CORRUPTION AND HETEROGENEOUS EFFECTS OF TRADE AGREEMENTS ON TRADE

by

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ABSTRACT

This study considers the effect of regional trade agreements (RTAs) on bilateral trade and allows these effects to differ depending on dissimilarities in the prevalence of corruption between importing and exporting country. Using a gravity model of trade spanning a panel of countries from 1996 to 2017, we find that RTAs increase trade more along the intensive margin when importing countries are more corrupt but boost trade more along the extensive margin when exporting countries are more corrupt. Results are stronger for trade between South-South countries than between North-South countries.

1. Introduction

Trade agreements have proliferated over the last few decades, bringing great study as to what extent these agreements have increased trade. More nuanced studies then explore why the effects of trade agreements could differ across countries or types of agreement. Kohl (2014) considers the effects of specific provisions within a trade agreement. Other studies such as Vicard (2011), Cheong et al. (2015), and Baier et al. (2018) interact the trade agreement variables with characteristics purported to influence the effect that trade agreements have on trade, examining to what extent characteristics of the country or of the trading pair matter for how trade agreements affect trade.

In this study, we follow the latter approach and allow the effect of a trade agreement to depend on the corruption difference between exporter and importer. The question behind this approach is whether trade agreements are more or less effective when such institutional variables greatly differ. Such differences could create more uncertainty that limits the potential for trade even if a trade agreement lowers barriers, implying that such agreements will have less effect at promoting trade. On the other hand, trade agreements could be most effective at increasing trade in such disparate countries. Not only might trade agreements

remove barriers used by corrupt officials to extort firms, but a trade agreement could provide more certainty when operating in a different business environment by codifying various arrangements and stipulations.

We employ a gravity model and consider a sample of countries from 1997 to 2017. We regress imports on a trade agreement dummy and its interaction with a measure of corruption distance, namely the difference in the corruption score from the World Governance Indicator's Control of Corruption Index. A significant coefficient on this interaction term would imply that differences in the prevalence of corruption influence to what extent trade agreements boost trade.

To the best of our knowledge, only Gil-Pareja et al. (2017) consider how differences in corruption levels between exporter and importer influence the impact a trade agreement has upon trade. However, our study differs from theirs in many important ways. Methodologically, Gil-Pareja et al. (2017) do not include multilateral resistance terms, components argued as crucial by Anderson and van Wincoop (2003). More importantly, we allow corruption difference to matter for trade agreements in several ways. For one, we allow these influences to differ depending on whether the exporter or importer is more corrupt. We also allow effects to differ on the intensive margin relative to the extensive one.

Finally, we allow effects to differ in South-South [S-S] as opposed to [S-N] trade.[1] The recent growth of S-S trade – that is, trade among lower middle and low income countries – has increased the importance of this type of trade. These countries have also entered trade agreements with each other, agreements that do not include high income countries. As a result, researchers also increased their attention of South-South relations and, specifically, the effectiveness of trade agreements signed between southern partners in promoting trade. See,

[1] We are less interested in looking at North-North agreements due to the lesser variation of corruption ratings across high income countries.

for example, Fugazza and Vanzetti (2008), Mayda and Steinberg (2009), and Behar and Criville (2013).

We explain below why each of these distinctions (whether exporter or importer is more corrupt, extensive versus intensive margin, and S-S versus S-N) could be relevant and so why the specification in Gil-Pareja et al. (2017) could be masking important nuances of how corruption distance affects trade agreement effectiveness.

Our methodological approach is similar to Baier et al. (2018) who consider how various "distances" between exporter and importer (both literal and figurative) impact intensive and extensive margins of trade. An important distinction, however, is again our more nuanced approach. In our approach, distance could be asymmetric in that it matters whether the exporter or importer is the more corrupt country.

We find that corruption distance influences the effectiveness of trade agreements but mainly for S-S trade, not for S-N trade. Agreements are more effective at raising trade along the intensive margin when exporters are more corrupt. On the other hand, they more greatly raise trade along the extensive margin when importers are more corrupt.

The rest of the paper is organized as follows. Section two provides a brief literature review and also further discusses why we allow effects to differ across so many different dimensions. Section three describes the empirical methodology and section 4 presents results. A short conclusion then follows.

2. Background

This section first briefly describes the literature surrounding the various facets of our examination. The section then provides motivating discussion for the why the empirical methodology allows the associations to differ along these facets.

2.1 Impact of Trade Agreements on Trade

The extent to which trade agreements promote trade has been a longstanding question, going back to such studies as Tinbergen (1962), Bergstrand (1985), and Frankel et al. (1995). These earlier studies found little evidence that such agreements promote trade. However, later studies such as Baier and Bergstrand (2007) and Anderson and Yotov (2016) found stronger effects. One possible reason for these more positive findings is the more appropriate empirical specifications employed, such as incorporating multilateral resistance terms and bilateral fixed effects into the model. Another possibility are differences in sample, especially the inclusion of more recent windows in later studies. A third possibility is that the effects of trade agreements depend on specific provisions within the agreement. Kohl (2014) provides an example examining this explanation as he constructs indices capturing specific items within agreements. Florensa et al. (2015) found that the degree of integration and institutional quality found within agreements matters for how trade agreements within Latin America impact trade.

