# Information and Capital Flows Revisited: the Internet as a determinant of transactions in financial assets

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ABSTRACT

This paper investigates the determinants of international transactions in financial assets empirically. We extend the gravity model in Portes et al. (2000) by introducing an internet variable. Using cross-country panel data on the portfolio flows between the US and other countries from 1990 to 2008, we found that the Internet turns out to mitigate the information asymmetries and thus increases the cross-border portfolio flows between countries.

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## I. Introduction

Traditionally, the gravity equation has been used to explain flows of a good between pairs of countries mainly in terms of distance and GDP (Tinbergen, 1962; Bergstrand, 1989 etc.). The negative relationship between the international trade volume of a good and the distance is interpreted as the transaction cost. However, it seems like a puzzle when the gravity equation also fits the transaction of international financial assets, since financial assets are weightless and cause little transaction cost. In this vein, Portes et al. (2000) and Portes and Rey (2005) did find that the information asymmetry is a very important determinant of trade in financial assets. They also explain that the negative correlation between the distance and financial asset trade can be explained by the information asymmetry. This implies that as two countries are located farther, the information asymmetry becomes bigger and trade in financial assets becomes less. This can also explain the home bias of financial assets in relation to information asymmetry. They used international telephone call traffic as a proxy of information flows between two countries and found an empirical evidence of the role of international telephone call traffic in mitigating the information asymmetry in financial assets transaction.

If the information friction is the very factor to explain the gravity model in the international financial markets, the new developments of the information technology might account for the recent dramatic increase in the international financial transaction. Therefore the main idea of this paper is to reinvestigate the gravity equation of the international financial markets considering the development of internet. The positive effect of the Internet on macroeconomic variables such as inflation and growth has been studied by recent researches, respectively (Yi and

Choi, 2005; Choi and Yi, 2008). The Internet also turned out to play a positive role in international goods trade (Freund and Weinhold, 2004), international service trade (Freund and Weinhold, 2002; Choi, 2010), and international direct investment (Choi, 2003). Recently Choi (2010) used cross-country panel data for over 110 countries from 1990 to 2007 and found that the Internet reduces the information asymmetry between two countries and thus increases the cross-border portfolio flows. These researches on the effect of the Internet in international transactions in goods and financial assets are mainly based on gravity models.

In our paper we are going to analyze the effect of the Internet on portfolio flows between US and other countries. Here financial asset transactions include foreign residents' transactions in US corporate stocks, corporate bonds, Treasury bonds, and US residents' transactions in foreign (non-US) stocks, and bonds. In this paper, we reconfirm that the gravity model of the international financial transaction is still valid in an extended period, and information flows is an important determinant on the volume of the transaction. We found that the Internet carries information, which cannot be available using telephone, to the international financial dealers and it vitalizes the transaction in some international financial markets.

The structure of the rest of the paper is as follows: section 2 describes the model and data, section 3 outline the estimation results, and the paper ends with concluding remarks put in section 4.

## II. Model and data

To test whether an increase in the Internet increases portfolio flows, we used a standard gravity equation. Here the US GDP is the same to all countries and omitted in the gravity equation.

$$\log(Portfolio_{it}) = \beta_0 + \beta_1 \log(DIST_{it}) + \beta_2 \log(GDP)_{it} + \beta_3 English_i + \beta_4 \log(SOPH_{it}) + \beta_5 \log(TEL_{it}) + \beta_6 \log(Internet)_{it} + u_{it} \quad (1)$$

where $t$ = 1990, 1991, …, 2008.

*Portfolio* represents portfolio flows between US and a partner country. There are various kinds of portfolio flows. They are STOCK (foreign residents' transactions in US corporate stocks), BOND (foreign residents' transactions in US corporate bonds), TB (foreign residents' transactions in US Treasury bond and notes), FSTOCK (US residents' transactions in foreign (non-US) stocks), and FBOND (US residents' transactions in foreign (non-US) bonds). *DIST* stands for the distance between US and partner country. *GDP* is GDP of a partner country. English stand for a dummy variable for English speaking country. FS is a survey data to indicate the degree of financial skill of a country. TEL is international telephone call traffic. *Internet* is number of the Internet users per hundred people. Natural logarithms (log) are used for all the variables except *English* dummies.

