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Abstract

This paper studies the pattern and structure of cross-border bilateral financial asset holdings. By utilizing an extended dataset and employing a variant of gravity models, we find strong evidence for the presence of complementarities among bank loans, short- and long-term debts, and portfolio equity holdings. The complementarities can be explained by common factors of standard gravity models such as economy size, state of development, and information cost proxies, as well as bilateral trade in goods and services. However, we also find the presence of a direct channel of complementarities among financial asset holdings that cannot be explained by these gravity factors. We proceed to investigate whether the complementarities can be characterized by the models that predict a special role of banks in alleviating information asymmetry. We find supporting evidence for this hypothesis in that international bank lending tends to increase the volume of portfolio asset holdings. This acceleration effect of bank lending is stronger for destination countries with higher degrees of 'law and order,' which suggests that cross-border bank lending may not lead to capital market integration, despite reduced information cost, if there is no appropriate infrastructure to facilitate portfolio investment. By investigating the structure of bilateral asset holdings, we also find positive evidence for the information role of banks. The share of bank lending decreases with increasing state of development of destination countries measured by per capita GDP and human capital accumulation, but increases with increasing distance, suggesting that information cost may play an important role in determining the structure of cross-border asset holdings.

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I. Introduction

With capital account regulations being substantially lifted around the world, international financial integration has progressed markedly over the last decade. The pattern of international financial integration is, however, not homogeneous across either different levels of development or economic regions. While the financial integration with developing economies remains mainly in the form of bank lending, international capital flows have become increasingly disintermediated for developed economies. Kim et al., (2005) also find that the regional financial integration in East Asia is especially pronounced in bank lending and that, compared to Europe, East Asia tends to be relatively more linked to global financial markets rather than being integrated within the region.

Will this unequal progress of international financial integration persist? This paper tries to answer this question by investigating whether different forms of cross-border capital flows are mutually reinforcing. If there are strong complementarities among different forms of international financial integration, we can expect that the currently biased pattern of financial integration will eventually be corrected by the complete development of various types of financial integration.

We use a gravity model that is more widely used in the international trade literature as a benchmark model for financial asset transactions. Recently, the gravity model has been proved useful in explaining trade in both financial assets and goods. Distance, which plays a crucial role as an explanatory variable in the gravity model, is presupposed as a proxy for transaction costs. Hence bilateral trade in goods is expected to be strongly negatively correlated with the distance between countries, which is also

confirmed empirically. Since trade in financial assets is not associated with large transaction costs, at least not proportional to the geographical distance, the success of the gravity model in explaining financial transactions was rather unexpected. Portes and Rey (2000) responded to this puzzling finding by arguing that the significant negative impact of distance on financial transactions results from the fact that distance is largely a proxy for information asymmetries. They also found that the geography of information is the main determinant of the pattern of cross-border equity flows while there is little support for diversification or return chasing motives being influential.[1] Employing a variant of gravity models, Ghosh and Wolf (1999), Portes et al. (2001), Kawai and Liu (2001), and Shin and Yang (2006) also report empirical evidence supporting the importance of geographical distance and information cost as important determinants of international capital flows and asset holdings.

By adding other types of financial asset holdings as additional explanatory variables to an otherwise standard gravity model, we test for the existence of complementarities among different types of financial integration. For example, we set up a gravity model for bank loans and add other types of financial asset holdings such as short- and long-term debts and portfolio equity holdings. We find that even after controlling for standard gravity factors such as economy size and distance, the coefficients of other types of financial asset holdings remain statistically significant, indicating that a deeper integration through other types of financial assets may induce further financial integration in bank lending. When we switch the roles in the regression

[1] Tesar and Werner (1995) also investigate the home bias in international portfolio allocation decisions and suggest that geographic proximity may be an important factor for this home bias due to institutional differences and the cost of obtaining information in foreign markets.

equation between bank loans and other types of financial asset holdings, we find that the coefficient of bank loans is also statistically significant, suggesting that bank lending accelerates other types of financial integration as well. The robustness of this finding is confirmed by replacing current explanatory variables with lagged ones and/or by adding a lagged value of the dependent variable and bilateral trade in goods as additional explanatory variables.

While it would be intriguing to provide a rationale for the existence of the mutually reinforcing, bilateral complementarities between bank loans and other types of financial assets, in this paper we instead pay attention to the special role of banks in accelerating other forms of financial integration. According to the banking literature, banks play an important role in reducing the agency cost associated with external financing. Diamond (1984) for instance, argues that banks have an advantage over outside investors because they know more about the borrowers' prospects as the insider position of banks allows them to overcome the information asymmetry. Namely, banks screen prospective borrowers and continuously monitor the debt service capacity of borrowers. By doing so, banks produce valuable private information that is not readily available in public capital markets. As a result of the diminished adverse selection and reduced moral hazard, borrowers' access to banks' informed fund yields a positive signal to external financiers such as arm's-length capital. Consequently, the approval of a bank loan may send a signal to the capital market that all claims of higher priority may be safe. Therefore, a positive loan renewal or increased volume of bank lending may induce other, limited-information investors to invest even in a situation with large information asymmetry. That is, there is a sequential complementarity between bank lending and capital market funding (Diamond 1991).

While there exists a volume of research on this certification effect of bank lending at the domestic firm level, relatively fewer studies are available that investigate the evidence on the international front.[2] For example, Hull and Tesar (2001) report that the shares of bank loans and foreign direct investment tend to fall as economies develop, presumably due to declining information costs. Lane and Milesi-Ferretti (2001) also find a positive relationship between the degree of financial development and portfolio investments. Using a cross sectional data set, Buch (2002) investigates whether the recent trend toward disintermediation of international capital flows, namely from bank financing to bond financing, has resulted from the declining information cost, and finds mixed evidence: while the development of an economy lowers the share of bank loans relative to bond financing, the geographical distance between a lender and a borrower is negatively associated with the share of bank loan, contrary to the prediction of information explanations.

In this paper, we also seek to find evidence of a special role of banks in alleviating asymmetric information problems in the international financial structure in the following three ways. First, when we estimate a gravity model for short- and long-term debts and portfolio equities, if we add bank loans as an additional explanatory variable, the estimated coefficients of the information cost proxy variables such as

[2] James (1987) for instance finds that announcements of loans by banks increase the stock market value of the borrowing firms in his event study for U.S. firms. Lummer and McConnell (1989) distinguish new loans and loan renewals, and report that loan renewals generate positive stock market effects while new loans demonstrate no significant effect. Hoshi *et al.* (1993) show that bank lending exposes borrowers to monitoring which serves as a certification device that facilitates capital market funding. For evidence in Korea, Hahm and Kang (2005) find that while an increase in bank lending tends to raise stock prices subsequently for small and medium-sized firms, it does not lead to increased volume of bond financing. All these studies have in common a focus on domestic issues.

distance, border and common language are substantially reduced. This reduced effect of information cost suggests that bank loans may influence the degree of information asymmetry and thereby weaken the impact of information cost on other asset holdings.

Second, following Buch's approach, we try to investigate if the share of bank loans in total bilateral asset holdings is related with the degree of information asymmetry across countries and over time. We find that the share of bank loans is negatively related with per capita GDPs of both source and destination countries, as well as with human capital accumulation, which indicates that as the economy develops countries tend to invest and receive other forms of financial assets relatively more than bank loans. On the other hand the distance variable is positively related with bank loan shares, implying that bank lending becomes more important relative to other portfolio investments in external financing with increasing distance between the countries.[3] Given that distance proxies for information asymmetry between countries, this finding also supports the information view that banks may play a special role even in international context.

Third, we test for the possibility that cross-border bank lending leads to subsequent capital market integrations only in the presence of adequate capital market infrastructure such as a legal system to facilitate portfolio investments in capital markets. The existence of this potential non-linear effect of bank lending is tested by including an interaction term between bank lending and the degree of 'law and order' - a proxy

[3] This finding is contrasted with Buch (2002) that showed that the geographical distance between a lender and a borrower is negatively associated with the share of bank loans. We believe that the difference is mainly due to the different regression approaches: while Buch relied on cross sectional information only based on data in year 1997, we used additional data in the three years from 2001 to 2003 and hence estimated the model in a panel regression setting.

variable to the development of relevant infrastructure. We find that the coefficient of the interaction term is significantly positive, which is consistent with our conjecture that the acceleration effect of international bank lending on other forms of asset holdings is stronger for destination countries with higher degrees of legal infrastructure development.

The present study is differentiated from existing literature in several ways. First, we use an extended panel dataset of cross-border bilateral asset holdings consisting of 5,940 observations involving 22 source countries and four years: 1997, 2001, 2002 and 2003. Second, we investigate the complementarity among various forms of asset holdings by estimating the elasticity of a specific type of asset holding with respect to another type of asset holding within a gravity model framework which enables us to control for the impacts of other standard gravity factors. We also test for the presence of complementarity by explicitly considering bilateral trade in goods and services as well as the lagged effect of dependent variables. Finally, we investigate potential non-linear effects of international bank lending by estimating the interaction effect between bank lending and other determinants of capital flows such as ‘law and order’ of destination countries.

The rest of the paper is organized as follows. In Section 2, the data and basic correlation structure among different forms of asset holdings are explained. Section 3 presents regression results of complementarities among cross-border asset holdings within the framework of a gravity model. Section 4 addresses the special role of international bank lending. Section 5 concludes the paper.