A fourth possibility and the one we consider in this paper is the potential for trade agreements to impact trade differently depending on the presence of other characteristics such as physical distance between trading partners or metaphorical types of distance such as culture or language. Vicard (2011) investigates interactions of numerous economic variables with RTA dummies. Cheong et al. (2015) examine if the effects of trade agreements vary depending on the similarity of GDP and per capita income between the two trading partners. Baier et al. (2018) explore the heterogeneous effect of RTA's on trade using a set of bilateral characteristics such as distance, contiguity, and common language and interacting these bilateral variables with a trade agreement dummy.[2]

[2] Baier et al. (2019) take a different approach. They first obtain coefficients on RTA variables from a standard gravity model for different trading partners for the period 1986–2006. They then regress these estimates on various covariates in a "second stage" regression. They find that effects of RTAs are smaller for more distant pairs, partners that previously were in the same trade agreement and those with higher trade

Our paper continues this approach of examining why the effects of trade agreements could differ but considers differences in corruption between trading partners as a potential explanation.

2.2 Influence of Corruption Differences on the Effectiveness of Trade Agreements

Several studies examine the effect of corruption on trade, including Dutt and Traca (2010), Gil-Pareja et al. (2017), Anderson and van Wincoop (2003), De Jong and Bogmans (2011), and Baier and Begstand (2009). Many of these studies also find a positive effect of corruption on trade, suggesting that corruption is a way that firms can "grease the wheels" and avoid costly bureaucratic obstacles. This paper does not focus on how corruption impacts trade by itself but rather to what extent corruption could impact the effect of an RTA on promoting trade. More specifically, we examine to what extent differences in the prevalence of corruption between exporter and importer influence how an RTA affects trade. To the best of our knowledge, only Gil-Pareja et al. (2017) consider how differences in corruption between the importer and exporter affect trade.[3] However, our study greatly differs from theirs. First, we focus on S-S trade. Second, our model specification contains multilateral resistance terms as well as other approaches that are more commonly employed in examining gravity models. Third, we allow the influence that corruption distance has on trade to depend on whether the importer or exporter is more corrupt (at least according to the World Bank measure of corruption). Finally, we not only examine the effect on total trade but also their effects on extensive and intensive margins. Are the effects primarily felt by

frictions prior to forming the RTA. Country level institutional variables (such as each country's rule of law, the degree of democracy, etc.) along with factor endowment levels are found to be useful predictors of the heterogeneous effects across different agreements but do not play an important role in explaining differences that occur within the same agreement but for different partners.

[3] Other studies examine how corruption distance affects foreign direct investment [Qian and Sandoval-Hernandez (2016), Godinez and Liu (2014)].

increasing trade of existing goods (intensive margin) or increasing the variety of goods (extensive margin)?

2.3 South-South Trade

South-South trade [S-S] greatly increased at the beginning of the 21st century, increasing from 11.1% of all global trade in 2000 to 21.4% in 2016 (WTO, 2018). By 2011, southern countries' exports to other southern nations surpassed its exports to northern countries, reaching 52% of its total exports in 2018 (WTO, 2019).

Given this expansion, researchers paid more attention to the effectiveness of RTAs for S-S trade. Fugazza and Vanzetti (2008) argue that that the lack of trade agreements with other developing nations represent a "missed opportunity" for southern countries that instead focus on trade liberalization with northern partners. Behar and Criville (2013) report that S-S agreements are more effective in promoting trade than are S-N agreements. Mayda and Steinberg (2009) consider the Common Market for Eastern and Southern Africa agreement. Although they did not find an increase in Uganda's total imports from southern countries, imports did increase in specific sectors. Others are less optimistic. Schiff (1996), argues that due to small size and similar production structures, gains from S-S trade are small. Venables (2003) even argues that some southern economies lacking comparative advantage in manufacturing can experience trade-diversion as a result of being a member of an RTA with southern partners. Venables (2003) and Puga and Venables (1998) conclude that southern countries are better off signing agreements with northern partners.

2.4 Questions

This study contributes to the aforementioned studies by examining to what extent RTAs promote trade. However, we allow this effect on trade to differ along several dimensions and the following discussion highlights these facets.

i) Why do differences in corruption influence the effectiveness of RTAs?

In this paper we ask a following question: does RTAs impact trade differently when partners have different degrees of corruption? Countries where corruption is less prevalent could hesitate to participate in markets of countries where corruption is common. On the other hand, if bribes are useful to grease the wheels of trade then perhaps firms in high corruption countries would be less willing to enter into markets with large amounts of red tape and little ability to circumvent such obstacles. In either case, dissimilarities as to how firms do business impact to what extent firms want to participate in specific markets and so could influence the effectiveness of RTAs in boosting trade. In this context, such differences between countries serve as another type of distance – such as physical distance, cultural distance, etc. – that others have examined when considering the effectiveness of trade agreements. However, how such distinctions in the prevalence of corruption matter for the effectiveness of RTAs is not clear. RTAs could be less effective at promoting trade where such dissimilarities exist because these dissimilarities in corruption lower the potential for trade even with an RTA. On the other hand, an RTA could be most effective at promoting trade under such dissimilarities because the stipulations within the RTA could lower barriers that had been used by predatory bureaucrats to extort firms. In these cases, the RTA lowers the opportunity for corruption (at least in areas relevant for the firm) and so contributes to trade.

ii) Why does it matter what country is more corrupt: the exporter or the importer?

