_t contains the (ordered) pair (i, j) if and only if trade from country i to country j at date t is regulated by an agreement of type FTA. To economize on notation, we collect all agreements a time t in the vector $TA_t = (GSP_t, PTA_t, FTA_t, CU_t, CM_t, ECU_t)$ and use the index k to denote the elements of this vector.[8] The collection $\{TA_t\}$ contains all the information on trade agreements (different from MERCOSUR) and their evolution over time.

Because our focus is on MERCOSUR countries, we adopt a more flexible specification for the bilateral trade costs between these countries. We denote the set of MERCOSUR countries by M. This set contains the pairs (i, j) with $i \neq j$ such that both i and j are one of the four founding members of MERCOSUR: Argentina, Brazil, Paraguay, and Uruguay. The set M is not time-dependent but we will estimate time-varying coefficients for this variable in our estimations.

With this notation, our initial specification for bilateral trade costs is

$$b_{ijt} = \delta_{ij} + \mu_t \mathbf{I}_{\{(i,j)\in M\}} + \gamma_t \mathbf{I}_{\{i\neq j\}} + \sum_k \alpha_k \mathbf{I}_{\{(i,j)\in TA_{kt}\}} + \beta' Z_{ijt}, \tag{15}$$

where $\mathbf{I}_{\{cond\}}$ denotes an indicator function that takes the value one if condition *cond* is satisfied and zero otherwise. The first term, δ_{ij}, is a directional fixed effect that takes the value one if trade flows from country i to j and zero otherwise. The object of interest is the sequence of parameters μ_t, which traces out the impact of MERCOSUR membership on trade through time.

[7] Santos Silva and Tenreyro (2006) introduced PPML as an appropriate choice to deal with heteroskedasticity. An added advantage of this estimator was discovered by Fally (2015), who showed that the estimated fixed effects of the PPML estimator comply with the definition of outward and inward multilateral resistance terms and the equilibrium constraints that they need to satisfy. Finally, the estimator can handle trade flows that are zero.

[8] For example, for $k = 3$, TA_{kt} makes reference to the third element: $TA_{3t} = FTA_t$.

The coefficients γ_t measure how trade is affected by the presence of a border. The evolution of these coefficients over time can be interpreted as a measure of a general globalization trend. The coefficients α_k capture the impact of the six types of trade agreement in the Baier-Bergstrand EIA database. Finally, $\beta' Z_{ijt}$ stands for additional controls that we include in robustness checks.

Our specification encompasses more restrictive specifications as special cases. For example, a specification with symmetric pair effects corresponds to the special case in which directional fixed effects are restricted to satisfy $\delta_{ij} = \delta_{ji}$. Any estimation that uses the original Baier-Bergstrand EIA database, which classifies the relationship between MERCOSUR countries as a PTA until 1994 and as a CU afterwards, implies the restriction $\mu_t = \alpha_2$ for $t \leq 1994$ and $\mu_t = \alpha_4$ for $t > 1994$.

2.3 Data

Given our focus in gains from trade, we require data that contains intra-national trade flows. Our source for bilateral trade flows is the database compiled by Yotov et al. (2016). This database contains yearly bilateral trade flows of manufacturing goods for 69 countries over the period 1986–2006 constructed in a homogeneous way, and including intra-national trade flows. Unfortunately it does not contain data on Paraguay, one of the members of MERCOSUR. We therefore construct bilateral data flows involving Paraguay following the procedure described by Yotov et al. (2016) as close as possible. With the addition of Paraguay, our database contains all flows between 70 countries over the period 1986–2006. We describe our methodology and the choices we made in detail in Appendix B.[9]

Data on trade agreements are taken from the 2017 version of the Baier-Bergstrand EIA database. When reporting results, we express flows in constant US dollars using consumer inflation from the April 2020 World Economic Outlook by the International Monetary Fund. Bilateral distance, which is used in robustness checks, is taken from the geography database by CEPII.

2.4 General equilibrium computations

As usual, we infer the value of $\hat{\theta}$ between two scenarios using estimates obtained for b_{ijt}. We then solve the fixed-point problem in (6) for a particular date t using this value of $\hat{\theta}$ and observed data on λ_{ijt}, Y_{it} and E_{jt}. We use a trade elasticity of four ($\epsilon = -4$) in all computations, as suggested by the results by Simonovska and Waugh (2014) and Bajzik et al. (2020). Because the fixed-point problem in (6) is homogeneous of degree zero in wages, the solution requires a normalization to pin down the growth rate of nominal variables. We use the same normalization as Baier et al. (2019b) and scale nominal wage growth so that that nominal world output stays constant between scenarios.[10] This assumption is particularly appealing in our case because we consider changes in trade policy involving MERCOSUR countries, who represent a small fraction of world trade and world GDP.

[9] The focus on manufacturing is dictated by data availability and cross-study comparability. Indeed, the overwhelming majority of previous studies on trade agreements and trade flows use manufacturing flows only (see, e.g., Baier et al., 2019b).

[10] With this normalization, the fixed-point problem can be solved in Stata with an extremely fast procedure using the excellent `ge_gravity` package by Thomas Zylkin.

3 The impact of Mercosur on trade

Mercosur was founded by the Treaty of Asunción in March 1991; Argentina, Brazil, Paraguay and Uruguay agreed to become a customs union by January 1995, and to gradually reduce tariffs applied to trade flows between them. Trade was to be liberalized over the period 1991–1994, by progressively reducing tariffs according to a linear schedule and by eliminating non-tariff barriers. In the Protocol of Ouro Preto (December 1994) and related agreements, the four mercosur members approved an exception for goods on reduced country-specific lists, whose tariffs were allowed to remain positive, but had to converge linearly to zero over the next five years. In parallel, mercosur also allowed for country-level deviations from the common external tariff. Despite not operating at full speed, in January 1995, mercosur was a customs union with free trade within the bloc, except for selected items on the Ouro Preto lists, for which tariffs were still being phased out.

The initial generalized phasing out of tariffs over the period 1991–1994, and the posterior phasing out for a limited set of goods point to a gradual trade impact of mercosur. We expect the coefficients μ_t in our specification of bilateral trade costs in (15) to increase over time, starting in 1991, when tariffs start to be reduced, and to keep increasing, although at a slower pace, after 1995.[11]

The evidence is consistent with this pattern. We plot estimates of μ_t in Figure 1. The continuous line traces out the evolution of point estimates, with the coefficient for the year 1990 normalized to zero. Coefficients are therefore interpreted as differences with respect to the value in the year immediately before the start of mercosur.[12] The coefficients pick up a rapid intensification of intra-mercosur trade flows between 1991 and 1994. After 1995, the partial effect of the mercosur dummies continues to intensify, although at a slower pace.

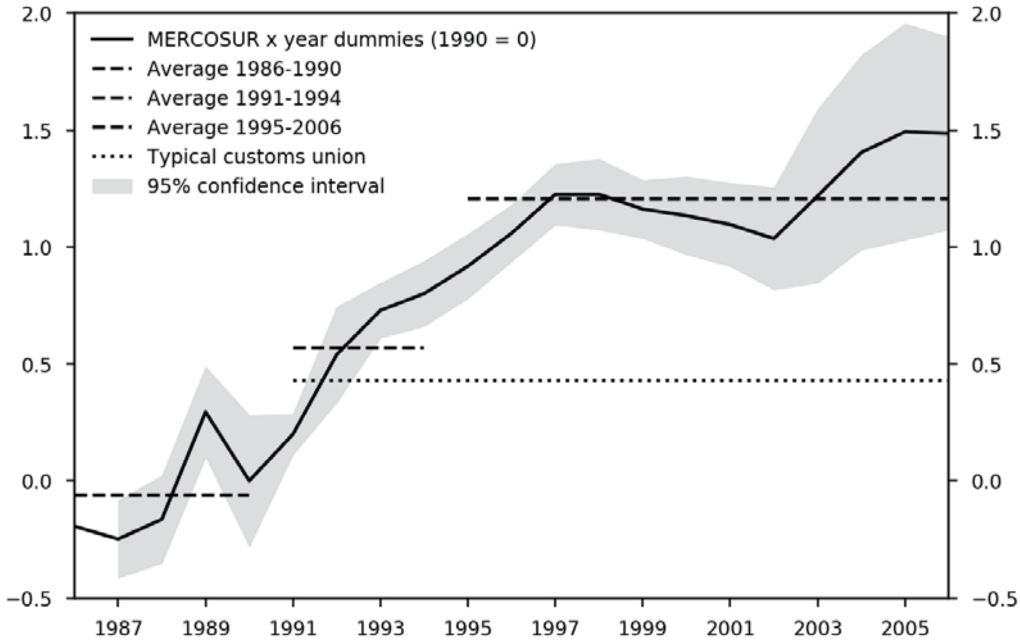
It is tempting to interpret the solitary jump in 1989 as an anticipatory effect of mercosur. As with most trade agreements, public announcements preceded the establishment of mercosur. For example, in 1988, Argentina and Brazil signed an Integration, Cooperation and Development Treaty, with the explicit goal of establishing a common market, which could be joined by other Latin American countries, although no clear time horizon was given. It is therefore possible that trade could have risen in anticipation of mercosur. However, the year 1989 also witnessed other events that confound the inference. In 1989, both Argentina and Brazil experienced significant macroeconomic instability, with periods of hyperinflation and strong exchange rate fluctuations, which are likely to lead to fluctuations in trade flows (or their valuation). If these fluctuations were larger for the important bilateral trade relationship between Argentina and Brazil than for trade of these countries with other partners, then individual country-year dummy variables cannot fully absorb them, and the point estimate of μ_t for 1989 might be affected by events unrelated to trade policy.

Figure 1 also shows averages of the estimated coefficients for the periods before mercosur 1986–1990, the transitional period 1991–1994, and the period 1995–2006. The two steps are substantial: the average in the pre-mercosur period is slightly below the 1990 value, at -0.063. The other two averages are 0.568 and 1.204. Formal statistical tests reported in Table 6

[11] In comparison, Baier et al. (2019b) and El Dahrawy Sánchez-Albornoz and Timini (2020), as do papers that use the Baier-Bergstrand database, use 1995 as the starting date of mercosur. This will lead to an underestimate of the effect of mercosur if there is an impact on trade flows already in the period 1991–1994.

[12] The coefficients used to construct the figure are taken from specification (3) of Table 6.