The coefficient of the distance is expected to be negative. It is because the transaction cost and information asymmetry become bigger when the distance between two countries becomes bigger. Coefficients of GDP are expected to have positive signs. Coefficient of *English* also is expected to have a positive sign. An English speaking country is expected to have an advantage in communication between two countries. The coefficient of finance skill is expected to have a positive sign. Portfolio flows are big when a partner country is financially developed. Finally the level of the Internet development is expected to have a positive relationship with the portfolio flows. As the Internet use increases, the information asymmetry between two countries becomes small and portfolio flows increase between two

countries. The definition and source of the variables are detailed in the Appendix 1. The list of the countries included in the empirical results is in the Appendix 2.

## III. Empirical Results

Table 1 shows the statistics for the variables used. Table 2 ~ Table 6 describe the main results and in each tables six regressions are reported for the independent variables and estimation methods. Table 2 ~ Table 4 deal with foreign residents' transactions in US markets, while Table 5 and Table 6 with US residents' transactions in foreign markets.

Table 2 summarizes the empirical results for the estimation of the foreign residents' transactions in US corporate stocks. Transactions here include the purchase and sales of stocks. A gravity model is employed in the estimation. A pooled OLS (ordinary least squares) is utilized in equations (1) to (3). Year dummies are included as independent variables in equations (1) to (3) but are not reported. Random effects model is employed in equations (4) to (6). The equations (1) and (4) describe the standard gravity model and the significant negative estimated coefficient of distant (DIST) reconfirms that the power of gravity model is still working in the international financial market. The other estimated coefficients are as we expected. The national income (GDP) is positive and significant at the 1% level. As the national incomes get bigger, the more become the foreign residents' transactions in US corporate stock. Language barrier can be another source of the information asymmetry. Countries using English are assumed to have a less information asymmetry between countries and thus have more financial transactions. Coefficient of English dummy is positive and significant at the 1% level in equation (1) but is

insignificant in equation (4). The coefficient of financial skill is positive and significant at the 1% level in all the equations. The telephone traffic (TEL) is added as an explanatory variable in the gravity model, and the results are consistent with Portes et al. (2001). The coefficient of the telephone traffic is positive and significant at 1% level. The telephone traffic is a significant determinant of the foreigners' transaction volume of US stock.

The equations (2) and (5) add the number of Internet user (Internet) to the equations (1) and (4), respectively. In equation (2) both the telephone traffic and the Internet user number are positive and significant. The estimated coefficient of the telephone traffic of equation (2) is smaller than the coefficient of equation (1), which implies the Internet variable takes over some explanatory power from the telephone traffic. The telephone traffic becomes insignificant in the random effect model estimation of equation (5), while internet variable is significant at the 1% level.

Lastly, the equations (3) and (6) of the Table 2 exclude telephone traffic from the equations (2) and (5), so that the Internet explains all the information flows. As is expected, Internet variable is still significant at the 1% level and the coefficients become a little bigger than those of equations (2) and (5).

The similar storyline to Table 2 is repeating for the case of foreign residents' transactions in US corporate bonds in Table 3. Equations (1) and (4) show that the gravity model holds in the foreign residents' transactions in US corporate bonds market, although coefficient of the distance is insignificant in equation (4). Information flows represented by the telephone traffic is a significant determinant of the international corporate bonds transactions. Equations (2) and (5) show that the Internet is also a significant determinant for the foreigners' transaction of US corporate bonds. The telephone traffic coefficients of the equations (2) and (5)

decreased by incorporating Internet variable, which implies the Internet delivers information which telephone call can not convey to the international bond dealers. Also it's worth noting that the finance skill variable (FS) becomes insignificant by including the Internet in the random effects estimation (5), which may imply that the explanatory power of the Internet absorbs that of the finance skill. Lastly, in the equations (3) and (6) of the table, the Internet is the only variable representing information flows. In the results of the equations (3) and (6), the coefficient of the Internet gets bigger than that of the equations (2) and (5), as is expected. The finance skill becomes insignificant in the equation (6) again, which means it is the information carried by the Internet, not by the telephone traffic, makes the financial skill insignificant.

