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Trade Costs and South-South Trade Agreements: Building Blocks or Stumbling Blocks?

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Abstract: This paper shows that new generation South-South preferential trade agreements (PTAs)—those entered into after 1995—are associated with lower trade costs for non-members. A ten percentage point drop in trade costs with new PTA partners leads to a three percentage point fall in trade costs with countries that have never been in a PTA with the reforming country. The paper builds on and extends previous research by using an inclusive measure of trade costs, rather than tariffs, to cover the wide range of issues dealt with in modern PTAs. It focuses on South-South trade because of the rise of large, middle income trading economies, and the fact that these new generation agreements have not been systematically investigated in the literature on a cross-regional basis. The strongest trade cost reduction effects for non-members are found for Economic Integration Agreements, followed by Free Trade Agreements; Customs Unions do not display a building block dynamic, which is in line with previous work.

JEL Codes: F13; F15; O24.

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1 INTRODUCTION

Trade liberalization is about a lot more than just tariffs. Successive negotiating rounds under the GATT brought in selected non-tariff barriers, such as quotas and product standards or technical regulations, but the "big bang" was the end of the Uruguay Round and the birth of the World Trade Organization in 1995. In addition to tariffs on industrial products—essentially the GATT's original remit—the WTO now includes agreements on agriculture, services, intellectual property, subsidies and countervailing measures, anti-dumping, and—following the Bali ministerial—trade facilitation (customs procedures and other border formalities), as well as other areas. And, of course, the WTO brought with it the inclusion of a wide range of developing countries in the multilateral trading system, a trend that has been reinforced with the rise of some of the BRIICs as major trading nations more recently.

Modern preferential trade arrangements (PTAs) go at least as far as the WTO Agreements, and often significantly further, in terms of their coverage. As of writing, perhaps the most recent PTA to be signed is the Japan-Mongolia Economic Partnership Agreement. As the name suggests, it is very broad in scope. In additional to tariffs, it covers the WTO areas of services and intellectual property, but also issues that have failed to find consensus in Geneva, such as investment and competition policy. It even includes a chapter on improving the business environment—an example of a trade agreement going far beyond the border to deal with general measures that affect the transaction costs linked to exporting and importing.

In this context of an expansive and expanding trade agenda, the dynamic between regionalism and multilateralism can no longer be understood solely in terms of tariffs. There has long been a debate as to whether regionalism is a "building block" or a "stumbling block" with respect to the multilateral system. It is only relatively recently that the question has been given empirical content, however. Results are mixed. On the one hand, Limao (2006) and Karacaovali and Limao (2008) find evidence from the USA and the EU of stumbling block effects, i.e. slower than expected multilateral tariff reductions following regional integration. In a similar vein, Fugazza and Nicita (2013) find that PTAs have improved market access for those countries involved in them, but that this dynamic has disadvantaged excluded countries. On the other hand, Estavadeordal et al. (2008) find evidence of a building block effect at work in Latin America, with a positive correlation between changes in preferential and most favored nation (MFN) tariffs. Ketterer et al. (2014) find similar evidence for Canada, as do Calvo-Pardo et al. (2009) for ASEAN.

This paper adds to the literature on the dynamic between regionalism and multilateralism in three ways. First, it moves the focus away from tariffs to encompass trade costs (Anderson and Van Wincoop, 2004)—i.e., the full range of factors that drive a wedge between producer prices in the exporting country and consumer prices in the importing country. This approach takes account of the dramatic changes that have taken place in the practice and policy of international trade since the building blocks versus stumbling blocks debate first arose.

Second, the paper focuses in particular on developing countries and South-South agreements.[2] Many developing countries are active in signing trade agreements, including with each other, as they pursue strategies of outward oriented growth and value chain based development. Estavadeordal et al. (2008) also considered developing countries, but limited their sample to Latin America and the Caribbean. This paper covers 40 developing countries in all regions and all income levels (except high income). It therefore provides a more global picture of the relationship between regionalism

[2] This paper defines the South as including all countries that are not part of the World Bank's high income group.

and multilateralism in the developing world. This approach is particularly pertinent at a time when South-South trade, driven by some of the larger middle income countries, is becoming increasingly important in the global trading system—a trend that is likely to continue and even intensify (Hanson, 2012).

An advantage of focusing on South-South trade agreements is that it excludes the special case of trade deals with the USA and EU. A priori, it seems more likely that a stumbling block dynamic might be at play in such cases, as the signing country could consider its appetite for market access "satiated" by achieving gains in these two large markets. The sample in this paper is composed exclusively of developing countries, which constitute smaller sources of demand, and so is potentially a more balanced test of the competing hypotheses.

The third innovative aspect of this paper is that it focuses only on PTAs that entered into force from 1996 onwards, i.e. following the Uruguay Round. These "new generation" PTAs are exactly the type of agreements that are expanding the trade agenda, like the Japan-Mongolia agreement referred to earlier. This paper can therefore be read specifically as an analysis of the dynamic that exists between regionalism and multilateralism in the context of a crowded and ever-expanding trade agenda, quite different from the original PTAs with their limited scope and issue coverage. This change is an important one, because some new generation PTA issues are, on their face, probably less discriminatory than preferential tariff cuts. Trade facilitation is a good example. When a country improves its customs and border procedures as part of a PTA, the benefit does not just accrue to PTA partners, but to all trading partners, at least in the general case of trade facilitation reforms that are not partner specific (which is the overwhelming majority of measures). Similarly, although the evidence is scant, there are suggestions in the literature that services PTAs are less preferential than goods PTAs because reform of services policies, even if motivated by PTA commitments, tends to be MFN-based (Miroudot and Shepherd, 2014).