Figure 1: Intensification of trade between MERCOSUR countries



Notes: The continuous line depicts the estimates of μ_t with the coefficient for the year 1990 normalized to zero. The coefficients are taken from specification (3) of Table 6. The 95% interval shown as a shaded area is constructed from standard errors clustered by exporter, importer and year. The line for a typical customs union is set at the level of the point estimate for the CU dummy variable in specification (3) of Table 6.

confirm that these average values are statistically different from each other at the 1% level across all specifications. More importantly, a quick back-on-the-envelope partial equilibrium calculation using these averages implies that MERCOSUR is associated with a rise in intra-bloc trade of $\exp(0.568-(-0.063))-1=87.8\%$ during the transitional period, and an additional $\exp(1.204-0.568)-1=89.1\%$ in the period in which it is a full customs union.[13] This increase in trade is substantially higher than that of a typical customs union (other than MERCOSUR) in the Baier-Bergstrand EIA database, which raises international trade flows between its members by an estimated $\exp(0.430)-1=53.7\%$.

Our results are consistent with prior studies and are located at the higher end of the range of estimates that are obtained using modern methods. Our average estimate for the period 1995–2006 is very close to the coefficient estimated by Baier et al. (2019b), who use the same database as we do. They report a point estimate of 1.20. El Dahrawy Sánchez-Albornoz and Timini (2020) use the WTF database by Feenstra and Romalis (2014)—which does not include intra-national trade flows—and compute intra-national trade flows as the difference between GDP and exports, and obtain a lower point estimate, at 0.88. This lower coefficient could be explained by the fact that their coefficient for MERCOSUR also includes the transitional period 1991–1994.[14] Estimates using only international trade flows obtain lower estimates: Baier et al. (2007) and Kohl (2014) report point estimates of 0.78 and a 0.81, respectively. These graduated partial equilibrium trade impacts—higher when intra-national flows are included, lower when

[13]The increase in trade according to the exact formulas that use all individual coefficients instead of the averages are very close to these approximations (and close to each other), at 88.7% and 87.1%, respectively.

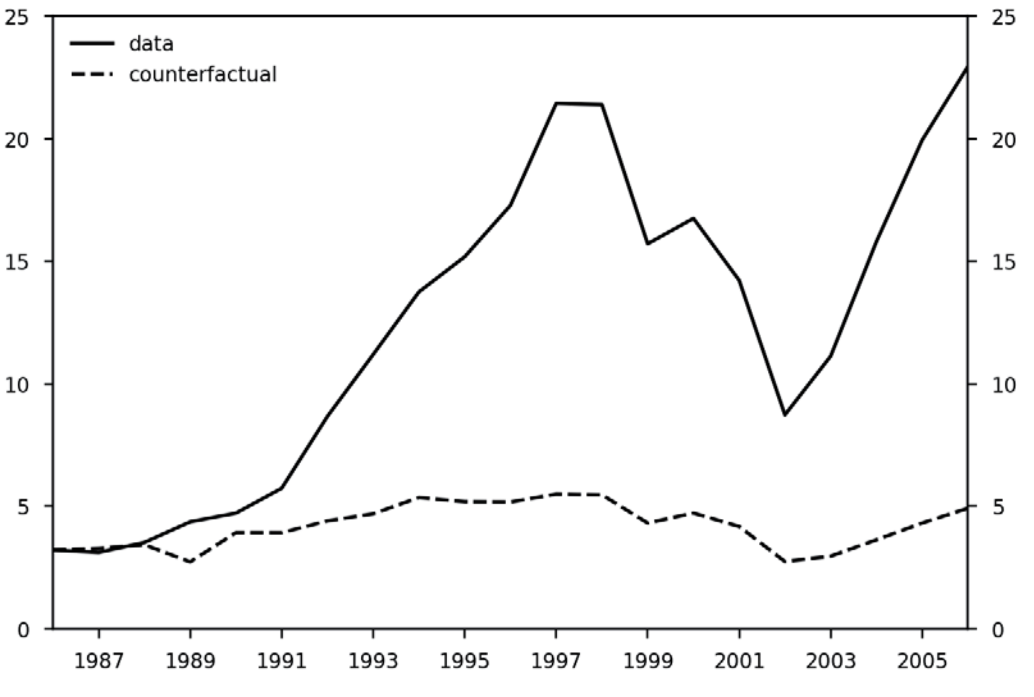
[14]In principle, their use of GDP rather than gross output to compute internal trade could also lead to a lower estimate: if trade agreements systematically lead to an expansion in higher value added activities, then this would mechanically introduce a downward bias for the coefficient of interest. However, Campos et al. (2021) find that the inclusion of the fixed effects that are usual in structural gravity estimations alleviates this problem and that the effects of trade agreements on trade is estimated to be very similar, regardless of how domestic trade flows are computed.

not—are to be expected, as they have been documented, for example, in a recent study by Vaillant et al. (2020).

To gauge the impact of MERCOSUR on trade flows over time through the lens of a structural gravity model, we solve for general equilibrium trade flows as described in section 2.4. We do not choose a base year and, instead, iterate over all years. For each year we construct counterfactual trade flows by setting that year's μ_t to zero, solving the fixed point problem in (6), and deriving the implied impact on trade flows using the relationships in (7)–(12). The counterfactual should be interpreted as trade flows that would have occurred if bilateral trade costs between MERCOSUR countries had remained at their level of 1986 instead of weakening systematically relative to those with other partners. The counterfactual also removes all general equilibrium effects that result from lower trade costs between MERCOSUR members. International trade and counterfactual trade between MERCOSUR countries are shown in Figure 2. In this figure imports equal exports by definition. Figure 3 shows international trade and counterfactual trade, exports and imports, between MERCOSUR countries and all origins and destinations, including MERCOSUR.

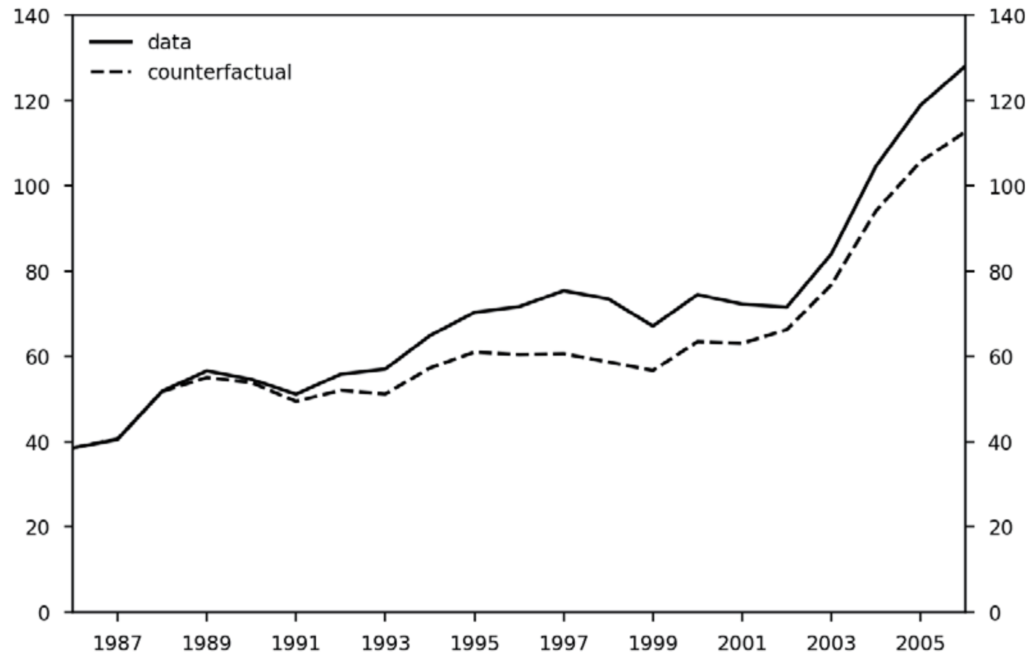
MERCOSUR appears to have had a substantial impact on trade flows within the trade bloc but a limited impact on overall trade openness. Figure 2 shows a large and widening gap between actual data and the counterfactual. From start to end, trade grows by 53% in the counterfactual scenario while it increased more than 600% in the actual data. The gap widens especially after 1991, coinciding with the start of the initial period of tariff reductions. The 1999 currency crisis in Brazil and the 2001–2002 crisis in Argentina are clearly visible, both in the actual data and in the counterfactual; the gap between data and the counterfactual narrows in those years but starts widening again in 2002. In contrast, Figure 3 shows that the impact of MERCOSUR on total trade, and therefore trade openness is relatively limited. Before 1991, both lines are hardly

Figure 2: Trade between MERCOSUR countries

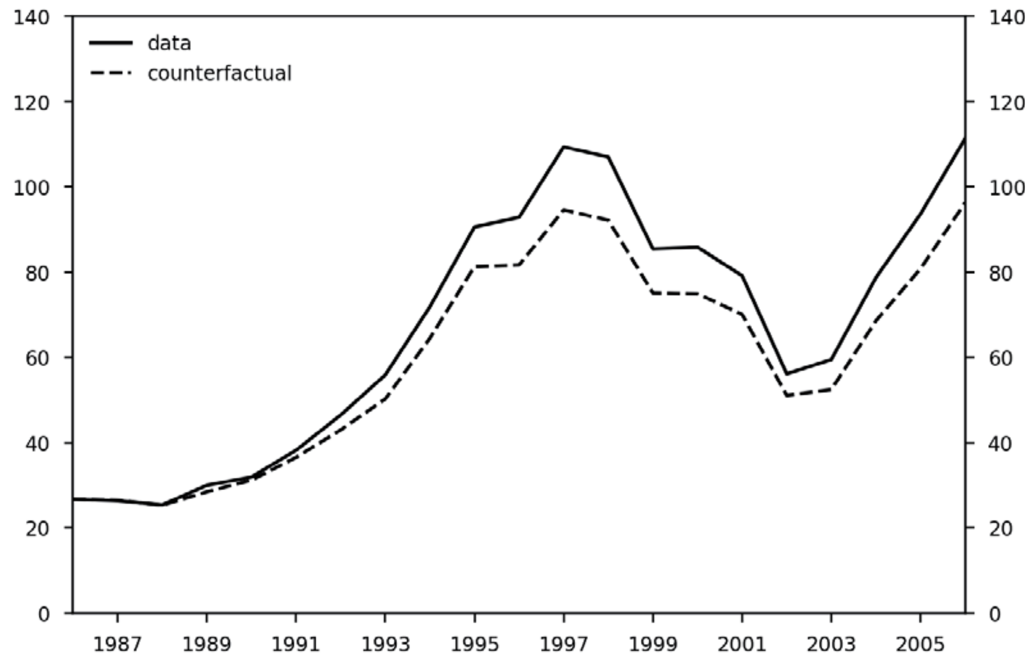


Notes: Units are billion constant US dollars for 2010 constructed using consumer inflation for the US (the source for US inflation is the April 2020 World Economic Outlook database by the IMF. Data and counterfactual are calculated as the sum of international trade flows between MERCOSUR members (intra-national trade flows are excluded). The counterfactual is the general equilibrium outcome computed by setting all coefficients μ_t to zero and using a trade elasticity of 4.