Table 4 lists the empirical results for the foreign residents' transactions in US Treasury bonds and notes. It is noteworthy that coefficients of distance are insignificant in all the random effect estimations. This implies that the distance may not be an important factor in transacting government bonds internationally. However, the distance is significantly negative in the gravity model of equation (3) estimated by a pooled OLS method. The distance becomes insignificant by adding telephone traffic, which means that the information flows entirely account for the gravity model. The distance variable remains insignificant after adding the Internet variable in the equation (2), but gets significant by excluding the telephone traffic in the equation (3). These results imply physical distance is replaced by the telephone in explaining the foreign residents' transactions in US Treasury bonds. The coefficient of the Internet is positive and significant at the 1% level in all the equations including it, which means the Internet carries information which cannot be delivered through telephones.

Table 5 shows the estimation results for the US residents' transaction in foreign corporate stocks. Again, the distance variable is insignificant in all the equations (2) through (6). The distance becomes insignificant when the telephone traffic or the Internet is considered. This implies that the distance is not an important factor in deciding the US residents' transaction in foreign corporate equities. Nevertheless, coefficients of the GDP, English, finance skill, and telephone call traffic are all positive and significant in all the equations estimated. The coefficient of the Internet is also positive and significant at the 1% level in all the equations including it. This means that the Internet is a very important determinant in the US residents' transaction in foreign corporate equities.

Table 6 is the estimation result for US residents' transaction in foreign corporate bonds. Unlike the case of Table 5, the distance variables are negative and significant in all the equations. Coefficients of telephone call traffic are positive and significant at the 1% level in equations (1) and (4) and at the 5% level in equation (5). The Internet, however, is significant in equations (2) and (3) but not significant in equations (5) and (6).

We found the evidence that information carried by the Internet is important when US residents transact foreign corporate equities in Table 5, but less important when they transact foreign bonds in Table 6.

In previous estimation results, natural logarithms of the number of the Internet users are used. For that reason many observations such as zero are omitted in the regression. Therefore in Table 2-1 to Table 6-1 the logarithm of the Internet plus 1 (log(Internet+1)) is used instead of the Internet. Number of observations of the Internet variable increased from 605 to 707 in some estimation. Almost all the regression results are similar to those from Table 2 to Table 6. All the coefficients of

the Internet in Table 2-1 and Table 3-1 get bigger than in Table 2 and Table 3. Especially the estimation result from Table 6-1 improved marginally. Coefficients of international telephone call traffic become positive and significant at the 5% level in equation (1), 10% level in equation (2) and 1% level in equations (4) and (5). Coefficients of the Internet are insignificant in equations (2) and (5) but positive and significant at the 5% level in equations (3) and (6). In general the results form Table 2-1 to Table 6-1 shows the robustness of the empirical analysis.

## IV. Conclusion

In this paper, we investigate the determinants of international financial transaction using cross-country panel data on portfolio flows between US and the 38 countries from 1990 to 2008. First, we reconfirm the gravity model explains international transactions in financial assets and information friction account for the negative relationship between distance and the transaction volume. Second, it is hypothesized that the development of the Internet will increase portfolio flows and we found that the Internet can mitigate the information asymmetry between two countries and thus increases the cross-border portfolio flows. We tested the hypothesis in various empirical models, and the results turns out to be very robust.

The results of this paper suggest that information friction is one of the key factors to impede international transaction and recent fast increase in the cross-country portfolio investment can be explained by the IT development. We can expect the international integration in the financial markets will be accelerated by IT technology development. Since the relationship between IT technology and international finance will become stronger for the future, it is needed for policymakers to observe the internet-related financial skills more carefully.

