

Financial development, trade agreements and international trade*

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Abstract

Using a structural gravity model on a data set of 69 developed and developing countries over the period 1986-2006, we show that the trade-promoting role of financial development in the exporting country, especially intermediated finance, is magnified when this country faces high exporting costs, i.e. when there is no Regional Trade Agreement (RTA) between this country and the importing one. Finally, we also find evidence that the same trade-boosting effect and the same interaction with RTAs prevails for financial development *in the importing country*.

Key words : international trade, exports, regional trade agreements, financial development, intermediated finance.

JEL Classification : F14, F15, G00

*This is only a preliminary version. Please do not quote.

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1 Introduction

The great trade collapse observed in 2009 was characterized by a slump by 12% in the volume of world trade. This decline was much more severe than the contraction in Gross Domestic Product (GDP), which amounted to -2.4% in 2009 (WTO, 2010). It was also greater than the fall in world trade experienced during the Great Depression of the 1930s (Almunia et al., 2010). The WTO (Auboin, 2009; 2011; 2014) has heavily pointed out the 2008 financial crisis as the main cause of the great trade collapse, thus raising the point of the effect of finance on export performance.

The key theoretical rationale for the impact of finance on trade is the existence of upfront export costs that firms face when they sell abroad. These costs, which refers to advertising, gathering information on foreign customers, translation, organizing foreign distribution networks but also administrative procedures and compliance to the regulatory environment, must be externally financed.¹ For this reason, exports crucially depend on the strength of firms' financial constraints and the level of financial development. This result is corroborated by empirical investigations. Beck (2002 ; 2003) shows that financial development in the exporting country enhances export performance, especially for industries that highly rely on external finance. On a more cyclical approach, Chor and Manova (2012) show that countries with tight credit conditions (i.e., with high interbank rates) export less to the United States. This effect is particularly pronounced in sectors that are strongly dependent on external financing and during the 2008 financial crisis. This outcome is confirmed by Berman et al. (2012) and Iacovone and Zavacka (2019), who consider data sets that cover a larger number of prior banking or financial crisis. The literature also suggests that the favorable effect of financial development on exports is stronger when export costs are high. Manova (2008) shows that the favorable effect of financial liberalization on the country' exports is stronger when export costs are high, i.e, when this country is weakly opened to trade. This paper suggests that financial reforms and trade policy are substitutes.

However, this literature does not consider an element of trade policies that crucially determines the level of export costs, i.e., the signature of regional trade agreements (RTAs). Trade liberalization through regional trade agreements plays a prominent role in the international trading system nowadays. Since the early 1990s, the number of RTAs concluded among countries has steadily increased. These agreements have increasingly gone beyond regional boundaries over time and turned into more and more cross-regional ones. RTAs help to substantially reduce traditional tariff and non tariff measures (such as quotas for example) among member countries. But they also reduce "cross-border", such as customs procedures and paperwork, and "behind-the-border" barriers, such as technical standards, sanitary and phytosanitary conditions, environment regulation or employment law (Chauffour and Maur, 2010 ; Pomfret and Saudin, 2009). Because these barriers represent significant costs for exporting firms, RTAs mitigate firms' need for external funds to finance these costs. Hence, in line with the literature

¹It is noteworthy that, in contrast to Anderson and van Wincoop (2004), who provide a broad definition of trade costs ("costs incurred in getting a good to a final user other than the marginal cost of producing that good itself: transportation costs (freight cost and time cost), policy barriers (tariffs and non-tariffs measures), information costs, contract enforcement costs, costs associated with the use of different currencies, legal and regulatory costs, and local distribution costs."), the literature on trade and finance focus on the costs incurred by *the exporting firm*.

on trade and finance, the positive impact of financial development on exports should be lower when the exporting and the importing countries are involved in an RTA. The first innovation of this paper is to check for this theoretical assumption interaction between RTA and financial development.

Secondly, while Manova (2008) focuses on equity market liberalization, our financial development indicators do not only refer to stock markets but also to intermediated finance. Doing this, we are in line with the literature on trade finance, which emphasizes the key role of banks and other financial institutions (such as insurance companies, for example) in the provision for trade finance tools (Egger and Ullr, 2006 ; Moser et al., 2008 ; Amiti and Weinstein, 2011 ; Auboin and Engemann, 2012 ; Felbermayr and Yalcin, 2013 ; Schmidt-Eisenlohr, 2013 ; Van der Veer, 2015 ; Van der Veer, 2015 ; Niepman and Schmidt-Eisenlohr, 2017).

Finally, our paper also suggests that RTAs does not only interact with financial development in the exporting country but also in the importing one. Indeed, it is noteworthy that our measure of trade openness, i.e., the existence of a RTA between two countries, is a country-pair-specific variable which captures the *bilateral* dimension of trade liberalization. Hence, in line with the idea that the cost of external finance in the importing country also matter for trade (Schmidt-Eisenlohr, 2013 ; Niepman and Schmidt-Eisenlohr, 2017), this allow us to check whether RTAs mitigate the favorable effect of financial development not only in the source but also *in the destination country*.

To check whether the existence of an RTA between two trading partners mitigates the positive impact of financial development on exports, we estimate a gravity model on a data set of 69 developed and developing countries over the period 1986-2006. To our knowledge, this study is one of the first researches that are able to identify the impacts of the interaction term between financial development indicator (a time-varying country-specific variable) with regional trade agreements (a bilateral determinant of trade) on international trade within a panel data gravity model with structural fixed effects. Since the country-time fixed effects should control for all time-varying country-specific factors, they do not allow one to identify the impact of this kind of variable, which is perfectly collinear with these fixed effects. To address this identification issue, we have recourse to the approach proposed by Heid et al. (2017) and Beverelli et al. (2018), which introduces intra-national trade flows in gravity estimations and yields proper estimates for country-specific determinants of trade.

The paper is organized as follows. Section 2 presents the literature and the testable assumptions of our study. Our econometric investigation is presented in Section 3. Section 4 presents our results and Section 5 addresses several extensions. Section 6 offers some concluding remarks.

2 Literature

Our research exploits two strands of literature. We first present the literature on the links between finance and trade. We then address the effect of RTA on trade flows.

2.1 Finance and trade

First, an amount of literature has shown that financial variables are not neutral as regards trade. Some papers introduce the notion of finance dependence in the Heckscher-Ohlin-Samuelson's

international trade model. In this two-country two-sector approach, differences in financial development give rise to comparative advantages and mutual gains from specialization and trade (Bardhan and Kletzer, 1987 ; Beck, 2002 . Baldwin, 1989). This theoretical result is corroborated by Beck (2002 ; 2003) who show that proxies for financial development in the exporting country have a significant and positive effect on exports, especially for industries that heavily rely on outside finance. In the line of the Melitz's (2003) model, Chaney (2016) and Manova (2013) consider that firms differ in their productivity level and that exporters face specific costs, notably upfront costs (due to advertising, gathering information on foreign customers, administrative procedures, translation, organizing foreign distribution networks, etc). The authors find that low-productivity firms, which cannot obtain external funds to cover fixed costs, do not sell abroad while high-productivity firms, which face no financial constrained, export. The adverse impact of financial constrained on export involvement is corroborated by a bulk of firm-level empirical papers which rely on financial and accounting ratios to proxy for the degree of firms' financial vulnerability (Berman and Héricourt, 2010 ; Muûls, 2015 ; Manova et al., 2015 ; Bellone et al., 2010 ; Engel et al., 2013 ; Askénazy et al., 2015 ; Feensta et al., 2014 ; Minetti and Zhu, 2011 ; Caggese and Cunat, 2013 ; Paravisini et al., 2015).