Figure 3: Total exports and imports by MERCOSUR countries



(a) Exports (all international destinations)



(b) Imports (all international origins)

Notes: Units are billion constant US dollars for 2010 constructed using consumer inflation for the US (the source for US inflation is the April 2020 World Economic Outlook database by the IMF. Total exports is the sum of all exports by MERCOSUR countries to all destinations, including MERCOSUR as a destination, but excluding intra-national trade flows. Total imports is the sum of all imports by MERCOSUR countries from all origins, including MERCOSUR as an origin, but excluding intra-national trade flows. The counterfactual is the general equilibrium outcome computed by setting all coefficients μ_t to zero and using a trade elasticity of 4.

distinguishable. In later years, the two lines separate but they remain remarkably close. Part of the diminished effect on total trade is driven by general equilibrium forces that redirects trade with other destinations to trade within MERCOSUR. However, the primary reason for the muted impact on total trade is that trade flows between MERCOSUR members are a small fraction of total trade, both in actual data and in the counterfactual.

The results we have discussed were derived assuming a homogeneous impact of MERCOSUR on all internal trade relationships. However, it is possible that MERCOSUR had heterogeneous effects on its members due to their differing economic structures, and also the different configuration of initial tariffs. Recent research by Baier et al. (2019b) finds evidence of heterogeneous effects between trade partners in trade agreements in a systematic study using trade flows with the Yotov et al. (2016) database and, using a different database, El Dahrawy Sánchez-Albornoz and Timini (2020) find evidence of heterogeneous impacts on trade flows both between and within Latin American trade agreements, including MERCOSUR.[15]

We study whether MERCOSUR has a heterogeneous impact on member countries by amending the baseline specification in (15). A complete disaggregation into directed pair-year effects within MERCOSUR is infeasible, as it would imply that each coefficient is estimated from a single observation. It is therefore convenient to group years. Based on the previous analysis, we use 1986–1990, 1991-1994, and 1995-2006 as the three periods of interest. By doing so, we move away from exploring the year-by-year evolution of the intensification of trade and focus on the longer terms effects of MERCOSUR. Formally, we allow for variation of the coefficient of interest along origin country i and destination country j, i.e., by turning the coefficient μ_t into μ_{ijt} leaving the rest of the specification in (15) unchanged. To group the coefficients into periods, we restrict the coefficients μ_{ijt} to be constant in across in the period 1991-1994 and in the period 1995-2006 (the period 1986–1990 is the excluded category). We also consider the case of heterogeneous but symmetric trade impacts, which corresponds to estimations that restrict the coefficients to satisfy symmetry, i.e., $\mu_{ijt} = \mu_{jit}$. Results are shown in Table 7 in the appendix. In Tables 1 and 2 we show the implied partial equilibrium impact on trade flows from these estimations.

In Table 1 we report results for a symmetric specification. There are three stylized facts that emerge. We find that

1. MERCOSUR has a particularly strong impact on trade links involving Argentina,
2. the link between Argentina and Brazil shows the greatest impact, and
3. trade flows between Paraguay and Uruguay strengthen, especially in the 1995–2006 period.

A specification that lifts the symmetry assumption, and allows for different effects depending on the direction of trade, allows to refine these findings. Results without the symmetry assumption are shown in Table 2. All three stylized fact continue to hold. Both exports and imports of Argentina attributed to MERCOSUR grow substantially. We find that this intensification of trade is stronger for Argentina's imports; their growth rates roughly double those of exports. In addition, we find that exports from Brazil to Argentina attributed to MERCOSUR have the highest growth rate, exceeding 600%. Moreover, we find that MERCOSUR increased trade between Paraguay and Uruguay in both directions, with a higher impact on exports from Paraguay to Uruguay. An additional finding of the heterogeneous specification is that some directional impacts are small, or even negative.[16] As highlighted by Waugh (2010), among

[15]As mentioned in the introduction, Baier et al. (2019a) estimate heterogeneous effects of NAFTA. Esteve-Pérez et al. (2020) also report heterogeneous effects on bilateral trade flows for countries in the European Monetary Union.

[16]However, only the impact on flows from Paraguay to Brazil in the 1995–2006 period is negative and significantly different from zero.

Table 1: Partial equilibrium trade impact of MERCOSUR assuming symmetry[a,b]

from/to	Argentina	Brazil	Paraguay	Uruguay
Period 1991–1994				
Argentina		**155**	**129**	*85*
Brazil	**155**		11	-1
Paraguay	**129**	11		**49**
Uruguay	*85*	-1	**49**	
Period 1995–2006				
Argentina		**451**	**187**	**109**
Brazil	**451**		*60*	1
Paraguay	**187**	*60*		**229**
Uruguay	**109**	1	**229**	

[a] Changes are expressed in percentage points. Exporters in rows, importers in columns. The coefficients used for the calculations are reported in Table 7, specification (1).

[b] The italic font denotes a calculation based on a coefficient that is significantly different from zero at the 5% level. The bold font denotes a calculation based on a coefficient that is significantly different from zero at the 1% level.

others, directional pair fixed effects may be better equipped for obtaining unbiased estimates if trade is unbalanced or trade costs are asymmetric. Baier et al. (2019b) argue that the estimation of country-specific coefficients increases the likelihood that estimates reflect omitted factors. In our case, exports from Paraguay to Brazil start out from a very low value in the data, which may partially explain the large magnitude of this particular negative estimate.

Table 2 shows the partial equilibrium trade impact. To compute the general equilibrium trade impact we again iterate over all years and compare a scenario with MERCOSUR to a scenario without MERCOSUR. We convert nominal trade flows in each year to constant US dollars and then average them over the three periods of interest. Table 3 reports the resulting growth rates of trade flows attributed to MERCOSUR.

For trade within MERCOSUR, the general equilibrium flows are a muted version of the partial equilibrium flows, although the stylized facts remain unchanged. Relative to a counterfactual scenario without MERCOSUR, within-bloc trade increases by 93% in 1991–1994 and 208% in 1995–2006. The impact of MERCOSUR on trade relations with the rest of the world differs by country: Argentina and Paraguay experience an increase in their exports while those of Brazil and Uruguay decrease. On the other hand, imports from the rest of the world fall by 8% in the case of Argentina and by 18% for Paraguay, as they are replaced by within-bloc trade, while those of Brazil and Uruguay are roughly unchanged.

The degree to which MERCOSUR influences trade openness, and therefore gains from trade, also differs by country. Argentina experiences the largest opening to international trade, as internal flows drop by 6%. In Paraguay and Uruguay internal trade flows fall by 5.5% and almost 3%, whereas for Brazil they decrease but by less than 1%.[17]

[17] Because we constructed data for Paraguay ourselves, it is convenient to check whether these data have an impact on the results from other countries. In Table 12 in the appendix we replicate the general equilibrium exercise and find that results are very similar.

Table 2: Partial equilibrium trade impact of MERCOSUR without the symmetry assumption[a,b]

from/to	Argentina	Brazil	Paraguay	Uruguay
Period 1991–1994				
Argentina		**123**	**111**	30
Brazil	**202**		14	-15
Paraguay	**323**	13		7
Uruguay	**181**	22	**61**	
Period 1995–2006				
Argentina		**301**	**160**	*71*
Brazil	**632**		**85**	-7
Paraguay	**467**	**-55**		**285**
Uruguay	**132**	10	**169**	

[a] Changes are expressed in percentage points. Exporters in rows, importers in columns. The coefficients used for the calculations are reported in Table 7, specification (3).

[b] The italic font denotes a calculation based on a coefficient that is significantly different from zero at the 10% level. The bold font denotes a calculation based on a coefficient that is significantly different from zero at the 1% level.

The effects on trade—and therefore welfare—are heterogeneous across MERCOSUR members, not only because the estimated reductions in bilateral trade costs are heterogeneous, but

Table 3: General equilibrium trade impact of MERCOSUR[a]

from/to	Argentina	Brazil	Paraguay	Uruguay	MERCOSUR[b]	RoW[c]	All destinations
1991-1994							
Argentina	*-2.7*	138	107	50	112	4	19
Brazil	173	*0.1*	4	-9	94	-2	5
Paraguay	305	20	*-2.9*	22	62	3	21
Uruguay	136	13	37	*-0.1*	52	-9	12
MERCOSUR[b]	169	94	24	10	93	-1	8
RoW[c]	-7	2	-6	10	-1	0.0	0.0
All origins	10	7	1	10	8	0.0	0.1
1995-2006							
Argentina	*-6.0*	310	113	70	239	1	29
Brazil	541	*-0.6*	46	-10	250	-2	9
Paraguay	495	-47	*-5.5*	343	17	17	17
Uruguay	108	9	114	*-2.9*	31	-2	10
MERCOSUR[b]	484	202	62	19	208	-2	14
RoW[c]	-8	2	-18	-1	-2	0.0	0.0
All origins	24	10	-2	7	13	0.0	0.1

[a] Percent change in trade flows in general equilibrium computed for a trade elasticity of 4. Exporters are in rows, importers in columns. Intra-national trade flows (the first four elements on the diagonals) are shown in italics. All other cells exclude intra-national trade. Changes are expressed with respect to a counterfactual in which trade intensification due to MERCOSUR does not occur and are measured in percentage points. The coefficients used for the computations are from the specification with heterogeneous directional trade effects in Table 7, column (3).

[b] The definition of MERCOSUR excludes the own country in cells that show a trade flow from/to Argentina, Brazil, Paraguay, or Uruguay. In all other cells, these four countries are included in the definition.

[c] RoW (rest of the world): all countries except the MERCOSUR countries: Argentina, Brazil, Paraguay, and Uruguay.

also because factors that affect the general equilibrium, such as a country's size, differ across countries.[18] To separate the role payed by the heterogeneity in estimates, in Table 11 (in the appendix) we compute the general equilibrium impact from assuming that MERCOSUR has a homogeneous effect on trade costs for member countries. As expected, the general equilibrium impact on trade flows becomes more similar across countries, i.e., lower in the case of trade flows involving Argentina and larger for those between other bloc members. In particular, the computation assuming homogeneity leads to a sizable impact on intra-national trade flows, and therefore welfare gains, for Uruguay (-11.5% instead of -2.9%) and Paraguay (-9.3% instead of -5.5%). In other words, disregarding heterogeneity leads to a substantial overestimation of the effect of MERCOSUR on trade openness and welfare for the two smaller countries. Because the change in trade openness translates directly into welfare calculations, this difference highlights the importance for our purposes of allowing for heterogeneity in the coefficients estimated in the gravity equations.