## Appendix: Description on data

### 1) Dependent Variables: Capital flows of the US and foreign securities between the US and foreign (non-US) residents

Source: US Treasury Web site (http://www.treas.gov/tic/index.htm)
Available originally as monthly, from which annual data is drawn.
Gross flows = sales to+ purchases from US residents, by non-US residents (in million $)

TB: gross flows of US treasury bond and notes
BOND: gross flows of US corporate bonds
STOCK: gross flows of US corporate stocks
FBOND: gross flows of foreign(non-US) bonds
FSTOCK: gross flows of foreign(non-US) stocks
ltreab, labond, lcbond, lcstock, lfbond, lfstock : in log of the above vars'.

### 2) Independent Variables

*DISTANCE*: The distance between New York and financial center of a foreign country from Portes, Rey and Oh (2001) and Shang-JinWei website (http://www.ksg.harvard.edu/people/sjwei)

*GDP*: World Development Indicator (2009), World Bank

*English language dummy*: 1 for English speaking countries, zero, otherwise; Australia, Canada, Hong Kong, India, Ireland, Singapore, South Africa, UK

*Finance Skill*: 1~7, higher value implies improved financial skill, *World Competitiveness Yearbook*, IMD

The original *Finance Skill* data have different scales by periods: the data for 1993~1995 have 1 to 10 values, the data for 1996 have 1 to 6 values, and the data for 1997 to present has 1 to 7 values. Thus the data before 1997 are rescaled to have 1 to 7 values. Also, missing values are replaced by nearest figures.

*Telephone traffic*: time of international outgoing telephone traffic of that country from International telecommunication Union

*Internet users*: number of Internet users per 100 people from World Development Indicator (2008), World Bank

**3) List of partner countries**

| | | | |
|---|---|---|---|
| 1 | Argentina | 20 | Korea |
| 2 | Australia | 21 | Malaysia |
| 3 | Austria | 22 | Mexico |
| 4 | Brazil | 23 | Netherlands |
| 5 | Canada | 24 | Norway |
| 6 | Chile | 25 | Pakistan |
| 7 | China - Mainland | 26 | Peru |
| 8 | Colombia | 27 | Philippines |
| 9 | Denmark | 28 | Poland |
| 10 | Finland | 29 | Portugal |
| 11 | France | 30 | Singapore |
| 12 | Germany | 31 | South Africa |
| 13 | Greece | 32 | Spain |
| 14 | Hong Kong | 33 | Sweden |
| 15 | India | 34 | Switzerland |
| 16 | Indonesia | 35 | Thailand |
| 17 | Ireland | 36 | Turkey |
| 18 | Italy | 37 | United Kingdom |
| 19 | Japan | 38 | Venezuela |

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**Table 1. Descriptive Statistics**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| STOCK | 707 | 66611.86 | 288310.6 | 2 | 3671086 |
| BOND | 707 | 20226.97 | 112802.1 | 0 | 1548650 |
| TB | 707 | 249313.5 | 1092795 | 0 | 1.56E+07 |
| FSTOCK | 707 | 59032.34 | 252247.6 | 0 | 3511734 |
| FBOND | 707 | 54269.01 | 215638 | 0 | 2190293 |
| GDP | 707 | 563.7491 | 844.4232 | 26.42198 | 5264.852 |
| Internet | 707 | 19.46704 | 23.91114 | 1 | 87.8 |
| Finance skill | 707 | 4.60294 | 1.124013 | 1.722 | 6.8 |
| distance | 707 | 8811.014 | 3576.393 | 1037.087 | 15810.22 |