II. Patterns of International Asset Holdings

1. Data

We need data on cross-border bilateral financial transactions to investigate the pattern of cross-border asset holdings. The most widely used data on international portfolio asset holdings is the Coordinated Portfolio Investment Survey (CPIS) published by the International Monetary Fund (IMF). The IMF conducted surveys on international portfolio asset holdings for the first time in 1997 and annually since 2001. The first CPIS involved 20 economies and was expanded to 67 source economies including several offshore and financial centers in 2001. The portfolio asset holdings consist of three components: short-term debts, long-term debts, and equities. The bilateral positions of asset holdings of the source countries in 223 destination countries and territories are reported in the dataset.[4]

In our study, the CPIS dataset is supplemented with the dataset on international bank claims reported to the Bank for International Settlements (BIS). It is the consolidated international bank claims of BIS-reporting banks by nationality of lenders and borrowers. We gathered these data for 22 reporting countries from the *BIS Quarterly Review*.[5] While the data are available from 1983 on a biannual basis, most countries began to report comprehensive bilateral data from 1999. The data set covers more than 200 destination countries and territories.

Other data were obtained from more standard sources. The bilateral trade data

[4] Please refer to the IMF website http://www.imf.org/external/np/sta/pi/cpis.htm for detailed description of the CPIS dataset.

[5] For detailed descriptions of the dataset, refer to the website http://www.bis.org/statistics/histstats10.htm.

were collected from the *Directions of Trade* dataset. The data for GDP and population were obtained from the *International Financial Statistics*. The human capital data were obtained from Barro and Lee (2001) and the law and order data from the *International Country Risk Guide*.[6] We also obtained data for other variables used in the standard gravity equation from the dataset provided by Rose.[7] The summary statistics for the data used in our estimation are described in Table 1.

2. The Intensities of Cross-border Asset Holdings

To characterize the pattern of cross-border bilateral asset holdings, we construct a measure of intensity for financial asset transactions. The intensity measure for a specific financial asset indicates the share held by a destination country out of the total asset holdings of a source country for the specific asset. Since bank lending data are available only in the form of stock data, we construct intensity measures for bank loan, short-term debt, long-term debt, and equity holdings using stock data as follows:

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

where l_{sdt}, std_{sdt}, ltd_{sdt} and eq_{sdt} are the bank loans, short-term debt, long-term debt, and equity, respectively, held by the source country *s* in the destination country *d* at time *t*. L_t, STD_t, LTD_t and EQ_t are the total amounts of bank loans, short-term debts,

[6] For details on the *International Country Risk Guide*, refer to the website, http://www.icrgonline.com.

[7] The dataset is available at the website, http://faculty.haas.berkeley.edu/arose/, maintained by Andrew Rose.

long-term debts, and equities, respectively, held by the source country *s* at time *t*.

Figure 1 illustrates the time series pattern of the correlation between bank loan intensity and other financial asset intensities for each of the 22 respective source countries for 1997, 2001, 2002 and 2003. The correlations for 1998, 1999, and 2000 could not be computed since after the start of the CPIS data in 1997 the following three year's data before 2001 are missing. As we can see in the figure, the cross correlations are positive in almost all cases and above 0.5 in general, which suggests the presence of complementarities rather than substitutabilities among the different forms of international financial asset holdings.

Note that the positive correlation between intensities indicates that if a source country tends to hold a relatively large amount of bank loans in a specific destination country, then the source country also tends to hold a relatively large amount of debts or equities in the destination country compared to other destination countries. Note also that, for many source countries, correlations among intensities tend to increase over time, especially for bank loans and debts, which suggests that the interrelation between bank loan integration and debt market integration becomes more intensive as financial markets become more integrated.

III. Estimation of Complementarities in Cross-border Asset Holdings

1. The Gravity Model of Bilateral Asset Holdings

While the correlation patterns described above imply that financial integrations are closely interrelated across different forms of asset holdings, we need to characterize further the complementarities within a more elaborated framework of cross-border asset holdings. For this purpose, we employ the gravity model as a basic model framework to investigate the complementarity among various forms of cross-border asset holdings.

The gravity model was originally developed as an explanation of the gravitational forces in physics and later became popular in economic modeling to explain cross-border bilateral trade in goods.[8] Following the success of the gravity model in explaining bilateral trade patterns in goods, recent attempts have been made to employ the gravity model to explain cross-border bilateral financial asset holdings. For instance, Martin and Rey (1999) suggest that a gravity equation can be a natural model of bilateral asset trade as well since financial assets are not perfect substitutes and cross-border asset transactions entail some information costs. As discussed above, the related literature indicates that the gravity model explains the pattern of bilateral asset holdings reasonably well, and based upon this finding we employ the following form of the gravity model as a base model to investigate the complementarities among financial asset holdings.

[8] See Frankel (1997) and Evenett and Keller (2002) for theoretical motivations and applications of the gravity model in explaining bilateral trade in goods and services.

$$\begin{aligned}\ln(AH_{sd})_{it} &= \alpha + \beta_1 \ln(GDP_s)_t + \beta_2 \ln(GDP_d)_t + \beta_3 \ln(GDP_s / Pop_s)_t \\ &+ \beta_4 \ln(GDP_d / Pop_d)_t + \beta_5 \ln(Area_s Area_d) + \beta_6 \ln(Dist_{sd}) \\ &+ \beta_7 Border_{sd} + \beta_8 Colony_{sd} + \beta_9 Language_{sd} + \varepsilon_{sdit}\end{aligned} \quad (1)$$

In equation (1) AH_{sd} is the amount of asset holdings of a source country *s* in a destination country *d*, and *i* and *t* denote the asset type and year, respectively. *Pop* is the size of population and GDP is used to measure the size of the economy.

It is now standard to add per capita GDP as a measure of the state of economic development in addition to the aggregate GDP. Higher per capital GDP is expected to be closely associated with deeper financial markets, which may lead to larger cross-border financial transactions. Note that this form of gravity model is less restricted than standard gravity models for bilateral trade in that it allows the coefficients of GDP and GDP per capita to differ across source and destination countries. The application of this asymmetric form of gravity model makes more sense in the case of financial asset holdings as bilateral asset holdings are not neutral with respect to the direction.

Other control variables mainly represent information cost. *Area* is the size of land area, and *Dist* is the shortest distance between countries *s* and *d*. Information asymmetry may be greater with increasing country land size and distance between the source and destination countries. *Border*, *Colony* and *Language* are binary variables that are unity if *s* and *d* share a land border, have a former colonial relationship, and have a common language, respectively. The geographical and cultural proximity may reduce information asymmetry and lower information costs. This form of gravity model was also adopted by Shin and Yang (2006) in investigating the relationship between financial integration and trade integration and found to explain bilateral cross-border asset holdings

reasonably well.

The random effect estimation results for the base gravity model for bilateral cross-border asset holdings are reported in Table 2.[9] Note that for all types of financial asset holdings, the coefficients of GDP and GDP per capita for both source and destination countries are significantly positive, which indicates that not only the economy size, but also the state of economic development in source and destination countries positively affects the volume of cross-border financial asset holdings.

Note also that the coefficient estimates of information proxy variables are in general significant and show the expected signs. For instance, distance is significantly negative in all cases, which suggests that information asymmetry may deter financial integration for all forms of financial assets. The significant positive coefficients of border and common language also confirm this conjecture that information cost is an important determinant of cross-border asset holdings. The estimation result indicates that the gravity model fits the data reasonably well and hence can be employed as a base model to investigate the complementarities among financial asset holdings.

2. Estimation of Complementarities: Augmented Gravity Models

We now turn to the interrelationship among different forms of asset holdings within the framework of the gravity model. That is, we investigate whether the complementarities among the financial assets observed in Figure 1 still exist when we control the effects of gravity factors such as the economy size and the state of development, as well as the

[9] We don't report the fixed effect 'within' estimation results. While the fixed effect method can provide more consistent estimates by controlling for the effects of omitted country specific factors, we cannot obtain coefficient estimates for time-invariant variables such as distance, area and border. Instead, we report the 'between' effect estimation results in the appendix.

proxies to information cost. More specifically we estimate the following augmented form of the gravity model for an asset holding of type *i* in order to investigate its relationship with asset holding of type *j (i ≠ j)*:

$$\begin{aligned}\ln(AH_{sd})_{it} &= \alpha + \gamma_1 \ln(AH_{sd})_{jt-1} + \beta_1 \ln(GDP_s)_t + \beta_2 \ln(GDP_d)_t \\ &+ \beta_3 \ln(GDP_s / Pop_s)_t + \beta_4 \ln(GDP_d / Pop_d)_t + \beta_5 \ln(Area_s Area_d) \\ &+ \beta_6 \ln(Dist_{sd}) + \beta_7 Border_{sd} + \beta_8 Colony_{sd} + \beta_9 Language_{sd} + \varepsilon_{sdit}\end{aligned} \quad (2)$$

To avoid possible inconsistency problems of estimation resulting from the simultaneity of asset holdings, we use one-year lagged values for AH_j as an explanatory variable. The estimation results for bank loans are reported in Table 3. Note that both short- and long-term debts and equity holdings have significantly positive coefficient estimates in the bank loan regression, which indicates the presence of a strong complementarity between bank lending and portfolio asset holdings, even after controlling for the effects of gravity factors. The regression result suggests that increased financial integrations in portfolio asset holdings tend to reinforce integration in bank lending. For example, a one percent increase in bilateral short-term debt holdings tends to increase bank loans by 0.328%. In terms of the magnitude of the semi-elasticity with respect to bank lending, long-term debts have the largest impact (0.534 percent), followed by equities (0.493 percent), and short-term debts. Note that all the gravity factors and information variables are statistically significant and have the expected signs, which imply that the complementarities between asset holdings may work independently from the gravity channel.