4 Gains from trade

In the previous section we analyzed the impact of MERCOSUR on trade flows. By participating in MERCOSUR, all four countries experience a reduction in their domestic trade shares. Using the change in domestic shares, from (13), gains from trade—in growth rates—are equal to $\frac{\Delta G_i}{G_i} = \hat{\lambda}_{ii}^{1/\epsilon} - 1$. Gains from trade are expressed in terms of consumption of a representative agent in each country. We conduct various experiments changing the structure of MERCOSUR.[19] Results are reported in Table 4. For all calculations, we solve for a counterfactual scenario as described in Section 2.4 for the three more recent years of data (2004–2006).[20] The results in the table are calculated in averages of trade flows over this period, after expressing trade flows in constant US dollars.

In a first experiment we simulate a complete disintegration of MERCOSUR. We follow the standard approach in the literature (e.g., Baier et al. 2019a and Mayer et al. 2019) and simulate the disintegration by assuming that the effect on trade costs of establishing and dismantling a trade agreement are symmetric.[21] This simulation reveals that a dissolution of MERCOSUR would reduce gains from trade by 4.0% in Argentina. For the other countries, the welfare loss induced by a dissolution of MERCOSUR would be smaller; for all three countries, their gains from trade would be reduced by less than 1%. These results are consistent with the prior finding that MERCOSUR has had an impact primarily on the trade relationship between Argentina and the other partners. The central role played by Argentina within MERCOSUR also explains why in our second scenario (shown in the second panel in the table) a unilateral exit by Argentina would impact all the other members of the trade bloc so strongly. The other scenarios show that an exit by Brazil would have a substantial negative impact on welfare in Argentina but a small

[18] In structural gravity models, reductions in bilateral trade costs always lead to welfare gains for all countries involved. However, some countries may gain more than others even if the reduction in trade costs is homogeneous across countries.

[19] These scenarios are not a merely of hypothetical interest. Member countries of MERCOSUR have recurrently expressed threats of leaving the bloc. See for example Preissler Iglesias and Gamarski (2019).

[20] By choosing only the three most recent years we exclude the period 2002–2003, which includes a currency crisis in Argentina, and may have led to temporary atypical trade flows.

[21] Glick and Rose (2016) argue that the symmetry assumption is reasonable for currency unions. For trade agreements, it assumes that a disintegration implies the reestablishment of both tariffs and non-tariff barriers that were eliminated with the agreement.

Table 4: Gains from trade in MERCOSUR[a]

	All origins and destinations			With trade bloc		Multilateral index		Gains
	Domestic	Exports	Imports	Exports	Imports	Inward	Outward	from trade
1. Trade bloc disintegrates								
Argentina	18	-20	-20	-71	-82	-17	-18	-4.0
Brazil	0	-7	-10	-72	-70	2	-1	-0.3
Paraguay	6	-16	2	-18	-38	-15	-2	-0.5
Uruguay	3	-7	-6	-26	-14	-2	-4	-0.8
2. Argentina exits								
Argentina	18	-20	-20	-71	-82	-17	-18	-4.0
Brazil	0	-7	-9	-70	-70	2	-1	-0.3
Paraguay	2	-21	-1	-41	-10	-3	-3	-0.5
Uruguay	3	-6	-6	-19	-16	-4	-4	-0.7
3. Brazil exits								
Argentina	18	-18	-19	-64	-79	-17	-17	-3.8
Brazil	0	-7	-10	-73	-70	2	-1	-0.3
Paraguay	3	11	4	35	-21	-12	1	0.2
Uruguay	-1	1	1	2	3	1	1	0.1
4. Paraguay exits								
Argentina	0	0	0	-2	-1	0	0	-0.1
Brazil	0	0	0	-2	1	0	0	0.0
Paraguay	6	-16	2	-19	-38	-16	-2	-0.5
Uruguay	0	0	0	-2	-1	0	0	0.0
5. Uruguay exits								
Argentina	0	-1	-1	-4	-2	0	-1	-0.1
Brazil	0	0	0	1	0	0	0	0.0
Paraguay	0	-4	0	-8	-2	0	-1	-0.1
Uruguay	3	-7	-7	-28	-15	-2	-4	-0.8

[a] All numbers are expressed in percent deviations from the status quo. The first scenario computes the general equilibrium impact of a dissolution of MERCOSUR. The other scenarios compute the general equilibrium impact of a single country leaving the trade bloc. A trade elasticity of 4 is used in all scenarios.

positive impact on Paraguay and Uruguay, who benefit from increased trade with Argentina once Brazil is removed from the trade bloc. Finally, an exit by either Paraguay or Uruguay, would reduce the welfare of the country involved, leaving that of the other countries mostly unchanged.

Across scenarios, Brazil, the largest trade bloc member, is least affected by disruptions of MERCOSUR. In Brazil, trade with MERCOSUR and also overall international trade is small relative to intra-national trade, both in the actual data and in the counterfactual scenarios, leading to small changes in welfare.[22] Notably, an exit of Brazil would impose substantial trade costs on Argentina, its main trade partner within the bloc, but lead to a drop that is an order of magnitude lower for Brazil. One of the main reasons that explain this findings is the relative size of Argentina and Brazil's internal market (with respect to their external sector).

[22] The fact that Brazil is relatively closed to international trade has been studied before. Canuto et al. (2015) explain Brazil's low import and export penetration by an idiosyncratic economic structure that relies primarily on domestic value chains instead of global production networks.

The low gains from trade derived from trading with MERCOSUR members leads to the question whether Brazil could gain by switching from MERCOSUR to other preferred trade partners. The most likely candidates include an integration with other Latin American countries, or even signing an agreement with NAFTA, the European Union, or with China. However, agreements with other trade blocs impose certain costs. They require time for negotiations and spending political capital; they may influence domestic variables, such as income inequality, imply changes in regulation, or affect the environment, sometimes with undesired consequences. Additionally, exiting a consolidated trade agreement may have economic consequences beyond direct trade effects, by increasing uncertainty, disrupting existing global and regional value chains, etc. There may also be other payoffs to Brazil from remaining a member of MERCOSUR. Among them are the democratic clause of MERCOSUR, migration regulations tied to MERCOSUR and, more generally, the value placed on Latin American integration.

The argument that a country does not always prefer a trade agreement that maximizes gains from trade can be formally rationalized by modeling the choices of a decision maker whose objective function includes other considerations besides gains from trade. We define a function $R_i(\theta) > 0$ that scales gains from trade to denote all other consequences of changing trade policy to the matrix of trade costs θ and write the value of trade policy θ for the decision-maker in country i as:

$$V_i(\theta) = R_i(\theta)G_i(\theta). \tag{16}$$

Because $G_i(\theta)$ is the ratio between total nominal expenditure on final goods in a country and an ideal price index it can be interpreted as the consumption by a representative agent in each country. The term $R_i(\theta)$ scales up or down consumption of this representative agent, as in the consumption-based welfare measure of Lucas (2003). The function $R(\theta)$ may include concerns about inequality or the environment, which are not captured in the gains from trade measure, or the various (economic, political, social, etc.) costs or political economy motivations described above.[23] The factor $R(\theta)$ should not be interpreted simply as a parameter but can be thought of as an endogenous result of a process in which the decision-maker has exhausted all possibilities of improving the situation after switching to an alternative new trade agreement.[24]

The decision-maker in a country finds it worthwhile to change trade policy if

$$\frac{\Delta V_i}{V_i} \approx \frac{\Delta R_i}{R_i} + \frac{\Delta G_i}{G_i} \geq 0, \tag{17}$$

with indifference if the weak inequality becomes an equality. This implies that a new trade policy will not be adopted if positive gains from trade are more than compensated by a negative value of $\frac{\Delta R_i}{R_i}$.

To quantify the value placed by Brazil on MERCOSUR, we consider different scenarios in which Brazil exits MERCOSUR and enters a closer relationship with other trade blocs or countries. This depends on the type of trade or integration agreement considered, and on the assumed effect of the agreement on trade flows. We simulate the effects of Brazil signing a customs union

[23] Recent examples that use a multiplicative specification as in (16) include the models by Heid and Larch (2016), where R_i captures changes in employment and Carrère et al. (2015), where it captures aversion to inequality.

[24] Results in this section are derived in the theoretical appendix (Appendix A).

with other trade blocs, which implies a relatively strong relationship with its new partners. Particularly, most scenarios imply the establishment of a customs unions involving countries in different geographical regions, while customs unions tend to be an intra-regional phenomenon (Lake and Yildiz, 2016). In this sense, results should be interpreted as upper bounds on the gains from trade from joining different blocs of countries. We simulate the impact of a customs union using the coefficient that we estimated for this type of agreement over the whole period (1986–2006). We interpret this value as the ex-ante estimate of the increase in trade in a typical customs union. This estimate has the benefit that it would also be available to the decision-maker at the time of the decision, which we place in the second half of the 2000s.

We report changes in trade flows and the resulting gains from trade in Table 5. Numbers reported are the net effect of Brazil withdrawing from MERCOSUR and joining a customs union with different trade blocs or countries. The different alternatives we consider are the group of countries which would later form Alianza del Pacífico (Chile, Colombia, Peru, Mexico), NAFTA (Canada, Mexico, the US), and the European Union (the group of countries after the 2004 expansion but before the 2007 expansion).[25] We also report results for a customs union with two individual countries: China and the US.

Table 5: Net impact for Brazil of withdrawing from MERCOSUR and forming a customs union with another trade bloc[a]

	All origins and destinations			Multilateral index		Gains
	Domestic	Exports	Imports	Inward	Outward	from trade
Alianza del Pacífico	0	-3	-5	0	-1	-0.2
NAFTA	-1	8	11	-1	2	0.3
European Union	-2	6	9	3	2	0.3
US	-1	5	7	0	1	0.2
China	0	-4	-6	3	-1	-0.2

[a] All numbers are expressed in percent deviations from the status quo. Scenarios compute the general equilibrium impact of Brazil withdrawing from MERCOSUR and joining a customs union with a different trade bloc. A trade elasticity of 4 is used in all scenarios.