Despite these considerations, it is important to stress at the outset that this paper is theoretically agnostic on the question whether South-South PTAs represent building blocks or stumbling blocks for the multilateral system. There are arguments on both sides, well summarized by Baldwin and Freund (2011).[3] This is an empirical paper, much in the spirit of Estevadeordal et al. (2008), and does not offer a structural model for testing. Rather, it takes a well-known conjecture to new data and attempts to analyze whether or not any causal inference can be drawn.

Against this background, the paper proceeds as follows. The next section discusses the measurement of trade costs, which will be the dependent variable for the empirical work, focusing on questions of methodology and data treatment. Section 3 conducts some preliminary empirical analysis using descriptive techniques, to give an idea of the state of the data and the correlations between particular variables. The core of the paper's empirical work is in Section 4, which estimates an econometric model and lays a claim to causal identification based on an instrumental variables strategy grounded in the reciprocal logic of trade liberalization. The last section concludes, and discusses possible avenues for future research.

2 MEASURING TRADE COSTS

This section introduces an inversion of the common gravity model as a way of inferring trade costs from the observed pattern of trade and production (Novy, 2013). Trade costs measured in this way accord with the "iceberg" approach commonly used in theoretical models, and thus capture all

[3] Recent contributions to this issue on the theoretical side include: Saggi and Yildiz (2010); and Saggi et al. (2013).

factors that drive a wedge between the producer price in the exporting country and the consumer price in the importing country. The first subsection introduces the methodology, and the second discusses data and implementation. Full details, along with a detailed analysis of the dataset, can be found in Arvis et al. (2015), which describes the ESCAP-World Bank Trade Cost Database.

2.1 Methodology

Anderson and Van Wincoop (2004) review the gravity model literature on trade costs. They sum together various estimates of particular barriers affecting the international movement and goods, and arrive at an estimate of 170% for the ad valorem equivalent trade costs faced by a representative developed country. The figure breaks down as 21% transportation costs, 44% border-related trade barriers, and 55% wholesale and retail distribution costs (2.70 = 1.21 * 1.44 * 1.55). The most important point to take away from this estimate is that trade costs are large—much larger than tariffs, which frequently average 5% or even less in developed countries, and even some developing countries. Many other factors are obviously at play.

Summing previous estimates in this "bottom up" way is one way of gaining an overall picture of the global trade costs environment. However, it suffers from two particular drawbacks. First, it cannot possibly take account of all factors that go into the "iceberg" trade costs commonly used in theoretical models, so there is a disconnect between theory and empirics. Second, the individual estimates used to create the sum are usually based on only a small subset of the relevant variables, which immediately gives rise to concerns over omitted variables bias to the extent that different sources of trade costs are correlated.

Novy (2013), following Head and Ries (2001), takes a different approach to trade costs, starting from a "top down" perspective.[4] His approach can be applied to any theoretically-grounded gravity model that results in a bilateral trade costs term combined with exporter and importer fixed effects (abstracting from temporal and sectoral dimensions). Examples of such models include Anderson and Van Wincoop (2003), Eaton and Kortum (2002), and Chaney (2008). The interpretation of the fixed effects—and potentially trade costs (fixed versus variable)—changes from one model to another, but the basic structure of this class of models lends itself to some simple but informative manipulation.

Taking the Anderson and Van Wincoop (2003) model as a benchmark, we can consider two countries, i and j, with four gravity models for intra- and international trade:

$$(1)\ X_{ij} = \frac{Y_i E_j}{Y}\left(\frac{\tau_{ij}}{\Pi_i P_j}\right)^{1-\sigma};\ (2)\ X_{ji} = \frac{Y_j E_i}{Y}\left(\frac{\tau_{ji}}{\Pi_j P_i}\right)^{1-\sigma};$$

$$(3)\ X_{ii} = \frac{Y_i E_i}{Y}\left(\frac{\tau_{ii}}{\Pi_i P_i}\right)^{1-\sigma};\ (4)\ X_{jj} = \frac{Y_j E_j}{Y}\left(\frac{\tau_{jj}}{\Pi_j P_j}\right)^{1-\sigma}$$

where: X represents trade between two countries (i to j or j to i) or within countries (goods produced and sold in i and goods produced and sold in j); Y represents total production in a country; E represents total expenditure in a country; τ represents "iceberg" trade costs; and σ is the

[4] Anderson and Yotov (2010) also adopt what could be termed a "top down" approach to calculating internal relative to multilateral trade costs for Canadian provinces. They focus, however, on a measure they call "constructed home bias", which represents the degree to which each province trades with itself relative to a frictionless benchmark. From an international policy standpoint, it is bilateral trade costs—rather than internal ones—that are more relevant, and so we focus on them rather than constructed home bias here.

intra-sectoral elasticity of substitution (among varieties within a sector). The two terms Π and P represent multilateral resistance. From the expressions:

$$(5)\ \Pi_i^{1-\sigma} = \sum_{j=1}^{C} \left\{\frac{\tau_{ij}}{P_j}\right\}^{1-\sigma} \frac{E_j}{Y} \text{ and } (6)\ P_{\mathrm{j}}^{1-\sigma} = \sum_{i=1}^{C} \left\{\frac{\tau_{ij}}{\Pi_i}\right\}^{1-\sigma} \frac{Y_i}{Y}$$

we can see that outward multilateral resistance Π captures the fact that trade flows between i and j depend on trade costs across all potential markets for i's exports, and that inward multilateral resistance P captures the fact that bilateral trade depends on trade costs across all potential import markets too. The two indices thus summarize average trade resistance between a country and its trading partners.