The augmented gravity models for portfolio assets with a lagged value of bank

loans as an explanatory variable are estimated in Table 4. Note that the bank loan variable is always positive and statistically significant for all portfolio asset holdings. A one percent increase in bank claim tends to increase short-term debt by 0.196%, long-term debt by 0.371%, and cross-border equity holdings by 0.249%. The results in Table 4 confirm that international bank lending tends to increase cross-border portfolio asset holdings. It is interesting to note that, compared to the results in Table 2, the information cost proxy variables now have smaller coefficients in absolute value when we include bank lending in the regression. For example, the coefficient of distance is -0.071, -0.290 and -0.138 in columns (1)-(3), respectively, in Table 4, which can be compared to the corresponding figures, -0.123, -0.398 and -0.213, respectively, in Table 2. The coefficient estimates for border, colony and common language are also reduced significantly in absolute value. This reduced effect of information cost suggests that bank lending may influence the degree of information asymmetry and thereby weaken the impact of information cost on portfolio asset holdings.

Note that the presence of strong mutual complementarities among financial asset holdings may have resulted from the omission of an important third factor; one such candidate is bilateral trade in goods. The cross-border financial asset transaction and goods transaction may be positively related with each other because, firstly, the geography of information cost may be positively related with the geography of transaction cost, and, secondly, a more active bilateral trade relationship may reduce information asymmetry and thus facilitate financial integrations between the partner countries. Indeed, recent empirical studies such as Kawai and Liu (2001) and Shin and Yang (2006) find a significant complementarity between cross-border financial asset transactions and goods transactions in their estimation of the gravity models.

We re-estimate the complementarities among financial asset holdings by including the volume of bilateral trade in goods estimated as exports from source country *s* to destination country *d*:

$$\begin{aligned}\ln(AH_{sd})_{it} &= \alpha + \gamma_1 \ln(Trade_{sd})_{t-1} + \gamma_2 \ln(AH_{sd})_{jt-1} + \beta_1 \ln(GDP_s)_t \\ &+ \beta_2 \ln(GDP_d)_t + \beta_3 \ln(GDP_s / Pop_s)_t + \beta_4 \ln(GDP_d / Pop_d)_t \\ &+ \beta_5 \ln(Area_s Area_d) + \beta_6 \ln(Dist_{sd}) + \beta_7 Border_{sd} + \beta_8 Colony_{sd} \\ &+ \beta_9 Language_{sd} + \varepsilon_{sdit}\end{aligned} \tag{3}$$

The regression results for bank lending are summarized in Table 5. The significant positive coefficients of the lagged trade variable indicate that trade integration enhances financial integration in bank lending. Note that an increase in bilateral trade will increase bilateral bank lending for an increasing volume of trade credit by banks. The increased volume of bilateral goods transaction may also alleviate information asymmetry between trading partners, thereby increasing cross-border bank lending.

More importantly, note that the short- and long-term debts and equity variables remain significantly positive even after controlling for this significant bilateral trade effect, which implies that the complementarities among asset holdings exist even after the influence of increased trade is taken into consideration. Note also that information cost proxy variables now become much weaker relative to the results in Table 3, which suggests that the previously observed, information cost effect on bank lending at least partially reflects the effect of omitted trade variable. However, information cost may still be an important determinant of cross-border bank lending as area sizes and colony variables remain significant in the regression.

Table 6 reports the estimation result for trade augmented gravity models for portfolio asset holdings. Note that the lagged bank loans are still significant for all portfolio asset holdings after controlling for the bilateral trade effect, which indicates that strong complementarities exist with bank lending. Note also that the coefficient estimates of the trade variable are all positive and significant. However, the magnitude of the elasticity is much smaller for portfolio asset holdings compared with the elasticity of international bank lending with respect to trade in Table 5. As for other gravity factors, the economy size variable seems to change its sign while per capita GDP variables remain significantly positive.

Next we proceed to test the robustness of the complementarities among asset holdings by adding a lagged dependent variable in the regression. This modification is essential if asset holdings are serially correlated which has the consequence of an omitted lagged dependent variable generating spuriously significant coefficients of other lagged explanatory variables of financial asset holdings. In this way, we can infer more accurately about the presence of a sequential complementarity among different forms of asset holdings:

$$\begin{aligned}\ln(AH_{sd})_{it} &= \alpha + \gamma_1 \ln(AH_{sd})_{it-1} + \gamma_2 \ln(AH_{sd})_{jt-1} \\ &+ \beta_1 \ln(GDP_s)_t + \beta_2 \ln(GDP_d)_t + \beta_3 \ln(GDP_s / Pop_s)_t \\ &+ \beta_4 \ln(GDP_d / Pop_d)_t + \beta_5 \ln(Area_s Area_d) + \beta_6 \ln(Dist_{sd}) \\ &+ \beta_7 Border_{sd} + \beta_8 Colony_{sd} + \beta_9 Language_{sd} + \varepsilon_{sdit}\end{aligned} \tag{4}$$

Table 7 reports the regression result on the augmented gravity equation for bank loans with a lagged dependent variable. Note that despite the inclusion of the lagged bank loan, the coefficients of lagged portfolio asset holdings are significantly positive,

which confirms the robustness of the complementarities. It is interesting to observe that now the GDP and per capita GDP of the destination countries remain significant while those of the source countries lose their explanatory power. Note also that the distance variable remains significantly negative. Table 8 shows the regression results for portfolio asset holdings and the bank loan variable remains significantly positive after controlling for the lagged effect of the dependent variable.

Finally we add both lagged dependent variable and bilateral trade in goods together in the gravity model:

$$\begin{aligned}\ln(AH_{sd})_{it} &= \alpha + \gamma_1 \ln(AH_{sd})_{it-1} + \gamma_2 \ln(Trade_{sd})_{t-1} + \gamma_3 \ln(AH_{sd})_{jt-1} \\ &+ \beta_1 \ln(GDP_s)_t + \beta_2 \ln(GDP_d)_t + \beta_3 \ln(GDP_s / Pop_s)_t \\ &+ \beta_4 \ln(GDP_d / Pop_d)_t + \beta_5 \ln(Area_s Area_d) + \beta_6 \ln(Dist_{sd}) \\ &+ \beta_7 Border_{sd} + \beta_8 Colony_{sd} + \beta_9 Language_{sd} + \varepsilon_{sdit}\end{aligned} \tag{5}$$

As Tables 9 and 10 show, even if we include both bilateral trade and lagged dependent variables, financial asset holdings remain strongly complementary among themselves. Advances in financial integration in one form of asset holding will lead to increased financial integration in other forms of asset holding as well. Note that the complementarity between goods trade and asset trade also remains significant in all regressions except for the case of long-term debts.

IV. Do Banks Have a Special Role?

Our empirical investigations so far have treated bank lending symmetrically with other forms of financial asset holdings. In this section, we explore whether the positive reinforcing effect from bank lending to portfolio asset holding is somehow associated with the special role of banks in alleviating information asymmetry. Note that while the estimation results of the augmented gravity models above indicate that the complementarities existing between bank lending and portfolio investment are largely symmetrical, the factors underlying the complementarities may differ depending upon their direction.

Note however that the volume-based gravity models estimated above may not be an adequate model to sort out the special effect of bank lending since both bank lending and portfolio asset holding may increase together in volume as the economies develop and financial markets deepen, but decrease together as information asymmetry gets worsening. To explore the special role of bank lending, it may be necessary to investigate directly the structure or composition of the bilateral asset holdings. Following the spirit of Buch (2002), using our extended panel dataset, we investigate whether the share of bank loans in total bilateral asset holding is significantly associated with information variables:

$$\begin{aligned}(AS_{sd})_{it} = {} & \alpha + \beta_1 \ln(GDP_s / Pop_s)_t + \beta_2 \ln(GDP_d / Pop_d)_t + \beta_3 HC_{dt} \\ & + \beta_4 Openness_{dt} + \beta_5 \ln(Dist_{sd}) + \beta_6 Language_{sd} \\ & + \beta_7 Law\,\&\,Order_d + \varepsilon_{sdit}\end{aligned} \qquad (6)$$

AS represents the composition of bilateral asset holdings and we consider three ratios for *AS*: i) bank loans / (bank loans + short-term debts + long-term debts + equity holdings), ii) bank loans / (bank loans + short-term debts + long-term debts), and iii) short-term debts / (short-term debts + long-term debts). While the third short-term debt ratio is not directly related with bank lending, we also investigate this ratio in order to explore the role of information cost as a determinant of the maturity structure in external bond financing. *HC* is human capital accumulation, *Openness* is the degree of openness of an economy measured as the ratio of total trading volume of the destination country with respect to the world (sum of global exports and global imports) relative to GDP, and *Law & Order* is the degree of development in legal infrastructure.

Note that the equation (6) is not exactly a gravity model since economy size variables are now entirely omitted and *HC*, *Openness*, and *Law & Order* variables are included only for destination countries. Economy sizes are not included as explanatory variables because it is unlikely that the size matters in determining the composition of bilateral asset holdings. On the other hand we include per capita GDP because the state of economic development in both source and destination countries may be an important factor of external finance structure. *Openness* is supposed to capture the possible association between the degree of openness in goods trade with the external finance structure. *HC* and *Law & Order* are included to represent the degree of institutional quality and infrastructure development in destination countries, which may also be important factors in determining the external finance structure.

Table 11 shows the regression result on the determinants of bilateral asset holding structure. Note that per capita GDPs of both source and destination countries as well as

human capital accumulation are negatively related with the share of bank loan, which indicates that as the economy develops, portfolio assets transactions become more important relative to bank loans. This result is also consistent with the information view presented above since as countries develop information cost may fall and thus bank lending becomes less important (Buch, 2002). The degree of openness of the destination country is significantly positively related with the bank loan shares, which suggests that countries with a relatively large trading volume relative to GDP tend to receive relatively more bank loans.