The overall conclusion from Table 5 is that net gains from some alternatives are positive, although they do not exceed 0.3%. The simulations indicate that, although Brazil would become more open to international trade by leaving MERCOSUR and signing a customs union agreement with either the European Union or the US, the gains from trade would not be substantial. The signature of a customs union agreement would probably also impose regulatory changes in Brazil or lead to other changes that would be costly for the decision-maker. In fact, because Brazil did not seek to enter an agreement with NAFTA or the European Union during the 2000s, a revealed preference argument suggests that a value $\frac{\Delta R_i}{R_i} \leq -0.3$ was associated to these choices.

In conclusion, although Brazil does not exact substantial gains from trade from MERCOSUR, the incentives to leave MERCOSUR to join another trade bloc are small, and probably overshadowed by other economic and political economy considerations.

[25] An analysis of the recent trade agreement between the European Union and MERCOSUR is outside the scope of the paper. See Timini and Viani (2020) for an in-depth study of this particular trade agreement.

5 Conclusion

In this paper we estimate the impact of MERCOSUR on trade flows and on gains from trade for its member countries. We find that Argentina occupies a central role, with trade flows into and out of Argentina due to MERCOSUR strengthening more than for the other members of the trade bloc. Gains from trade are largest for Argentina and smallest for Brazil. Using a general equilibrium quantitative structural gravity model, we estimate that the dissolution of MERCOSUR would reduce welfare derived from gains from trade by 4.0% (in consumption-equivalent terms) in Argentina, and by much smaller amounts, 0.8%, 0.5% and 0.3%, in Uruguay, Paraguay and Brazil.

Because of the reduced gains from trade that accrue to Brazil, we study whether Brazil would be better off by withdrawing from MERCOSUR and joining a different trade bloc. Counterfactual scenarios show that the net gains from trade to Brazil of switching into other existing trade agreements would be 0.3% of consumption of a representative agent, at most, a small but positive number. However, as we discuss in the text, it is likely that Brazil's decision to remain in MERCOSUR was driven by other (economic, political, social, etc.) considerations.

Our results are subject to a number of well-known caveats. Our methodology does not explicitly account for dynamics and input-output linkages and our empirical results rely on data on manufacturing goods alone. Certainly, the inclusion of trade in agricultural products and services would enrich the analysis. Moreover, the aggregate nature of the manufacturing data we use does not allow to shed light on interesting phenomena such as the integration in the automotive industry within MERCOSUR, where trade flows encompass both intermediate and final goods.

Our results shed light on the more general question of how bilateral trade flows and gains from trade are distributed among trade bloc members. In the case of MERCOSUR we uncover a substantial amount of heterogeneity. It would be interesting to see an application of the techniques of modern quantitative trade models that we use in this paper to other trade blocs, to detect to what extent MERCOSUR is an example of a more general pattern.

References

Arkolakis, C., A. Costinot, and A. Rodriguez-Clare (2012): "New Trade Models, Same Old Gains?" *American Economic Review*, 102, 94–130.

Baier, S., J. Bergstrand, and J. Bruno (2019a): "Putting Canada in the Penalty Box: Trade and Welfare Effects of Eliminating NAFTA," *The World Economy*.

Baier, S. L., J. H. Bergstrand, and M. W. Clance (2018): "Heterogeneous effects of economic integration agreements," *Journal of Development Economics*, 135, 587 – 608.

Baier, S. L., J. H. Bergstrand, and E. Vidal (2007): "Free Trade Agreements In the Americas: Are the Trade Effects Larger than Anticipated?" *The World Economy*, 30, 1347–1377.

Baier, S. L., Y. V. Yotov, and T. Zylkin (2019b): "On the widely differing effects of free trade agreements: Lessons from twenty years of trade integration," *Journal of International Economics*, 116, 206–226.

Bajzik, J., T. Havranek, Z. Irsova, and J. Schwarz (2020): "Estimating the Armington elasticity: The importance of study design and publication bias," *Journal of International Economics*, 127, 103383.

Campos, R. G., J. Timini, and E. Vidal (2021): "Structural gravity and trade agreements: does the measurement of domestic trade matter?" Mimeo.

Canuto, O., C. Fleischhaker, and P. Schellekens (2015): "The curious case of Brazil's closedness to trade," Policy Research Working Paper Series 7228, The World Bank.

Carrère, C. (2006): "Revisiting the effects of regional trade agreements on trade flows with proper specification of the gravity model," *European Economic Review*, 50, 223 – 247.

Carrère, C., A. Grujovic, and F. Robert-Nicoud (2015): "Trade and frictional unemployment in the global economy," CEPR Discussion Papers 10692, C.E.P.R. Discussion Papers.

Dekle, R., J. Eaton, and S. Kortum (2007): "Unbalanced Trade," *American Economic Review*, 97, 351–355.

El Dahrawy Sánchez-Albornoz, A. and J. Timini (2020): "Trade Agreements and Latin American trade (creation and diversion) and welfare," Working Papers 2009, Banco de España.

Esteve-Pérez, S., S. Gil-Pareja, R. Llorca-Vivero, and J. A. Martínez-Serrano (2020): "EMU and trade: A PPML re-assessment with intra-national trade flows," *The World Economy*.

Fally, T. (2015): "Structural gravity and fixed effects," *Journal of International Economics*, 97, 76–85.

Feenstra, R. C. and J. Romalis (2014): "International Prices and Endogenous Quality," *The Quarterly Journal of Economics*, 129, 477–527.

Glick, R. and A. K. Rose (2016): "Currency unions and trade: A post-EMU reassessment," *European Economic Review*, 87, 78–91.

Head, K. and T. Mayer (2014): "Chapter 3 - Gravity Equations: Workhorse,Toolkit, and Cookbook," in *Handbook of International Economics*, ed. by G. Gopinath, E. Helpman, and K. Rogoff, Elsevier, vol. 4 of *Handbook of International Economics*, 131 – 195.

Heid, B. and M. Larch (2016): "Gravity with unemployment," *Journal of International Economics*, 101, 70 – 85.

Kohl, T. (2014): "Do we really know that trade agreements increase trade?" *Review of World Economics (Weltwirtschaftliches Archiv)*, 150, 443–469.

Lake, J. and H. Yildiz (2016): "On the different geographic characteristics of Free Trade Agreements and Customs Unions," *Journal of International Economics*, 103, 213–233.

Lucas, Robert E., J. (2003): "Macroeconomic Priorities," *American Economic Review*, 93, 1–14.

Magee, C. S. (2008): "New measures of trade creation and trade diversion," *Journal of International Economics*, 75, 349 – 362.

Mayer, T., V. Vicard, and S. Zignago (2019): "The cost of non-Europe, revisited," *Economic Policy*, 34, 145–199.

Nessi, H. (2020): "Argentina to exit Mercosur trade talks to focus on problems at home," *Reuters*, https://www.reuters.com/article/us-argentina-mercosur-idUSKCN2270TA, accessed on 2020-10-20.

Preissler Iglesias, S. and R. Gamarski (2019): "A Latin American Brexit? Analyzing Brazil's Threat on Mercosur," *Bloomberg*, https://www.bloomberg.com/news/articles/2019-09-14/a-latin-american-brexit-analyzing-brazil-s-threat-on-mercosur, accessed on 2020-10-20.

Santos Silva, J. and S. Tenreyro (2006): "The Log of Gravity," *The Review of Economics and Statistics*, 88, 641–658.

Simonovska, I. and M. E. Waugh (2014): "The elasticity of trade: Estimates and evidence," *Journal of International Economics*, 92, 34–50.

The Economist (2012): "Mercosur RIP?" *The Economist*, https://www.economist.com/the-americas/2012/07/14/mercosur-rip, accessed on 2020-10-20.

Timini, J. and F. Viani (2020): "A highway across the Atlantic? Trade and welfare effects of the EU-Mercosur agreement," Working Papers 2023, Banco de España.

Vaillant, M., M. Flores, and P. Moncarz (2020): "Missing data in the structural gravity: estimation bias of preferential trade agreements due to the omission of internal trade," Documentos de Trabajo 2020-08, RedNIE.

Waugh, M. E. (2010): "International Trade and Income Differences," *American Economic Review*, 100, 2093–2124.

Yotov, Y. V., R. Piermartini, J.-A. Monteiro, and M. Larch (2016): *An advanced guide to trade policy analysis: The structural gravity model*, World Trade Organization Geneva.

Appendices

A Theoretical appendix

A.1 Bilateral trade

Bilateral trade flows in a structural gravity model satisfy the relationship

$$X_{ij} = \frac{Y_i}{\Omega_i}\frac{E_j}{\Pi_j}\theta_{ij} \geq 0, \tag{18}$$

where production in country i is $Y_i \stackrel{\text{def}}{=} \sum_j X_{ij}$ and expenditure in country j is $E_j \stackrel{\text{def}}{=} \sum_i X_{ij}$ and the following two conditions are also satisfied:

$$\Omega_i = \sum_k \frac{E_k}{\Pi_k}\theta_{ik} \tag{19}$$

and

$$\Pi_j = \sum_k \frac{Y_k}{\Omega_k}\theta_{kj}. \tag{20}$$

Using hat-notation,

$$\hat{X}_{ij} = \frac{X'_{ij}}{X_{ij}} = \frac{Y'_i}{Y_i}\frac{\Omega_i}{\Omega'_i}\frac{E'_j}{E_j}\frac{\Pi_j}{\Pi'_j}\frac{\theta'_{ij}}{\theta_{ij}} = \frac{\hat{Y}_i}{\hat{\Omega}_i}\frac{\hat{E}_j}{\hat{\Pi}_j}\hat{\theta}_{ij}, \tag{21}$$

where

$$\Omega'_i = \sum_k \frac{E'_k}{\Pi'_k}\theta'_{ik} \tag{22}$$

and

$$\Pi'_j = \sum_k \frac{Y'_i}{\Omega'_i}\theta'_{kj}. \tag{23}$$

$$\hat{X}_{ij} = \frac{\hat{Y}_i}{\hat{\Omega}_i}\frac{\hat{E}_j}{\hat{\Pi}_j}\hat{\theta}_{ij}. \tag{24}$$

From the definition of the trade share in the main text,

$$\hat{\lambda}_{ij} = \frac{\hat{Y}_i}{\hat{\Omega}_i}\frac{\hat{\theta}_{ij}}{\hat{\Pi}_j}. \tag{25}$$

A result that was first derived by Dekle et al. (2007) for the Eaton-Kortum model, but which holds more generally in structural gravity models, is that

$$\hat{\lambda}_{ij} = \frac{\frac{\hat{Y}_i}{\hat{\Omega}_i}\hat{\theta}_{ij}}{\sum_k \lambda_{kj}\frac{\hat{Y}_k}{\hat{\Omega}_k}\hat{\theta}_{kj}}. \tag{26}$$

Notice that this implies

$$\hat{\Pi}_j = \sum_k \lambda_{kj}\frac{\hat{Y}_k}{\hat{\Omega}_k}\hat{\theta}_{kj}. \tag{27}$$

Structural models all have in common that $\frac{Y_i}{\Omega_i} = A_i w_i^{\varepsilon}$, where $A_i > 0$ is a technological or population constant and $\epsilon < 0$ is the trade elasticity (cf. Head and Mayer, table 3.1). Therefore,

$\frac{\hat{Y}_k}{\hat{\Omega}_k} = (\hat{w}_k)^{\epsilon}$, and changes in shares depend exclusively on changes in wages and bilateral trade costs.

$$\hat{\lambda}_{ij} = \frac{(\hat{w}_i)^{\epsilon}\hat{\theta}_{ij}}{\sum_k \lambda_{kj}(\hat{w}_k)^{\epsilon}\hat{\theta}_{kj}} \tag{28}$$

If labor is the only factor of production, so that $Y_i = w_i L_i$ and L_i is held fixed, then $\hat{Y}_i = \hat{w}_i$, so that the change is GDP can be substituted into the above equation.

