Complementarity between Bilateral Trade and Financial Integration

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Abstract

This paper explores the complementarities between bilateral trade in goods and financial assets. By utilizing a gravity model specification with an extended dataset in terms of time span and asset classification as well as alternative instrumental variables, we confirm the existence of positive evidence for complementarities. We find that common factors such as bilateral distance and other economic size variables that determine both cross-border trade and financial flows contribute to complementarity. However, the fact that the estimated coefficients of distance for financial transactions are about half the size of those for trade in goods suggests that physical distance is less important for financial transactions. Furthermore, the significance of distance in explaining bilateral transactions disappears when trade is added as an additional explanatory variable, indicating that distance may not directly influence financial flows. Finally, we also find that there exists another important factor that is responsible for the complementarities that exist between trade and financial integration. This additional factor is a direct causal relationship that acts from both directions between trade in goods and financial transactions, while the directional effects from trade in goods to financial transactions are much stronger.

JEL Classification: F15, F36

Keywords: Trade integration; Financial integration, Gravity model

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1. Introduction

As globalization progresses, the relationship between trade integration and financial integration raises important questions. Though not directly related, there is evidence that countries which are more open to trade are also more financially open (Lane 2000; Heathcote and Perri 2004). Aizenman and Noy (2004) explain these findings theoretically by showing the endogenous determination of financial and trade openness. Feeney (1994) also concludes that the relationship between international asset markets and international trade in goods is complementary, that the risk diversification via asset markets encourages greater specialization in production, and finally, that it causes the pattern of consumption to diverge further from the pattern of production.

However, none of the above studies imply that the directions of trade in goods and financial assets are bilaterally identical. In fact, there is a strong theoretical argument that the determinants of the pattern of trade in goods are in general different from those of the pattern of trade in assets. For instance, in order to diversify portfolios, investors may want to buy equity more from a distant country than a neighboring one, since business cycle co-movements tend to be lower for a pair of countries that are more distant.

Nevertheless, recent empirical studies show that the directions of trade flows generally coincide with those of asset flows. Lane and Milesi-Feretti (2004), Portes and Rey (2005), and Aviat and Coeurdacier (2006), by analyzing bilateral trade flows and asset flows, conclude that trade in goods is strongly biased toward trade in assets.

Several channels have recently been emphasized to explain the bilateral complementary relationship between trade in goods and assets. First, Portes and Rey (2005) give an account of this complementary relationship by showing that the geography of information affects trade in assets. They argue that distance, which is a proxy for information costs, strongly impedes asset trade flows. Since distance is strongly negatively related to trade in goods as well, directions of trade in assets and goods tend to coincide.[1] The findings of Portes and Rey further suggest that if information costs decline as trade in goods increases, this increased amount of information flow should facilitate trade in assets. Therefore, the relationship between trade in goods and assets can be complementary.

Second, Obstfeld and Rogoff (2000) argue that trade costs in the goods market produce a bias in consumption toward domestic products, which would result in reducing incentives for holding foreign assets as well.[2] This is because foreign earnings are eventually subject to trade costs if they are redeemed in foreign goods and transported to domestic countries.[3] Lastly, Rose and Speigel (2002) postulate that creditors favor countries with whom they share closer trade links, because debtors fear that defaults might lead to a decrease in international trade. They also confirm the hypothesis that international trade patterns determine lending patterns.

In this paper, we attempt to empirically investigate why there exist complementarities between trade and financial integration by adopting a gravity model specification with an extended data set in terms of time span and asset classification, as well as alternative instrumental variables. We find positive evidence for the complementarities between the two

[1] This finding came as a surprise, since financial assets were regarded as not subject to transaction costs that are usually proxied by distance. Moreover, if greater distance between the source and host country is associated with reduced correlation of asset returns, then the source country's asset flows should be biased toward the distant host countries because of the greater possibility of risk diversification. This is dubbed the distance puzzle.

[2] Lane and Milesi-Feretti (2004) provide an N-country generation of the Obstfeld and Rogoff model.

[3] On the contrary, Coeurdacier (2005) shows that trade costs worsen the home bias in the portfolio puzzle.

integrations. We find that the complementarities are due to common factors such as bilateral distance and other economic size variables that determine both cross-border trade flows and financial flows. However, the fact that the estimated coefficients of distance for financial transactions are about half the size of those for trade in goods suggests that physical distance is less important for financial transactions. Furthermore, the significance of distance in explaining bilateral flows disappears as trade is added as an additional explanatory variable, indicating that distance may not directly influence financial flows.

We also find that there exists another important factor that is responsible for the complementarities between trade and financial integration. This additional factor is a direct causal relationship that acts from both directions between trade in goods and financial transactions. That is, even after controlling for the common factors that influence complementarity, we find that deeper trade integration enhances financial integration and vice versa.

This paper is organized as follows. First, we provide stylized patterns of trade and financial integration by analyzing bilateral trade and asset flows in section 2. In section 3, we investigate the relationship between financial integration and trade integration by adopting a gravity model. In section 4, we conclude with a summary of the paper.

2. Stylized Patterns of Trade and Financial Integration

In this section, we examine the data to build up some stylized patterns of the relationship between trade and financial integration, and investigate whether trade integration deepens with financial integration on a bilateral basis. Depending on the extent of a country's trade in goods with another, the trading of financial assets may be facilitated as well, or vice

versa. This interrelation can be verified by calculating, for a particular country, its bilateral trade intensity with other countries and comparing it with the financial intensities between these countries.

2-1 Data

We need to collect data on international asset holdings as well as trade flows on a bilateral basis. There are limited sources for such data on cross-border financial transactions. The most widely used data on financial asset holdings is from the Coordinated Portfolio Investment Survey (CPIS), published by the International Monetary Fund (IMF). The IMF conducted a survey on international portfolio asset holdings for the first time in 1997, and annually since 2001. The first CPIS involved 20 economies, and then expanded to include 67 source economies, including several offshore and financial centers in 2001. In each case, the bilateral positions of the asset holdings of the source countries in 223 destination countries/territories were reported.[4] The total portfolio asset holdings consists of three components: short-term debts, long-term debts, and equities. Problems of survey methods and under-reporting of assets by participating countries were pointed out as shortcomings of the CPIS data (Lane and Milesi-Ferretti 2003). Nevertheless, the CPIS survey provides a unique opportunity to examine the foreign equity and debt holdings of a wide set of participating countries.