Note that the distance variable is positively related with bank loan shares. In the case of bank loan share in total external borrowing (bank loans and total debts) the coefficient is significantly positive. This implies that bank lending becomes more important relative to portfolio investments in external financing with increasing information asymmetry between the source and destination countries, given that distance proxies well the degree of information asymmetry. This finding supports the information view that banks may play a special role even in an international context. Contrary to the bank loan shares however, the presence of information cost does not seem to influence the maturity structure of external bond financing, as shown in column 3 of Table 11.

In sum, the overall results suggest that there may be a special role of banks in alleviating information asymmetry and thereby accelerating financial integrations in portfolio asset holdings. Then why doesn't the special effect of bank lending stand out distinctly relative to other forms of asset holdings in previous, volume-based, gravity models? One possibility is that while the cross-border bank lending tends to increase subsequent portfolio asset holdings, this positive effect may be limited by other

conditions of destination countries. For instance, La Porta et al. (1997, 1998) convincingly argue that the legal structure, corporate governance, and other related infrastructure are crucial determinants of financial deepening, especially for the development of capital markets.

Indeed, cross-border bank lending may not lead to subsequent capital market integrations despite reduced information asymmetry due to bank lending if there is no adequate capital market infrastructure such as a legal system to facilitate portfolio investments in capital markets. We test for the existence of this potential non-linear effect of bank lending by including an interaction term between bank lending and the degree of 'law and order' - a proxy variable to the development of relevant infrastructure:

$$\begin{aligned}\ln(AH_{sd})_{it} &= \alpha + \gamma_1 \ln(BL_{sd})_{jt-1} + \gamma_2 Law\&Order_d \\ &+ \gamma_3 Law\&Order_d \ln(BL_{sd})_{jt-1} + \beta_1 \ln(GDP_s)_t + \beta_2 \ln(GDP_d)_t \\ &+ \beta_3 \ln(GDP_s / Pop_s)_t + \beta_4 \ln(GDP_d / Pop_d)_t + \beta_5 \ln(Area_s Area_d) \\ &+ \beta_6 \ln(Dist_{sd}) + \beta_7 Border_{sd} + \beta_8 Colony_{sd} + \beta_9 Language_{sd} + \varepsilon_{sdit}\end{aligned} \tag{7}$$

Table 12 reports the regression estimation result for the augmented gravity model for bank lending based on equation (7). Note that now the effect of bank lending on portfolio asset holding is not constant but a function of the degree in law and order, that is, ($\gamma_1 + \gamma_3 Law\&Order_d$). The coefficient of the interaction term is significantly positive for all three forms of portfolio asset holdings, which is consistent with our conjecture that the degree of this reinforcing effect from bank lending to portfolio asset holding is positively influenced by the degree of 'law and order.' Namely, the acceleration effect of international bank lending is stronger for destination countries

with higher degrees of legal infrastructure development. For example, if $Law\&Order_d$ takes the highest possible value, 6, the impact of a one percent increase in bank loans on portfolio equity holdings is 0.344% while the corresponding impact is only 0.014% if it takes the lowest value of 0.

Table 13 reports the estimation of the same model when bank loans are used as a dependent variable. Note that, compared to the results in Table 12, the impact of 'law and order' through its interaction effect is significantly reduced. The coefficient of the interaction term between financial asset holdings and 'law and order' is not statistically significant when the short-term debt is an independent variable. For long-term debts and equities, although the coefficient estimates are significant, the size is as low as a half of those presented in Table 12. These results imply that the reinforcing effects of other portfolio assets on bank loans may not necessarily be stronger for destination countries with higher degrees of legal infrastructure development. [10]

[10] In appendix tables 12 and 13, we report between-effect estimation results. These results are even more strikingly contrasted: the estimates of the interaction term between bank loans and 'law and order' are positive and statistically significant in Table 12-A, while the interaction terms between other portfolio assets and 'law and order' are sometimes negative and statistically significant in Table 13-A.

V. Summary and Concluding Remarks

In this paper we study the dynamics of international financial integration utilizing a recently available dataset of cross-border financial asset holdings. We investigate whether different forms of cross-border capital flows are mutually reinforcing, and if they are, whether the complementarities are symmetric across bank lending and portfolio investments. In investigating the pattern and structure of the cross-border bilateral asset holdings, we also pay attention to the special role of banks in accelerating other forms of financial integration by alleviating information asymmetry.

By employing a variant of the gravity model, we find strong evidence for the presence of complementarities among bank loans, short- and long-term debts, and portfolio equity holdings. The complementarities can be explained by common factors of standard gravity models such as economy size, state of development, and information cost proxies. However, we also find the presence of a direct channel of complementarities among financial asset holdings that cannot be explained by these gravity factors. These complementarities remain significant even after controlling for the effects of bilateral trade in goods as well as lagged dependent variable.

We proceed to investigate whether the complementarities can be characterized by the models that predict a special role of banks. We find supporting evidence for this hypothesis in that international bank lending tends to increase the volume of portfolio asset holdings. By investigating the determinants of the structure of bilateral asset holdings, we also find positive evidence for the information role of banks. The share of bank lending decreases with increasing state of development of destination countries measured by per capita GDP and human capital accumulation, but increases with

increasing distance, suggesting that information cost may play an important role in determining the structure of cross-border asset holdings. Furthermore, this effect of bank lending in accelerating financial integration of other forms of asset holdings is stronger for destination countries with higher degrees of 'law and order.' This finding suggests that cross-border bank lending may not lead to capital market integration, despite reduced information cost due to international bank lending, if there is no appropriate infrastructure to facilitate portfolio investments.

Our findings suggest a number of interesting future research issues, one of which is the further illumination of channels underlying the strong complementarities among asset holdings. While the reduction in information cost may be one such channel through which international bank lending may lead to increased cross-border portfolio investments, other channels are largely unknown, especially for the effect of portfolio investments on bank lending. Another issue requiring further investigation is the role of international bank lending in facilitating other forms of external financing. Note that in this paper we have investigated the quantity impact only. However, the increased volume of cross-border bank lending may improve the terms and conditions of other external financing as well. That is, it may reduce the funding cost of destination countries by lowering interest rates or improving maturity structure in bond financing.

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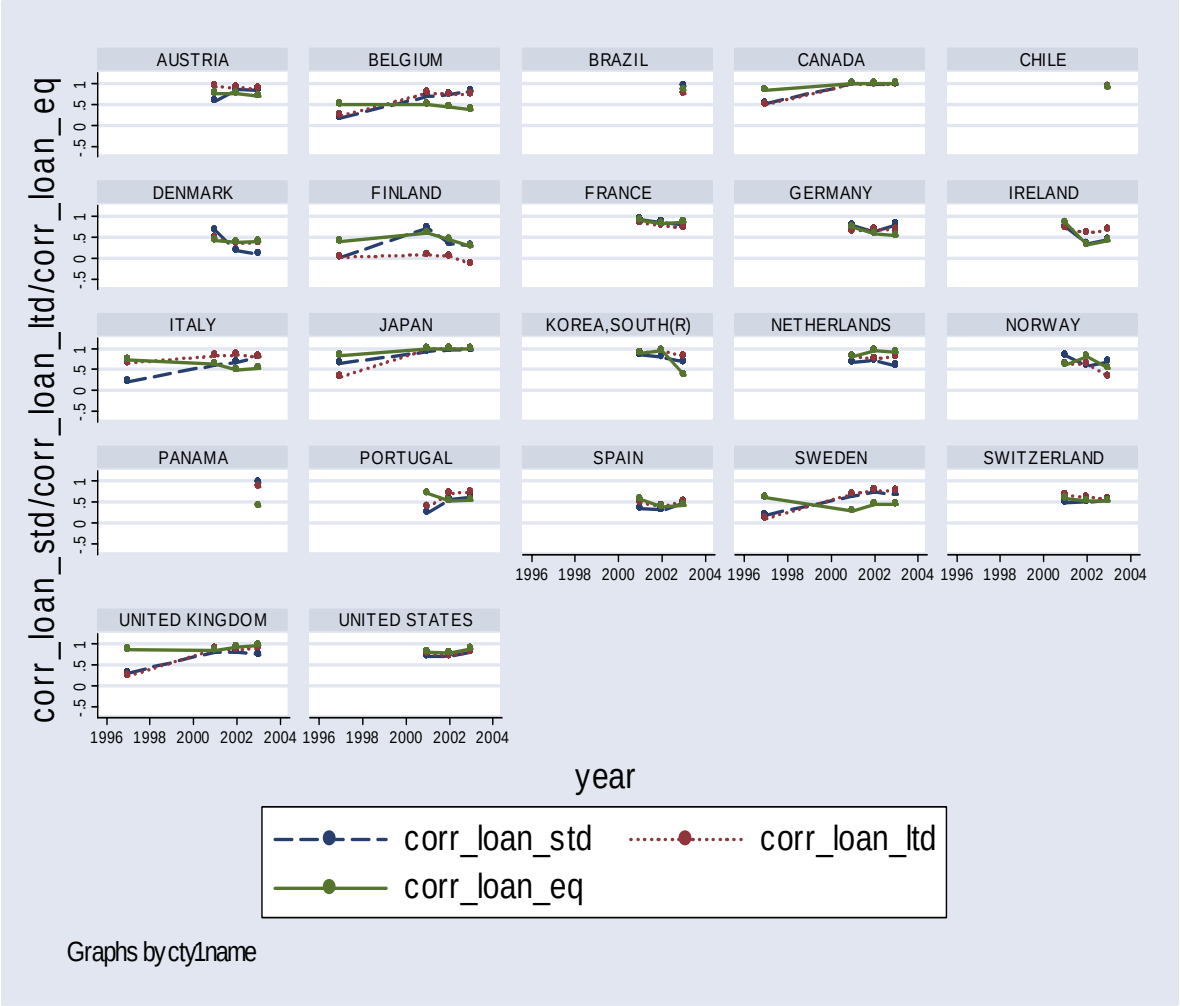
<Figure 1> Correlation between Bank Loan Intensity and Other Financial Assets Intensity



Note: The figure shows the time series pattern of correlations between bank loan intensity and other financial assets intensity for 22 respective source countries for 1997, 2001, 2002 and 2003. Three correlations are reported: correlations between bank loan intensity and short-term debt intensity (corr_loan_std), between bank loan intensity and long-term debt intensity (corr_loan_ltd) and between bank loan intensity and equity intensity (corr_loan_eq).