Market clearing implies

$$\hat{w}_i = \hat{Y}_i = \frac{1}{Y_i}\sum_j \lambda'_{ij}E'_j \tag{29}$$

$$= \frac{1}{Y_i}\sum_j \lambda_{ij}\hat{\lambda}_{ij}E'_j \tag{30}$$

$$= \frac{1}{Y_i}\sum_j \frac{\lambda_{ij}(\hat{w}_i)^{\epsilon}\hat{\theta}_{ij}}{\sum_k \lambda_{kj}(\hat{w}_k)^{\epsilon}\hat{\theta}_{kj}}E'_j \tag{31}$$

$$\tag{32}$$

In general, expenditure does not equal production because there are trade deficits. A trade deficit is defined by $E_j = Y_j + D_j$ and $E'_j = Y_j\hat{Y}_j + D_j\hat{D}_j$. There are two common assumptions that are commonly made to deal with the evolution of trade deficits. The most common assumption (multiplicative deficit) is that the deficit evolves in proportion to GDP, so that $\hat{D}_j = \hat{Y}_j$. An alternative assumption (additive deficit) is that the deficit remains constant and $\hat{D}_j = 1$. In the first case, $E'_j = E_j\hat{Y}_j = E_j\hat{w}_j$ and in the second case $E'_j = Y_j\hat{Y}_j + D_j = Y_j\hat{w}_j + D_j$. We choose the multiplicative assumption and obtain

$$\hat{w}_i = \frac{1}{Y_i}\sum_j \frac{\lambda_{ij}(\hat{w}_i)^{\epsilon}\hat{\theta}_{ij}}{\sum_k \lambda_{kj}(\hat{w}_k)^{\epsilon}\hat{\theta}_{kj}}E_j\hat{w}_j. \tag{33}$$

This equation can be solved for wages $\{\hat{w}_i\}$. Once obtained, the other variables follow from

$$\hat{Y}_i = \hat{w}_i \tag{34}$$

$$\hat{E}_i = \hat{w}_i \tag{35}$$

$$\hat{\Omega}_i = (\hat{w}_i)^{1-\epsilon} \tag{36}$$

$$\hat{\Pi}_j = \sum_k \lambda_{kj}(\hat{w}_k)^{\epsilon}\hat{\theta}_{kj} \tag{37}$$

$$\hat{\lambda}_{ij} = \frac{(\hat{w}_i)^{\epsilon}}{\hat{\Pi}_j}\hat{\theta}_{ij} \tag{38}$$

$$\hat{X}_{ij} = \frac{\hat{Y}_i}{\hat{\Omega}_i}\frac{\hat{E}_j}{\hat{\Pi}_j}\hat{\theta}_{ij} = \hat{\lambda}_{ij}\hat{E}_j = \frac{(\hat{w}_i)^{\epsilon}\hat{w}_j}{\hat{\Pi}_j}\hat{t}_{ij} \tag{39}$$

See Baier et al. (2019b) for the solution when the additive assumption is made. Structural gravity models usually assume utility functions that imply that the change in welfare, or gains from trade, equals the change in expenditure relative to the change in a price index P_i, with $\hat{P}_i = \hat{\Pi}_i^{1/\epsilon}$. In this case, the formula by Arkolakis et al. (2012) is obtained:

$$\hat{G}_i = \frac{\hat{E}_i}{\hat{\Pi}_i^{1/\epsilon}} = \frac{\hat{w}_i}{\hat{\Pi}_i^{1/\epsilon}} = \left(\frac{(\hat{w}_i)^{\epsilon}}{\hat{\Pi}_i}\right)^{1/\epsilon} = \hat{\lambda}_{ii}^{1/\epsilon}. \tag{40}$$

The second equality requires the multiplicative assumption and the last equality follows because $\hat{\theta}_{ii} = 1$.

A.2 Tradeoffs

Agreements among countries imply different values of θ. We denote the set of all possible configurations of trade costs by Θ. This set includes at least two configurations of trade costs to make the problem non-trivial.

Let the real-valued function $r_i(c(\theta), \theta)$ capture the tradeoffs produced by moving to different trade agreements. These tradeoffs include all additional issues which the decision-maker cares about. Examples include the motivations discussed in the main text. We assume that the decision-maker can control the continuous function $r_i(c(\theta), \theta)$ through an arbitrary vector of choice variables c chosen from a compact set $C(\theta)$, which may also depend on θ.

The decision-maker of country i therefore chooses $\theta \in \Theta$ and a vector of choices $c(\theta) \in C(\theta)$ to maximize the value

$$v_i(\theta) = r_i(c(\theta), \theta)G_i(\theta), \tag{41}$$

where we assume both terms to be positive. Given the structure of the payoff function, the problem faced by the decision-maker can be decomposed into two steps: a step in which $c(\theta)$ is optimally chosen for any value of θ to maximize $r_i(c(\theta), \theta)$, and a second step that optimizes over values of θ. Formally, for any given θ, we denote the solution to the first problem as

$$R_i(\theta) = \max_{c \in C(\theta)} r_i(c, \theta). \tag{42}$$

The maximized function $R_i(\theta) = r_i(c^*(\theta))$ incorporates the optimal adjustments made by the decision-maker for any possible value of θ. This solution is guaranteed to exist if $r(\cdot)$ is continuous (because $C(\theta)$ is assumed to be a compact set for all θ). The optimum $c^*(\theta)$ does not need to be unique but the value of $R_i(\theta)$ is guaranteed to exist and to be unique.

The second optimization step of the decision-maker can then be expressed as the maximization of

$$V_i(\theta) = R_i(\theta)G_i(\theta) \tag{43}$$

over different choices of $\theta \in \Theta$.

This implies, after taking the logarithm and differentiating,

$$\frac{dV_i}{V_i} = \frac{dR_i}{R_i} + \frac{dG_i}{G_i}. \tag{44}$$

For discrete changes, the following approximation holds:

$$\frac{\Delta V_i}{V_i} \approx \frac{\Delta R_i}{R_i} + \frac{\Delta G_i}{G_i}. \tag{45}$$

B Data appendix

We use the UNCTAD/WTO database (Yotov et al., 2016) which includes both international and intra-national manufacturing trade flows (bilateral exports and imports) for 69 countries over the 21-year period spanning from 1986–2006. In this database, the primary source for international (bilateral) trade flows is UN COMTRADE and the primary source for intra-national data is the CEPII TradeProd dataset.

Paraguay is not included in the UNCTAD/WTO database. Unfortunately, data on gross manufacturing for Paraguay are spotty in CEPII TradeProd. Therefore, we infer manufacturing gross output for Paraguay from data on value added. We compute the ratio of gross manufacturing output to value added in manufacturing for those years in which data on gross output are available from CEPII TradeProd and then construct gross output as the value added times the average of this ratio.

We obtain the international trade flows of Paraguay from the Observatory for Economic Complexity (OEC), who in turn source the data from UN COMTRADE and adjust it with mirroring techniques. When we detected trade flows not classified in any SITC category (labeled "ZZ" in the OEC database), we used WITS data on bilateral manufacturing trade flows (classified following the same SITC classification used for the OEC database) instead, as long as WITS data was available for all years. We changed both directional flows in this case, for consistency. If WITS data was not available, then we used OEC data (without the "ZZ" category). We compute intra-national trade flows as the difference between our computed series for gross production and total manufacturing exports.