The CPIS data set is supplemented by data on international bank claims reported to the Bank for International Settlements (BIS). These are the consolidated international bank claims of BIS reporting banks by nationality of lenders and borrowers. We gathered these data for 25 reporting countries from the BIS Quarterly Review.[5] The data are available from 1983 to 2004

[4] Refer to the IMF website at http://www.imf.org/external/np/sta/pi/cpis.htm for details.
[5] Refer to the BIS website at http://www.bis.org/statistics/histstats10.htm for details.

on a biannual basis, but most countries report bilateral data extensively starting from 1999. We have also obtained compatible data for South Korea from its supervisory authority.

Other data sources are more standard. The bilateral trade data are collected from the *Directions of Trade* dataset. The data for GDP, exchange rates, and population are from the *International Financial Statistics*. We also add other control variables related to various measures of distance and size used in a standard gravity equation obtained from the dataset provided by Rose (2004).

2-2 Stylized Patterns

In order to compare trade integration with financial integration we need to define two intensity measures corresponding to each integration progress. Since the financial asset holdings data are defined with a clear distinction between the source and destination countries, we also define trade intensity in a comparable way based on export data as follows:

$$\text{tradeint}_{sdt} = \frac{x_{sdt}}{X_{st}}$$

where x_{sdt} is exports from source country *s* to destination country *d* at time *t* and X_{st} is total global exports for source country *s* at time *t*. Note that the trade intensity measure is based solely on export data.

While measuring trade intensity is straightforward, there are a few concerns about measuring financial intensity. First, bank loan data is available only in the form of stock data. It is generally difficult to record the entire flow of financial assets accurately. Hence we expect financial flow data to be subject to numerous errors. While the CPIS also reports flow data for other financial asset transactions, we restrict our attention to stock data in order to maintain

consistency and minimize errors. Second, there are four categories of financial asset holdings available: bank loans, short-term debts, long-term debts, and equities. Depending on which classification of assets we use, we can calculate four measures of financial intensity. To ensure robust checking and to observe any differences arising from the different nature of financial transactions, we analyze the four cases below.

The comparable way to define the measure of financial intensity is quite straightforward, and is as follows:[6]

$$\text{loanint}_{sdt} = \frac{l_{sdt}}{L_{st}}, \quad \text{stdint}_{sdt} = \frac{std_{sdt}}{STD_{st}}, \quad \text{ltdint}_{sdt} = \frac{ltd_{sdt}}{LTD_{st}}, \text{ and } \quad \text{eqint}_{sdt} = \frac{eq_{sdt}}{EQ_{st}}$$

where l_{sdt}, std_{sdt}, ltd_{sdt} and eq_{sdt} are bank loans, short-term debts, long-term debts, and equities held by source country *s* in destination country *d* at time *t,* and where L_{st}, STD_{st}, LTD_{st}, and EQ_{st} are total bank loans, total short-term debt, total long-term debt, and total equity held by source country *s* at time *t.*

Figure 1 illustrates the time pattern of correlation between trade intensity and financial intensity for each individual source country. Figure 1.A looks at when financial intensity is measured based on bank loans. In other words, we illustrate corr(tradeint_{sdt}, loanint_{sdt}) for all 25 reporting source countries from 1983 to 2004. The figure suggests that the correlation measure has generally been increasing, indicating that the interrelation between trade integration and financial integration has been getting stronger. Figures 1.B–D show the time pattern of financial intensity based on other financial asset categories, i.e. corr(tradeint_{sdt}, stdint_{sdt}), corr(tradeint_{sdt}, ltdint_{sdt}), and corr(tradeint_{sdt}, eqint_{sdt}) respectively. Since the CPIS data

[6] In the literature, an alternative indirect measure of financial intensity (or integration) is suggested based on financial price data such as interest rate movements. For example, we can define financial intensity based on how closely interest rates are moving across countries.

started from 1997 and those years before 2001 are missing, the sample size is relatively short and we cannot obtain a clear time-series pattern from the figures. However, the data cover more source countries and the level of correlation itself is comparably high for most asset categories and for most source countries.

3. A Gravity-Model Test of the Interaction between Trade and Financial Integration

While the analyses in the previous section suggest that trade integration is closely related to financial integration, the results do not explain why such complementarities exist. In this section, by adopting a gravity model, we will attempt to investigate the reasons for the complementarities. We will also examine if there is a causal relationship between financial integration and trade integration.

In the gravity model estimation, for every country, the nominal values of both trade volumes and financial assets are converted to real values using the common US GDP deflator.[7] To compare the roles of financial assets among the four classifications evenly, we restrict the sample to the observations where there are no missing data for trade, asset holdings, or GDPs of source and destination countries.

The dataset resembles a panel structure consisting of 5,940 annual observations for the years 1997, 2001, 2002, and 2003 clustered by 2,049 country pair groups. The number of observations varies per year. Summary statistics for the dataset used in the estimation are presented in table 1. The average size of bank loans is larger that that of the other three financial assets. After normalizing by average size, volatility is also the lowest for bank loans. In general, the size of aggregate and per capita GDP for source countries is much larger than

[7] For an ideal case, it would be preferable to use a separate deflator for each country, but such deflators in a unified framework are not available.

that for destination countries, reflecting that financial capital moves from larger and developed countries to smaller and less developed countries. In the sample, 3% of country pairs share a common land border, 5% have experienced a colony-colonizer relationship, and 14% share a common language.

The analytical tool adopted in this section is the gravity model, originally developed as an explanation for the gravitational forces in physics. The model was successfully adapted by economists to explain trade in goods flows in empirical studies without firm theoretical grounds. In its basic form, trade between two countries is assumed to depend positively on their total income and negatively on the distance between them. The great empirical success of the gravity model in explaining bilateral goods trade flows has motivated a number of theoretical models to justify it.[8] These models have generated a theoretically justified simple form of the gravity equation as follows:

$$\ln(x_{sdt}) = t_{sdt} + \ln(GDP_{st}) + \ln(GDP_{dt}), \quad (1)$$

where t_{sdt} expresses the transaction costs of trade between source country *s* and destination country *d*, and GDP_{st} and GDP_{dt} are the GDPs for source country *s* and destination country *d* respectively at time *t*.