<Table 1> Summary Statistics

Variables	Observations (N=5,940)	
	Mean	Std. Dev
Log Trade	1.35	1.47
Log Bank Loan	1.4	1.8
Log Short-term Debt	0.24	0.76
Log Long-term Debt	0.88	1.58
Log Equity	0.73	1.47
Log GDP of Source Country	8.69	1.21
Log GDP of Destination Country	5.66	2.26
Log Per Capita GDP of Source Country	5.44	0.44
Log Per Capita GDP of Destination Country	3.36	1.66
Log Product of Area Sizes	24.40	2.72
Log Distance	7.99	0.87
Border	0.03	0.17
Colony	0.05	0.21
Common Language	0.14	0.34
Human Capital	5.49	2.94
Law and Order	3.73	1.57

Note: The summary statistics are based upon the bilateral variables for the cross-border portfolio holdings and bank claims data. See data descriptions in the text for variable definitions and sources.

<Table 2> The Gravity Model for Financial Asset Holdings: Base Models
(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 Destination 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 Destination Country	0.129***	0.068***	0.169***	0.148***
	[0.019]	[0.010]	[0.018]	[0.017]
Product of Area Sizes	-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	5,940	5,940	5,940	5,940
R-Squared	0.65	0.30	0.57	0.52

Note: All the variables are on the bilateral basis between source country and destination country. The dependent variables are outstanding amounts of bank loans, short-term debts, long-term debts and equities held by a source country in a destination country. Natural logarithms were taken after adding one to include all the observations with zero value. Natural logarithms were also taken for the explanatory variables except dummy variables. Robust standard errors of the estimated coefficients are reported in the parentheses. Intercept and year dummy variables were included but not reported to save space. ***, ** and * indicate that the estimated coefficients are statistically significant at the 1 %, 5% and 10 % level, respectively. The same results are also reported in Table 5 of Shin and Yang (2006).

<Table 3> The Gravity Model for Bank Loans: Impact of Portfolio Assets
(Random Effects Estimation)

	(1)	(2)	(3)
Short-term Debts	0.328***		
(lagged)	[0.018]		
Long-term Debts		0.534***	
(lagged)		[0.013]	
Equities			0.493***
(lagged)			[0.014]
GDP of Source Country	0.408***	0.304***	0.339***
	[0.018]	[0.016]	[0.016]
GDP of Destination Country	0.404***	0.294***	0.314***
	[0.015]	[0.013]	[0.013]
Per capita GDP of Source	0.311***	0.113***	0.134***
Country	[0.040]	[0.035]	[0.037]
Per capita GDP of	0.110***	0.034**	0.045***
Destination Country	[0.018]	[0.016]	[0.016]
Product of	-0.059***	-0.062***	-0.062***
Area Sizes	[0.010]	[0.009]	[0.009]
Distance	-0.337***	-0.176***	-0.288***
	[0.027]	[0.023]	[0.024]
Border	1.024***	0.656***	0.601***
	[0.137]	[0.117]	[0.122]
Colony	0.719***	0.717***	0.713***
	[0.104]	[0.089]	[0.093]
Common Language	0.283***	0.219***	0.135***
	[0.058]	[0.050]	[0.052]
Observations	5,814	5,814	5,814
R-Squared	0.70	0.77	0.76

Note: The dependent variable is bank loans. For other information see notes in Table 2.

<Table 4> The Gravity Model for Portfolio Assets: Impact of Bank Loans
(Random Effects Estimation)

	Short-term Debts	Long-term Debts	Equities
Bank Loans	0.196***	0.371***	0.249***
(lagged)	[0.008]	[0.011]	[0.010]
GDP of Source Country	-0.002	0.088***	0.085***
	[0.010]	[0.015]	[0.016]
GDP of Destination	-0.001	0.106***	0.137***
Country	[0.008]	[0.013]	[0.013]
Per capita GDP of	0.089***	0.328***	0.320***
Source country	[0.023]	[0.034]	[0.034]
Per capita GDP of	0.046***	0.145***	0.138***
Destination Country	[0.010]	[0.015]	[0.015]
Product of	0.015***	0.027***	0.021**
Area Sizes	[0.005]	[0.008]	[0.008]
Distance	-0.071***	-0.290***	-0.138***
	[0.014]	[0.022]	[0.023]
Border	0.369***	0.579***	0.911***
	[0.071]	[0.112]	[0.116]
Colony	0.001	-0.150*	-0.059
	[0.053]	[0.084]	[0.087]
Common Language	0.044	0.063	0.269***
	[0.031]	[0.047]	[0.049]
Observations	5,880	5,880	5,880
R-Squared	0.41	0.71	0.68

Note: The dependent variables are other financial asset holdings such as short-term debts (column 1), long term debts (column 2) and equities (column 3). The lagged bank loan is added as an explanatory variable. For other information see note in Table 2.

<Table 5> The Gravity Model for Bank Loans: Impact of Trade and Portfolio Assets
(Random Effects Estimation)

	(1)	(2)	(3)
Trade	0.788***	0.612***	0.665***
(lagged)	[0.020]	[0.020]	[0.020]
Short-term Debts	0.248***		
(lagged)	[0.017]		
Long-term Debts		0.384***	
(lagged)		[0.013]	
Equities			0.335***
(lagged)			[0.014]
GDP of Source Country	0.066***	0.070***	0.076***
	[0.017]	[0.016]	[0.016]
GDP of Destination	0.067***	0.064***	0.061***
Country	[0.015]	[0.014]	[0.014]
Per capita GDP of Source	0.322***	0.176***	0.199***
Country	[0.033]	[0.032]	[0.032]
Per capita GDP of	0.114***	0.058***	0.070***
Destination Country	[0.015]	[0.014]	[0.014]
Product of Area Sizes	-0.020**	-0.031***	-0.029***
	[0.008]	[0.008]	[0.008]
Distance	-0.028	0.014	-0.049**
	[0.023]	[0.021]	[0.022]
Border	0.144	0.097	0.02
	[0.113]	[0.104]	[0.107]
Colony	0.569***	0.605***	0.594***
	[0.085]	[0.078]	[0.080]
Common language	0.075	0.077*	0.009
	[0.048]	[0.044]	[0.045]
Observations	5,814	5,814	5,814
R-Squared	0.79	0.81	0.81

Note: The dependent variable is bank loans. The lagged bilateral trade (exports + imports) is added as an explanatory variable. For other information see note in Table 2.

<Table 6> The Gravity Model for Portfolio Assets: Impact of Trade and Bank Loans
(Random Effects Estimation)

	Short-term Debts	Long-term Debts	Equities
Bank Loans	0.157***	0.300***	0.191***
(lagged)	[0.010]	[0.012]	[0.011]
Trade	0.141***	0.364***	0.356***
(lagged)	[0.016]	[0.020]	[0.020]
GDP of Source Country	-0.045***	-0.034**	-0.038**
	[0.011]	[0.016]	[0.016]
GDP of Destination	-0.048***	-0.024*	0.008
Country	[0.010]	[0.014]	[0.014]
Per capita GDP of Source	0.103***	0.357***	0.352***
Country	[0.023]	[0.033]	[0.033]
Per capita GDP of	0.048***	0.152***	0.146***
Destination Country	[0.009]	[0.014]	[0.015]
Product of Area Sizes	0.020***	0.041***	0.035***
	[0.005]	[0.008]	[0.008]
Distance	-0.024	-0.158***	-0.004
	[0.015]	[0.023]	[0.023]
Border	0.264***	0.261**	0.585***
	[0.072]	[0.109]	[0.113]
Colony	-0.005	-0.188**	-0.104
	[0.053]	[0.081]	[0.084]
Common Language	0.018	-0.012	0.194***
	[0.030]	[0.046]	[0.047]
Observations	5,753	5,753	5,753
R-Squared	0.42	0.73	0.67

Note: The dependent variables are other financial asset holdings such as short-term debts (column 1), long term debts (column 2) and equities (column 3). The lagged bilateral trade (exports + imports) is added as an explanatory variable. For other information see note in Table 2.