Multiplying equation (1) and equation (2), and then equation (3) and equation (4) gives:

$$(7)\ X_{ij}X_{ji} = \frac{Y_i E_j}{Y}\frac{Y_j E_i}{Y}\left(\frac{\tau_{ij}\tau_{ji}}{\Pi_i P_j \Pi_{\mathrm{j}} P_i}\right)^{1-\sigma} \text{ and } (8)\ X_{ii}X_{jj} = \frac{Y_i E_i}{Y}\frac{Y_j E_j}{Y}\left(\frac{\tau_{ii}\tau_{jj}}{\Pi_i P_i \Pi_{\mathrm{j}} P_j}\right)^{1-\sigma}$$

Dividing equation (7) by equation (8) eliminates terms and allows us to derive an expression for trade costs in terms of intra- and international trade flows:

$$(9)\ \left(\frac{X_{ij}X_{ji}}{X_{ii}X_{jj}}\right)^{\frac{1}{1-\sigma}} = \frac{\tau_{ij}\tau_{ji}}{\tau_{ii}\tau_{jj}}$$

Taking the geometric average of trade costs in both directions and converting to an ad valorem equivalent by subtracting unity gives:

$$(10)\ t_{ij} = t_{ji} = \left(\frac{\tau_{ij}\tau_{ji}}{\tau_{ii}\tau_{jj}}\right)^{\frac{1}{2}} - 1 = \left(\frac{X_{ii}X_{jj}}{X_{ij}X_{ji}}\right)^{\frac{1}{2(\sigma-1)}} - 1$$

In this paper, we refer to t_{ij} as "trade costs". It is the geometric average of international trade costs between two countries relative to domestic trade costs within each country. Our empirical work is based on an analysis of trade costs in new PTAs compared with trade costs for country pairs that have never been involved in a PTA. We do not examine the determinants of trade costs as in Chen and Novy (2011), or describe cross-country and through time differences as in Arvis et al. (2015). Instead, we use trade costs as a lens to examine the building blocks and stumbling blocks conjectures.

2.2 Data

This paper uses the data assembled by Arvis et al. (2015) and treated using the Novy (2013) methodology to produce the ESCAP-World Bank Trade Costs Database. This section describes the main features of the underlying data. Variable definitions and sources for the full dataset used in the econometric section of this paper are set out in Table 1, with summary statistics in Table 2.

After assembling all components, the trade costs dataset covers up to 167 countries for the period 1995-2012. In sectoral terms, it covers trade in agricultural products and trade in manufactured goods, as well as total goods trade (the sum of the two sectors). This paper focuses exclusively on trade in manufactured goods; the relationship between trade costs inside and outside agriculture PTAs is left for further research.

Implementing equation (10) in practice requires data on the value of bilateral trade in both directions, as well as data on intra-national trade in both countries. Trade data are readily available from standard sources like WITS-Comtrade,[5] but production data are more challenging. Importantly, since the models behind the trade costs formula do not allow for input-output relationships among sectors, intra-national trade needs to be measured as gross shipments, not value added (which subtracts intermediate inputs). The ESCAP-World Bank database uses UN national accounts data[6] and proxies intranational trade by total production less total exports. Interpolation is used to fill in missing country pair-sector-year observations. Full details of data treatment are set out in detail in Arvis et al. (2015).

To produce trade costs in ad valorem equivalent terms, an assumption is needed as to the intra-sectoral elasticity of substitution σ. We follow Novy (2013) in assuming that it is constant across sectors and countries, and equal to eight—an estimate that is reasonable in terms of the existing literature. However, little turns on this choice for the econometric analysis in this paper, as potential differences across countries and through time are accounted for by fixed effects at the estimation stage.

3 TRADE COSTS IN SOUTH-SOUTH PTAS

This section uses the data and methodology set out in Section 2 to analyze trade costs in South-South PTAs using descriptive statistics and graphical techniques. The idea is to introduce the fundamental features of the data in an intuitive way. Section 4 uses properly specified econometric models to tease out the intuitions presented in this section in greater detail.

The first question of interest relates to the level of trade costs in South-South PTAs as opposed to outside them. There have been suggestions that South-South PTAs often lack "teeth": they exclude some sensitive but important products, and are phased in over long periods. If this argument is true, we would expect to see little difference between trade costs inside and outside PTAs for developing country pairs. In fact, Figure 1 shows that we observe a substantial difference: the kernel density for country pairs with an active PTA is significantly to the left of the density for pairs without an active PTA, which indicates that trade costs are indeed lower inside South-South PTAs than outside them. The difference is quantitatively important: on a simple average basis, South-South country pairs without a PTA have average trade costs of 254%, compared with 134% for country pairs with a PTA. Figure 1 and these numbers provide some preliminary evidence that South-South PTAs are associated with lower trade costs among members.

What about the core question of this paper, namely whether or not there is a relationship between trade costs for country pairs with an PTA and those for pairs without an PTA? To provide some preliminary evidence on this question, we examine the dynamics of trade costs over time in the two groups of countries (Figure 2). Clearly, trade costs have been declining generally in the South, a finding that is in line with Arvis et al. (2015). The fall for country pairs in a new PTA has been stronger, however, by 14.8% compared with 13.1% for country pairs that have never been in an PTA. There is therefore some evidence of a positive relationship between the two, which would be consistent with the building blocks argument. Of course, the difference between the two figures

[5] For a small number of countries, Comtrade data are modified to better take account of re-exports.

[6] The UN National Accounts database provides gross shipments production data for up to 137 countries. For the remainder, we use value added data "scaled up" using average multipliers calculated for those countries where both gross shipments and value added data are available.

gives rise to its own concerns, notably about trade diversion; however, a consideration of that issue is beyond the scope of this paper.