Corruption differences could be more relevant when importing countries are more corrupt as potential sellers could shy away from such markets. On the other hand, if exporting countries are more corrupt, firms buying inputs from these countries could be more averse to relying on suppliers from corrupt marketplaces to provide these inputs in a timely manner. In both cases, corruption differences dissuade trade (but we don't find it to be significant in the results). Whether the RTA is more or less successful in such cases depends on the discussion above. However, regardless of the answer to this first question, no requirement arises that the imposition of the RTA should provide the same effect in these two cases. This examination will consider to what extent such possibly asymmetries arise.

iii) Why could results differ along the intensive versus the extensive margin?

An increase in trade along the intensive margin increases trade in goods and services that were already traded between the two countries. An increase in trade along the extensive margin constitutes trade in goods that were not traded before. Presumably, trade along the intensive margin has already paid fixed costs associated with establishing contacts in new markets, complying with government regulations including obtaining various licenses and permits, and tailoring a promotional campaign towards the target country. Such costs still must be paid in order to increase trade along the extensive margin.

Therefore, increasing trade along the extensive margin exerts greater costs, some of which might be associated with corruption such as paying a bribe to acquire a license (although some of these costs such as creating a promotional campaign might not be tied to corruption). Given these greater costs, differences in corruption could be more relevant for the extensive margin although once again, whether these differences increase or decrease the effectiveness of trade agreements is a priori unclear.

iv) Why might results differ between S-S trade and S-N trade?

Finally, we allow effects to differ between S-S and S-N trade. Countries partnering in S-N trade could be trading more heterogenous products. Moreover, the recent growth of S-S trade suggests that these trading arrangements are newer and so results could differ from cases where trading arrangements have pre-existed for a longer time such as with S-N trade.[4] Additionally, studies like Cheong et al. (2018) find that tariffs imposed by northern nations tend to be smaller on average than tariffs imposed by southern nations. Thus, a trade agreement signed between southern nations has a greater potential to lower tariff rates thereby impacting trade.

To consider the above issues, we create a gravity model where we interact an RTA dummy with a variable capturing the difference in corruption scores between the importing and exporting countries. This is not the first study to consider corruption distance under a gravity model framework. Gil-Pareja et al. (2017) use the square of the difference in corruption scores between two countries to assess the impact of liberalization on the relationship between corruption and trade. However, the paper does not include the multilateral resistance terms highlighted as necessary by Anderson and van Wincoop (2003). More importantly, Gil-Pareja et al. (2017) also do not allow results to differ between the intensive and extensive margins or between whether corruption is more prevalent in the exporting or importing country.

[4] We do not consider N-N trade as corruption levels are more similar for these countries, thereby limiting the amount of variation in the sample.

3. Methodology

3.1 The Model

We begin with a gravity model using a panel of country-year observations. Similar models are employed in Baier and Bergstrand (2007) [BB], Anderson and Yotov (2011), Head and Mayer (2014), and Eicher et al. (2012). The general form is:

$$\ln(M_{ijt}) = \alpha + \beta_1 \mathrm{RTA}_{\mathrm{ijt}} + \beta_2 \mathrm{RTA}_{\mathrm{ijt}} \times \mathrm{Z}_{\mathrm{ij}} + F_{it} + F_{jt} + F_{ij} + \varepsilon_{ijt} \quad (1)$$

where M_{ijt} denotes total bilateral imports by importer *i* from exporter *j* in year *t*. We will later replace total imports with variables denoting imports of *i* from *j* on the extensive margin or intensive margin, respectively. An increase along the extensive margin would indicate the trade of new products from *j* to *i* whereas an increase along the intensive margin denotes more trade of existing products. We show below how we calculate extensive and intensive margins.

RTA is a dummy variable that takes the value one if two countries are in the same agreement, and zero otherwise. We do not distinguish between various types of RTA's although we acknowledge that RTA's comprise a broad spectrum of agreements that include one-way preferential trade agreements, two-way preferential trade agreements, free trade agreements, customs unions, common markets, and economic unions. Unfortunately, the data set we use to identify trade agreements does not classify agreements by all of these different types.

We include bilateral time-invariant dummy variables (F_{ij}) as suggested by BB to account for the general level of trade costs between *i* and *j*, as well as to tackle endogeneity issues associated with the *RTA* variable. As a result, we omit trade cost variables that do not vary over time (geographic distance, contiguity, common language and colonial ties) that

otherwise would be perfectly collinear with bilateral fixed effects. F_{it} and F_{jt} are importer-time and exporter -time fixed effects, respectively, capturing time-varying variables including exporter and importer GDP's, the level of j's exports to the world as well as all other time-varying country-specific variables that cannot be observed directly but influence trade, including the importer's and exporter's "multilateral trade resistance" (MTR) terms. Anderson and van Wincoop (2003) note that a failure to account for the presence of MTR terms can bias estimation. They show that bilateral trade is determined by relative trade costs and not simply by the absolute trade costs between countries i and j.[5]