Even more interestingly, the effect of financial development on exports is also shown to be stronger when export fixed costs are high. In Manova (2008), upfront costs are proxied by an indicator that measures the level of restriction imposed by trade policies (in terms of tariff rate, non tariff barriers, black market exchange rate, market power of the state as an exporter and political system).

Thirdly, the literature also suggests that banks and financial intermediaries play a crucial role in the financing of trade. Indeed, exporting firms also massively resort to letters of credit, which involves a third party (e.g., a bank, an insurance company) between the importer and the exporter. As described by Amiti and Weinstein (2011), the importer's bank issue a letter of credit, which guarantees the payment for the import. Using the letter of credit as collateral, the exporter then obtain a credit from its bank to cover the production costs of the goods that will be exported. Once the good transferred to the importer, the exporter is paid through the importer's bank. Export credit guarantee, provided by public export credit agencies or private insurers, is another type of intermediated trade finance device (Egger and Uhl, 2006 ; Van der Veer, 2015). By reducing the risk for trading partners, insurance contracts increase international trade. The empirical literature corroborates the view that private and public export insurance promotes exports (Auboin and Engemann, 2012 ; Van der Veer, 2015 ; Felbermayr and Yalcin, 2013 ; Moser et al., 2008 ; Egger and Uhl, 2006).

2.2 RTAs and trade

For more than a half century, economists have sought to examine the economic reasons that help to explain why countries decided to go for RTAs. A vital question following the formation of an RTA is whether it will enhance participating countries' welfare. As first stated in the traditional Vinerian analysis (Viner, 1950), trade agreements can either trigger inefficient domestic production being replaced by imports from more efficient firms from member countries (trade creation) or more efficient imports from non-member countries being substituted for higher-cost imports from member countries (trade diversion). The welfare effect of RTAs is equivocal. Many empirical studies in the literature have focused on the impacts of RTAs

on members' trade. Results from these studies have also been puzzling. Comparing all these empirical studies is challenging, as they use different methodologies (i.e., cross-section data or panel data), data sets, control variables, and country coverage.

However, most studies showed evidence for intra-bloc trade creation following the formation of RTAs. Baier and Bergstrand (2007) found that an Free Trade Agreement (FTA), on average, could double the bilateral trade between two member countries after 10 years. Carrère (2004) showed a significant increase in trade flows among RTAs' members, which is detrimental to non-member countries. Cernat (2003) examines several RTAs formed exclusively by developing countries around the world and shows evidence of a significant increase in intra-bloc trade between member countries following their RTAs' entry in force, i.e., the Common Market for Eastern and Southern Africa (COMESA), the Economic Community of West African States (ECOWAS), the Association of Southeast Asian Nations (ASEAN) Free trade area, the Southern Common Market (MERCOSUR). Lee and Park (2005) showed the trade creation effect from East Asian RTAs will be significant enough to overwhelm the trade diversion effect. Frankel (1997) found that the North American Free Trade Agreement (NAFTA) has a positive and significant impact on their intra-bloc trade by means of pooled estimation over the period of 1970 through 1992. Cheng (2005) and Bussiere (2005) also found that the NAFTA creates a positive impact on intra-bloc trade based on panel data with specific effects. Regarding the European Union (EU) and the European Free Trade Association (EFTA), most of studies reach the conclusion that these RTAs had positive impact on trade flows between participating countries (see Aitken, 1973; Brada and Mendez, 1985; Frankel, 1997).

Taken together, the theoretical and empirical works presented above suggest that 1) the trade-promoting effect of financial development should be stronger when export costs are large, 2) this effect is particularly stronger when financial development is measured through intermediated finance, and 3) export costs should be reduced when there is a RTA between two trading partners. This allows us to state the following testable assumption:

H1: The export-promoting role of financial development in the exporting country should be mitigated by the existence of a RTA between trading partners. This effect should be particularly strong when financial development is measured through intermediated finance.

3 Econometric investigation

In this section, we begin with a short review of the theoretical foundations of the structural gravity model in Section 3.1. We then, in Section 3.2, present our methodology to identify and estimate the impacts of both the country-specific national financial development and regional trade agreements on international trade. In Section 3.3, we describe our data and unveil its sources.

3.1 Theoretical foundations of the structural gravity model

Tinbergen (1962) introduced the basic gravity model in the form of Newton's law of gravity. It soon became the workhorse framework for both partial and general equilibrium analysis

to examine the impact of various determinants of bilateral trade flows despite a lack of solid underpinnings in economic theory. Anderson and van Wincoop (2003), in their prominent work, established the following comprehensive structural form of gravity model²:

$$X_{ijt} = \frac{Y_{it}E_{jt}}{Y_{wt}} \left(\frac{C_{ijt}}{P_{it}P_{jt}} \right)^{1-\sigma} \quad (1)$$

Here, at each given time t , X_{ijt} are bilateral trade flows from exporting country i to importing country j . Y_{it} denotes the total value of production in exporter i . E_{jt} is the value of total expenditure in importer j . Y_{wt} is the value of world output. C_{ijt} represents the bilateral trade cost or any trade barriers between exporting country i and its importing partner j , i.e., bilateral geographic distance, regional trade agreements and other country-specific determinants of international trade. Then σ denotes the elasticity of substitution between all goods from different exporting and importing countries³. Finally, P_{it} and P_{jt} represent the structural outward and the inward multilateral resistance terms as originated by Anderson and van Wincoop (2003), respectively. These multilateral resistances terms are generated as follow:

$$\begin{cases} P_{it}^{1-\sigma} = \sum_j \left(\frac{C_{ijt}}{P_{jt}} \right)^{1-\sigma} \frac{Y_{jt}}{Y_{wt}} ; \\ P_{jt}^{1-\sigma} = \sum_i \left(\frac{C_{ijt}}{P_{it}} \right)^{1-\sigma} \frac{Y_{it}}{Y_{wt}} \end{cases} \quad (2)$$

The Anderson and van Wincoop's multilateral resistances terms described in equation (2) highlight the important of the remoteness factor of a country from the rest of the world on its trade flows with other partners. On the one hand, bilateral trade flows between an exporting country and importing one depend on their economic sizes and on the bilateral trade frictions between them. On the other hand, their bilateral trade also rely on how distant or remote they are from the rest of the world. Anderson and van Wincoop (2003) found that the producers and the consumers in more multilaterally isolated countries tend to sell and/or buy goods more with each other, all else being equal.

Moreover, by construction, the structural outward and inward multilateral resistance terms pointed out the fact that any changes in trade barriers between a pair of exporting country and importing country in the world would have an impact on all other countries in the world. Thus, the estimates of the impacts of the determinants of trade flows can be severely biased due to the omission of these multilateral resistances⁴.

To take account of these multilateral resistance terms with cross-section data, the standard procedure in the literature suggested by Feenstra (2004) is to include specific fixed effects for exporting and importing countries in an econometric estimation based on a cross-sectional gravity equation. However, in a setting with panel data, the inward and the outward multilateral

²The gravity system of trade in Anderson and van Wincoop (2003) was derived on a cross-section framework. Here, we include a time dimension t in the system of equations (1) in order to adapt to panel data method.