The model can be extended by permitting the coefficients of the GDP to be freely estimable, specifying the transactions costs based on observed variables and adding other relevant explanatory variables. Then the final form can be constructed as follows:

[8] See Anderson (1979), Bergstrand (1985), and Evenett and Keller (2002) for the theoretical background of the gravity equation.

$$\ln(x_{sdt}) = \beta_0 + \beta_1 \ln(GDP_{st}) + \beta_2 (GDP_{dt}) + \beta_3 \ln(GDP_s / Pop_s)_t + \beta_4 \ln(GDP_d / Pop_d)_t + \beta_5 \ln(Areas_s Area_d) + \beta_6 \ln(dist_{sd}) + \beta_7 Border_{sd} + \beta_8 Colony_{sd} + \beta_9 Language_{sd} + \varepsilon_{sdt} \quad (2)$$

where *s* and *d* denote source and destination countries, *t* denotes time, *Pop* is Population, *Area* is the size of land area of the country, *Dist* is the distance between *s* and *d*, *Border* is a binary variable which is unity if s and d share a land border and *Language* is a binary variable which is unity if s and d have a common language.

It is now standard to add per capita GDP into the gravity equation, as the size of trade volume is closely related to the level of economic development. Other control variables mainly represent transaction costs.

Table 2 presents the estimation results of specification (2). Two estimation approaches are adopted: column (1) reports random-effects estimation and column (2) reports between-effects estimation results.[9] In both cases, we find that the gravity model fits the data very well and that most estimated coefficients are statistically significant with the expected sign. To briefly summarize the common features of the random- and between-effects estimation results, the estimated coefficients for the bilateral distance, and the size of the area are significantly negative and the estimated coefficients for the log of GDP for source and destination countries, a common land border dummy, and a common language dummy are significantly positive. It is interesting to note that the level of per capita GDP is generally not statistically significant. The

[9] We omit the fixed-effect "within" estimation results. This method can provide more consistent estimates by controlling for influences from omitted country-specific factors. One drawback of this fixed-effect approach is, however, that since the fixed effect estimator exploits variation over time, we cannot obtain estimates for the coefficients of time-invariant factors such as distance, area, land border, and language. We believe that the fixed-effect estimation is not appropriate for our analysis since the time span of our sample is too short.

only exception is the level of per capita GDP of destination countries in the between-effects estimation, in which case the coefficient of it is positive and statistically significant at the 5% level.

The above regression results suggest that a gravity model works well in explaining the trade in goods volume for our sample. This confirms previous findings of the empirical success of the gravity model in the literature. The model clearly shows that the trade in goods volume is positively related to the economic size of the countries and negatively related to broad representations of transactions costs.

Now, by adding financial asset holdings as an additional explanatory variable, we investigate whether financial integration boosts trade integration as well. In order to avoid an endogeneity problem, we use a lagged instead of a contemporaneous value of financial asset holdings and present the estimation results in table 3.[10] As before, tables 3.A and B respectively report random- and between-effects estimation results, and columns (1), (2), (3), and (4) correspond to the cases where bank loans, short-term debts, long-term debts, and equities represent financial assets, respectively.

When we add bilateral financial asset holdings as a regressor variable, most other coefficients preserve the same sign with statistical significance. Furthermore, the sizes of other coefficients change little, suggesting that adding financial asset holdings data does not obscure the explanatory power of other variables. Most importantly, the coefficient of financial asset holdings is positive and statistically very significant in all four cases. The estimated coefficients suggest that a 1% increase in various financial asset holdings leads to a 0.06 to 0.22% increase in trade volume. Overall, these results indicate that financial integration

[10] If a financial asset holdings series exhibits autocorrelation, which is the case in our sample, even employing a lagged variable does not entirely cure the endogeneity problem. Later, we will try to undertake an alternative way to avoid the problem by taking an instrument variable approach.

enhances further trade integration.

While the results in table 3 are suggestive, we should be cautious in strongly arguing for the existence of a causal relationship between financial and trade integration due to the problem of endogeneity. Namely, there is the possibility that financial integration is inversely affected by trade integration, or that a third factor influences both integrations simultaneously. In order to overcome the endogeneity issue, we apply an instrumental variable approach. We believe that there exist some variables that are reasonably assumed to be relevant to financial investments but not to trade in goods. These variables are "corruption," "socio," and "financial risk." The corruption index is an assessment of corruption within the political system. The socio index is an assessment of the socioeconomic pressures at work in a society that could constrain government action or fuel social dissatisfaction. The financial risk index is to provide a means of assessing a country's ability to pay its own way. In essence, this requires a way to measure a country's ability to finance its official, commercial, and trade debt obligations. These indexes are collected from the International Country Risk Guide.[11]

The instrumental variable estimation results are reported in table 4. Since most instrumental variables are not time varying, only the between-effects estimation that solely relies on the cross-sectional dimension is reported. We find that the coefficient of financial asset holdings is statistically very significant, while, in general, its size is slightly reduced. Hence, the results confirm our conclusion that financial integration boosts trade integration.

We now turn to the determinants of bilateral financial integration. As a benchmark, we set up a gravity model of bilateral financial asset holdings in a similar manner. Compared to a long history of empirics and theoretical foundations of the gravity model to explain bilateral

[11] For details on the ICRG, refer to www.icrgonline.com.

trade flows, there have been relatively few attempts made to utilize it to explain financial transactions. The main reason is that unlike goods, financial assets are weightless, and hence transaction costs involved with financial transaction costs are hard to measure. However, Portes and Rey (2005) find that the gravity model performs at least as well in explaining assets trade as it does in explaining trade in goods.[12] Justifying the negative impact of distance on financial asset trade, Portes and Rey interpret this as reflecting that information friction is positively correlated with distance. Following their approach, this paper also uses the same gravity model used to explain goods trade flows by replacing trade volume with financial asset holdings in equation (2).

Table 5 reports the estimation results for the gravity model of financial asset holdings. Tables 5.A and B present the random- and between-effects estimation results respectively. In both tables, columns (1), (2), (3), and (4) correspond to the cases where bank loans, short-term debts, long-term debts and equities are used for financial assets.

Consistent with Portes and Rey, we find that the gravity model fits the data very well. The signs of the coefficients are generally the same as those for the gravity model of trade in goods. In particular, the estimated coefficients for bilateral distance are significantly negative and the estimated coefficients of the log of GDP for both the source and the destination countries, a common land border dummy and a common language dummy are significantly positive. However, unlike the gravity model for goods trade, the coefficients of per capita GDP for both source and destination countries are significantly positive, indicating that financial asset transactions are higher for more developed countries. Interestingly, the coefficient of per capita GDP for the source country is much larger, reflecting that more developed countries make financial investments more heavily.