In this paper, we extend (1) to allow for differential impacts of RTA's on trade depending on the corruption distance between *i* and *j*. Let COR_{it} denote the corruption score of importing country *i* and let COR_{jt} denote the corruption score of the exporter, *j*. Then, let $CORD\_IM_{ijt} = COR_{it} - CORj_t$ if $COR_{it} > CORj_t$ and zero otherwise whereas $CORD\_EX_{ijt} = COR_{jt} - CORi_t$ if $COR_{it} < CORj_t$ and zero otherwise. In other words, $CORD\_EX_{ijt}$ denotes the difference in corruption scores when the exporter is more corrupt and $CORD\_IM_{ijt}$ denotes the difference in corruption scores when the importer is more corrupt. The model becomes:

$$\ln(M_{ijt}) = \alpha + \beta_1 \mathrm{RTA}_{\mathrm{ijt}} + \beta_2 CORD\_IM_{ijt} + \beta_3 CORD\_EX_{ijt} + \beta_4 \mathrm{RTA}_{\mathrm{ijt}} \bullet CORD\_IM_{ijt} + \\ + \beta_5 \mathrm{RTA}_{\mathrm{ijt}} \bullet CORD\_EX_{ijt} + F_{it} + F_{jt} + F_{ij} + \varepsilon_{ijt} \qquad (2)$$

If β_4 or β_5 differs from zero, some aspect of corruption difference matters for how RTAs impact trade. If $\beta_4 \neq \beta_5$, then whether the importer or exporter is more corrupt matters for how corruption impacts the influence of an RTA on trade.

[5] For instance, the propensity of importer *i* to import goods from country *j* depends on the trade cost between *i* and *j* relative to the overall cost associated with country *i*'s imports from all of *i*'s other trading partners as well as the average cost that exporters face when exporting their goods to country *i*. In general, that means that two countries that are relatively close to each other but at the same time isolated from the rest of the world will trade more than two nearby countries that are surrounded by many other potential trading partners.

Following Baier et al. (2018), we estimate (2) using Ordinary Least Squares [OLS] instead of by a nonlinear alternative such as PPML since the natural logarithm of total trade is the sum of the natural logarithms of the extensive and intensive margins (plus the natural log of j's total exports) as shown by (6) below.

We will later include additional interaction terms in (2) that capture other types of distance such as physical distance. Suppose neighboring countries with similar histories have similar levels of corruption. If so, then corruption difference would be associated with physical distance, making it less clear what is driving the coefficient estimates on the variables of interest. Including such alternative types of distance in the model will help to address this concern. We acknowledge, however, that other types of governing or political distance is not included since they are highly correlated with corruption distance.

3.2 Extensive and Intensive Margins

We follow the Baier et al. (2018) approach of applying the Hummels and Klenow (2005) [HK] trade–margin–decomposition methodology using 4-digit SITC data for goods categories. A similar application also appears in Baier et al. (2014).

Imports of *i* from *j* in year *t* on the extensive margin [EM] is calculated as:

$$EM_{ijt} = \frac{\sum_{m \in M_{ijt}} X_{wjt}^{m}}{\sum_{m \in M_{wjt}} X_{wjt}^{m}} \tag{3}$$

where X_{wjt}^{m} is the value of country *j*'s exports to the world in product *m* in year *t*, M_{wjt} is the set of all products imported by the world from *j* in year *t*, and M_{ijt} is the subset of all products imported by *i* from *j* in year *t*. Hence, EM_{ijt} is a measure of the fraction of all products that are imported by *i* from *j* in year *t*, where each product is weighted by the

importance of that product in world imports from *j* in year *t*. For example, suppose EM_{ijt} = 0.4. This signifies that 40% of what *j* exports consists of products that are exported to some extent to country *i*. Note, however, that a value of 0.4 does not mean that 40% of *j*'s exports go to *i*. Of course, this means that 60% of *j*'s exports consists of products that none of which go to country *i*.

The intensive margin [IM] is calculated as:

$$IM_{ijt} = \frac{\sum_{m \in M_{ijt}} X_{ijt}^{m}}{\sum_{m \in M_{ijt}} X_{wjt}^{m}} \tag{4}$$

where X_{ijt}^{m} is the value of i's imports from *j* in product *m* in year *t*, X_{wjt}^{m} is the value of country j's exports to the world in product *m* in year *t*, and M_{ijt} is the set of all products imported by *i* from *j* in year *t*. Thus, IM_{ijt} represents the market share of country *i* in country *j*'s exports to the world within the set of products that *i* imports from *j* in year *t*. A value of IM_{ijt} equal to 0.4 denotes that what *j* exports to *i* constitutes 40% of *j*'s total exports of these same products.

One important property that this decomposition methodology has is:

$$EM_{ijt} IM_{ijt} = \frac{\sum_{m \in M_{ijt}} X_{ijt}^{m}}{\sum_{m \in M_{wjt}} X_{wjt}^{m}} = \frac{X_{ijt}}{X_{jt}} \tag{5}$$

where X_{jt} denotes *j*'s exports to the world. Taking the natural logs of (5) and then rearranging yields the following equation:

$$\ln X_{ijt} = \ln EM_{ijt} + \ln IM_{ijt} + \ln X_{jt} \tag{6}$$

That is, trade flows from j to i equals the sum of the extensive margin, the intensive margin and the value (taken as a natural logarithm) of j's exports to the world. The term $\ln X_{jt}$ will be subsumed in (2) within the exporter-time fixed effect, F_{jt}.

3.3 Data

Our panel data set covers 96 countries in the "South" category and 103 countries in the "North" category. An appendix lists the countries in each group. South contains low and lower middle-income countries and North contains high and upper middle-income countries using the World Bank Income Classification. Control of Corruption data comes from the World Bank's World Governance Indicators [WGI] database. Since WGI begins in 1996, our panel extends from 1996 to 2017. The panel is arranged by country-pair and year. The list of RTA's including what countries comprise the RTA is taken from Mario Larch's Regional Trade Agreements Database.