<Table 7> The Gravity Model for Bank Loans: Impact of Lagged Loans and Portfolio Assets (Random Effects Estimation)

	(1)	(2)	(3)
Short-term Debts	0.034***		
(lagged)	[0.006]		
Long-term Debts		0.031***	
(lagged)		[0.004]	
Equities			0.026***
(lagged)			[0.004]
Bank Loans	0.978***	0.969***	0.973***
(lagged)	[0.004]	[0.004]	[0.004]
GDP of Source Country	-0.002	-0.003	-0.002
	[0.004]	[0.004]	[0.004]
GDP of Destination	0.014***	0.012***	0.012***
Country	[0.003]	[0.003]	[0.003]
Per capita GDP of Source	0.021**	0.011	0.012
Country	[0.010]	[0.010]	[0.010]
Per capita GDP of	0.016***	0.012***	0.014***
Destination Country	[0.004]	[0.004]	[0.004]
Product of Area Sizes	0.002	0	0.001
	[0.002]	[0.002]	[0.002]
Distance	-0.066***	-0.061***	-0.067***
	[0.005]	[0.005]	[0.005]
Border	-0.060**	-0.058**	-0.063**
	[0.025]	[0.025]	[0.025]
Colony	0.054***	0.061***	0.060***
	[0.020]	[0.020]	[0.020]
Common Language	-0.004	-0.003	-0.011
	[0.012]	[0.012]	[0.012]
Observations	5,627	5,627	5,627
R-Squared	0.98	0.98	0.98

Note: The dependent variable is bank loans. The lagged dependent variable is added as an explanatory variable. For other information see note in Table 2.

<Table 8> The Gravity Model for Portfolio Assets: Impact of Lagged Portfolio Assets and Bank Loans (Random Effects Estimation)

	Short-term Debts	Long-term Debts	Equities
Bank Loans	0.041***	0.017***	0.024***
(lagged)	[0.008]	[0.006]	[0.007]
Short-term Debts	0.891***		
(lagged)	[0.012]		
Long-term Debts		0.997***	
(lagged)		[0.006]	
Equities			0.965***
(lagged)			[0.007]
GDP of Source Country	-0.029***	-0.025***	-0.007
	[0.010]	[0.007]	[0.007]
GDP of Destination	-0.01	-0.010*	0.010*
Country	[0.008]	[0.006]	[0.006]
Per capita GDP of Source	0.099***	0.032**	0.075***
Country	[0.023]	[0.016]	[0.017]
Per capita GDP of	0.034***	0.037***	0.018***
Destination Country	[0.008]	[0.006]	[0.006]
Product of Area Sizes	0.016***	0.015***	0.004
	[0.005]	[0.003]	[0.003]
Distance	-0.036***	-0.061***	0
	[0.011]	[0.008]	[0.008]
Border	-0.023	-0.018	0.065*
	[0.049]	[0.035]	[0.037]
Colony	0.008	-0.028	-0.035
	[0.044]	[0.032]	[0.033]
Common Language	0.026	-0.026	0.019
	[0.030]	[0.021]	[0.022]
Observations	2,416	2,416	2,416
R-Squared	0.84	0.98	0.97

Note: The dependent variables are other financial asset holdings such as short-term debts (column 1), long term debts (column 2) and equities (column 3). The lagged dependent variable is added as an explanatory variable. For other information see note in Table 2.

<Table 9> The Gravity Model for Bank Loans: Impact of Trade, Lagged Loans and Portfolio Assets (Random Effects Estimation)

	(1)	(2)	(3)
Trade	0.050***	0.045***	0.047***
(lagged)	[0.006]	[0.007]	[0.007]
Bank Loans	0.961***	0.956***	0.959***
(lagged)	[0.004]	[0.005]	[0.005]
Short-term Debts	0.029***		
(lagged)	[0.006]		
Long-term Debts		0.024***	
(lagged)		[0.004]	
Equities			0.020***
(lagged)			[0.004]
GDP of Source Country	-0.017***	-0.017***	-0.017***
	[0.005]	[0.005]	[0.005]
GDP of Destination	-0.002	-0.002	-0.003
Country	[0.004]	[0.004]	[0.004]
Per capita GDP of Source	0.027***	0.019*	0.020**
Country	[0.010]	[0.010]	[0.010]
Per capita GDP of	0.019***	0.016***	0.017***
Destination Country	[0.004]	[0.004]	[0.004]
Product of Area Sizes	0.003	0.002	0.003
	[0.002]	[0.002]	[0.002]
Distance	-0.050***	-0.048***	-0.052***
	[0.006]	[0.006]	[0.006]
Border	-0.088***	-0.084***	-0.089***
	[0.025]	[0.025]	[0.025]
Colony	0.059***	0.064***	0.063***
	[0.020]	[0.020]	[0.020]
Common Language	-0.014	-0.012	-0.018
	[0.012]	[0.012]	[0.012]
Observations	5,627	5,627	5,627
R-Squared	0.98	0.98	0.98

Note: The dependent variable is bank loans. The lagged dependent variable and bilateral trade (exports + imports) are added as explanatory variables. For other information see note in Table 2.

<Table10> The Gravity Model for Portfolio Assets: Impact of Trade, Lagged Portfolio Assets and Bank Loans (Random Effects Estimation)

	Short-term Debts	Long-term Debts	Equities
Trade	0.039***	-0.001	0.029***
(lagged)	[0.014]	[0.011]	[0.011]
Bank Loans	0.029***	0.017**	0.016**
(lagged)	[0.009]	[0.007]	[0.007]
Short-term Debts	0.886***		
(lagged)	[0.012]		
Long-term Debts		0.998***	
(lagged)		[0.007]	
Equities			0.961***
(lagged)			[0.007]
GDP of Source Country	-0.042***	-0.024***	-0.016**
	[0.011]	[0.008]	[0.008]
GDP of Destination	-0.024**	-0.009	-0.001
Country	[0.009]	[0.007]	[0.007]
Per capita GDP of Source	0.101***	0.032*	0.079***
Country	[0.023]	[0.016]	[0.017]
Per capita GDP of	0.037***	0.037***	0.021***
Destination Country	[0.008]	[0.006]	[0.006]
Product of Area Sizes	0.018***	0.015***	0.005
	[0.005]	[0.003]	[0.003]
Distance	-0.022*	-0.061***	0.01
	[0.012]	[0.009]	[0.009]
Border	-0.043	-0.018	0.051
	[0.049]	[0.035]	[0.037]
Colony	0.008	-0.028	-0.036
	[0.044]	[0.032]	[0.033]
Common Language	0.019	-0.026	0.016
	[0.030]	[0.021]	[0.022]
Observations	2,416	2,416	2,416
R-Squared	0.98	0.98	0.98

Note: The dependent variables are other financial asset holdings such as short-term debts (column 1), long term debts (column 2) and equities (column 3). The lagged dependent variable and bilateral trade (exports + imports) are added as explanatory variables. For other information see note in Table 2.

<Table 11> Determinants of Cross-Border Financial Asset Holding Composition
(Random Effects Estimation)

	Bank Loans / (Loans + Total Portfolios)	Bank Loans / (Loans + Total Debts)	ST Debts / Total Debts
GDP per capita of Source Country	-4.497**	-0.03	-7.375**
	[1.551]	[1.532]	[1.003]
GDP per capita of Destination Country	-4.720**	-3.280**	-0.353
	[1.000]	[0.978]	[0.673]
Human Capital	-15.312*	-12.089*	-6.854
	[5.991]	[5.906]	[3.855]
Openness	4.835**	6.809**	-2.132*
	[1.566]	[1.537]	[1.018]
Distance	0.594	2.698**	-0.018
	[0.904]	[0.897]	[0.562]
Common Language	-2.007	4.599	5.436**
	[2.432]	[2.414]	[1.517]
Law and Order	0.224	0.557	1.591**
	[0.569]	[0.544]	[0.454]
Observations	2,125	2,125	2,125
R-Squared	0.15	0.12	0.07

Note: The dependent variables in columns 1-3 are the composition shares of bilateral asset holdings defined as i) bank loans / (bank loans + short-term debts + long-term debts + equity holdings), ii) bank loans / (bank loans + short-term debts + long-term debts), and iii) short-term debts / (short-term debts + long-term debts), respectively. For other information see note in Table 2.

<Table 12> The Gravity Model for Portfolio Assets: Impact of Bank Loans and 'Law and Order' (Random Effects Estimation)

	Short-term Debts	Long-term Debts	Equities
Bank Loans (lagged)	-0.070***	0.207***	0.014
	[0.021]	[0.025]	[0.024]
Law and Order	-0.065***	-0.061***	-0.049***
	[0.011]	[0.014]	[0.013]
Law and Order * Loans	0.058***	0.034***	0.055***
	[0.004]	[0.005]	[0.005]
GDP of Source Country	0.003	0.105***	0.105***
	[0.012]	[0.018]	[0.018]
GDP of Destination Country	0.020*	0.142***	0.171***
	[0.010]	[0.016]	[0.016]
Per capita GDP of Source Country	0.107***	0.376***	0.332***
	[0.025]	[0.037]	[0.037]
Per capita GDP of Destination Country	0.041***	0.163***	0.140***
	[0.012]	[0.018]	[0.018]
Product of Area Sizes	0.024***	0.044***	0.032***
	[0.006]	[0.010]	[0.010]
Distance	-0.069***	-0.335***	-0.136***
	[0.017]	[0.027]	[0.027]
Border	0.278***	0.441***	0.743***
	[0.076]	[0.123]	[0.124]
Colony	0.068	-0.113	-0.01
	[0.063]	[0.102]	[0.103]
Common Language	0.035	0.046	0.298***
	[0.036]	[0.058]	[0.058]
Observations	4,785	4,785	4,785
R-squared	0.52	0.74	0.72

Note: The dependent variables are other financial asset holdings such as short-term debts (column 1), long term debts (column 2) and equities (column 3). 'Law and order' and its interaction term with bank loans are added as explanatory variables. For other information see note in Table 2.