[12] See subsequent research, including Buch (2002, 2003), Yildrim (2003), and Lane and Milesi-Ferritti (2004).

Our results indicate that there are some common factors such as distance and GDP that are important elements in determining both cross-border trade flows and financial flows. This fact can explain the observed complementarities between bilateral trade and financial integration. However, the fact that the estimated coefficients of distance for financial transactions are about half the size of those for goods trade suggests that physical distance is less important for financial transactions. In contrast, the coefficients of common language are even larger for bank loans and equities than those for goods trade, which reflects the importance of information or communication in financial transactions.

The above regression results also suggest that a gravity model can be appropriately used as a benchmark to explain normal financial asset exchanges. Now we investigate whether trade integration enhances financial integration by adding trade volume as an additional explanatory variable. In order to avoid an endogeneity problem we use a lagged instead of a contemporaneous value for trade volume and present the estimation results in table 6. As before, tables 6.A and B report random- and between-effects estimation results respectively and columns (1), (2), (3), and (4) correspond to the cases where bank loans, short-term debts, long-term debts, and equities are used for financial assets.

As trade volume is added, the importance of aggregate GDP becomes much weaker as absolute value gets smaller, sometimes exhibiting a negative sign. However, the importance of per capita GDP is preserved with little change in the sizes of the coefficients. Interestingly the importance of distance, colony, and common language dummies almost disappears in the sense that the estimated coefficients of those variables are in many cases insignificant, much smaller in absolute value or even of a negative sign.

The most important feature in table 6 is, however, that the coefficient of lagged trade volume is large, positive, and statistically very significant. Except for per capita GDP, it seems

that the importance of trade dominates other variables in explaining financial transactions. The size of the coefficient is largest when bank loans are the dependent variable, so that a 1% increase in trade leads to almost the same percentage increase in bank loans. It is instructive to compare the importance of trade in explaining financial transactions to that of financial transactions in explaining trade. The size of the coefficient of trade in table 6 is much larger than the size of the corresponding coefficient of financial assets in table 3, indicating that while trade and financial transactions reinforce each other, the directional effects from trade to financial transactions are much stronger.

While the results in table 6 are suggestive, we once again perform the instrumental variable estimation to overcome the endogeneity issue. We believe that tariffs on imported goods imposed by the destination countries can act appropriately as an instrumental variable for trade as they were expected to heavily influence trade but not financial transactions. The tariff data are taken from the World Integrated Trade Solution (WITS),[13] which contains the tariff rates of the UNCTAD TRAINS Database.

Table 7 presents the results from the instrumental variable estimation. Since the tariff data available is not time varying, only the between-effects estimation results are reported. We find that the coefficient of lagged trade is still statistically very significant and the size of it is even larger. Therefore, we conclude that the evidence that more trade causes further financial integration is quite strong.

Our analysis sheds new light on the complementarities between bilateral trade in goods and assets transactions. The gravity model analysis suggests that there are some common factors that explain both goods and financial transactions, which contribute to complementarity. In addition, we also find that there are some direct effects of a causal relationship between the

[13] http://wits.worldbank.org/.

two integrations, which indicates that if one integration is strengthened, the other integration is enhanced. We believe that this is another important source of complementarity between trade and financial integration.

4. Conclusion

It is not necessary for the direction of capital flows to be identical to that of trade flows. If capital flows pursue the liquid and efficient global market, trade can go in the other direction. However, recent empirical research has determined that international portfolio holdings are determined by market size, transaction costs, and information costs (represented by the physical distance between the capital cities of two economies). That is to say, financial market size and distance variables are powerful explanatory variables, and economies with a larger domestic market tend to hold a greater quantity of foreign assets. Lane (2000) suggests that, in a cross-section of economies, gross international investment positions are positively associated with trade openness and a large domestic financial market. Possible explanations for this are that these factors that stimulate trade in goods can also stimulate trade in assets and that trades in goods and assets are complementary activities.

We confirm the complementarities between bilateral trade in goods and assets by utilizing a gravity model specification with extended data in terms of time span and asset classification as well as alternative instrumental variables. The gravity model for financial assets generate that the estimated coefficients for the bilateral distance are significantly negative and the estimated coefficients of the log of GDP for source and destination countries, a common land border dummy, and a common language dummy are significantly positive. However, unlike the gravity model for trade, the coefficients of per capita GDP for both source and

destination countries are significantly positive, indicating that financial asset transactions are higher for more developed countries. Interestingly, the coefficient of per capita GDP for the source country is much larger, reflecting that more developed countries make financial investments more heavily. Furthermore, the estimated coefficients of distance are about half the size of those for trade, suggesting that physical distance is less important for financial transactions. In contrast, the coefficients of a common language are even larger for bank loans and equities than those for trade, which reflects the importance of information or communication in financial transactions.

In addition to the common determinants of both trade and financial integration that explain the complementarities between them, we also find that trade in goods encourages trade in assets and vice versa. Moreover, while trade and financial transactions reinforce each other, the directional effects from trade to financial transactions are much stronger. This reinforcement of goods and financial transactions in both directions is also responsible for the complementarities between them. The exact mechanisms of how the two integrations reinforce each other remain to be examined in future research.