To calculate the extensive and intensive margins, bilateral trade data classified according to the 4-digit Standard Industrial Trade Classification (SITC), Revision 2 is from the United Nations' Commodity Trade Statistics Database (COMTRADE). Variables such as geographical distance, contiguity, common language and colonial ties (which we will consider as robustness checks) are taken from CEPII's Trade.

4. Results

4.1 Baseline regression results for South-South trade partners

We first examine S-S trade in Table 1. Columns (1) – (3) consider total trade, columns (4) – (6), consider trade along the intensive margin, and columns (7) – (9) consider trade along the extensive margin. The first column for each of these triads provides a baseline regression where we do not include any of the corruption variables. The coefficient on *RTA*

is small and insignificant in column (1) but this likely arises because of offsetting effects in (4) and (7). RTAs increase trade along the intensive margin but decrease it along the extensive margin. The negative impact on the extensive margin is surprising. However, other studies also report negative coefficients along the extensive margin when including more recent periods (as we do) in the sample. Florenca (2015) found that for 1962–2009 the effect of shallower trade agreements (NRRTAs and RTAs) signed among countries in Latin America is negative for the extensive margin. As Florenca (2015) explains, the negative effect on the extensive margin could be due to the RTA's removal of subsidies by exporting countries. They then no longer export products in which the importer has comparative advantage thereby decreasing the number of varieties sent from *j* to *i*. Spilker et al. (2018) also find negative effects for some industries examining the 2008-2014 period.

Columns (2), (5), and (8) then add the corruption distance variables. Columns (3), (6), and (9) include other interaction terms comprising *RTA* such as the natural log of physical distance, whether the two countries are contiguous, whether they speak a common language, and whether they have a similar colonial history. As stated these variables control for other types of distances or differences that corruption distance might be capturing. Since the coefficients on the corruption distance and RTA interaction terms remain robust to their inclusion, we focus discussion on the simpler specifications in (2), (5), and (8). Additionally, in section 4.2, we control for political distance and other institutional differences to see if corruption distance remains significant in the presence of these variables.

From column (2), the coefficients on both interaction terms are positive and significant. The creation of an RTA agreement increases trade more substantially when differences in corruption are vast between the two countries, suggestion that RTAs more greatly increase trade for distinct – at least as measured by corruption scores -- countries. However, columns (5) and (8) show that the underlying story differs across cases. Along the

intensive margin, RTAs more greatly raise trade when the exporting country is more corrupt. On the other hand, along the extensive margin RTAs are more effective at boosting trade when the importing country is more corrupt.

How can one explain these differing coefficients on the interaction terms? First, consider trade along the extensive margin when the importing country is more corrupt. Corruption in the importing country acts as a barrier that undermines potential for trade. This barrier is especially strong for firms in exporting countries that have lower corruption levels and so have little experience dealing with it. The higher relative corruption levels in destination countries discourage trade. Given this backdrop, an RTA can remove regulatory obstacles that had been used by predatory officials to extort bribes. With less ability to extort exporting firms, more firms export into *i*. Therefore, along the extensive margin RTAs raise trade more when corruption is high in the importing country relative to the exporting country.

However, results are weaker along the intensive margin when the importing country is more corrupt. The presence of trade obstacles and their potential abuse by predatory officials could have been lowering trade but was not preventing it. The removal of trade barriers still boosts trade along the intensive margin given the positive value for β_1 but this positive impact on trade is not stronger when importing countries are more corrupt. In short, for goods that were traded before despite corruption, the elimination of tools used by corrupt officials to extort firms will have less of a beneficial effect.

What about the case when the exporter is more corrupt? As shown in Table 1, the coefficient on the interaction term is not significant nor large in magnitude for the extensive margin, suggesting that the RTA's removal of any regulatory obstacle that acts as a trade barrier does not further increase trade when the exporter is more corrupt. Either trade barriers in the exporting country are being less abused by predatory officials to extort firms (possibly because of fewer predatory officials) or newer exporting firms know how to circumvent them

due to their experience with corrupt officials in their home country. Either way, the RTA's removal of these trade barriers has a lesser effect at boosting trade. Therefore, an RTA that reduces subsides for exporting firms could then lower trade as j exports fewer products to i and this effect is negligibly offset (if at all) from the importing country due to its relatively low levels of corruption compared to exporting country.

The most difficult case to explain is the positive coefficient on the interactive term for the intensive margin when the exporter is more corrupt. As discussed in the preceding paragraph, the presence of larger degrees of corruption in the exporting country does not influence the impact of the RTA on trade along the extensive margin so why does it appear to do so along the intensive margin? One possibility is that the removal of subsidies described above could reallocate trade. Although *j* exports fewer types of products to *i* (thereby leading to the decline on the extensive margin described above), quantities of remaining exports to *i* could increase in magnitude, thereby creating an increase on the intensive margin. This reallocation effect along the intensive margin is smaller when the importing country is more corrupt (this case is insignificant along the IM) because trade is less reduced along the extensive margin after the RTA.