³The elasticity of substitution between all goods σ should be greater than 1.

⁴See Head and Mayer (2014), Costinot and Rodríguez-Clare (2014) and Yotov et al. (2016) for an insightful surveys of the structural gravity model, as well as for a more detailed discussion about the multilateral resistance terms' properties.

resistances (P_{jt} and P_{it} , respectively) are expected to vary over time as highlighted by Baldwin and Taglioni (2006). An appropriate specification of the gravity equation with panel data needs to take into account country-time fixed effects as in Baier and Bergstrand (2007), Olivero and Yotov (2012) and Anderson and Yotov (2016), who control for these time-varying multilateral resistance terms.

3.2 Identification and econometric methodology

We start our identification strategy by employing the following classical gravity model in a panel framework:

$$\ln X_{ijt} = \beta_0 CONTROL_{ijt} + \beta_1 RTA_{ijt} + \beta_2 FD_{it} + \beta_3 FD_{it} \times RTA_{ijt} + \pi_{it} + \mu_{jt} + \gamma_{ijt} + \epsilon_{ijt} \quad (3)$$

Equation (3) is achieved by log-linearizing equation (1) and adding our variables of interest, which are RTA_{ijt} denoting the existence of regional trade agreements between a pair of countries, FD_{it} denoting the financial development indicator of an exporting country and the interaction term between these two variables⁵. In particular, FD_{it} focuses on two country-specific aspects as regards the financial development: intermediated finance and stock markets. Turning to $CONTROL_{ijt}$, it is a vector of trade frictions factors that replace the bilateral trade costs variables in equation (1), which may feature multiple determinants of bilateral trade flows (other than RTAs), such as bilateral distance, common cultural, common historical relationships, colonial ties, etc. We then insert the exporter-time fixed effects (π_{it}), which will account for the outward multilateral resistances in the exporting country i and the value of total output, a set of importer-time fixed effect (μ_{jt}), which will control for the inward multilateral resistances in the importing country j and total expenditure, and a set of country-pair fixed effects (γ_{ijt}). Finally, the gravity equation (3) expands the equation (1) with an error term ϵ_{ijt} .

The motivation for the introduction of the country-pair fixed effects in a panel gravity estimation is twofold. First, Baier and Bergstrand (2007) underlined that a full set of country-pair fixed effects effectively account for the issue of potential endogeneity of any time-varying bilateral trade policy determinants, such as regional trade agreements⁶, since this type of fixed effects can absorb any time-invariant bilateral factors that are unobservable and able to be correlated with the trade policy variables. Thus, the country-pair fixed effects would alleviate potential endogeneity in terms of the bilateral determinant covariates in the gravity equation. Second, this set of fixed effects also controls more rigorously for bilateral trade costs after controlling for both observable and unobservable time-invariant bilateral drivers of trade flows, according to Yotov et al. (2016). As Ghosh and Yamarik (2004) pointed out that results from gravity equations are quite sensitive to the determinants introduced in the model and to the beliefs of studies' author. By using the country-pair fixed effects, one don't need to decide anymore

⁵The three variables of interest are indeed needed to test for our main assumption H1 stated in Section 2.

⁶Regional trade agreement tends to be concluded between two countries that would achieve possibly higher trade volumes in the aftermath of their RTA's entry into force. Consequently, there is a potential reverse causality between RTAs in general and a greater level of bilateral trade flows between a pair of countries (Baier and Bergstrand, 2007).

which bilateral determinants to include as controls in gravity equations. Nevertheless, the estimates of the impacts of those time-invariant bilateral variables, such as distance, international borders, cannot be achieved, because these covariates have been completely absorbed by the set of country-pair fixed effects.

To secure proper econometric estimates of our variables of interest, we must also address two other prominent challenges: zero trade flows and heteroskedasticity, which commonly presents in international trade data. We resort to the Poisson pseudo-maximum-likelihood estimator (PPML) proposed by Santos Silva and Tenreyro (2006), who point out that the PPML estimator leads to more robust and consistent coefficient estimates than the standard log-linear OLS method in the presence of heteroskedasticity. Moreover, as constructed with a multiplicative form⁷, the PPML estimator allows one to capture useful insight contained in the zero trade flows. In particular, according to Santos Silva and Tenreyro (2006), the performance of the PPML estimator is consistent whether the ratio of zero trade flows is low or high in the data set. A series of recent empirical studies on gravity model and international trade have employed the PPML estimator as the main econometric method and praised the estimator as one of the new workhorses to analyze international trade, such as Fally (2015), Anderson and Yotov (2016) and Beverelli et al. (2018).

To sum up, in line with Piermartini and Yotov (2016) and Anderson and Yotov (2016), our analysis will try to overcome some prominent issues in the gravity model with the help of these above-mentioned econometric techniques. Unobserved multilateral resistance terms are taken into account by the exporter-year and importer-year fixed effects; the possible endogeneity of regional trade agreements is addressed by country-pair fixed effects; finally, zero trade flows and the issue of heteroskedasticity are handled by the use of PPML technique.

We should be able to employ the PPML estimator to estimate the following gravity equation:

$$X_{ijt} = \exp [\beta_0 CONTROL_{ijt} + \beta_1 RTA_{ijt} + \beta_2 FD_{it} + \beta_3 FD_{it} \times RTA_{ijt} + \pi_{it} + \mu_{jt} + \gamma_{ij}] + \epsilon_{ijt} \quad (4)$$

Instead of employing the standard approach of log-linearizing the gravity equation as described in equation (3), the PPML technique will estimate the equation (4), which is in the multiplicative form. All variables and series of fixed effects remain the same from equation (3) to equation (4). The ϵ_{ijt} has turned into an exogenous Poisson error term since our complete and powerful set of fixed effects take into account all observable and unobservable time-invariant bilateral trade costs determinants, as well as any time-varying country-specific factors of the exporting country and the importing country, according to Anderson and Yotov (2016).

Nevertheless, our set of fixed effects results in some considerable inconveniences. The set of country-time fixed effects do not allow us to assess the impact of our variable of interest FD_{it} , since the latter is also a time-variant country-specific characteristic. Therefore, it is perfectly collinear with these fixed effects.

To handle this issue regarding our identification strategy, different practices have been employed in the empirical literature. Dutt and Traca (2010) and de Jong and Bogmans (2011) have succeeded in estimating the impact of national corruption (a country-specific determinant) on bilateral trade flows, but they neglected to properly take account for the multilateral resistance terms. In a panel data setting, Dutt and Traca (2010) have to drop both exporter-time

⁷The dependent variable is measured in levels, instead of log-linearizing the gravity model after the standard practice.

and importer-time fixed effects in order to identify this country-specific characteristics. They can only include exporter and importer time-invariant fixed effects at best. Similarly, exporter and importer fixed effects are also omitted in de Jong and Bogmans (2011)’s cross-sectional gravity equation as they would absorb the estimated coefficients on exporting country’s and importing country’s corruption. As noted by Anderson and van Wincoop (2003), studies that fail to control for the multilateral resistances could result in potentially biased estimates.

Alternative method have complied with the structure of the gravity model in terms of country-specific dummies, which stand as proxy for the multilateral resistance terms. These studies have to indirectly assess the effects of national institutions on trade flows by employing bilateral institution determinants, which based on the institutional indexes on the exporter and on the importer country (Anderson and Marcouiller, 2002; Yu et al., 2015). However, this approach does not allow for a direct assessment of the effects of exporter’s and importer’s national institutions on their bilateral trade flows.