C Tables

Table 6: Time-varying impact of MERCOSUR

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
M × 1987	-0.082	-0.028	-0.055			-0.054
	(0.079)	(0.117)	(0.085)			(0.087)
M × 1988	0.034	0.124	0.029	0.030		0.035
	(0.054)	(0.123)	(0.095)	(0.092)		(0.103)
M × 1989	0.195	0.613***	0.489***			0.513***
	(0.135)	(0.111)	(0.099)			(0.105)
M × 1990	0.259**	0.385**	0.194	0.194	0.193*	0.201
	(0.121)	(0.156)	(0.143)	(0.133)	(0.104)	(0.145)
M × 1991	0.290***	0.599***	0.394***			0.402***
	(0.046)	(0.041)	(0.044)			(0.052)
M × 1992	0.433***	0.979***	0.734***	0.734***		0.738***
	(0.097)	(0.140)	(0.104)	(0.107)		(0.110)
M × 1993	0.552***	1.195***	0.923***			0.917***
	(0.065)	(0.062)	(0.060)			(0.066)
M × 1994	0.506***	1.319***	0.995***	0.997***	0.994***	0.987***
	(0.091)	(0.067)	(0.071)	(0.061)	(0.055)	(0.070)
M × 1995	0.566***	1.498***	1.112***			1.072***
	(0.083)	(0.078)	(0.070)			(0.062)
M × 1996	0.685***	1.650***	1.253***	1.255***		1.223***
	(0.078)	(0.065)	(0.062)	(0.056)		(0.058)
M × 1997	0.793***	1.892***	1.419***			1.384***
	(0.087)	(0.082)	(0.066)			(0.065)
M × 1998	0.845***	1.937***	1.419***	1.421***	1.418***	1.362***
	(0.078)	(0.103)	(0.077)	(0.073)	(0.063)	(0.076)
M × 1999	0.783***	1.866***	1.356***			1.274***
	(0.080)	(0.063)	(0.063)			(0.069)
M × 2000	0.860***	1.888***	1.328***	1.329***		1.232***
	(0.123)	(0.055)	(0.085)	(0.085)		(0.091)
M × 2001	0.778***	1.861***	1.290***			1.194***
	(0.131)	(0.057)	(0.091)			(0.102)
M × 2002	0.677***	1.762***	1.230***	1.233***	1.233***	1.123***
	(0.170)	(0.100)	(0.111)	(0.117)	(0.130)	(0.124)
M × 2003	0.772***	1.986***	1.412***			1.315***
	(0.253)	(0.161)	(0.189)			(0.202)
M × 2004	0.783***	2.205***	1.598***	1.602***		1.495***
	(0.253)	(0.176)	(0.212)	(0.213)		(0.226)
M × 2005	0.818***	2.310***	1.687***			1.583***
	(0.267)	(0.207)	(0.236)			(0.249)
M × 2006	0.836***	2.328***	1.680***	1.684***	1.688***	1.560***
	(0.249)	(0.188)	(0.210)	(0.212)	(0.213)	(0.224)
GSP	-0.224***	-0.265***	-0.188***	-0.184***	-0.141***	-0.216***
	(0.056)	(0.063)	(0.055)	(0.056)	(0.054)	(0.063)
PTA	0.002	0.391***	0.258***	0.260***	0.283***	0.255***
	(0.061)	(0.123)	(0.089)	(0.078)	(0.098)	(0.095)
FTA	0.061*	0.578***	0.255***	0.252***	0.273***	0.218**
	(0.032)	(0.108)	(0.084)	(0.085)	(0.105)	(0.097)
CU	0.213***	0.752***	0.430***	0.454***	0.503***	0.407***
	(0.060)	(0.127)	(0.117)	(0.112)	(0.112)	(0.122)
CM	0.129*	0.962***	0.324***	0.349***	0.380***	0.248*
	(0.076)	(0.130)	(0.117)	(0.114)	(0.111)	(0.141)
ECU	0.073	1.066***	0.255**	0.280**	0.324***	0.125
	(0.091)	(0.137)	(0.122)	(0.119)	(0.114)	(0.155)
Observations	101,430	102,900	102,900	53,812	29,280	102,900
Intranational trade	no	yes	yes	yes	yes	yes
Border × year	no	no	yes	yes	yes	yes
log distance × year	no	no	no	no	no	yes
p avg(1986–1990) = avg(1991–1994)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
p avg(1991–1994) = avg(1995–2006)	0.0055	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: The dependent variable are nominal bilateral trade flows. All specifications include exporter-time, importer-time and country pair fixed effects. Standard errors are clustered by exporter, importer and year. Specifications (4) and (5) use data only every two or four years. Specifications (6) adds log distance-year dummies as a control. The last two rows use a chi-squared test with the null hypothesis that the average of coefficients of μ_t over different periods are equal to each other.

Table 7: Heterogeneous impact of MERCOSUR

VARIABLES	(1)	(2)	(3)
ARG ↔ BRA × 1991–1994	0.938***		
	(0.138)		
ARG ↔ PRY × 1991–1994	0.828***		
	(0.236)		
ARG ↔ URY × 1991–1994	0.613**		
	(0.253)		
BRA ↔ PRY × 1991–1994	0.103		
	(0.127)		
BRA ↔ URY × 1991–1994	-0.012		
	(0.138)		
PRY ↔ URY × 1991–1994	0.399***		
	(0.120)		
ARG ↔ BRA × 1995–2006	1.707***		
	(0.177)		
ARG ↔ PRY × 1995–2006	1.056***		
	(0.295)		
ARG ↔ URY × 1995–2006	0.738***		
	(0.107)		
BRA ↔ PRY × 1995–2006	0.470**		
	(0.197)		
BRA ↔ URY × 1995–2006	0.006		
	(0.119)		
PRY ↔ URY × 1995–2006	1.191***		
	(0.171)		
ARG → BRA × 1991–1994		1.045***	0.803***
		(0.163)	(0.227)
ARG → PRY × 1991–1994		0.702***	0.749***
		(0.181)	(0.219)
ARG → URY × 1991–1994		0.765***	0.264
		(0.296)	(0.177)
BRA → ARG × 1991–1994		0.874***	1.104***
		(0.267)	(0.183)
BRA → PRY × 1991–1994		-0.055	0.127
		(0.209)	(0.139)
BRA → URY × 1991–1994		-0.114	-0.165
		(0.154)	(0.117)
PRY → ARG × 1991–1994		1.671***	1.442***
		(0.347)	(0.269)
PRY → BRA × 1991–1994		1.474***	0.126
		(0.305)	(0.217)
PRY → URY × 1991–1994		1.505***	0.072
		(0.380)	(0.335)
URY → ARG × 1991–1994		0.464	1.033***
		(0.360)	(0.229)
URY → BRA × 1991–1994		0.152	0.201
		(0.167)	(0.149)
URY → PRY × 1991–1994		0.230	0.479***
		(0.250)	(0.156)
ARG → BRA × 1995–2006		1.622***	1.389***
		(0.220)	(0.314)
ARG → PRY × 1995–2006		0.902***	0.955***
		(0.250)	(0.281)
ARG → URY × 1995–2006		1.030***	0.535*
		(0.337)	(0.287)
BRA → ARG × 1995–2006		1.778***	1.991***
		(0.108)	(0.335)
BRA → PRY × 1995–2006		0.438**	0.613***
		(0.188)	(0.214)
BRA → URY × 1995–2006		-0.012	-0.069
		(0.090)	(0.245)
PRY → ARG × 1995–2006		1.979***	1.736***
		(0.209)	(0.327)
PRY → BRA × 1995–2006		0.555***	-0.795***
		(0.203)	(0.258)
PRY → URY × 1995–2006		2.783***	1.348***
		(0.258)	(0.288)
URY → ARG × 1995–2006		0.289	0.842***
		(0.237)	(0.272)
URY → BRA × 1995–2006		0.047	0.092
		(0.129)	(0.243)
URY → PRY × 1995–2006		0.749***	0.991***
		(0.275)	(0.108)
Observations	102,900	102,900	102,543
Symmetric pair FE	yes	yes	no
Directional pair FE	no	no	yes

Notes for the table on next page.

Table 8: Heterogeneous impact of MERCOSUR (cont.)

VARIABLES	(1)	(2)	(3)
GSP	-0.188***	-0.188***	-0.006
	(0.055)	(0.055)	(0.064)
PTA	0.258***	0.258***	0.314***
	(0.089)	(0.089)	(0.103)
FTA	0.254***	0.254***	0.300***
	(0.084)	(0.084)	(0.088)
CU	0.429***	0.429***	0.475***
	(0.117)	(0.117)	(0.120)
CM	0.323***	0.323***	0.367***
	(0.117)	(0.117)	(0.119)
ECU	0.254**	0.254**	0.289**
	(0.122)	(0.122)	(0.126)
Border × 1986	-0.767***	-0.767***	-0.771***
	(0.084)	(0.084)	(0.086)
Border × 1987	-0.747***	-0.747***	-0.751***
	(0.079)	(0.079)	(0.080)
Border × 1988	-0.667***	-0.667***	-0.670***
	(0.078)	(0.078)	(0.079)
Border × 1989	-0.625***	-0.625***	-0.632***
	(0.079)	(0.079)	(0.080)
Border × 1990	-0.554***	-0.554***	-0.559***
	(0.070)	(0.070)	(0.070)
Border × 1991	-0.537***	-0.537***	-0.542***
	(0.068)	(0.068)	(0.068)
Border × 1992	-0.513***	-0.513***	-0.518***
	(0.062)	(0.062)	(0.062)
Border × 1993	-0.470***	-0.470***	-0.474***
	(0.057)	(0.057)	(0.057)
Border × 1994	-0.402***	-0.402***	-0.406***
	(0.054)	(0.054)	(0.053)
Border × 1995	-0.326***	-0.326***	-0.330***
	(0.048)	(0.048)	(0.047)
Border × 1996	-0.313***	-0.313***	-0.317***
	(0.051)	(0.051)	(0.050)
Border × 1997	-0.225***	-0.225***	-0.228***
	(0.047)	(0.047)	(0.046)
Border × 1998	-0.173***	-0.173***	-0.174***
	(0.038)	(0.038)	(0.035)
Border × 1999	-0.179***	-0.179***	-0.179***
	(0.045)	(0.045)	(0.042)
Border × 2000	-0.122***	-0.122***	-0.121***
	(0.039)	(0.039)	(0.038)
Border × 2001	-0.109***	-0.109***	-0.108***
	(0.032)	(0.032)	(0.031)
Border × 2002	-0.140***	-0.140***	-0.140***
	(0.021)	(0.021)	(0.019)
Border × 2003	-0.094***	-0.094***	-0.093***
	(0.018)	(0.018)	(0.016)
Border × 2004	-0.052***	-0.052***	-0.051***
	(0.010)	(0.010)	(0.014)
Border × 2005	-0.030*	-0.030*	-0.029
	(0.018)	(0.018)	(0.022)
Observations	102,900	102,900	102,543
Symmetric pair FE	yes	yes	no
Directional pair FE	no	no	yes

Notes: The dependent variable are nominal bilateral trade flows. All specifications include exporter-time, importer-time and either symmetric of directional pair fixed effects. Standard errors are clustered by exporter, importer and year.

D Additional results

D.1 Flexible specification for other trade agreements

Table 9: Controlling for heterogeneous impact of other trade agreements (between agreements)

VARIABLES	(1)
M × 1987	-0.055
	(0.083)
M × 1988	0.029
	(0.096)
M × 1989	0.477***
	(0.099)
M × 1990	0.179
	(0.144)
M × 1991	0.380***
	(0.042)
M × 1992	0.719***
	(0.105)
M × 1993	0.929***
	(0.042)
M × 1994	1.012***
	(0.052)
M × 1995	1.107***
	(0.051)
M × 1996	1.249***
	(0.043)
M × 1997	1.415***
	(0.051)
M × 1998	1.413***
	(0.063)
M × 1999	1.361***
	(0.049)
M × 2000	1.328***
	(0.080)
M × 2001	1.288***
	(0.091)
M × 2002	1.225***
	(0.113)
M × 2003	1.406***
	(0.193)
M × 2004	1.578***
	(0.219)
M × 2005	1.665***
	(0.243)
M × 2006	1.656***
	(0.218)
Observations	102,897
Symmetric pair FE	yes
Directional pair FE	no
Additional FE	agreement

Notes: The dependent variable are nominal bilateral trade flows. All specifications include exporter-time, importer-time and country pair fixed effects. Standard errors are clustered by exporter, importer and year. The specification replicates that specifications (3) of Table 6, adding a dummy for each trade agreement.