<Table 13> The Gravity Model for Bank Loans: Impact of Portfolio Assets and 'Law and Order' (Random Effects Estimation)

	(1)	(2)	(3)
Short-term Debts (lagged)	0.271*** [0.087]		
Law and Order *Short-term Debts	0.006 [0.017]		
Long-term Debts (lagged)		0.405*** [0.037]	
Law and Order *Long-term Debts		0.020*** [0.007]	
Equities (lagged)			0.356*** [0.047]
Law and Order *Equities			0.020** [0.009]
Law and Order	0.001 [0.013]	-0.018 [0.014]	-0.033** [0.014]
GDP of Source Country	0.468*** [0.021]	0.358*** [0.019]	0.398*** [0.019]
GDP of Destination Country	0.460*** [0.018]	0.340*** [0.016]	0.369*** [0.017]
Per capita GDP of Source Country	0.306*** [0.045]	0.106*** [0.040]	0.125*** [0.041]
Per capita GDP of Destination Country	0.105*** [0.022]	0.028 [0.020]	0.042** [0.020]
Product of Area Sizes	-0.063*** [0.012]	-0.070*** [0.010]	-0.069*** [0.011]
Distance	-0.374*** [0.031]	-0.207*** [0.027]	-0.335*** [0.028]
Border	0.862*** [0.146]	0.565*** [0.127]	0.492*** [0.132]
Colony	0.878*** [0.125]	0.862*** [0.108]	0.859*** [0.112]
Common Language	0.332*** [0.070]	0.263*** [0.061]	0.163** [0.063]
Observations	4,943	4,943	4,943
R-Squared	0.70	0.77	0.75

Note: The dependent variable is bank loans. 'Law and order' and its interaction term with other financial asset holdings such as short-term debts (column 1), long term debts (column 2) and equities (column 3) are added as explanatory variables. For other information see note in Table 2.

APPENDIX : Between Effects Estimation Results

<Table 2-A> The Gravity Model for Financial Asset Holdings: Base Models
(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 Destination Country	0.157***	0.071***	0.226***	0.207***
	[0.019]	[0.010]	[0.018]	[0.018]
Product of Area Sizes	-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	5,940	5,940	5,940	5,940
R-Squared	0.65	0.31	0.57	0.51

Note: This is the same table as Table 2 except that between-effect estimation results are reported. For other information see note in Table 2.

<Table 3-A> The Gravity Model for Bank Loans: Impact of Portfolio Assets
(Between Effects Estimation)

	(1)	(2)	(3)
Short-term Debts	0.887***		
(lagged)	[0.033]		
Long-term Debts		0.693***	
(lagged)		[0.016]	
Equities			0.672***
(lagged)			[0.017]
GDP of Source	0.323***	0.247***	0.275***
Country	[0.019]	[0.017]	[0.017]
GDP of Destination	0.323***	0.231***	0.245***
Country	[0.015]	[0.013]	[0.014]
Per capita GDP of	0.430***	0.129***	0.148***
Source Country	[0.044]	[0.039]	[0.041]
Per capita GDP of	0.095***	0.006	0.022
Destination Country	[0.018]	[0.016]	[0.016]
Product of	-0.043***	-0.054***	-0.052***
Area Sizes	[0.010]	[0.009]	[0.009]
Distance	-0.211***	-0.087***	-0.220***
	[0.026]	[0.023]	[0.023]
Border	0.683***	0.504***	0.381***
	[0.132]	[0.114]	[0.119]
Colony	0.627***	0.687***	0.682***
	[0.099]	[0.086]	[0.089]
Common Language	0.233***	0.190***	0.07
	[0.055]	[0.048]	[0.050]
Observations	5,814	5,814	5,814
R-Squared	0.73	0.79	0.78

Note: This is the same table as Table 3 except that between-effect estimation results are reported. For other information see note in Table 3.

<Table 4-A> The Gravity Model for Portfolio Assets: Impact of Bank Loans
(Between Effects Estimation)

	Short-term Debts	Long-term Debts	Equities
Bank Loans	0.261***	0.618***	0.590***
(lagged)	[0.010]	[0.015]	[0.015]
GDP of Source Country	-0.026**	-0.033**	-0.058***
	[0.010]	[0.016]	[0.016]
GDP of Destination	-0.027***	-0.009	-0.01
Country	[0.009]	[0.013]	[0.013]
Per capita GDP of	0.033	0.318***	0.314***
Source Country	[0.028]	[0.042]	[0.043]
Per capita GDP of	0.034***	0.135***	0.122***
Destination Country	[0.010]	[0.014]	[0.014]
Product of	0.017***	0.050***	0.045***
Area Sizes	[0.005]	[0.008]	[0.008]
Distance	-0.054***	-0.203***	-0.017
	[0.014]	[0.022]	[0.022]
Border	0.263***	0.246**	0.471***
	[0.071]	[0.108]	[0.108]
Colony	-0.051	-0.319***	-0.305***
	[0.053]	[0.080]	[0.080]
Common Language	0.019	-0.011	0.175***
	[0.029]	[0.044]	[0.045]
Observations	5,880	5,880	5,880
R-Squared	0.46	0.75	0.70

Note: This is the same table as Table 4 except that between-effect estimation results are reported. For other information see note in Table 4.

<Table 5-A> The Gravity Model for Bank Loans: Impact of Trade and Portfolio Assets (Between Effects Estimation)

	(1)	(2)	(3)
Trade	0.788***	0.605***	0.648***
(lagged)	[0.023]	[0.024]	[0.024]
Short-term Debts	0.523***		
(lagged)	[0.029]		
Long-term Debts		0.463***	
(lagged)		[0.017]	
Equities			0.435***
(lagged)			[0.018]
GDP of Source Country	0.019	0.039**	0.042**
	[0.018]	[0.017]	[0.017]
GDP of Destination	0.013	0.024*	0.018
Country	[0.015]	[0.014]	[0.015]
Per capita GDP of Source	0.427***	0.230***	0.247***
Country	[0.036]	[0.035]	[0.036]
Per capita GDP of	0.099***	0.040***	0.052***
Destination Country	[0.015]	[0.014]	[0.014]
Product of Area Sizes	-0.008	-0.023***	-0.020**
	[0.008]	[0.008]	[0.008]
Distance	0.049**	0.070***	-0.004
	[0.023]	[0.021]	[0.022]
Border	-0.015	0.037	-0.077
	[0.111]	[0.104]	[0.106]
Colony	0.499***	0.571***	0.559***
	[0.082]	[0.077]	[0.078]
Common Language	0.062	0.075*	-0.011
	[0.046]	[0.043]	[0.044]
Observations	5,814	5,814	5,814
R-squared	0.81	0.84	0.83

Note: This is the same table as Table 5 except that between-effect estimation results are reported. For other information see note in Table 5.

<Table 6-A> The Gravity Model for Portfolio Assets: Impact of Trade and Bank Loans
(Between Effects Estimation)

	Short-term Debts	Long-term Debts	Equities
Bank Loans	0.208***	0.480***	0.474***
(lagged)	[0.013]	[0.019]	[0.020]
Trade	0.120***	0.313***	0.262***
(lagged)	[0.019]	[0.028]	[0.028]
GDP of Source Country	-0.052***	-0.101***	-0.115***
	[0.011]	[0.017]	[0.017]
GDP of Destination	-0.056***	-0.086***	-0.074***
Country	[0.010]	[0.015]	[0.015]
Per capita GDP of Source	0.046	0.346***	0.338***
Country	[0.028]	[0.041]	[0.042]
Per capita GDP of	0.037***	0.144***	0.128***
Destination Country	[0.009]	[0.014]	[0.014]
Product of Area Sizes	0.019***	0.057***	0.050***
	[0.005]	[0.008]	[0.008]
Distance	-0.021	-0.115***	0.059**
	[0.015]	[0.023]	[0.023]
Border	0.204***	0.087	0.341***
	[0.072]	[0.107]	[0.108]
Colony	-0.044	-0.302***	-0.290***
	[0.053]	[0.078]	[0.079]
Common Language	0.005	-0.051	0.141***
	[0.029]	[0.044]	[0.044]
Observations	5,753	5,753	5,753
R-squared	0.47	0.76	0.71

Note: This is the same table as Table 6 except that between-effect estimation results are reported. For other information see note in Table 6.

<Table 7-A> The Gravity Model For Bank Loans: Impact of Lagged Loans and Portfolio Assets (Between Effects Estimation)

	(1)	(2)	(3)
Short-term Debts	0.032***		
(lagged)	[0.007]		
Long-term Debts		0.020***	
(lagged)		[0.005]	
Equities			0.015***
(lagged)			[0.005]
Bank Loans	1.000***	0.996***	0.999***
(lagged)	[0.004]	[0.005]	[0.005]
GDP of Source Country	-0.009**	-0.009**	-0.009**
	[0.004]	[0.004]	[0.004]
GDP of Destination	0.003	0.003	0.003
Country	[0.003]	[0.003]	[0.003]
Per capita GDP of Source	0.013	0.007	0.008
Country	[0.009]	[0.009]	[0.009]
Per capita GDP of	0.011***	0.010***	0.010***
Destination Country	[0.004]	[0.004]	[0.004]
Product of Area Sizes	0.004*	0.003	0.003*
	[0.002]	[0.002]	[0.002]
Distance	-0.049***	-0.047***	-0.051***
	[0.005]	[0.005]	[0.005]
Border	-0.054**	-0.050*	-0.053**
	[0.026]	[0.026]	[0.027]
Colony	0.029	0.034*	0.032
	[0.020]	[0.020]	[0.020]
Common Language	-0.011	-0.01	-0.013
	[0.011]	[0.011]	[0.011]
Observations	5,627	5,627	5,627
R-squared	0.99	0.99	0.99

Note: This is the same table as Table 7 except that between-effect estimation results are reported. For other information see note in Table 7.