Table 2 provides the magnitudes for different levels of corruption. Our findings in column 1 of Table 2 indicate that groups of countries linked through an RTA see trade decrease with $e^{-0.153}$-1=-14.2 per cent compared to those without an RTA (when both types of corruption distance are held at zero). Given that either exporter or importer is more corrupt, the effect of RTA on total trade can become positive and equal to 57.2 and 64.1 per cent respectively (if both types of corruption distance are taken at the maximum value of 2.69). Two countries with no corruption distance signing an RTA can expect a 16.3 per cent increase in trade along the intensive margin, and a 26.2 per cent decrease in trade along the extensive margin (for reasons discussed above). At the same time, two countries with more

corrupt exporter entering an agreement have a potential to boost trade on the intensive margin of 58.9%. Furthermore, if a country signs a trade agreement with a more corrupt importer, the RTA has a potential to raise trade on the extensive margin up to 37%.

We consider the other interaction terms in columns (3), (6), and (9). Our findings suggest that greater distance raises trade costs, tending to lower effectiveness of RTA's on both intensive and extensive margins. The interaction terms with the colonial dummy and a dummy for contiguity are negative and significant for the intensive margin, suggesting that pre-established colonial relationships and common borders make it harder to benefit from RTA's. The interaction of RTA with the language dummy is negative for the extensive margin, suggesting that for two countries that have common language it is harder to realize benefits from participating in the agreement.

4.2 Robustness check for South-South trading partners

One concern is that the corruption distance variables are picking up other types of institutional or political differences. To address this concern, we include other variables that might capture institutional distance along with our corruption distance measures. Column 1, 4, and 7 in Table 3 repeat baseline results of Table 1 (column 1, 4, 7) for both total trade, intensive margin, and extensive margin accordingly. Column 2, 5, and 8 of Table 3 repeat the same specification used in column 1, 4, and 7 of Table 3 only now accounting for the distance in other governance indicators, such as: Voice and Accountability Estimate (VAE), Political Stability and Absence of Violence Estimate (PVE), Government Effectiveness Estimate (GEE), Regulatory Quality Estimate (RQE), and Rule of Law Estimate (RLE). The results remain significant even in the presence of distance in other governance indicators with magnitudes of our main variables of interest (RTA*COR_DIST_EX and RTA*COR_DIST_IM) slightly increasing in the case when exporter is more corrupt and

decreasing (or staying the same) in the case when importer is more corrupt. Additionally, as shown in Column 3, 6, and 9 of Table 3, corruption distance variables remain robust to the inclusion of the political distance estimates calculated as the distance in terms of POLITY IV scores between the two countries.

4.3 Regression results for South-North trading partners

Finally, let's consider results for S-N partners. In table 4 most of the coefficient estimates on the corruption distance-RTA interaction terms are smaller in magnitude than are their counterparts in Table 1 and not statistically significant. Corruption distance matters for whether trade agreements can boost trade among S-S countries but not for S-N trade.

5. Conclusion

This study contributes to the literature showing the multifaceted effects of RTAs on trade. We consider that differences in corruption levels across countries provide one source of this heterogeneity. However, even this distinction does not uniformly apply. Results appear more relevant for S-S trade than for S-N trade. Of course, this finding is of increasing relevance as S-S trade becomes more prevalent and as more emerging market countries enter into trade agreements with one another. We also find that results differ between extensive and intensive margins. RTAs are more effective at increasing trade along the intensive margin when exporters are more corrupt. However, these same agreements more greatly increase trade along the extensive margin when importers are more corrupt.

More generally, these results hold strong implications for what particular aspects of a country's trade will be affected by trade agreements given it institutional environment. For example, a country – call it country k – that enters into a trade agreement with a partner where corruption is more prevalent is likely to see growth of its existing imports. On the

other hand, when k enters into agreements with countries that are less corrupt than k, then k's is likely to see an inflow of new products. Such results can fine tune predictions about how specific sectors of a country will be impacted, making it easier to design policies to compensate losers from free trade arrangements or to know what industries might expand or contract.

Moreover, a reform to an economic system does not occur in a vacuum. Our results imply that campaigns to clamp down on corruption (or for that matter developments that lead to corruption becoming more prevalent) can also influence the effects of trade agreements.

Appendix

Tables A1 and A2 classifies countries into South and North groups.

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Table 1 – Regression Results for South-South Trading Partners

	Total Trade			Intensive Margin			Extensive Margin		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
RTA	-0.001 (0.044)	-0.153 (0.054)***	1.899 (0.375)***	0.198 (0.044)***	0.151 (0.054)***	3.721 (0.382)***	-0.199 (0.039)***	-0.304 (0.049)***	-1.822 (0.332)***
COR_DIST_EX	-	-0.124 (0.081)	-0.115 (0.081)	-	-0.012 (0.085)	0.002 (0.085)	-	-0.112 (0.083)	-0.117 (0.083)
RTA*COR_DIST_EX	-	0.225 (0.06)***	0.225 (0.06)***	-	0.116 (0.063)*	0.147 (0.062)**	-	0.109 (0.063)*	0.078 (0.063)
RTA*COR_DIST_IM	-	0.241 (0.064)***	0.231 (0.064)***	-	0.011 (0.066)	0.024 (0.066)	-	0.23 (0.062)***	0.207 (0.062)***
RTA*Ln(DIST)	-	-	-0.237 (0.045)***	-	-	-0.432 (0.046)***	-	-	0.195 (0.04)***
RTA*COLONY	-	-	-0.756 (0.143)***	-	-	-0.273 (0.145)*	-	-	-0.483 (0.146)***
RTA*LANG	-	-	-0.334 (0.124)***	-	-	-0.184 (0.121)	-	-	-0.15 (0.107)
RTA*CONTIG	-	-	-0.655 (0.14)***	-	-	-0.448 (0.131)***	-	-	-0.207 (0.121)*
Exporter-Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Importer-Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Pair	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	97652	97620	97620	97652	97,620	97,620	97652	97,620	97,620
R-squared	0.8476	0.8476	0.8477	0.6787	0.6785	0.6788	0.7484	0.7485	0.7486