Table 10: Controlling for heterogeneous impact of other trade agreements (within agreements)

VARIABLES	(1)	(2)
ARG $\leftrightarrow$ BRA $\times$ 1991–1994	0.974***	
	(0.150)	
ARG $\leftrightarrow$ PRY $\times$ 1991–1994	0.858***	
	(0.261)	
ARG $\leftrightarrow$ URY $\times$ 1991–1994	0.627**	
	(0.265)	
BRA $\leftrightarrow$ PRY $\times$ 1991–1994	0.125*	
	(0.073)	
BRA $\leftrightarrow$ URY $\times$ 1991–1994	-0.001	
	(0.113)	
PRY $\leftrightarrow$ URY $\times$ 1991–1994	0.403***	
	(0.074)	
ARG $\leftrightarrow$ BRA $\times$ 1995–2006	1.739***	
	(0.178)	
ARG $\leftrightarrow$ PRY $\times$ 1995–2006	1.101***	
	(0.332)	
ARG $\leftrightarrow$ URY $\times$ 1995–2006	0.751***	
	(0.106)	
BRA $\leftrightarrow$ PRY $\times$ 1995–2006	0.496***	
	(0.183)	
BRA $\leftrightarrow$ URY $\times$ 1995–2006	0.033	
	(0.105)	
PRY $\leftrightarrow$ URY $\times$ 1995–2006	1.202***	
	(0.182)	
ARG $\rightarrow$ BRA $\times$ 1991–1994		0.818***
		(0.225)
ARG $\rightarrow$ PRY $\times$ 1991–1994		0.757***
		(0.199)
ARG $\rightarrow$ URY $\times$ 1991–1994		0.285
		(0.181)
BRA $\rightarrow$ ARG $\times$ 1991–1994		1.133***
		(0.178)
BRA $\rightarrow$ PRY $\times$ 1991–1994		0.141
		(0.115)
BRA $\rightarrow$ URY $\times$ 1991–1994		-0.136
		(0.122)
PRY $\rightarrow$ ARG $\times$ 1991–1994		1.463***
		(0.196)
PRY $\rightarrow$ BRA $\times$ 1991–1994		0.140
		(0.181)
PRY $\rightarrow$ URY $\times$ 1991–1994		0.092
		(0.226)
URY $\rightarrow$ ARG $\times$ 1991–1994		1.054***
		(0.231)
URY $\rightarrow$ BRA $\times$ 1991–1994		0.215
		(0.160)
URY $\rightarrow$ PRY $\times$ 1991–1994		0.486***
		(0.116)
ARG $\rightarrow$ BRA $\times$ 1995–2006		1.426***
		(0.341)
ARG $\rightarrow$ PRY $\times$ 1995–2006		0.961***
		(0.287)
ARG $\rightarrow$ URY $\times$ 1995–2006		0.577*
		(0.301)
BRA $\rightarrow$ ARG $\times$ 1995–2006		2.035***
		(0.365)
BRA $\rightarrow$ PRY $\times$ 1995–2006		0.624***
		(0.219)
BRA $\rightarrow$ URY $\times$ 1995–2006		-0.022
		(0.249)
PRY $\rightarrow$ ARG $\times$ 1995–2006		1.796***
		(0.309)
PRY $\rightarrow$ BRA $\times$ 1995–2006		-0.736***
		(0.245)
PRY $\rightarrow$ URY $\times$ 1995–2006		1.409***
		(0.179)
URY $\rightarrow$ ARG $\times$ 1995–2006		0.878***
		(0.292)
URY $\rightarrow$ BRA $\times$ 1995–2006		0.127
		(0.251)
URY $\rightarrow$ PRY $\times$ 1995–2006		0.994***
		(0.076)
Observations	102,861	102,442
Symmetric pair FE	yes	no
Directional pair FE	no	yes
Additional FE	agreement-symmetric pair	agreement-directional pair

Notes: The dependent variable are nominal bilateral trade flows. Specifications include exporter-time, importer-time, agreement-pair dummies, and either symmetric of directional pair fixed effects. Standard errors are clustered by exporter, importer and year.

D.2 Homogeneous within-bloc trade cost reduction

Table 11: General equilibrium trade impact of MERCOSUR of a homogeneous within-bloc trade cost estimate[a]

from/to	Argentina	Brazil	Paraguay	Uruguay	MERCOSUR[b]	RoW[c]	All destinations
1991-1994							
Argentina	*-1.8*	101	71	86	95	2	15
Brazil	83	*0.0*	65	79	80	-2	5
Paraguay	103	114	*-5.2*	98	109	9	35
Uruguay	86	96	68	*-5.8*	90	0	28
MERCOSUR[b]	83	100	67	82	86	-1	8
RoW[c]	-4	2	-13	-6	-1	0.0	0.0
All origins	9	7	0	21	8	0.0	0.1
1995-2006							
Argentina	*-4.9*	250	162	202	239	-2	26
Brazil	224	*-0.8*	160	202	215	-2	9
Paraguay	299	326	*-9.3*	271	305	21	85
Uruguay	239	258	169	*-11.5*	248	2	45
MERCOSUR[b]	225	251	161	202	227	-2	14
RoW[c]	-5	1	-24	-13	-2	0.0	0.0
All origins	22	10	-1	30	13	0.0	0.2

[a] Percent change in trade flows in general equilibrium computed for a trade elasticity of 4. Exporters are in rows, importers in columns. Intra-national trade flows (on the diagonals) are shown in italics. All other cells exclude intra-national trade. Changes are expressed with respect to a counterfactual in which trade intensification due to MERCOSUR does not occur and are measured in percentage points. The coefficients used for the computations are from a specification similar to the one in Table 7, column (3), but restricting coefficients to be the same for all directional pairs within MERCOSUR.

[b] The definition of MERCOSUR excludes the own country in cells that show a trade flow from/to Argentina, Brazil, Paraguay, or Uruguay. In all other cells, these four countries are included in the definition.

[c] RoW (rest of the world): all countries except the MERCOSUR countries: Argentina, Brazil, Paraguay, and Uruguay.

D.3 Exclusion of data on Paraguay

Table 12: General equilibrium trade impact of MERCOSUR excluding all data on Paraguay[a]

from/to	Argentina	Brazil	Paraguay	Uruguay	MERCOSUR[b]	RoW[c]	All destinations
1991-1994							
Argentina	*-2.8*	139	—	50	113	5	19
Brazil	172	*0.1*	—	-9	110	-2	5
Paraguay	—	—	—	—	—	—	—
Uruguay	135	14	—	*-0.1*	52	-9	12
MERCOSUR[b]	168	97	—	9	102	-1	8
RoW[c]	-8	2	—	10	-1	0.0	0.0
All origins	10	7	—	10	9	0.0	0.1
1995-2006							
Argentina	*-6.0*	310	—	71	248	1	29
Brazil	540	*-0.7*	—	-10	299	-2	9
Paraguay	—	—	—	—	—	—	—
Uruguay	108	9	—	*-2.8*	30	-1	9
MERCOSUR[b]	483	213	—	18	232	-1	14
RoW[c]	-9	1	—	-1	-1	0.0	0.0
All origins	24	10	—	7	13	0.0	0.1

[a] Percent change in trade flows in general equilibrium computed for a trade elasticity of 4. Both the estimation and the general equilibrium computation exclude all data on Paraguay. Exporters are in rows, importers in columns. Intra-national trade flows (on the diagonals) are shown in italics. All other cells exclude intra-national trade. Changes are expressed with respect to a counterfactual in which trade intensification due to MERCOSUR does not occur and are measured in percentage points. The coefficients used for the computations are from a specification with heterogeneous directional trade effects similar to the one in Table 7, column (3), but where all observations involving Paraguay have been dropped.

[b] The definition of MERCOSUR excludes the own country in cells that show a trade flow from/to Argentina, Brazil, or Uruguay. In all other cells, these three countries are included in the definition.

[c] RoW (rest of the world): all countries except the MERCOSUR countries: Argentina, Brazil, and Uruguay.

D.4 Treating Chile and Bolivia differently

Table 13: Gains from trade in MERCOSUR

	All origins and destinations			Trade bloc		Multilateral index		Gains
	Domestic	Exports	Imports	Exports	Imports	Inward	Outward	from trade
1. Trade bloc disintegrates								
Argentina	18	-21	-22	-71	-82	-16	-19	-4.1
Brazil	0	-7	-10	-72	-70	2	-1	-0.3
Paraguay	5	-15	2	-19	-37	-15	-2	-0.5
Uruguay	3	-7	-6	-26	-14	-2	-4	-0.8
2. Argentina exits								
Argentina	18	-22	-23	-71	-82	-15	-19	-4.2
Brazil	0	-7	-9	-70	-69	2	-1	-0.3
Paraguay	2	-20	-1	-41	-10	-3	-3	-0.5
Uruguay	3	-6	-6	-20	-15	-4	-4	-0.7
3. Brazil exits								
Argentina	18	-18	-19	-65	-79	-17	-17	-3.8
Brazil	0	-7	-10	-72	-71	2	-1	-0.3
Paraguay	2	11	4	34	-21	-12	1	0.2
Uruguay	-1	1	1	2	3	1	1	0.1
4. Paraguay exits								
Argentina	0	0	0	-2	-1	0	0	-0.1
Brazil	0	0	0	-2	1	0	0	0.0
Paraguay	5	-13	2	-18	-39	-14	-2	-0.4
Uruguay	0	0	0	-2	-1	0	0	0.0
5. Uruguay exits								
Argentina	0	-1	-1	-5	-2	0	-1	-0.1
Brazil	0	0	0	1	0	0	0	0.0
Paraguay	0	-4	0	-8	-2	0	-1	-0.1
Uruguay	3	-8	-7	-27	-16	-2	-4	-0.8

[a] All numbers are expressed in percent deviations from the status quo. The first scenario computes the general equilibrium impact of a dissolution of MERCOSUR. The other scenarios compute the general equilibrium impact of a single country leaving the trade bloc. In this table the scenarios also take into account that MERCOSUR implies close bilateral ties with Chile and Bolivia. We assume that these are also severed when a country exits MERCOSUR. We estimate the partial equilibrium of the ties between each MERCOSUR country and Chile and Bolivia by using directional pair dummies interacted with a dummy for the 1996–2006 period during which these two countries had a free trade agreement with MERCOSUR. A trade elasticity of 4 is used in all scenarios.

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