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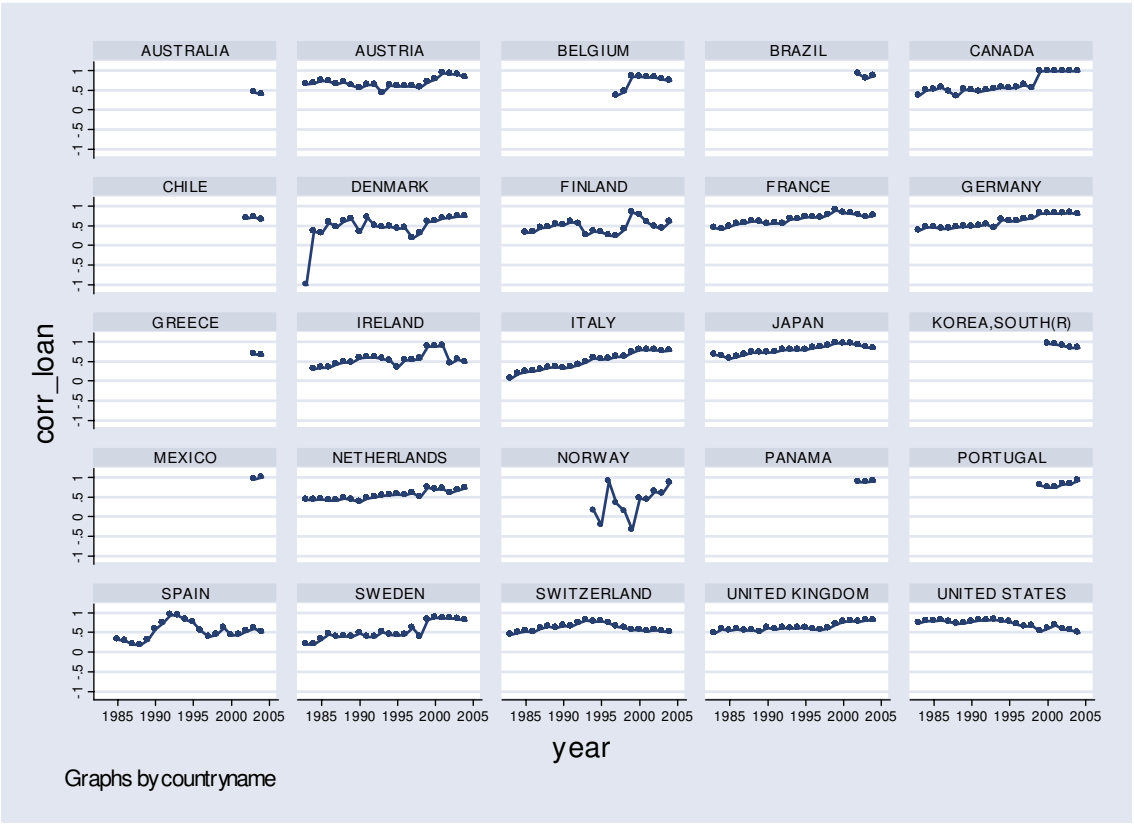
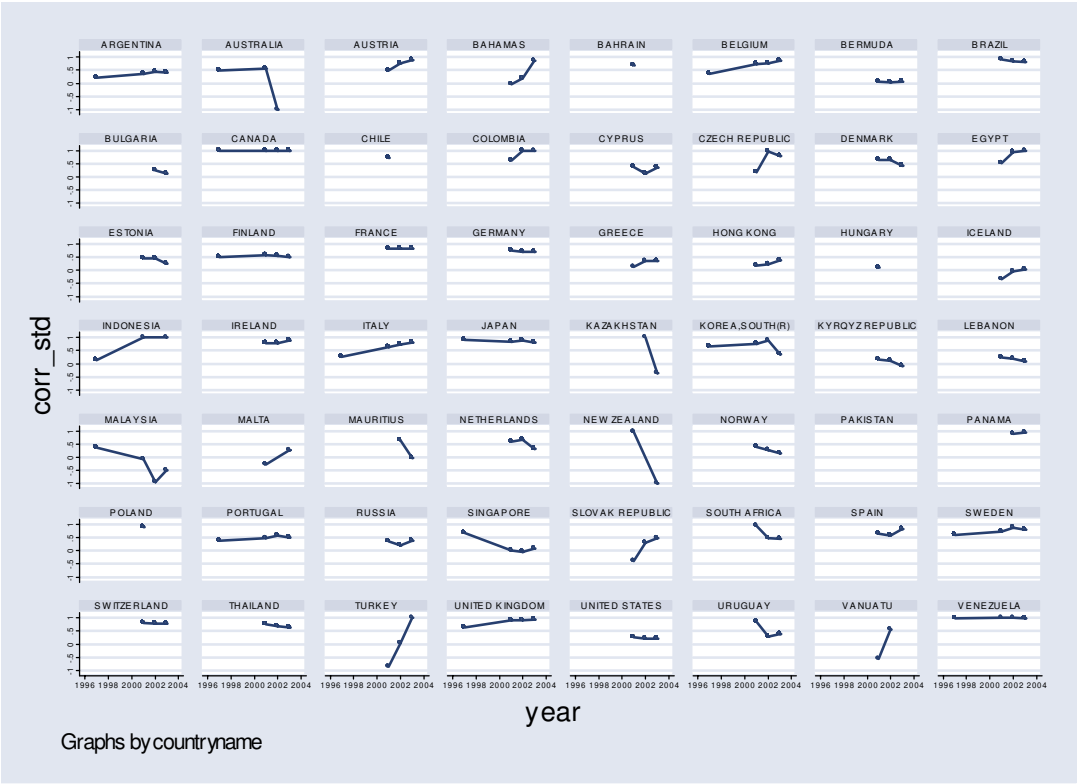
Figure 1. Time Series Patterns of the Relationship between Trade intensity and Financial Intensity