Although the reasonably similar downwards trends in PTA and non-PTA trade costs in the South could be consistent with the building blocks argument, it could also be consistent with the existence of an external factor that is driving both sets of numbers. General economic liberalization in the developing world has proceeded apace during our sample period, so there might be a concern that what we are seeing is not peculiar to trade agreements, but is merely a manifestation of a general relaxation of economic interactions, which has in part translated into lower trade costs. To deal with that issue in a preliminary way, we examine the dynamics of trade costs before and after signing a South-South PTA. Figure 3 reframes the data for South-South PTAs signed during the sample period with period 0 the date of entry into force of the agreement, and a five year window on either side of that date. Results from this analysis are striking. Trade costs are relatively stable until the year before the entry into force of a PTA, and then they fall dramatically for the following five years. This descriptive evidence strongly suggests that a PTA effect is indeed in evidence: trade costs clearly fall at a vastly different rate before and after an agreement's signature. This visual pattern strongly suggests that South-South PTAs are indeed exerting some trade cost reducing effect, quite above and beyond the general trend of falling trade costs associated with broader programs of economic liberalization.

Having shown that trade costs are falling in the South, and that PTAs appear to be playing some role in that process, at least based on exploratory analysis, we can now address the question more directly of whether or not South-South PTAs are building blocks or stumbling blocks. Figure 4 shows the correlation between lagged trade costs for pairs with a PTA signed between 1996 and 2010, and current trade costs for country pairs that have never had a PTA during the sample period. There is a clear positive correlation, in line with the dynamic evidence presented above. The use of a one period lag limits simultaneity concerns somewhat, so it can be concluded that the figure provides some suggestive evidence of a building block effect in relation to South-South PTAs.

4 BUILDING BLOCKS OR STUMBLING BLOCKS?

The previous section has provided suggestive evidence on two questions: first, whether or not South-South PTAs are effective in reducing trade costs beyond what is otherwise happening in the economic environment; and second, whether or not there is an association between trade costs changes inside and outside PTAs. This section focuses in more detail on the second question, using econometric methods rather than graphical analysis and descriptive statistics. It attempts to identify a causal link between entry into a PTA and trade cost reductions for non-PTA partners, i.e. a building block effect.

The basic empirical model considered in this section is based on Estevadeordal et al. (2008), and is estimated by OLS. It relates current trade costs for country pairs that have never been in a PTA to lagged trade costs for country pairs that entered into a PTA between 1996 and 2010. Trade costs are calculated as the simple average across all trading partners at the country level.[7] As in Estevadeordal et al. (2008), we primarily rely on fixed effects to control for other factors that might be influencing trade costs, such as country specific factors like economic remoteness, use of an international language, and other factors typically taken into account in the gravity literature. The estimating equation is as follows:

[7] To avoid composition effects, all averages are calculated based on a consistent sample of country pairs for which trade costs are observed for all years from 1996-2010. That gives a total of 20,370 observations on trade costs for 65 countries.

$$(11)\ \bar{t}_{it}^{NeverPTA} = d_i + d_t + \bar{t}_{it-1}^{NewPTA} + e_{it}$$

where: i indexes countries; t indexes time; the d terms are fixed effects by country and by time period; and $\bar{t}$ is simple average trade costs, calculated as set out above. For each reporting country, the dependent variable takes the simple average of trade costs with all partners with which the reporter does not have an PTA at any point during the sample period. The independent variable, by contrast, takes the simple average of trade costs will all partners with which the reporter entered into a new PTA during the sample period. It is lagged by one period to deal with simultaneity concerns. By using narrow definitions of the two average trade costs terms, we focus on the effect of signing new PTAs, and can plausibly claim that identification is based on that source of variation

Results for the baseline model are in Table 3 column 1. The PTA trade costs variable has a positively signed coefficient that is statistically significant at the 5% level. Its magnitude suggests that a ten percentage point reduction in within-PTA trade costs is associated with a 2.45 percentage point reduction in trade costs with other (non-PTA) countries. This magnitude is nearly identical to the instrumental variables estimate of the baseline model in Estevadeordal et al. (2008), which provides some additional support for the statistical and economic importance of the result.

In terms of interpretation, this result means that inferred openness with respect to PTA partners is associated with observed openness with relation to non-PTA partners. Of course, the extent to which this effect is due to policies typically understood as related to trade depends on how far the theory underlying the trade costs measurement model is pushed. The theory interprets all changes in relative openness as being related to trade costs, understood in the broad sense of iceberg trade costs (i.e., not just tariffs). But if that assumption is relaxed, there could clearly be other factors at work. Nonetheless, the implied openness measure of trade costs is useful for policy purposes as it captures the broad range of issues included in modern trade agreements, and so provides an indication of the underlying dynamic. More detailed work using particular agreements and countries could of course be undertaken to make more explicit policy mechanisms apparent.

As in Estevadeordal et al. (2008), we unpack the PTA variable into different types of agreements, as it is plausible that they have different effects on the trade costs of non-members. We consider free trade agreements (FTAs), customs unions (CUs), and economic integration agreements (EIAs). Estavadeordal et al. (2008) find a building block effect for FTAs but not for CUs, so we expect that result to be reflected here also. Moreover, if our contention is correct that new generation trade agreements have a more significant building block effect because of the inclusion of relatively non-discriminatory issues like trade facilitation, investment, and services, we would expect to see a larger coefficient on EIAs than on FTAs.