<Table 8-A> The Gravity Model for Portfolio Assets: Impact of Lagged Portfolio Assets and Bank Loans (Between Effects Estimation)

	Short-term Debts	Long-term Debts	Equities
Bank Loans	0.016**	0.004	0.024***
(lagged)	[0.006]	[0.005]	[0.007]
Short-term Debts	1.003***		
(lagged)	[0.010]		
Long-term Debts		1.028***	
(lagged)		[0.005]	
Equities			0.965***
(lagged)			[0.007]
GDP of Source Country	-0.025***	-0.028***	-0.007
	[0.008]	[0.006]	[0.007]
GDP of Destination	-0.011*	-0.012***	0.010*
Country	[0.006]	[0.004]	[0.006]
Per capita GDP of	0.085***	0.008	0.075***
Source country	[0.017]	[0.013]	[0.017]
Per capita GDP of	0.030***	0.030***	0.018***
Destination Country	[0.006]	[0.005]	[0.006]
Product of Area Sizes	0.012***	0.013***	0.004
	[0.004]	[0.003]	[0.003]
Distance	-0.026***	-0.051***	0
	[0.009]	[0.007]	[0.008]
Border	-0.06	-0.026	0.065*
	[0.039]	[0.028]	[0.037]
Colony	0.012	-0.022	-0.035
	[0.034]	[0.025]	[0.033]
Common Language	0.008	-0.027	0.019
	[0.023]	[0.017]	[0.022]
Observations	2,416	2,416	2,416
R-squared	0.93	0.99	0.97

Note: This is the same table as Table 8 except that between-effect estimation results are reported. For other information see note in Table 8.

<Table 9-A> The Gravity Model for Bank Loans: Impact of Trade, Lagged Loans, and Portfolio Assets (Between Effects Estimation)

	(1)	(2)	(3)
Trade	0.038***	0.037***	0.038***
(lagged)	[0.007]	[0.007]	[0.007]
Bank Loans	0.984***	0.983***	0.986***
(lagged)	[0.005]	[0.005]	[0.005]
Short-term Debts	0.027***		
(lagged)	[0.007]		
Long-term Debts		0.014***	
(lagged)		[0.005]	
Equities			0.010**
(lagged)			[0.005]
GDP of Source Country	-0.019***	-0.019***	-0.019***
	[0.004]	[0.004]	[0.004]
GDP of Destination	-0.007*	-0.007**	-0.008**
Country	[0.004]	[0.004]	[0.004]
Per capita GDP of Source	0.019**	0.015	0.017*
Country	[0.009]	[0.009]	[0.009]
Per capita GDP of	0.013***	0.012***	0.012***
Destination Country	[0.004]	[0.004]	[0.004]
Product of Area Sizes	0.005**	0.004**	0.005**
	[0.002]	[0.002]	[0.002]
Distance	-0.039***	-0.038***	-0.040***
	[0.006]	[0.006]	[0.006]
Border	-0.077***	-0.072***	-0.074***
	[0.027]	[0.027]	[0.027]
Colony	0.032	0.035*	0.034*
	[0.020]	[0.020]	[0.020]
Common Language	-0.015	-0.015	-0.017
	[0.011]	[0.011]	[0.011]
Observations	5,627	5,627	5,627
R-squared	0.99	0.99	0.99

Note: This is the same table as Table 8 except that between-effect estimation results are reported. For other information see note in Table 8.

<Table10-A> The Gravity Model for Portfolio Assets: Impact of Trade, Lagged Portfolio Assets and Bank Loans (Between Effects Estimation)

	Short-term Debts	Long-term Debts	Equities
Trade	0.018	-0.016*	0.020**
(lagged)	[0.011]	[0.009]	[0.008]
Bank Loans	0.011	0.008	-0.001
(lagged)	[0.007]	[0.006]	[0.005]
Short-term Debts	1.000***		
(lagged)	[0.011]		
Long-term Debts		1.031***	
(lagged)		[0.006]	
Equities			0.999***
(lagged)			[0.005]
GDP of Source Country	-0.031***	-0.023***	-0.011*
	[0.008]	[0.006]	[0.006]
GDP of Destination	-0.017**	-0.007	0.004
Country	[0.007]	[0.005]	[0.005]
Per capita GDP of	0.087***	0.006	0.029**
Source Country	[0.017]	[0.013]	[0.012]
Per capita GDP of	0.031***	0.028***	0.010**
Destination Country	[0.006]	[0.005]	[0.005]
Product of Area sizes	0.013***	0.013***	0.002
	[0.004]	[0.003]	[0.003]
Distance	-0.020**	-0.057***	0.007
	[0.010]	[0.007]	[0.007]
Border	-0.069*	-0.018	0.042
	[0.039]	[0.029]	[0.028]
Colony	0.012	-0.021	-0.041*
	[0.034]	[0.025]	[0.024]
Common Language	0.006	-0.024	-0.001
	[0.023]	[0.017]	[0.017]
Observations	2,416	2,416	2,416
R-squared	0.93	0.99	0.99

Note: This is the same table as Table 10 except that between-effect estimation results are reported. For other information see note in Table 10.

<Table 11-A> Determinants of Cross-Border Financial Asset Holding Composition
(Between Effects Estimation)

	Bank Loans / (Loans + Total Portfolios)	Bank Loans / (Loans + Total Debts)	ST Debts / Total Debts
GDP per capita of	-2.764	1.458	-8.594**
Source Country	[1.671]	[1.671]	[1.068]
GDP per capita of	-9.314**	-7.308**	-1.353
Destination Country	[1.174]	[1.173]	[0.750]
Human Capital	-4.03	-0.231	-5.716
	[6.375]	[6.372]	[4.072]
Openness	8.128**	8.734**	-2.156
	[1.742]	[1.741]	[1.113]
Distance	1.048	2.885**	-0.33
	[0.926]	[0.925]	[0.591]
Common Language	-0.923	5.225*	5.065**
	[2.393]	[2.392]	[1.528]
Law and Order	0.401	0.584	2.367**
	[0.901]	[0.900]	[0.575]
Observations	2,125	2,125	2,125
R-squared	0.17	0.12	0.11

Note: This is the same table as Table 11 except that between-effect estimation results are reported. For other information see note in Table 11.

<Table 12-A> The Gravity Model for Portfolio Assets: Impact of Bank Loans and 'Law and Order' (Between Effects Estimation)

	Short-term Debts	Long-term Debts	Equities
Bank Loans (lagged)	-0.241***	0.128***	-0.086**
	[0.028]	[0.044]	[0.043]
Law and Order	-0.086***	-0.120***	-0.100***
	[0.013]	[0.021]	[0.020]
Law and Order * Loans	0.105***	0.101***	0.140***
	[0.005]	[0.009]	[0.008]
GDP of Source Country	-0.012	0.007	-0.026
	[0.012]	[0.018]	[0.018]
GDP of Destination Country	0.011	0.057***	0.051***
	[0.010]	[0.016]	[0.016]
Per capita GDP of Source Country	0.038	0.295***	0.340***
	[0.029]	[0.046]	[0.045]
Per capita GDP of Destination Country	0.012	0.139***	0.110***
	[0.012]	[0.019]	[0.019]
Product of Area Sizes	0.024***	0.056***	0.054***
	[0.006]	[0.009]	[0.009]
Distance	-0.044**	-0.242***	0.02
	[0.017]	[0.027]	[0.026]
Border	0.167**	0.101	0.362***
	[0.075]	[0.118]	[0.114]
Colony	0.069	-0.248**	-0.176*
	[0.062]	[0.097]	[0.094]
Common Language	-0.011	-0.054	0.172***
	[0.035]	[0.054]	[0.053]
Observations	4,785	4,785	4,785
R-squared	0.55	0.76	0.74

Note: This is the same table as Table 12 except that between-effect estimation results are reported. For other information see note in Table 12.

<Table 13-A> The Gravity Model for Bank Loans: Impact of Portfolio Assets and 'Law and Order' (Between Effects Estimation)

	(1)	(2)	(3)
Short-term Debts (lagged)	1.312*** [0.208]		
Law and Order *Short-term Debts	-0.093** [0.039]		
Long-term Debts (lagged)		0.701*** [0.060]	
Law and Order *Long-term Debts		-0.008 [0.011]	
Equities (lagged)			0.862*** [0.075]
Law and Order *Equities			-0.043*** [0.014]
Law and Order	-0.024 [0.022]	0.002 [0.021]	-0.031 [0.020]
GDP of Source Country	0.374*** [0.022]	0.287*** [0.020]	0.313*** [0.020]
GDP of Destination Country	0.357*** [0.018]	0.257*** [0.017]	0.269*** [0.017]
Per capita GDP of Source Country	0.453*** [0.049]	0.141*** [0.045]	0.145*** [0.046]
Per capita GDP of Destination Country	0.093*** [0.023]	-0.012 [0.021]	0.016 [0.021]
Product of Area Sizes	-0.044*** [0.012]	-0.060*** [0.010]	-0.056*** [0.010]
Distance	-0.253*** [0.031]	-0.110*** [0.028]	-0.274*** [0.028]
Border	0.545*** [0.141]	0.447*** [0.124]	0.267** [0.128]
Colony	0.774*** [0.119]	0.831*** [0.105]	0.822*** [0.107]
Common Language	0.277*** [0.066]	0.236*** [0.059]	0.085 [0.060]
Observations	4,943	4,943	4,943
R-Squared	0.73	0.79	0.78

Note: This is the same table as Table 13 except that between-effect estimation results are reported. For other information see note in Table 13.