1. A Bank Loans



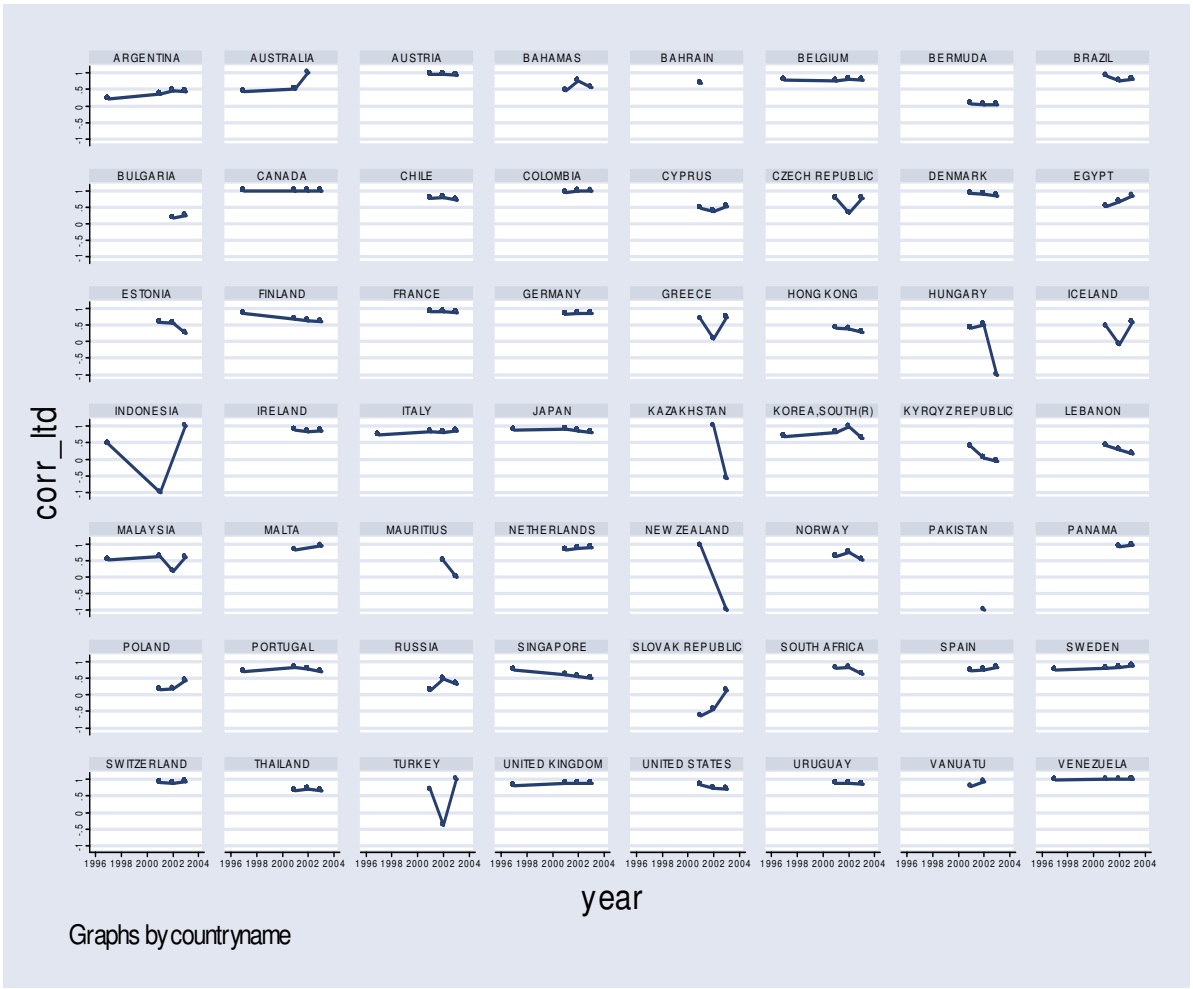
Note: This figure depicts the time pattern of correlation between trade intensity and financial intensity for all 25 individual source countries from 1983 to 2004. The financial intensity is measured based on bank loans and the correlation refers to corr(tradeint_{sdt} , loanint_{sdt}), where tradeint_{sdt} and loanint_{sdt} are trade intensity and financial intensity based on bank loans between source country *s* and destination country *d* at time *t*.

1. B Short-Term Debts



Note: This figure depicts corr(tradeint_{sdt} , stdint_{sdt}), where tradeint_{sdt} and stdint_{sdt} are trade intensity and financial intensity based on short-term debts between source country *s* and destination country *d* at time *t*. For other things, see the note for figure 1.A.

1. C Long-Term Debts



Note: This figure depicts corr(tradeint_{sdt} , ltdint_{sdt}), where tradeint_{sdt} and ltdint_{sdt} are trade intensity and financial intensity based on long-term debts between source country *s* and destination country *d* at time *t*. See also the note for figure 1.A.

1. D Equities

Note: This figure depicts corr(tradeint_{sdt} , eqint_{sdt}), where tradeint_{sdt} and eqint_{sdt} are trade intensity and financial intensity based on equities between source country *s* and destination country *d* at time *t*. For other things, see the note for figure 1.A.

Table 1. Summary Statistics

	Observations (N = 5,940)	
	Mean	Std. Dev
Year	2000.76	2.31
Log of trade	1.35	1.47
Log of loan	1.4	1.8
Log of short-term debt	0.24	0.76
Log of long-term debt	0.88	1.58
Log of equity	0.73	1.47
Tariff	8.13	5.82
Log of GDP of source country	8.69	1.21
Log of GDP of destination country	5.66	2.26
Log of per capita GDP of source country	5.44	0.44
Log of per capita GDP of destination country	3.36	1.66
Product of geographical size	24.40	2.72
Distance	7.99	0.87
Border	0.03	0.17
Colony	0.05	0.21
Common language	0.14	0.34

Note: These summary statistics are based on the bilateral variables for the portfolio holdings and bank claims datasets. See the text for an explanation of the variables and their sources.

Table 2. The Gravity Model for Trade

	Random-Effects	Between-Effects
GDP of source country	0.442***	0.433***
	[0.014]	[0.015]
GDP of partner country	0.423***	0.435***
	[0.011]	[0.011]
Per capita GDP of source country	-0.045	0.056
	[0.029]	[0.034]
Per capita GDP of partner country	0.003	0.028**
	[0.013]	[0.014]
Product of geographical size	-0.045***	-0.044***
	[0.008]	[0.008]
Distance	-0.424***	-0.394***
	[0.020]	[0.020]
Border	1.205***	1.205***
	[0.103]	[0.100]
Colony	0.199**	0.206***
	[0.079]	[0.077]
Common language	0.242***	0.245***
	[0.044]	[0.043]
Observations	5702	5702
R-squared	0.79	0.76

Note: All the variables are bilateral variables between source country s and destination country *d*. The dependent variable, trade volume, refers to exports from source country *s* to destination country *d*. The logarithm is taken after adding 1 to include all the observations with value zero. All other explanatory variables except the dummy variables are logs. Robust standard errors of the estimated coefficients are reported in parentheses. Intercept and year dummy variables are included (not reported). ***, **, and * indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10 % levels, respectively.