**Table 2. Foreign residents' transactions in US corporate stocks[1,2]**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent variable | Log(Stock) | | | | | |
| Estimation | Pooled OLS[3] | | | Random effects | | |
| Log(DIST) | -0.864*** | -0.725*** | -0.810*** | -0.517 | -1.040*** | -1.110*** |
| | (0.101) | (0.106) | (0.101) | (0.372) | (0.369) | (0.367) |
| Log(GDP) | 0.641*** | 0.736*** | 0.954*** | 0.854*** | 0.466*** | 0.475*** |
| | (0.067) | (0.073) | (0.048) | (0.108) | (0.103) | (0.092) |
| English | 0.291** | 0.625*** | 0.709*** | 0.221 | 1.284*** | 1.361*** |
| | (0.142) | (0.153) | (0.140) | (0.472) | (0.470) | (0.464) |
| Log(FS) | 3.562*** | 3.132*** | 3.263*** | 1.573*** | 0.654*** | 0.625*** |
| | (0.240) | (0.302) | (0.294) | (0.233) | (0.238) | (0.231) |
| Log(TEL) | 0.460*** | 0.323*** | | 1.028*** | 0.101 | |
| | (0.065) | (0.079) | | (0.071) | (0.089) | |
| Log(Internet) | | 0.176*** | 0.290*** | | 0.353*** | 0.367*** |
| | | (0.058) | (0.054) | | (0.024) | (0.019) |
| Constant | -1.738 | -0.678 | 5.367*** | -15.099*** | 11.360*** | 14.011*** |
| | (1.539) | (1.780) | (1.102) | (3.604) | (3.939) | (3.376) |
| Year dummy included | yes | yes | yes | | | |
| Observations | 672 | 567 | 605 | 672 | 567 | 605 |
| R-squared | 0.747 | 0.722 | 0.710 | 0.648 | 0.624 | 0.596 |
| Number of country | 38 | 38 | 38 | 38 | 38 | 38 |

Source: author's calculation.

Notes:

1. Standard errors are in the parentheses
2. *** p<0.01, ** p<0.05, * p<0.1
3. Coefficients for year dummy variables are not reported.

**Table 3. Foreign residents' transactions in US corporate bonds[1,2]**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent variable | Log(Bond) | | | | | |
| Estimation | Pooled OLS[3] | | | Random effects | | |
| Log(DIST) | -0.946*** | -0.784*** | -0.837*** | -0.619 | -0.959** | -1.067*** |
| | (0.120) | (0.121) | (0.116) | (0.435) | (0.411) | (0.411) |
| Log(GDP) | 0.703*** | 0.830*** | 0.991*** | 1.165*** | 0.924*** | 0.978*** |
| | (0.079) | (0.084) | (0.056) | (0.125) | (0.126) | (0.114) |
| English | 0.570*** | 1.125*** | 1.133*** | 0.472 | 1.268** | 1.503*** |
| | (0.169) | (0.174) | (0.161) | (0.553) | (0.525) | (0.522) |
| Log(FS) | 2.590*** | 1.942*** | 2.002*** | 1.022*** | 0.300 | 0.254 |
| | (0.286) | (0.347) | (0.340) | (0.269) | (0.300) | (0.293) |
| Log(TEL) | 0.478*** | 0.247*** | | 0.892*** | 0.285*** | |
| | (0.077) | (0.091) | | (0.082) | (0.111) | |
| Log(Internet) | | 0.250*** | 0.364*** | | 0.257*** | 0.306*** |
| | | (0.067) | (0.063) | | (0.030) | (0.024) |
| Constant | -1.976 | 1.165 | 5.844*** | -13.877*** | 3.477 | 9.903*** |
| | (1.820) | (2.035) | (1.267) | (4.212) | (4.518) | (3.807) |
| Year dummy included | yes | yes | yes | | | |
| Observations | 664 | 565 | 603 | 664 | 565 | 603 |
| R-squared | 0.661 | 0.655 | 0.637 | 0.579 | 0.618 | 0.595 |
| Number of country | 38 | 38 | 38 | 38 | 38 | 38 |

Source: author's calculation.

Notes:

1. Standard errors in parentheses
2. *** p<0.01, ** p<0.05, * p<0.1
3. Coefficients for year dummy variables not shown

**Table 4. Foreign residents' transactions in US Treasury bonds and notes[1,2]**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent variable | Log(TB) | | | | | |
| Estimation | Pooled OLS[3] | | | Random effects | | |
| Log(DIST) | -0.189 | -0.154 | -0.261** | -0.295 | -0.555 | -0.654 |
| | (0.121) | (0.112) | (0.108) | (0.441) | (0.402) | (0.416) |
| Log(GDP) | 0.663*** | 0.823*** | 1.119*** | 1.029*** | 0.823*** | 0.798*** |
| | (0.079) | (0.077) | (0.052) | (0.123) | (0.119) | (0.110) |
| English | 0.394** | 0.957*** | 1.108*** | 0.880 | 1.319** | 1.458*** |
| | (0.170) | (0.160) | (0.151) | (0.560) | (0.513) | (0.528) |
| Log(FS) | 1.666*** | 0.648** | 0.873*** | 0.016 | -0.060 | -0.101 |
| | (0.286) | (0.316) | (0.315) | (0.261) | (0.281) | (0.278) |
| Log(TEL) | 0.848*** | 0.430*** | | 0.664*** | 0.155 | |
| | (0.078) | (0.083) | | (0.080) | (0.104) | |
| Log(Internet) | | 0.355*** | 0.493*** | | 0.118*** | 0.147*** |
| | | (0.061) | (0.058) | | (0.028) | (0.023) |
| Constant | -12.187*** | -2.387 | 5.467*** | -6.905 | 6.908 | 11.094*** |
| | (1.835) | (1.870) | (1.182) | (4.250) | (4.370) | (3.843) |
| Year dummy included | yes | yes | yes | | | |
| Observations | 667 | 566 | 604 | 667 | 566 | 604 |
| R-squared | 0.650 | 0.648 | 0.626 | 0.605 | 0.576 | 0.523 |
| Number of country | 38 | 38 | 38 | 38 | 38 | 38 |

Source: author's calculation.

Notes:

1. Standard errors in parentheses
2. *** p<0.01, ** p<0.05, * p<0.1
3. Coefficients for time dummy variables not shown

**Table 5. US residents' transactions in foreign corporate stocks[1,2]**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent variable | Log(FSTOCK) | | | | | |
| Estimation | Pooled OLS[3] | | | Random effects | | |
| Log(DIST) | -0.158* | 0.019 | -0.007 | 0.266 | -0.108 | -0.146 |
| | (0.087) | (0.078) | (0.073) | (0.294) | (0.272) | (0.256) |
| Log(GDP) | 0.841*** | 0.938*** | 1.031*** | 1.117*** | 0.896*** | 1.038*** |
| | (0.057) | (0.054) | (0.035) | (0.107) | (0.088) | (0.078) |
| English | 0.485*** | 0.984*** | 1.008*** | 0.351 | 1.164*** | 1.397*** |
| | (0.122) | (0.112) | (0.101) | (0.376) | (0.349) | (0.325) |
| Log(FS) | 3.670*** | 2.828*** | 2.932*** | 1.591*** | 1.344*** | 1.336*** |
| | (0.205) | (0.221) | (0.212) | (0.242) | (0.213) | (0.212) |
| Log(TEL) | 0.316*** | 0.143** | | 0.978*** | 0.242*** | |
| | (0.056) | (0.058) | | (0.074) | (0.078) | |
| Log(Internet) | | 0.206*** | 0.256*** | | 0.186*** | 0.225*** |
| | | (0.042) | (0.039) | | (0.021) | (0.017) |
| Constant | -6.317*** | -4.606*** | -2.072*** | -22.436*** | -2.806 | 1.590 |
| | (1.312) | (1.304) | (0.793) | (2.992) | (3.053) | (2.384) |
| Year dummy included | yes | yes | yes | | | |
| Observations | 670 | 567 | 605 | 670 | 567 | 605 |
| R-squared | 0.795 | 0.811 | 0.812 | 0.664 | 0.764 | 0.759 |
| Number of country | 38 | 38 | 38 | 38 | 38 | 38 |

Source: author's calculation.