Table 2 –Magnitudes from South-South Regressions

Effect of RTA at:	Total Trade (column 2)	Intensive Margin (column 5)	Extensive Margin (column 8)
$CD^{ex} = CD^{im} = 0$	-14.2%	16.3%	-26.2%
$CD^{ex} = 0.39$ (St.Dev.**), $CD^{im} = 0$	-6.3%	21.7%	-23.0%
$CD^{ex} = 0$, $CD^{im} = 0.37$ (St.Dev.**)	-6.2%	16.8%	-19.7%
$CD^{ex} = 2.69$ (Max.***), $CD^{im} = 0$	57.2%	58.9%	-1.1%
$CD^{ex} = 0$, $CD^{im} = 2.69$ (Max.***)	64.1%	19.8%	37.0%

Note: CD^{ex} denotes corruption distance when exporter is more corrupt, while CD^{im} denotes corruption distance when importer is more corrupt.
* coefficient is not significant.
** St. Dev – stands for standard deviation
*** Max. – stands for maximum value of corruption distance.

Table 3 – Robustness Check

	Total Trade			Intensive Margin			Extensive Margin		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
RTA	-0.153 (0.054)***	-0.088 (0.067)	-0.154 (0.059)**	0.151 (0.054)***	0.155 (0.067)**	0.16 (0.06)***	-0.304 (0.049)***	-0.244 (0.064)***	-0.313 (0.055)***
COR_DIST_IM	-0.124 (0.081)	-0.133 (0.089)	-0.139 (0.086)	-0.012 (0.085)	0.042 (0.094)	-0.028 (0.09)	-0.112 (0.083)	-0.173 (0.092)*	-0.111 (0.087)
VAE_DIST_IM	-	0.068 (0.061)	-	-	0.062 (0.063)	-	-	0.006 (0.062)	-
PVE_DIST_IM	-	-0.005 (0.042)	-	-	-0.043 (0.043)	-	-	0.039 (0.043)	-
GEE_DIST_IM	-	0.103 (0.088)	-	-	-0.079 (0.092)	-	-	0.18 (0.091)	-
RQE_DIST_IM	-	-0.261 (0.084)***	-	-	-0.097 (0.088)	-	-	-0.165 (0.086)*	-
RLE_DIST_IM	-	0.07 (0.091)	-	-	-0.067 (0.095)	-	-	0.136 (0.093)	-
POL_DIST_IM	-	-	0.011 (0.006)*	-	-	0.024 (0.006)***	-	-	-0.013 (0.006)**
RTA*COR_DIST_EX	0.225 (0.06)***	0.356 (0.084)***	0.24 (0.063)***	0.116 (0.063)*	0.231 (0.087)***	0.168 (0.065)**	0.109 (0.063)*	0.123 (0.089)	0.072 (0.066)
RTA*COR_DIST_IM	0.241 (0.064)***	0.197 (0.084)**	0.195 (0.065)**	0.011 (0.066)	-0.044 (0.086)	-0.046 (0.067)	0.23 (0.062)***	0.241 (0.085)***	0.241 (0.063)***
RTA*VAE_DIST_IM	-	-0.033 (0.058)	-	-	0.088 (0.059)	-	-	-0.121 (0.055)**	-
RTA*VAE_DIST_EX	-	-0.064 (0.061)	-	-	0.065 (0.058)	-	-	-0.129 (0.06)**	-

Table 3 (continued) – Robustness Check

	Total Trade			Intensive Margin			Extensive Margin		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
RTA*PVE_DIST_IM	-	-0.118 (0.041)***	-	-	-0.101 (0.041)**	-	-	-0.017 (0.041)	-
RTA*PVE_DIST_EX	-	-0.008 (0.038)	-	-	-0.002 (0.039)	-	-	-0.006 (0.039)	-
RTA*GEE_DIST_IM	-	-0.063 (0.087)	-	-	-0.019 (0.091)	-	-	-0.044 (0.084)	-
RTA*GEE_DIST_EX	-	-0.266 (0.092)***	-	-	-0.013 (0.093)	-	-	-0.252 (0.098)**	-
RTA*RQE_DIST_IM	-	0.234 (0.074)***	-	-	0.254 (0.076)**	-	-	-0.02 (0.072)	-
RTA*RQE_DIST_EX	-	0.03 (0.078)	-	-	-0.026 (0.081)	-	-	0.056 (0.085)	-
RTA*RLE_DIST_IM	-	-0.037 (0.089)	-	-	-0.145 (0.092)	-	-	0.109 (0.088)	-
RTA*RLE_DIST_EX	-	0.05 (0.095)	-	-	-0.166 (0.095)*	-	-	0.215 (0.098)**	-
RTA*POL_DIST_EX	-	-	-0.001 (0.005)	-	-	-0.005 (0.005)	-	-	0.005 (0.005)
RTA*POL_DIST_IM	-	-	-0.001 (0.005)	-	-	0 (0.005)	-	-	-0.001 (0.005)
Exporter-Year	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Importer-Year	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Country-Pair	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Observations	97620	97492	84350	97620	97492	84350	97620	97492	84350
R-squared	0.8476	0.8478	0.8505	0.6785	0.6782	0.662	0.7485	0.7487	0.755