Therefore, econometric techniques with panel data sets which only contain international trade flows and address the structural multilateral resistance terms by using exporter-time and importer-time fixed effects are not capable of generating estimated coefficients on any country-specific determinants of bilateral trade.

To address the downside of the two above-mentioned methods, Heid et al. (2017) and Beverelli et al. (2018) suggest to include the intra-national trade flows to gravity model in order to identify the impacts of country-specific and time-varying country-specific variables within a theoretical structural gravity setting with both exporter-time and importer-time fixed effects. Heid et al. (2017) make use of this approach and are able to assess the effect of non-discriminatory unilateral trade policies on the importer country (e.g. Most Favored Nation (MFN) tariffs) and on the exporter country (e.g. export subsidies) even in the inclusion of exporter and importer fixed effects. Beverelli et al. (2018) carry out the similar method and find strong evidence of positive impacts of exporter’s and importer’s institutional quality in order to foster international trade.

We follow the proposition of Heid et al. (2017) and Beverelli et al. (2018) to make use of both international trade and intra-national trade flows within a structural gravity framework. Thus, besides observations matching only the international trade, we added observations that represent the domestic trade in our data set. We constructed a dummy variable $INTL_{ij}$, which equals 1 for international trade between country i and country j , and it takes a value of zero for intra-national trade, i.e. the domestic sales in country i . Here, our new dummy for international trade $INTL_{ij}$ is considered as a time-invariant bilateral variable. Next, we adjust the financial development variable as the product of the initial financial development variable and the international trade dummy, therefore it becomes $FD_{it} \times INTL_{ij}$. As a result, by this definition, the estimated coefficient on $FD_{it} \times INTL_{ij}$ should take account for the differential effect of exporting country’s financial development on international trade relative to intra-national trade. The financial development variable is no longer collinear with any fixed effects and it is transformed into a bilateral variable in nature (Piermartini and Yotov, 2016)⁸.

We should be able to include the new variable $FD_{it} \times INTL_{ij}$ in our structural gravity equation as follows in order to test for the assumption H1 as previously mentioned in Section

⁸See Heid et al. (2017) and Beverelli et al. (2018) for a detailed discussion related to the approach and the challenges of collinearity that it confronted.

2⁹:

$$X_{ijt} = \exp [\beta_0 CONTROL_{ijt} + \beta_1 RTA_{ijt} + \beta_2 (FD_{it} \times INTL_{ij}) + \beta_3 (FD_{it} \times INTL_{ij}) \times RTA_{ijt} + \pi_{it} + \mu_{jt} + \gamma_{ij}] + \epsilon_{ijt} \quad (5)$$

According to the existing literature, the expected sign of β_2 is positive for the impacts of financial development indicator (Bardhan and Kletzer, 1987; Beck, 2002; 2003 and Baldwin, 1989). Similarly, the estimated coefficient β_1 on the effects of RTAs should also be positive (Baier and Bergstrand, 2007 ; Carrere, 2006; Frankel, 1997). In line with H1, the trade-promoting role of financial development (especially intermediated finance) in a country should be exacerbated when this country is not involved in an RTA. Hence, the existence of an RTA between exporter i and importer j should reduce the favorable impact of financial development in the exporting country i on its exports to the importing country j . Thus, the expected sign of β_3 should be negative. Moreover, the absolute value of the coefficient should be stronger for intermediated finance indicators than for financial markets indicators.

Unfortunately, even with the inclusion of intra-national trade flows in our panel data sets, we are unable to simultaneously capture separate effects of the financial development variable for both exporting country and for importing country. In fact, our gravity model can only assess the effects of one of the two country-specific variables at a time¹⁰.

3.3 Data description

To carry out this analysis, we had recourse to four main types of data: data on trade flows in terms of both international and intra-national trade; data on financial development; data on RTAs; and data on conventional gravity variables. As mentioned, an important characteristic of our data set is that it takes into account bilateral trade on the one hand and intra-national trade flows on the other, which are domestic sales of each country. Thus, availability of this type of data is vital for the application of our econometric method and for the coverage in terms of sample's size and period of study. According to the availability of these above-mentioned types of data, we were able to compile necessary data for 69 developed and developing countries over the period 1986-2006 (Table 4, in Appendix, lists the countries in our data set). Due to a lack of publicly available data about recent intra-national trade flows, our paper could only cover until the year 2006. We specify the construction of our data as well as our variables, and discuss our data sources as follows.

⁹As argued by Beverelli et al. (2018), this international trade dummy is not correlated with the country-specific variables as well as the potentially unobservable variables, thus we should be able to obtain proper estimates following Nizalova and Murtazashvili (2016)'s critique. By construction, $INTL_{ij}$ is exogenous as it takes the value of one for all international trade flows and zero otherwise, regardless of any country choice, thus it should not fluctuate with any country-specific variables. Furthermore, the use of country-pair fixed effects allows one to mitigate the issue of omitted or unobservable variables mentioned above.

¹⁰Due to the perfect collinearity between $FD_{it} \times INTL_{ij}$ and $FD_{jt} \times INTL_{ij}$, we are unable to include in the gravity equation both the financial development variable for exporter side and for importer side. Therefore, the corresponding estimated coefficients on the two financial development variables from different estimations should be interpreted as the impacts of financial development on international trade flows (exports and imports) relative to domestic trade. In the following empirical analysis, we separately identify the impacts of financial development of the importing country on international trade relative to intra-national trade.

Data on international and intra-national trade. In order to construct a data set combining values for international trade flows and intra-national trade flows, we primarily use the CEPII’s Trade, Production and Bilateral Protection (TradeProd) database¹¹. The principal source for bilateral trade flows in the CEPII TradeProd database is the United Nations’ Commodity Trade Statistics Database (COMTRADE)¹². Moreover, production values in TradeProd are largely collected from the United Nations’ UNIDO Industrial Statistics (IndStat) database and further complemented by using the World Bank Trade, Production and Protection data set compiled by Nicita and Olarreaga (2007)¹³. To apply our econometric practice, we have to measure intra-national trade flows observations by calculating the difference between a country’s total manufacturing production and its total manufacturing exports to other partner countries as inspired by the work of Baier et al. (2016). Then, the data from Baier et al. (2016) was searched and cross-checked to fill in gaps in terms of missing international and intra-international trade values during our period of study¹⁴.

Data on regional trade agreements. The time-varying bilateral variable RTA_{ijt} is defined as a dummy that takes a value of one if there exists an RTA between exporting country i and importing country j from year t , and zero otherwise. Our main data on RTAs is composed from the collection of regional trade agreements used in Baier and Bergstrand (2007). Then, we improve this data by cross-checking it against the WTO Regional Trade Agreements Information System (RTA-IS) database as well as the NSF-Kellogg Database on Economic Integration Agreements¹⁵. Table 7, in Appendix, provides a complete summary of RTAs included in our study. Overall, our data on RTAs covers 65 different agreements, including 8 multilateral trading blocs, 32 bilateral FTAs, and 25 agreements between multilateral blocs and outside partners. Within these 65 agreements, there are 455 different agreement-pairs, counting as separate any instance where two countries that are already joined via a prior agreement become part of a second agreement.