Table 3. The Gravity Model for Trade and the Impact of Financial Asset Holdings

A. Random Effects Estimation

	(1)	(2)	(3)	(4)
Loan(lagged)	0.175***			
	[0.007]			
Short Term Debt		0.060***		
(lagged)		[0.009]		
Long Term Debt			0.178***	
(lagged)			[0.008]	
Equity				0.216***
(lagged)				[0.009]
GDP of source	0.367***	0.439***	0.400***	0.402***
Country	[0.012]	[0.013]	[0.012]	[0.012]
GDP of partner country	0.359***	0.421***	0.384***	0.377***
	[0.010]	[0.011]	[0.010]	[0.010]
Per capita GDP of source country	-0.082***	-0.045	-0.105***	-0.115***
	[0.025]	[0.028]	[0.026]	[0.026]
Per capita GDP of partner country	-0.01	0.002	-0.021*	-0.028**
	[0.011]	[0.013]	[0.012]	[0.012]
Product of geographical size	-0.037***	-0.046***	-0.047***	-0.048***
	[0.006]	[0.007]	[0.007]	[0.007]
Distance	-0.360***	-0.414***	-0.350***	-0.379***
	[0.017]	[0.019]	[0.018]	[0.018]
Border	0.970***	1.165***	1.007***	0.926***
	[0.087]	[0.099]	[0.091]	[0.093]
Colony	0.074	0.191**	0.184***	0.180**
	[0.067]	[0.076]	[0.070]	[0.071]
Common language	0.193***	0.238***	0.213***	0.167***
	[0.037]	[0.042]	[0.039]	[0.039]
Observations	5702	5702	5702	5702
R-Squared	0.84	0.8	0.83	0.83

Note: All the variables are bilateral variables between source country s and destination country *d*. For more information, see the note for table 2.

B. Between Effects Estimation

	(1)	(2)	(3)	(4)
Loan (lagged)	0.421*** [0.011]			
Short Term Debt (lagged)		0.441*** [0.024]		
Long Term Debt (lagged)			0.376*** [0.013]	
Equity (lagged)				0.353*** [0.013]
GDP of source Country	0.265*** [0.012]	0.405*** [0.014]	0.360*** [0.013]	0.376*** [0.013]
GDP of partner country	0.274*** [0.010]	0.403*** [0.011]	0.350*** [0.010]	0.361*** [0.010]
Per capita GDP of source country	-0.193*** [0.028]	-0.025 [0.032]	-0.201*** [0.030]	-0.182*** [0.031]
Per capita GDP of partner country	-0.033*** [0.011]	-0.002 [0.013]	-0.054*** [0.012]	-0.043*** [0.012]
Product of geographical size	-0.026*** [0.006]	-0.048*** [0.007]	-0.054*** [0.007]	-0.052*** [0.007]
Distance	-0.294*** [0.016]	-0.348*** [0.019]	-0.278*** [0.018]	-0.353*** [0.018]
Border	0.656*** [0.081]	0.920*** [0.095]	0.797*** [0.087]	0.746*** [0.090]
Colony	-0.088 [0.062]	0.151** [0.072]	0.174*** [0.066]	0.177*** [0.068]
Common language	0.103*** [0.034]	0.198*** [0.040]	0.168*** [0.037]	0.109*** [0.038]
Observations	5702	5702	5702	5702
R-Squared	0.85	0.79	0.83	0.82

Note: All the variables are bilateral variables between source country *s* and destination country *d*. For others see the note for table 3.

Table 4. The Gravity Model for Trade and the Impact of Financial Asset Holdings: IV estimation

	Trade	Trade	Trade	Trade
Loan	0.300***			
(lagged)	[0.051]			
Short Term Debt		0.453***		
(lagged)		[0.099]		
Long Term Debt			0.233***	
(lagged)			[0.042]	
Equity				0.267***
(lagged)				[0.048]
GDP of source	0.344***	0.447***	0.429***	0.430***
Country	[0.027]	[0.017]	[0.018]	[0.017]
GDP of partner country	0.371***	0.459***	0.437***	0.435***
	[0.025]	[0.015]	[0.016]	[0.017]
Per capita GDP of source country	-0.161***	-0.066*	-0.146***	-0.173***
	[0.043]	[0.040]	[0.044]	[0.048]
Per capita GDP of partner country	-0.060***	-0.053***	-0.074***	-0.082***
	[0.014]	[0.016]	[0.017]	[0.018]
Product of geographical size	-0.024***	-0.043***	-0.046***	-0.046***
	[0.008]	[0.008]	[0.008]	[0.008]
Distance	-0.388***	-0.414***	-0.388***	-0.434***
	[0.024]	[0.025]	[0.025]	[0.021]
Border	0.693***	0.763***	0.812***	0.714***
	[0.105]	[0.116]	[0.102]	[0.111]
Colony	-0.031	0.143*	0.187**	0.184**
	[0.085]	[0.086]	[0.079]	[0.080]
Common language	0.164***	0.226***	0.231***	0.160***
	[0.046]	[0.048]	[0.045]	[0.049]
Observations	4810	4810	4810	4810
R-Squared	0.85	0.8	0.82	0.82

Note: All the variables are bilateral variables between source country *s* and destination country *d*. For more information see the note for table 2.

Table 5. The Gravity Model for Financial Assets

A. Random-Effects Estimation

	Bank Loans	Short-Term Debts	Long-Term Debts	Equities
GDP of source country	0.442***	0.077***	0.241***	0.190***
	[0.019]	[0.010]	[0.018]	[0.018]
GDP of partner country	0.414***	0.080***	0.250***	0.230***
	[0.015]	[0.008]	[0.014]	[0.014]
Per capita GDP of source country	0.373***	0.163***	0.431***	0.355***
	[0.040]	[0.023]	[0.038]	[0.037]
Per capita GDP of partner country	0.129***	0.068***	0.169***	0.148***
	[0.019]	[0.010]	[0.018]	[0.017]
Product of geographical size	-0.061***	0.004	0.005	0.006
	[0.010]	[0.006]	[0.010]	[0.010]
Distance	-0.334***	-0.123***	-0.398***	-0.213***
	[0.028]	[0.015]	[0.027]	[0.026]
Border	1.289***	0.642***	1.068***	1.266***
	[0.143]	[0.077]	[0.137]	[0.135]
Colony	0.712***	0.124**	0.079	0.079
	[0.108]	[0.058]	[0.103]	[0.101]
Common language	0.295***	0.109***	0.172***	0.346***
	[0.060]	[0.033]	[0.057]	[0.056]
Observations	5940	5940	5940	5940
R-Squared	0.65	0.3	0.57	0.52

Note: All the variables are bilateral variables between source country *s* and destination country *d*. For more information see the note for table 2.