Table 4 – Regression Results for South-North Trading Partners

	Total Trade			Intensive Margin			Extensive Margin		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
RTA	0.018 (0.027)	-0.025 (0.045)	0.997 (0.217)***	0.148 (0.028)***	0.175 (0.046)***	2.888 (0.227)***	-0.13 (0.025)***	-0.2 (0.04)***	-1.892 (0.199)***
COR_DIST_EX	-	-0.05 (0.068)	-0.039 (0.068)	-	0.015 (0.07)	0.03 (0.07)	-	-0.065 (0.067)	-0.069 (0.067)
RTA*COR_DIST_EX	-	0.116 (0.078)	0.107 (0.078)	-	0.184 (0.086)**	0.211 (0.086)***	-	-0.068 (0.076)	-0.103 (0.076)
RTA*COR_DIST_IM	-	0.025 (0.024)	0.026 (0.025)	-	-0.044 (0.024)*	0.008 (0.026)	-	0.069 (0.02)***	0.017 (0.021)
RTA*Ln(DIST)	-	-	-0.116 (0.027)***	-	-	-0.331 (0.028)***	-	-	0.215 (0.025)***
RTA*COLONY	-	-	-0.023 (0.073)	-	-	-0.149 (0.076)**	-	-	0.126 (0.064)**
RTA*LANG	-	-	-0.26 (0.067)***	-	-	-0.002 (0.07)	-	-	-0.258 (0.059)***
RTA*CONTIG	-	-	-0.416 (0.078)***	-	-	-0.256 (0.077)***	-	-	-0.161 (0.065)**
Exporter-Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Importer-Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Pair	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	123167	122687	122687	123167	122,687	122,687	123167	122,687	122,687
R-squared	0.8905	0.8909	0.8909	0.7435	0.7434	0.7437	0.7435	0.7434	0.7437

Table A1 – South (low and lower middle income) Countries

Afghanistan	Jamaica	United Rep. of Tanzania
Albania	Kazakhstan	Venezuela
Algeria	Kenya	Viet Nam
Angola	Kiribati	Yemen
Armenia	Kyrgyzstan	Zambia
Azerbaijan	Latvia	Zimbabwe
Bangladesh	Madagascar	
Belarus	Malawi	
Belize	Maldives	
Benin	Mali	
Bhutan	Mauritania	
Bolivia (Plurinational State of)	Mongolia	
Bosnia Herzegovina	Morocco	
Bulgaria	Mozambique	
Burkina Faso	Myanmar	
Burundi	Nepal	
C??te d'Ivoire	Nicaragua	
Cabo Verde	Niger	
Cambodia	Nigeria	
Cameroon	Pakistan	
Central African Rep.	Panama	
China	Papua New Guinea	
Colombia	Paraguay	
Comoros	Peru	
Costa Rica	Philippines	
Dominica	Rep. of Moldova	
Dominican Rep.	Romania	
Ecuador	Russian Federation	
Egypt	Rwanda	
El Salvador	Saint Vincent and the Grenadines	
Estonia	Samoa	
Ethiopia	Sao Tome and Principe	
FS Micronesia	Senegal	
Fiji	Solomon Isds	
Gambia	South Africa	
Georgia	Sri Lanka	
Ghana	State of Palestine	
Guatemala	Suriname	
Guinea	TFYR of Macedonia	
Guyana	Thailand	
Honduras	Togo	
India	Tunisia	
Indonesia	Turkey	
Iran	Uganda	
Iraq	Ukraine	

Table A2 – North (high and upper middle income) Countries

Albania	Hungary	Suriname
Algeria	Iceland	Sweden
Andorra	Iran	Switzerland
Angola	Iraq	TFYR of Macedonia
Antigua and Barbuda	Ireland	Thailand
Argentina	Israel	Trinidad and Tobago
Armenia	Italy	Tunisia
Aruba	Jamaica	Turkey
Australia	Japan	USA
Austria	Kazakhstan	United Arab Emirates
Azerbaijan	Kuwait	United Kingdom
Bahamas	Latvia	Uruguay
Bahrain	Lebanon	Venezuela
Barbados	Luxembourg	
Belarus	Malaysia	
Belgium	Maldives	
Belize	Malta	
Bosnia Herzegovina	Mauritius	
Botswana	Mexico	
Brunei Darussalam	Mongolia	
Bulgaria	Netherlands	
Canada	New Zealand	
Chile	Norway	
China	Oman	
China, Hong Kong SAR	Palau	
China, Macao SAR	Panama	
Colombia	Paraguay	
Costa Rica	Peru	
Croatia	Poland	
Cyprus	Portugal	
Czechia	Qatar	
Denmark	Rep. of Korea	
Dominica	Romania	
Dominican Rep.	Russian Federation	
Ecuador	Saint Kitts and Nevis	
Estonia	Saint Lucia	
Fiji	Vincent and the Grenadines	
Finland	Samoa	
France	Saudi Arabia	
Gabon	Seychelles	
Georgia	Singapore	
Germany	Slovakia	
Greece	Slovenia	
Greenland	South Africa	
Guyana	Spain	