Data on financial development. We focus on indicators for financial development of countries around the world, which are taken from the Beck et al. (2014) data set built from IMF statistics and now available on the World Bank’s Global Financial Development database¹⁶. This country-specific variable actually denotes a set of four financial indicators, which account for the level of financial development in any country. First, *BCREDIT* measures the financial resources provided to the private sector by deposit money banks (i.e., financial institutions that have liabilities under the shape of transferable deposits) as a share of GDP. Second,

¹¹The CEPII TradeProd data is described in the ISIC Rev. 2 industry classification and covers the period of 1980-2006. It can be accessed at http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=5.

¹²The UN COMTRADE database can be found at <https://comtrade.un.org/>.

¹³The World Bank Trade, Production and Protection database can be found at <https://datacatalog.worldbank.org/dataset/trade-production-and-protection-database>.

¹⁴These data were kindly provided to us by Thomas Zylkin.

¹⁵The WTO RTA-IS database can be found at <http://rtais.wto.org/UI/PublicMaintainRTAHome.aspx>. For more detailed information on the NSF-Kellogg Database on Economic Integration Agreements, we refer the reader to <https://kellogg.nd.edu/nsf-kellogg-institute-data-base-economic-integration-agreements>.

¹⁶The World Bank’s Global Financial Development database can be accessed at <https://databank.worldbank.org/data/source/global-financial-development>.

BFICREDIT relates to a broader definition of intermediated finance. It is measured as the amount of financial resources provided to the private sector not only by deposit money banks but also other financial institutions (i.e., bank-like institutions, which accept deposits without providing transferable deposit facilities such as savings banks, cooperative banks, mortgage banks, building societies and finance companies) and non-bank financial institutions (i.e., intermediaries that raise funds on financial markets, such as insurance companies, pension funds, real estate investment schemes, mutual funds and development banks) over GDP. In line with the literature on trade finance mentioned in Section 2, *BCREDIT* and *BFICREDIT* control for the role of financial intermediaries in trade finance. Third, *VALUE* is the total value of all traded shares in the stock market exchange in an economy as a percentage of GDP. Finally, *CAPI* denotes the ratio of the total value of all listed shares in the stock market of a country over GDP. The latter variables are employed because we were interested in identifying financial development indicators that relate to market-based finance besides the intermediated finance.

Our data set mainly covers the period from 1986 to 2006 since trade data are available from 1986 to 2006. However, financial development indicators, such as *VALUE* and *CAPI* are only available from 1989. Hence, our regressions including these financial development indicators will only cover the period 1989-2006¹⁷.

By construction, these financial development indicators are highly correlated with each other¹⁸. Especially, a serious correlation is observed between *BCREDIT* and *BFICREDIT*, since they both measure the role of financial intermediaries in trade finance. Similarly, two market-based finance factors, *VALUE* and *CAPI*, are also correlated between them. Therefore, we avoid combining all financial development variables in a unique estimation. We choose to separately run the estimation with each variable for financial development in exporting country or importing country in order to deliver consistent and unbiased estimates.

Data on standard gravity variables. In spite of a very complete set of fixed effects included in our structural gravity model, which account for various observable and unobservable drivers of bilateral trade flows, we resorted to the conventional proxies for bilateral trade frictions that have been employed traditionally in the existence gravity literature. In fact, we make use of data on bilateral distance, contiguity (whether or not two partner countries share a common border), common language, common religion, common legal origin, common currency (whether or not a country pair speak the same official language, share a common religion, has the same origin for legal system, uses the same currency in transaction), and colonial ties (whether *i* and *j* share any colonial relationships in their history). We collect all of these gravity controls from the CEPII's GeoDist database¹⁹. Table 5, in the Appendix, provides summary statistics for the dependent and explanatory variables.

¹⁷While there are no missing values for trade data in the entire period of study, there are nevertheless some missing values for financial development indicators.

¹⁸Table 6, in the Appendix, details the level of correlation among these variables.

¹⁹The GeoDist database can be found at http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=6.

4 Results

In this section, we present the baseline estimation results when testing for the assumption H1 regarding the export-promoting role of exporting country’s financial development. The econometric results of the regressions of equation (5) are reported in Table 1. Columns (1)-(4) present estimation results with standard gravity variables. Columns (5)-(6) reports our baseline results, which are obtained with country-pair fixed effects, the PPML estimator, and panel data. As noted in previous section, each specification in Table 1 takes account for only one financial development variable, which interacts with RTAs variable to avoid the issue of correlation.

At first glance, we note that variants (1)-(4) in Table 1 highlight the fact that bilateral distance and international frontier are both significant obstacles to international trade with their negative estimated coefficients. Overall, all other classical gravity regressors’ coefficients have the expected sign and in line with the existence literature. The fact of sharing a common official language, common religion, having a contiguous border, and use the same currency foster bilateral trade flows. The estimate of the effect of RTAs on international trade is also highly significant and positive, as anticipated. The impacts of common legal origin and colonial relationships on international trade are small and not statistically significant throughout all variants. It is noteworthy that in order to be able to deliver estimates of gravity variables, we have to drop the set of country-pair fixed effects, which are described in the gravity equation (5).

Let us now focus on the exporter’s financial development indicators and the interaction term between the latter and regional trade agreements variable. First, variants (1)-(4) point out that we are capable of generating estimates of the impacts of financial development, a country-specific determinant, in the presence of the exporter-time and the importer-time fixed effects and without confronting any problems in terms of collinearity. Second, estimated coefficient on exporting country’s financial development is positive, statistically significant and high in magnitude as compared with the estimates of other gravity variables, regardless of which financial indicator being controlled for. Stronger financial development in exporting country seems to increase international trade flows, especially in financial intermediaries as broader definition (*BFICREDIT*). The impacts of exporting countries’ financial development in terms of market-based indicators (i.e., *VALUE* and *CAP*) are also beneficial to international trade, but in smaller economic magnitude than ones from financial intermediaries’ indicators. Turning to our interaction term of interest, as expected, all specifications of $FD_{it} \times RTA_{ijt}$ are negative and statistically significant as expected across variants (1)-(4). However, we do note that estimations with only exporter-time and importer-time fixed effects deliver less sound estimates, since they are unable to capture unobservable variables and potential endogeneity of RTAs.

We then turn to the estimation results in columns (5)-(8) in Table 1 which are obtained with country-pair fixed effects in addition to those country-time fixed effects. Four main findings stand out from these results.

First of all, the coefficient for regional trade agreements throughout variants (5)-(8) is positive and significant, which is consistent with the previous results in variants (1)-(4). Hence, in line with Baier and Bergstrand (2007), Frankel (1997), Carrere (2006), being involved in an RTA increases trade flows between two countries.