Indeed, these results are exactly the ones we observe in columns 2-4 of Table 3. The coefficients on new FTAs and new EIAs are positive and statistically significant, but the coefficient on new CUs is not statistically significant. Moreover, the magnitude of the coefficient on the EIAs variable is considerably larger than for either PTAs in general or FTAs. This result provides support for our contention that new generation trade agreements may play a stronger building block role in relation to the multilateral system.

Lagging the independent variable by one period helps deal with concerns over simultaneity bias, but cannot be regarded as a perfect fix. In particular, it does not adequately deal with the possibility—for which there is evidence in the literature—that countries choose their PTA partners in part based on low trade costs with them. The remaining columns of Table 3 therefore consider instrumental variables strategies, so that the association presented in column 1 can be examined from a causal

angle. As an initial point of investigation, lagged PTA trade costs are instrumented with their second lag. This variable has a stronger claim to be exogenous to the model given the two year time lag, yet it should be strongly correlated with the PTA trade costs variable—the only way in which it could affect non-PTA trade costs. It therefore has a good claim to be a valid instrument.

Results from this strategy are in columns 2 and 3 of Table 3, with estimation by two stage least squares. We take the first stage results first (column 3). The instrument has a positive and 1% statistically significant coefficient, which is in line with expectations. It has a 1% significant instrument F-test, so it can safely be concluded that it is a strong instrument. In the second stage results (column 2), the lagged PTA trade costs variable retains its positive and statistically significant (10%) coefficient. Its magnitude is somewhat larger than under OLS, which suggests that simultaneity issues may have been biasing the estimate of PTA trade costs downwards.

To strengthen the claim for causality based on instrumental variables results, it is desirable to over-identify the model so that Hansen's test for a lack of correlation between the instruments and the main equation error term can be performed. To facilitate this approach, we adapt the instrumental variables strategy of Estevadeordal et al. (2008). For each reporter, we calculate the average trade costs of its PTA partners, and use that as an instrument for its own intra-PTA trade costs. By the logic of reciprocity, the instrument should be strongly correlated with the independent variable. Moreover, there is no reason to believe that the dependent variable is affected by the reporters' partners' trade costs with other countries other than through the instrumented variable.

Results from this second instrumental variables model are in columns 4 and 5 of Table 3. Estimation in this case is by GMM, to take advantage of the efficiency gains that can result from over-identification. Column 5 presents results analogous to the first stage of two stage least squares, so that instrument strength can be assessed. Both instruments have positively signed coefficients, which is in line with expectations, and they are statistically significant at the 1% level. The first stage instrument F-test strongly rejects the null hypothesis (1% level), so we can safely conclude that the instruments are individually and jointly strong.

GMM results for the main equation are in column 4. The PTA trade costs variable retains its positively signed and statistically significant coefficient, at the 5% level in this case. Its magnitude lies between the OLS and TSLS estimates. Most importantly, Hansen's J-statistic does not reject the null hypothesis (prob. = 0.757). We can therefore be confident that the instruments are both strongly correlated with the potentially endogenous variable, and genuinely exogenous to the model. Column 4 of Table 3 contains our preferred results, which we interpret causally based on the strictness of the variable definitions and the use of instrumental variables estimation: a 10 percentage point reduction in trade costs within PTAs leads to a 3.07 percentage point reduction in trade costs vis-à-vis other trading partners with which the reporting country does not have a PTA relationship.

Results thus far have been strong. However, there is still the possibility that the effects we have been seeing have been driven by some external cause that influences intra- and extra-PTA trade costs, but which is not accounted for by the model. Because of the configuration of fixed effects, such a variable would need to vary in the country-time dimension, which is a relatively strict criterion to meet.

WTO membership is one possibility: there is a small amount of variation in this indicator because the sample we are considering is composed exclusively of developing countries, some of which were not original signatories of the WTO Agreements but acceded post-1995. To examine the possibility that this may have an impact on results, we add a dummy variable for WTO membership to our

preferred GMM results in Table 3 column 4. Results in Table 4 column 1 show that a WTO effect is not driving the results we have observed here: the WTO dummy has a coefficient with the expected negative sign, but it is not statistically significant. Of course, we do not conclude that WTO membership has no impact on trade costs—simply that in this sample, where most countries are WTO members for most of the sample period, there is no discernable effect, probably due to lack of variation in the dummy variable. Importantly, though, it does not call into question our results on PTAs.

Another plausible candidate, as noted in the descriptive statistics section, is the general climate of economic liberalization that has moved through the developing world during our sample period. Skeptics could look at results in Table 3 and claim that they are simply the manifestation of general economic policies that are lowering trade costs both inside and outside PTAs, and not some particular effect of PTAs themselves.

To deal with this objection, we introduce two additional variables to capture country-time varying general economic liberalization, or the business climate. The first variable is the time taken to start a business, as per the Doing Business dataset. More liberal countries tend to have simpler and less time consuming procedures for starting businesses, so it is a plausible proxy for a country's general economic stance, including its business climate. The only disadvantage of this variable is its relatively limited temporal scope, from 2006 onwards. We therefore also consider a second variable, namely the regulatory quality index from the Worldwide Governance Indicators. Twelve observations are available on that variable over the 1996-2010 period. It summarizes a large number of indicators relating to regulatory quality, and is described as measuring perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. It too is therefore a good proxy for the general economic policy climate in a country. If that is what is driving the results, we would expect to see these two variables with statistically significant coefficients, and an effect of PTAs that is reduced or eliminated.