B. Between-Effects Estimation

	Bank Loans	Short-Term Debts	Long-Term Debts	Equities
GDP of source country	0.380***	0.059***	0.180***	0.149***
	[0.020]	[0.011]	[0.019]	[0.019]
GDP of partner country	0.373***	0.069***	0.219***	0.205***
	[0.016]	[0.009]	[0.015]	[0.015]
Per capita GDP of source country	0.540***	0.174***	0.631***	0.623***
	[0.047]	[0.026]	[0.045]	[0.044]
Per capita GDP of partner country	0.157***	0.071***	0.226***	0.207***
	[0.019]	[0.010]	[0.018]	[0.018]
Product of geographical size	-0.035***	0.010*	0.032***	0.028***
	[0.011]	[0.006]	[0.010]	[0.010]
Distance	-0.282***	-0.116***	-0.348***	-0.155***
	[0.028]	[0.015]	[0.027]	[0.026]
Border	1.273***	0.631***	1.045***	1.273***
	[0.142]	[0.078]	[0.135]	[0.133]
Colony	0.721***	0.128**	0.109	0.097
	[0.107]	[0.058]	[0.101]	[0.100]
Common language	0.308***	0.100***	0.181***	0.361***
	[0.059]	[0.032]	[0.057]	[0.055]
Observations	5940	5940	5940	5940
R-Squared	0.65	0.31	0.57	0.51

Note: All the variables are bilateral variables between source country *s* and destination country *d*. For more information see the note for table 2.

Table 6. The Gravity Model for Financial Assets and the Impact of Trade

A. Random-Effects Estimation

	Bank Loans	Short-Term Debts	Long-Term Debts	Equities
Trade(lagged)	0.773***	0.266***	0.558***	0.463***
	[0.020]	[0.013]	[0.019]	[0.019]
GDP of source country	0.108***	-0.039***	0	-0.009
	[0.017]	[0.011]	[0.018]	[0.018]
GDP of partner country	0.090***	-0.035***	0.017	0.037**
	[0.015]	[0.010]	[0.015]	[0.015]
Per capita GDP of source country	0.360***	0.152***	0.442***	0.384***
	[0.033]	[0.022]	[0.033]	[0.033]
Per capita GDP of partner country	0.125***	0.063***	0.178***	0.159***
	[0.015]	[0.010]	[0.015]	[0.015]
Product of geographical size	-0.025***	0.017***	0.032***	0.028***
	[0.008]	[0.005]	[0.009]	[0.009]
Distance	-0.024	-0.018	-0.170***	-0.02
	[0.023]	[0.015]	[0.024]	[0.024]
Border	0.356***	0.327***	0.390***	0.707***
	[0.115]	[0.073]	[0.119]	[0.121]
Colony	0.541***	0.065	-0.042	-0.022
	[0.085]	[0.054]	[0.088]	[0.089]
Common language	0.096**	0.037	0.029	0.230***
	[0.048]	[0.031]	[0.049]	[0.050]
Observations	5940	5940	5940	5940
R-Squared	0.77	0.38	0.68	0.62

Note: All the variables are bilateral variables between source country *s* and destination country *d*. For more information see the note for table 2.

B. Between-Effects Estimation

	Bank Loans	Short-Term Debts	Long-Term Debts	Equities
Trade(lagged)	0.912***	0.303***	0.748***	0.692***
	[0.023]	[0.015]	[0.023]	[0.023]
GDP of source country	0.011	-0.064***	-0.123***	-0.131***
	[0.018]	[0.012]	[0.019]	[0.019]
GDP of partner country	-0.003	-0.056***	-0.089***	-0.081***
	[0.015]	[0.010]	[0.016]	[0.016]
Per capita GDP of source country	0.470***	0.151***	0.574***	0.570***
	[0.037]	[0.024]	[0.038]	[0.038]
Per capita GDP of partner country	0.121***	0.059***	0.197***	0.180***
	[0.015]	[0.010]	[0.015]	[0.015]
Product of geographical size	-0.001	0.021***	0.059***	0.053***
	[0.009]	[0.006]	[0.009]	[0.009]
Distance	0.062***	-0.001	-0.066***	0.107***
	[0.024]	[0.015]	[0.024]	[0.024]
Border	0.186	0.270***	0.154	0.448***
	[0.114]	[0.074]	[0.117]	[0.118]
Colony	0.496***	0.053	-0.076	-0.074
	[0.084]	[0.054]	[0.086]	[0.086]
Common language	0.078*	0.024	-0.008	0.186***
	[0.047]	[0.030]	[0.048]	[0.048]
Observations	5940	5940	5940	5940
R-Squared	0.78	0.41	0.69	0.64

Note: All the variables are bilateral variables between source country *s* and destination country *d*. For more information see the note for table 2.

Table 7. The Gravity Model for Financial Assets and the Impact of Trade: IV Estimation

	Bank Loans	Short-Term Debts	Long-Term Debts	Equities
Trade(lagged)	1.826***	0.898***	2.125***	2.182***
	[0.253]	[0.167]	[0.313]	[0.327]
GDP of source country	-0.394***	-0.328***	-0.719***	-0.782***
	[0.114]	[0.075]	[0.141]	[0.147]
GDP of partner country	-0.396***	-0.310***	-0.691***	-0.737***
	[0.112]	[0.074]	[0.139]	[0.145]
Per capita GDP of source country	0.455***	0.133***	0.500***	0.490***
	[0.051]	[0.034]	[0.063]	[0.066]
Per capita GDP of partner country	0.109***	0.051***	0.177***	0.154***
	[0.021]	[0.014]	[0.026]	[0.027]
Product of geographical size	0.038**	0.046***	0.121***	0.121***
	[0.016]	[0.011]	[0.020]	[0.021]
Distance	0.432***	0.239***	0.490***	0.692***
	[0.105]	[0.069]	[0.130]	[0.136]
Border	-0.848***	-0.406*	-1.436***	-1.230***
	[0.324]	[0.214]	[0.401]	[0.419]
Colony	0.386***	-0.031	-0.300*	-0.317*
	[0.127]	[0.083]	[0.157]	[0.164]
Common language	-0.206**	-0.170**	-0.451***	-0.259**
	[0.102]	[0.067]	[0.126]	[0.132]
Observations	5240	5240	5240	5240
R-Squared	0.70	0.30	0.55	0.48

Note: All the variables are bilateral variables between source country *s* and destination country *d*. For more information see the note for table 2.