Also, the coefficient for FD_{it} is significant and positive. This is consistent with the view that financial development and financial conditions in the exporting country favors export

Table 1: PPML baseline estimation results

Specifications	Panel A: Gravity regressors				Panel B: Country-pair fixed effects			
	Intermediated finance		Bank-based finance		Intermediated finance		Bank-based finance	
$FD_{it} =$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	BCREDIT	BFICREDIT	VALUE	CAPI	BCREDIT	BFICREDIT	VALUE	CAPI
$FD_{it} \times INTL_{ij}$	1.181*** (0.12)	1.662*** (0.07)	0.904*** (0.07)	0.956*** (0.11)	0.784*** (0.14)	1.146*** (0.09)	0.321*** (0.03)	0.407*** (0.11)
RTA_{ijt}	1.263*** (0.18)	1.389*** (0.13)	0.771*** (0.10)	0.752*** (0.11)	0.663*** (0.10)	0.826*** (0.08)	0.310*** (0.07)	0.350*** (0.09)
$(FD_{it} \times INTL_{ij}) \times RTA_{ijt}$	-0.919*** (0.22)	-0.625*** (0.13)	-0.304*** (0.10)	-0.394*** (0.11)	-0.209 (0.13)	-0.448*** (0.07)	-0.008 (0.03)	-0.054 (0.09)
$DISTANCE_{ij}$	-0.538*** (0.05)	-0.436*** (0.05)	-0.486*** (0.05)	-0.581*** (0.05)				
$CONTIGUITY_{ij}$	0.527*** (0.12)	0.648*** (0.12)	0.588*** (0.11)	0.563*** (0.12)				
$LANGUAGE_{ij}$	0.366*** (0.10)	0.185* (0.10)	0.191** (0.09)	0.088 (0.09)				
$COLONY_{ij}$	0.090 (0.11)	0.093 (0.09)	0.030 (0.09)	0.045 (0.10)				
$CURRENCY_{ij}$	0.198** (0.09)	0.258*** (0.09)	0.129 (0.10)	0.178** (0.09)				
$RELIGION_{ij}$	1.036*** (0.14)	0.765*** (0.14)	1.130*** (0.14)	1.073*** (0.14)				
$LEGAL_{ij}$	-0.046 (0.07)	0.038 (0.06)	0.010 (0.07)	0.009 (0.07)				
$INTL_{ij}$	-4.054*** (0.20)	-5.019*** (0.20)	-3.696*** (0.21)	-3.572*** (0.21)				
Nb. Obs.	83,490	83,628	71,070	70,242	96,412	96,757	70,966	70,125
Exporter-time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Importer-time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Exporter-importer effects	No	No	No	No	Yes	Yes	Yes	Yes

Notes: All specifications are performed in panel data framework including exporter-time and importer time fixed effects. All estimates are obtained by employing the PPML estimation. The dependent variable is the international trade or domestic trade flows in level. Each estimate only takes into account one type of exporter's financial development indicator. Estimates of the constant term, as well as estimates of all fixed effects dummies are omitted for brevity. Columns (1)-(4) reports estimates with standard gravity regressors. Columns (5)-(6) reports results obtained by including country-pair fixed effects. Standard errors are reported in parentheses and clustered by country-pair level. *, **, *** denote significance respectively at the 10%, 5% and 1% level.

performance (Bardhan and Kletzer, 1987; Beck, 2002, 2003; Baldwin, 1989; Schmidt-Eisenlorh, 2013). This finding is robust across specifications in Panel B with country-pair fixed effects.

Thirdly, we observe that, in variant (6), the coefficient for the interaction term $FD_{it} \times RTA_{ijt}$ (when $FD_{it} = BFICREDIT$) is statistically significant and negative. This reinforces the results obtained in Panel A with gravity regressors and is in line with the view that the export-promoting role of financial development in a country is amplified when this country is not involved in an RTA, i.e., when upfront export costs are high.

Finally, the coefficient for FD_{it} is not significant when $FD_{it} = VALUE$ or $FD_{it} = CAPI$, i.e. when financial development is measured by market-based financial indicators. We can also note that the coefficient for FD_{it} is not significant when $FD_{it} = BCREDIT_{it}$, which suggests that the broad definition of intermediated finance is more relevant to capture the interacted effect of financial development and RTAs on exports. This is in line with the idea that trade finance (letters of credit, export credit guarantee,...) is not only provided by money banks but also by other financial intermediaries, among which other bank-like institutions and insurance companies (Amiti and Weinstein, 2011; Egger and Ulr, 2006; Van der Veer, 2015).

It is also noteworthy that the estimated coefficients on our variables of interest in Panel B are significantly smaller relative to the corresponding estimates that are achieved with the standard gravity regressors across columns (1)-(4) in Table 1. A plausible interpretation of the smaller magnitude of coefficients is that we have better captured the issues of unobservable determinants of trade and reverse causality by using the set of country-pair fixed effects. Since these fixed effects are added in our estimations, the impact of exporter’s financial development is mostly determined from the variation in this variable over the time span. As a result, we find that the estimations in Panel B, Table 1 with a complete structure of fixed effects could lead to more proper impacts of our variables of interest and should be favored over the specifications in Panel A, Table 1 with only country-time fixed effects.

In conclusion, our results provide some support to H1, according to which The export-promoting role of financial development (especially, intermediated finance) in the exporting country should be mitigated when trading partners have engaged in a RTA.²⁰

5 Robustness and extensions

In this section, we consider some extensions to our work. We first check for the robustness of our results by estimating the marginal effects of our financial development indicators. We finally extend our model by considering the level of financial development in the importing country.

5.1 The marginal effects of financial development variables

Table 2: Marginal effects of financial development variables

Specifications	Intermediated finance		Bank-based finance	
	(1)	(2)	(3)	(4)
FD _{it} =	BCREDIT	BFICREDIT	VALUE	CAPI
RTA _{ijt} (Min)	0.784*** (0.140)	1.146*** (0.091)	0.321*** (0.033)	0.406*** (0.112)
RTA _{ijt} (Max)	0.575*** (0.097)	0.698*** (0.057)	0.313*** (0.030)	0.353*** (0.056)

Notes: All specifications are performed in panel data framework with PPML estimation including exporter-time and importer time fixed effects and country-pair fixed effects. The dependent variable is the international trade or domestic trade flows in level. Standard errors are reported in parentheses and clustered by country- pair level. *, **, *** denote significance respectively at the 10%, 5% and 1% level.

²⁰It is noteworthy that we also disaggregated the regional trade agreements variable to estimate the effect of being involved in *a particular RTA* on exports. For example, we built a variable which equals 1 if both countries are involved in the Association of Southeast Asian Nations Free Trade Area (ASEAN), 0 otherwise, and so one for other RTAs. Our results suggest that despite the great heterogeneity of RTAs included in our data set (in terms of type, size and geographical location), most of them have a positive effect on trade and interact with financial development in the way suggested by H1.

We now investigate the effects of financial development variable for different levels of the RTA indicator by estimating the marginal effects of *FD.INTL*. The overall impact of the financial development on exports equals the marginal effect conditional on specific values of the RTA indicator.

We are obtained marginal coefficients for exporting country’s financial development indicators on the basis of the PPML regression results presented in Panel B, Table 1 with the full set of structural fixed effects. As in Table 2, all marginal coefficients are estimated using STATA. Variants (1)-(4) take into account one financial development indicator and its interaction term with RTAs variable. To ease comparison, specifications (1)-(4) in Table 2 reproduce the exact estimates from variants (5)-(8) in Table 1. Then, each variant provides marginal coefficients for each corresponding exporter’s financial development indicator relative to two specific levels of the interacted regional trade agreements variable (0, which is its minimum value and 1, its maximum value).

Let us now go into details as regards the consequences of promoting regional trade agreements related to financial development indicators. Marginal coefficients across variants in Table 2 are strongly significant. First, they suggest that financial development has smaller impact on international trade when the level of RTAs variable is very high (i.e., at its maximum level). Second, the variation of this impact (between its minimum and its maximum level) appears much more important in the intermediated finance indicators (*BCREDIT* and *BFICREDIT*) than in the market-based indicators (*VALUE* and *CAP1*).