Results from this further sensitivity analysis are in columns 2-4 of Table 4, with estimation by GMM using the same instrumental variables as in Table 3 columns 4 and 5. In all three columns, the PTA trade costs variable retains its positive and 1% statistically significant coefficient. The time to start a business variable has a positive coefficient, as expected, but it is not statistically significant. Regulatory quality, by contrast, has an unexpected positive coefficient, but it is similarly not statistically significant. The same results hold true whether the variables are entered into the estimating equation individually or together. The conclusion we draw is that there is indeed a particular causal relationship between within-PTA trade costs and extra-PTA trade costs. This finding is consistent with the building blocks hypothesis, but could also be part of a narrative in which countries decide to open up preferentially and multilaterally at more or less the same time, using preferential agreements to develop experience that is then applied more broadly.

5 Conclusion and Directions for Future Research

Using data from 1996-2010 and considering the relationship between country pairs that enter into a PTA during that period and those that never enter into a PTA, this paper has shown that lowering trade costs within a PTA can lead to a reduction in trade costs with non-PTA countries. There are strong grounds to believe the link is causal, based on our instrumental variables estimates as well as the construction of the dependent and independent variables. Our findings sit well with the existing literature, such as Estevadeordal et al. (2008), and tend to support the building blocks view of regional integration. Moreover, we find that new generation PTAs, such as EIAs, tend to have stronger trade cost reduction effects for non-members than standard FTAs; CUs do not have any

effect at all. Based on our results, the type of agreement that developing countries sign has a significant impact on their level of trade costs vis-à-vis non-partners as well as partners.

In terms of further research, two issues stand out. The first is to provide some additional theoretical insight on why the type of PTA matters for the building blocks versus stumbling blocks argument. Estevadeordal et al. (2008) review a number of contributions supporting the view that CUs may tend to set higher tariffs for non-members than FTAs, but there has as yet been little detailed consideration of EIAs. The distinction is important, because EIAs tend to cover areas such as trade facilitation, trade in services, and investment where discrimination is less likely on a practical level, and reform efforts are often MFN in effect even if set in process by a PTA. More work on these types of broad-based preferential agreements could help elucidate the different forces at work in relation to multilateral trade costs.

Second, this paper has focused on aggregate data for the manufacturing sector. Future work could explore the possibility of disaggregation, although the need to match national accounts data with trade data to calculate trade costs raises serious problems of data coverage. Nonetheless, an expanded sample and greater variation due to the inclusion of a sectoral dimension would help identification of a causal effect, and lend greater weight to the results reported here.

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TABLES

Table 1: Data and sources.

Variable	Definition	Years	Source
Log(Entry Time_it)	Time taken to start a new business, in days.	2006-2010.	Doing Business.
$\bar{t}_{it}^{NeverPTA}$	Simple average trade costs of country pairs never in a PTA, in ad valorem equivalent terms.	1996-2010.	UNESCAP-World Bank Trade Costs Database.
$\bar{t}_{it}^{NewCU}$	Simple average trade costs of country pairs in a post-1995 Customs Union, in ad valorem equivalent terms.	1996-2010.	UNESCAP-World Bank Trade Costs Database.
$\bar{t}_{it}^{NewEIA}$	Simple average trade costs of country pairs in a post-1995 Economic Integration Agreement, in ad valorem equivalent terms.	1996-2010.	UNESCAP-World Bank Trade Costs Database.
$\bar{t}_{it}^{NewFTA}$	Simple average trade costs of country pairs in a post-1995 Free Trade Agreement, in ad valorem equivalent terms.	1996-2010.	UNESCAP-World Bank Trade Costs Database.
$\bar{t}_{it}^{NewPTA}$	Simple average trade costs of country pairs in a post-1995 PTA, in ad valorem equivalent terms.	1996-2010.	UNESCAP-World Bank Trade Costs Database.
$\bar{t}_{it}^{PartnerPTA}$	Simple average trade costs of a country's PTA partners, in ad valorem equivalent terms.	1996-2010.	UNESCAP-World Bank Trade Costs Database.
Regulatory Quality_it	Index measuring regulatory quality, i.e. perceptions of the ability of the government to formulate and implement sound policies and regulations that	1996, 1998, 2000, 2002-2010.	Worldwide Governance Indicators.

	permit and promote private sector development		
WTO Membership_it	Dummy equal to unity if a country is a member of the WTO.	1996-2010.	www.wto.org.

Table 2: Summary statistics

Variable	Observations	Mean	Std. Dev.	Min.	Max.
Log(Entry Time_it)	388	3.355	0.770	1.099	5.030
$\bar{t}_{it}^{NeverPTA}$	915	276.341	57.252	132.486	457.570
$\bar{t}_{it}^{NewCU}$	225	212.604	152.787	32.683	730.438
$\bar{t}_{it}^{NewEIA}$	345	127.046	38.381	49.610	264.638
$\bar{t}_{it}^{NewFTA}$	570	158.032	51.286	74.582	435.317
$\bar{t}_{it}^{NewPTA}$	600	174.659	77.562	75.023	471.933
$\bar{t}_{it}^{PartnerPTA}$	600	167.163	41.418	99.966	323.434
Regulatory Quality_it	790	-0.294	0.646	-2.210	1.310
WTO Membership_it	388	3.355	0.770	1.099	5.030

Table 3: Baseline regression results.