In sum, these results provide additional support to H1 and reinforce our previous findings according to which the favorable impact of exporting country’s financial development on international trade flows is lower when a regional trade agreement is concluded between this country and its importing partner and this, particularly when financial development is measured by intermediated finance indicators.

5.2 Accounting for the level of financial development in the importing country

Up to now, we have focused on the interaction between RTAs and financial development in the exporting country. But Schmidt-Eisenlohr (2013) and Niepman and Schmidt-Eisenlohr (2017) establish that the cost of external finance and legal enforcement in the importing country also matter for trade. More especially, there are at least two arguments which suggest that financial development in the importing country could increase exports towards this country. First, a high level of financial development increase the demand for goods and services, which encourages imports (Fauceglia, 2015). Second, trade flows also depends on trade finance, such as letters of credit and export credit insurance. Let us remind that letters of credit requires two banks: the exporters’ and the importer’s one. Similarly, insurance companies implanted in the destination country are likely to have better information about importers. Hence, having a well developed financial system in the importing country may encourage the use of trade finance tools. This idea is well illustrated by Cabalero et al. (2018). Using a gravity model, they show that when two countries are linked through cross-border syndicated bank lending, one observes an increase in trade flows between them.

Moreover, the second argument also suggests that the trade boosting effect of financial development (especially intermediated finance) in the importing country is mitigated by the existence of an RTA between the exporting and the importing country. Indeed, because RTAs reduce the amount of export costs to finance with external funds, the effect of having a well developed trade finance sector, such as banks or insurance companies, in the importing country, should be weaker.

Taken together, these arguments lead us to state the following testable assumption:

H2: The export-promoting role of financial development in the importing country (especially intermediated finance) should be stronger when there is no RTA between the exporting and the importing country.

To check for H2, we take the gravity equation 5 and replace FD_{it} by FD_{jt} , which denotes the level of financial development in importing countries. Thus, we estimate the following model:

$$X_{ijt} = \exp [\beta_0 CONTROL_{ijt} + \beta_1 RTA_{ijt} + \beta_2 (FD_{jt} \times INTL_{ij}) + \beta_3 (FD_{jt} \times INTL_{ij}) \times RTA_{ijt} + \pi_{it} + \mu_{jt} + \gamma_{ij}] + \epsilon_{ijt} \quad (6)$$

where $BCREDIT_{jt}$, $BFICREDIT_{jt}$, $VALUE_{jt}$ and $CAPL_{jt}$ are defined in the same way as those for the exporter side. As noted in previous section, due to perfect collinearity issues, we are unable to estimate in a unique gravity model the impact of both exporter-specific and importer-specific variables. As a result, following our econometric approach, we have to neglect the financial development variable in exporter side in order to estimate the impact of those in importer side.

We obtain estimates of gravity equation 6 in specifications (1), (3), (5), (7) in Table 3, which correspond to $BCREDIT_{jt}$, $BFICREDIT_{jt}$, $VALUE_{jt}$ and $CAPL_{jt}$, respectively. First, one observe that in all specifications in Table 3, RTA_{ijt} has a positive effect on exports. One also observe that the coefficient β_2 is significant and positive. Moreover, the coefficient β_3 is significant and negative, but only in variant [3], i.e., when the level of financial development is measured through the large definition of intermediated finance. This result corroborates H2, which states the trade-boosting effect of financial intermediation development in the importing country is mitigated when there exists a RTA between both trading partners.

To conduct a sensitivity analysis, we go around the perfect collinearity problems by introducing different financial development indicator for exporter side and importer side in the same gravity equation. For example, we include simultaneously $BCREDIT_{it}$ for exporting country and $BFICREDIT_{jt}$ for importing country in a unique equation, and vice versa. Similarly, we introduce simultaneously $CAPL_{it}$ and $VALUE_{jt}$ in the same model, and vice versa. Although there exists a certain degree of correlation within a same type of financial development indicator (intermediated finance and market-based finance), the value of $BCREDIT$ is different from $BFICREDIT$, and the value of $CAPL$ is also different than $VALUE$. Thus, we can avoid the problem of perfect collinearity by carrying out this approach.

Variants [2], [4], [6] and [8] in Table 3 indicate that, except in variant [4], the coefficient for this variable has a significant and positive sign. Hence, financial development in the exporting country has a favorable impact on exports from this country. It is also noteworthy that the

Table 3: PPML estimation results with financial development in the importing country

Specifications $FD_{jt} =$ $FD_{it} =$	Intermediated finance		Bank-based finance		Intermediated finance		Bank-based finance	
	\emptyset	BCREDIT	\emptyset	BFICREDIT	\emptyset	CAPI	\emptyset	CAPI
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$(FD_{it} \times INTL_{ij})$		1.136*** (0.13)		0.107 (0.14)		0.219* (0.11)		0.220*** (0.05)
$(FD_{jt} \times INTL_{ij})$	0.761*** (0.13)	0.086 (0.14)	1.117*** (0.09)	1.109*** (0.13)	0.323*** (0.03)	0.206*** (0.05)	0.401*** (0.11)	0.195* (0.11)
RTA_{ijt}	0.629*** (0.10)	0.893*** (0.09)	0.776*** (0.08)	0.877*** (0.08)	0.311*** (0.07)	0.329*** (0.08)	0.332*** (0.09)	0.302*** (0.08)
$(FD_{it} \times INTL_{ij}) \times RTA_{ijt}$		-0.398*** (0.06)		-0.259*** (0.09)		-0.071 (0.08)		0.001 (0.04)
$(FD_{jt} \times INTL_{ij}) \times RTA_{ijt}$	-0.159 (0.12)	-0.181* (0.10)	-0.399*** (0.09)	-0.328*** (0.09)	-0.008 (0.05)	0.033 (0.05)	-0.030 (0.09)	-0.015 (0.08)
Nb. Obs.	96,396	93,620	96,741	93,620	70,939	59,156	70,116	59,166
Exporter-time effects	yes	yes	yes	yes	yes	yes	yes	yes
Importer-time effects	yes	yes	yes	yes	yes	yes	yes	yes
Exporter-importer effects	yes	yes	yes	yes	yes	yes	yes	yes

Notes: All specifications are performed in panel data framework including exporter-time, importer time and country-pair fixed effects. All estimates are obtained by employing the PPML estimation. The dependent variable is the international trade or domestic trade flows in level. Estimates of the constant term, as well as estimates of all fixed effects dummies are omitted for brevity. Columns (1), (3), (5) and (7) reports estimates with only importing country's financial development indicators. Columns (2), (4), (6) and (8) reports results obtained with both exporter and importer's financial development variables. Standard errors are reported in parentheses and clustered by country-pair level. *, **, *** denote significance respectively at the 10%, 5% and 1% level.

coefficient for the interaction term $(FD_{it} \times INTL_{ij}) \times RTA_{ijt}$ is significant and negative but only in specifications (2) and (4), i.e., when financial development indicator is measured through intermediated finance indicators (*BCREDIT* or *BFICREDIT*). This corroborates the results we obtained in Section 4. Turning to the impact of financial development in the importing country, variants [4], [6] and [8] exhibit the same findings as variants [3], [5], [7]. This indicates that the boosting impact of intermediated finance in the importing country and its interaction with RTAs still prevails, even when the level of financial intermediation in the exporting country is included in the estimation. Finally, these results corroborate H2, which states that the existence of an RTA between two trading partners mitigates the favorable impact of financial development, especially intermediated finance, in the destination country. In line with Cabalero (2013), Schmidt-Eisenlohr (2013), Fauceglia (2015) and Niepman and Schmidt-Eisenlohr (2017), they also suggest that financial development, not only in the exporting but also in the importing country, matters for international trade.