	(1) OLS $\bar{t}_{it}^{NeverPTA}$	(2) OLS $\bar{t}_{it}^{NeverPTA}$	(3) OLS $\bar{t}_{it}^{NeverPTA}$	(4) OLS $\bar{t}_{it}^{NeverPTA}$	(5) TSLS 2nd $\bar{t}_{it}^{NeverPTA}$	(6) TSLS 1st $\bar{t}_{it-1}^{NewPTA}$	(7) GMM $\bar{t}_{it}^{NeverPTA}$	(8) "GMM 1st" $\bar{t}_{it-1}^{NewPTA}$
$\bar{t}_{it-1}^{NewPTA}$	0.245**				0.356*		0.307**	
	(0.017)				(0.092)		(0.024)	
$\bar{t}_{it-1}^{NewFTA}$		0.273**						
		(0.015)						
$\bar{t}_{it-1}^{NewCU}$			0.092					
			(0.140)					
$\bar{t}_{it-1}^{NewEIA}$				0.498**				
				(0.015)				
$\bar{t}_{it-2}^{NewPTA}$						0.549***		0.491***
						(0.000)		(0.000)
$\bar{t}_{it-1}^{PartnerPTA}$								0.894***
								(0.000)
Constant	254.806***					76.294***		-51.729**
	(0.000)					(0.000)		(0.014)
N	560	518	210	308	520	520	520	520
R2	0.174	0.163	0.096	0.271	0.133	0.374	0.139	0.480
First Stage F-Test	-	-	-	-	-	84.06***	-	80.71***
Hansen's J-Statistic	-	-	-	-	-	-	0.096	-
Fixed Effects	Country, Year.	Country, Year.	Country, Year.	Country, Year.	Country, Year.	Country, Year.	Country, Year.	Country, Year.

*The dependent variable is as indicated at the top of each column, as is the estimation method. Prob. values based on robust standard errors clustered by country are reported in parentheses below the parameter estimates. Statistical significance is reported as follows: * (10%), ** (5%), and *** (1%).*

Table 4: Sensitivity analysis.

	(1) GMM $\bar{t}_{it}^{NeverRTA}$	(2) GMM $\bar{t}_{it}^{NeverRTA}$	(3) GMM $\bar{t}_{it}^{NeverRTA}$	(4) GMM $\bar{t}_{it}^{NeverRTA}$
$\bar{t}_{it-1}^{NewRTA}$	0.311**	0.269***	0.343***	0.266***
	(0.020)	(0.003)	(0.007)	(0.004)
WTO Membership	-2.018			
	(0.898)			
Log(Entry Time)		7.334		7.561
		(0.288)		(0.241)
Regulatory Quality			1.444	3.227
			(0.873)	(0.898)
N	520	230	440	230
R2	0.139	0.141	0.134	0.142
First Stage F-Test	79.10***	120.53***	63.68***	122.62***
Hansen's J-Statistic	0.093	0.318	0.181	0.310
Fixed Effects	Country, Year.	Country, Year.	Country, Year.	Country, Year.

*The dependent variable is as indicated at the top of each column, as is the estimation method. Prob. values based on robust standard errors clustered by country are reported in parentheses below the parameter estimates. Statistical significance is reported as follows: * (10%), ** (5%), and *** (1%).*

FIGURES

Figure 1: South-South trade costs with and without a PTA, 2010, percent ad valorem equivalent.

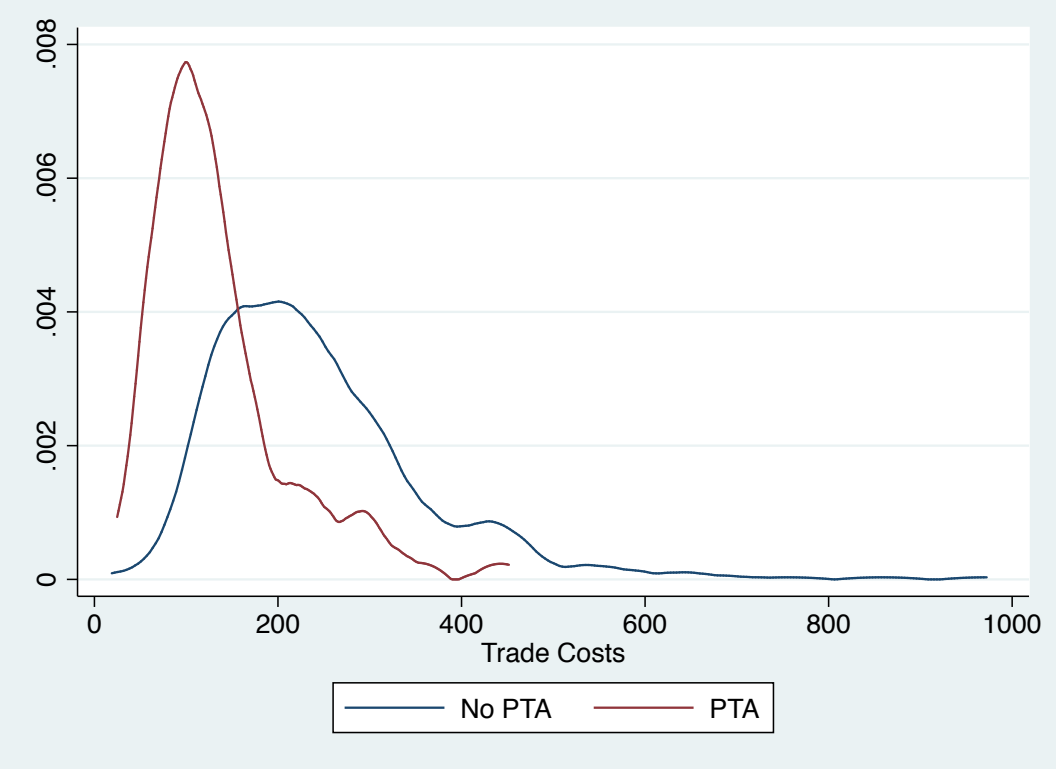

Figure 2: Trade costs for country pairs never in a PTA and country pairs with a new PTA over the 1996-2010 period, percent ad valorem equivalent.

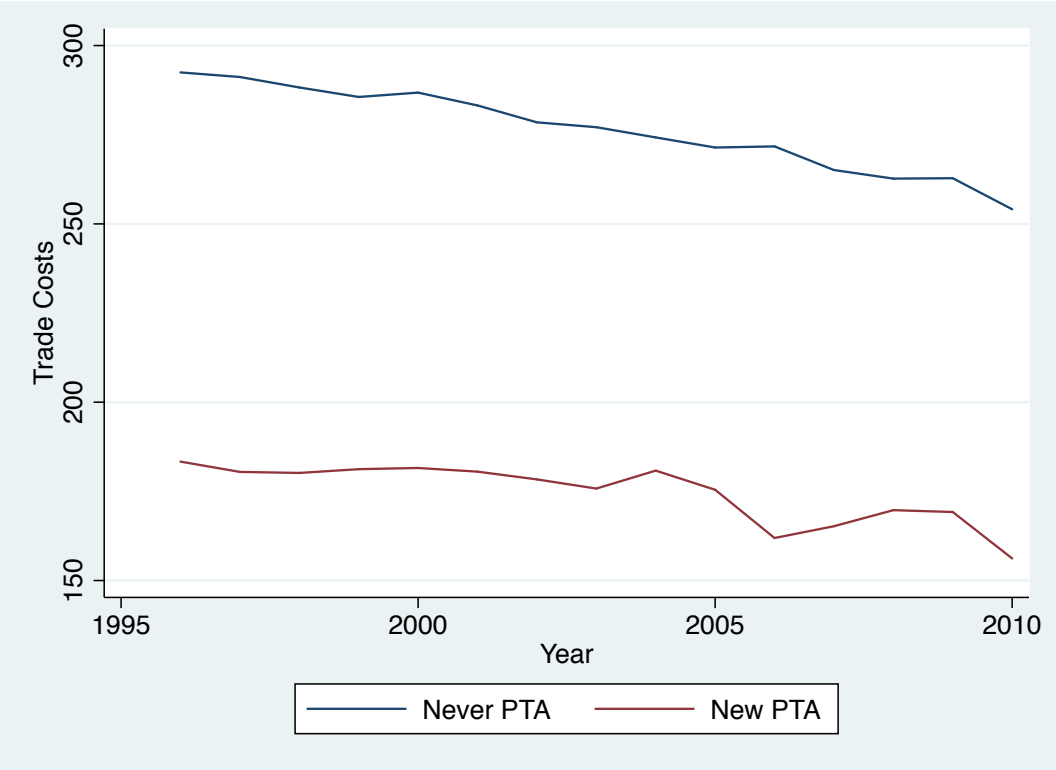

Figure 3: Dynamics of trade costs in South-South PTAs.

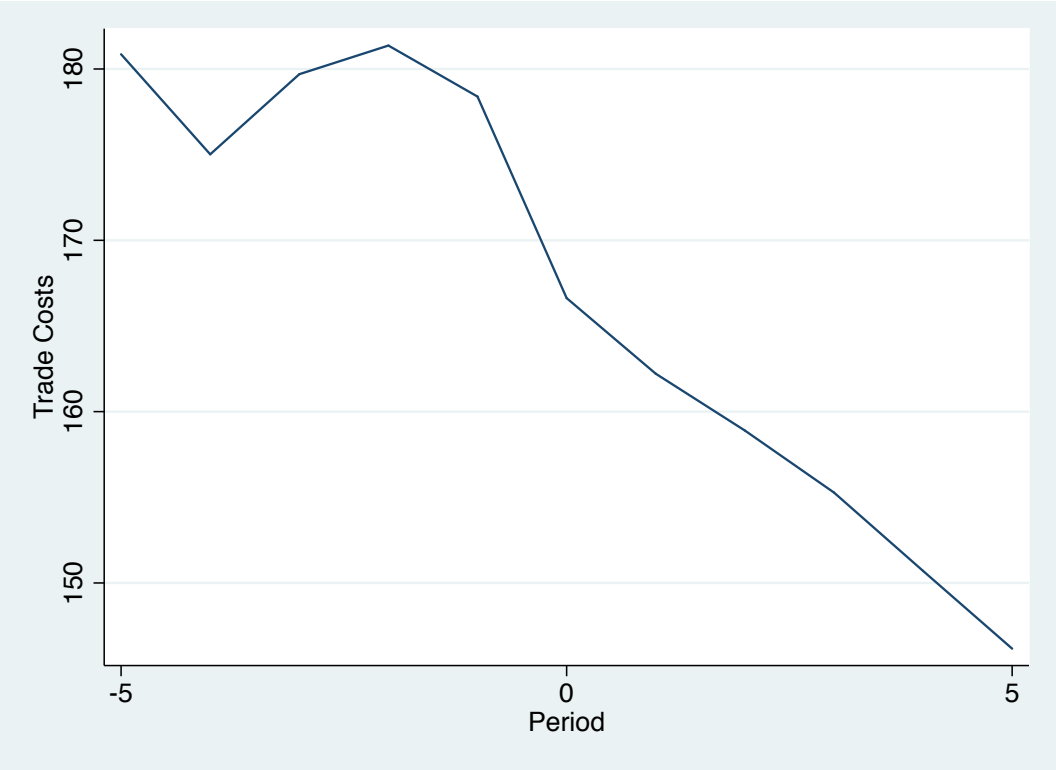

Figure 4: Lagged average trade costs for country pairs with a new PTA versus country pairs never having had a PTA, percent ad valorem equivalent.