6 Conclusion

The goal of the paper was to check whether the favorable impact of financial development on exports is particularly strong when upfront export costs are high, i.e. when there is no RTA between the exporting and the importing countries. Estimating a gravity model on a data set of 69 developed and developing countries over the period 1986-2006, we show that financial development in the exporting country, as measured by a ratio of intermediated credit to GDP, boosts exports all the stronger when the exporting and the importing countries are not

involved in an RTA. However, we find no effect when financial development is proxied by stock market ratios. Finally, we also obtained evidence that the existence of a RTA also mitigates the trade-promoting impact of financial development in the importing country.

Our paper thus contributes to the literature on the interactions between financial regulation and trade openness and their effect not only on trade but also on productivity (Taylor, 2010 ; Peters and Schnitzer, 2015 ; Topalova and Khandelwal, 2011) and growth (Chang et al., 2009). It also provides additional support to the view that intermediated finance and arm's length finance do not have the same characteristics as regards the financing of real economy (Allen and Gale, 2000). While this debate on "banks versus financial markets" usually focuses on the financing of firms' investment, our paper shows that such an opposition is also relevant for trade finance. More especially, we provide additional support to the view that developing financial intermediation is more effective than relying on market-based finance to boost trade.

Our work could be enriched in several ways. First, when disaggregating the regional agreement variable to estimate the impact of being involved in a particular RTA on export flows, we observed that some of the RTAs included in our data set amplify (rather than mitigate) the export-promoting effect of financial development. Hence, it would be interesting to explore the theoretical rationale for such interactions. Second, given that the quality of matters both for trade and finance, we could extend our work by checking in what extent the interactions between RTAs and financial development are affected by the quality of the legal framework in the exporting and importing countries.

Appendix

Table 4: List of countries in the data set

Argentina, Australia, Austria, Belgium-Luxembourg, Bolivia, Brazil, Bulgaria, Canada , Cameroon, Chile, China, Colombia, Costa Rica, Cyprus, Denmark, Ecuador, Egypt, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Japan, Kenya, Kuwait, Macau, Malawi, Malta, Malaysia, Morocco, Mauritanius, Mexico, Myanmar, Netherlands, Nepal, Niger, Nigeria, Norway, Panama, Philippines, Poland, Portugal, Qatar, Romania, Senegal, South Africa, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Tanzania, Thailand, Trinidad & Tobago Tunisia, Turkey, United Kingdom, USA, Uruguay

Table 5: Summary statistics for dependent and explanatory variables

Variables	Nb. obs.	Mean	Sd	Min	Max
X_{ijt}	99,981	3,266	61,861	0	4,233,436
$BCREDIT_{it/jt}$	97,014	0.582	0.423	0.013	2.625
$BFICREDIT_{it/jt}$	96,669	0.539	0.390	0.013	2.625
$VALUE_{it/jt}$	77,487	0.256	0.395	0	3.034
$CAPI_{it/jt}$	75,003	0.519	0.593	0	7.147
RTA_{ijt}	99,981	0.113	0.317	0	1
$DISTANCE_{ij}$	99,981	7,491	4,503	1.881	19,658
$INTL_{ij}$	99,981	0.986	0.120	0	1
$CONTIGUITY_{ij}$	99,981	0.024	0.153	0	1
$LANGUAGE_{ij}$	99,981	0.126	0.331	0	1
$COLONY_{ij}$	99,981	0.024	0.153	0	1
$CURRENCY_{ij}$	99,981	0.025	0.156	0	1
$RELIGION_{ij}$	99,981	0.169	0.255	0	0.988
$LEGAL_{ij}$	99,981	0.349	0.477	0	1

Table 6: Correlations between financial development indicators

	BCREDIT	BFICREDIT	VALUE	CAPI
BCREDIT	1			
BFICREDIT	0.934	1		
VALUE	0.503	0.580	1	
CAPI	0.528	0.576	0.730	1

Table 7: List of RTAs and member countries included in the data set

Agreement	Year	Member countries
ASEAN	2000	Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand
Agadir	2006	Egypt, Jordan, Morocco, Tunisia
Andean Community	1993	Bolivia, Colombia, Ecuador
CEFTA	1993	Poland (1993-2004), Hungary (1993-2004), Romania (1997-2004), Bulgaria (1998-2004)
EFTA	1960	Norway, Switzerland, Iceland (1970), Portugal (1960-1986), Austria (1960-1995), Sweden (1960-1995) Finland (1986-1995)
EU	1958	Belgium-Luxembourg, France, Italy, Germany, Netherlands, Denmark (1973), Ireland (1973), United Kingdom (1973), Greece (1981), Portugal (1986), Spain (1986), Austria (1995), Finland (1995), Sweden (1995), Cyprus (2004), Malta (2004), Hungary (2004), Poland (2004)
Mercosur	1995	Argentina, Brazil, Uruguay
NAFTA	1994	Canada, Mexico, United States
Pan Arab Free Trade Area	1998	Egypt, Kuwait, Jordan, Morocco, Qatar, Tunisia
EFTA's outside agreements		Turkey (1992), Bulgaria (1993), Hungary (1993), Israel (1993), Poland (1993), Romania (1993), Mexico (2000), Morocco (2000), Singapore (2003)
EU's outside agreements		EFTA (1973), Cyprus (1988), Hungary (1994), Poland (1994), Bulgaria (1995), Romania (1995), Turkey (1996), Tunisia (1998), Israel (2000), Mexico (2000), Morocco (2000), Chile (2003), Egypt (2004)
Other free trade agreements		Australia-Singapore (2003), Australia-Thailand (2005), Australia-U.S. (2005), Bulgaria-Israel (2002), Bulgaria-Turkey (1998), Canada-Chile (1997), , Canada-Costa Rica (2003), Canada-Israel (1997), Canada-U.S. (1989), Chile-China (2006), Chile-Costa Rica (2002), Chile-Mexico (1999), Chile-Singapore (2006), Chile-South Korea (2004), Chile-U.S. (2004), Colombia-Mexico (1995), Costa Rica-Mexico (1995), Egypt-Turkey (2006), Hungary-Israel (1998), Hungary-Turkey (1998), Israel-Mexico (2000), Israel-Poland (1998), Israel-Romania (2001), Israel-Turkey (2001), Japan-Mexico (2005), Jordan-U.S. (2002), Mercosur-Andean (2005), Mercosur-Bolivia (1996), Mercosur-Chile (1996), Mexico-Uruguay (2005), Morocco-U.S. (2006), Poland-Turkey (2000), Romania-Turkey (1998), Singapore-U.S. (2004), Tunisia-Turkey (2006)

Source: Baier et al. (2016) Years in parentheses indicate the date of entry into force of RTAs or the date when new member countries join in RTAs.

Andean Community, EU, Mercosur, EU-Turkey denote a deeper level of integration (e.g., a customs union).

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