Notes:

1. Standard errors in parentheses
2. *** p<0.01, ** p<0.05, * p<0.1
3. Coefficients for year dummy variables not shown

**Table 6. US residents' transactions in foreign bonds[1,2]**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent variable | Log(FBOND) | | | | | |
| Estimation | Pooled OLS[3] | | | Random effects | | |
| Log(DIST) | -1.031*** | -0.894*** | -0.886*** | -0.763* | -0.950** | -1.014** |
| | (0.123) | (0.117) | (0.110) | (0.420) | (0.428) | (0.409) |
| Log(GDP) | 0.946*** | 1.085*** | 0.976*** | 1.261*** | 1.255*** | 1.289*** |
| | (0.081) | (0.081) | (0.053) | (0.132) | (0.124) | (0.111) |
| English | 0.751*** | 1.305*** | 1.107*** | 0.897* | 1.102** | 1.240** |
| | (0.173) | (0.168) | (0.153) | (0.535) | (0.547) | (0.519) |
| Log(FS) | 2.371*** | 1.981*** | 1.861*** | 0.086 | 0.612** | 0.747*** |
| | (0.292) | (0.331) | (0.320) | (0.288) | (0.291) | (0.284) |
| Log(TEL) | 0.182** | -0.152* | | 0.591*** | 0.199* | |
| | (0.079) | (0.087) | | (0.088) | (0.108) | |
| Log(Internet) | | 0.161** | 0.154*** | | -0.006 | 0.022 |
| | | (0.064) | (0.059) | | (0.029) | (0.023) |
| Constant | 5.108*** | 10.923*** | 7.588*** | -4.171 | 4.809 | 8.989** |
| | (1.871) | (1.959) | (1.186) | (4.133) | (4.631) | (3.785) |
| Year dummy included | yes | yes | yes | | | |
| Observations | 671 | 568 | 606 | 671 | 568 | 606 |
| R-squared | 0.603 | 0.606 | 0.602 | 0.527 | 0.540 | 0.554 |
| Number of country | 38 | 38 | 38 | 38 | 38 | 38 |

Source: author's calculation.

Notes:

1. Standard errors in parentheses
2. *** p<0.01, ** p<0.05, * p<0.1
3. Coefficients for year dummy variables not shown

**Table 2-1. Foreign residents' transactions in US corporate stocks[1,2]**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent variable | Log(Stock) | | | | | |
| Estimation | Pooled OLS[3] | | | Random effects | | |
| Log(DIST) | -0.864*** | -0.832*** | -0.914*** | -0.517 | -0.872** | -1.067*** |
| | (0.101) | (0.101) | (0.097) | (0.372) | (0.368) | (0.367) |
| Log(GDP) | 0.641*** | 0.683*** | 0.943*** | 0.854*** | 0.609*** | 0.775*** |
| | (0.067) | (0.067) | (0.046) | (0.108) | (0.101) | (0.090) |
| English | 0.291** | 0.423*** | 0.596*** | 0.221 | 1.003** | 1.414*** |
| | (0.142) | (0.146) | (0.135) | (0.472) | (0.470) | (0.465) |
| Log(FS) | 3.562*** | 3.067*** | 3.150*** | 1.573*** | 0.326 | 0.218 |
| | (0.240) | (0.273) | (0.271) | (0.233) | (0.227) | (0.226) |
| Log(FS) | 0.460*** | 0.374*** | | 1.028*** | 0.454*** | |
| | (0.065) | (0.069) | | (0.071) | (0.078) | |
| Log(Internet) | | 0.287*** | 0.482*** | | 0.445*** | 0.555*** |
| | | (0.082) | (0.075) | | (0.034) | (0.028) |
| Constant | -1.738 | -0.715 | 5.181*** | -15.099*** | 1.970 | 11.857*** |
| | (1.539) | (1.554) | (1.059) | (3.604) | (3.759) | (3.380) |
| Year dummy included | yes | yes | yes | | | |
| Observations | 672 | 669 | 707 | 672 | 669 | 707 |
| R-squared | 0.747 | 0.753 | 0.740 | 0.648 | 0.697 | 0.661 |
| Number of country | 38 | 38 | 38 | 38 | 38 | 38 |

Source: author's calculation.

Notes:

1. Standard errors are in the parentheses
2. *** p<0.01, ** p<0.05, * p<0.1
3. Coefficients for year dummy variables are not reported.

**Table 3-1. Foreign residents' transactions in US corporate bonds[1,2]**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent variable | Log(BOND) | | | | | |
| Estimation | Pooled OLS[3] | | | Random effects | | |
| Log(DIST) | -0.946*** | -0.897*** | -0.951*** | -0.619 | -0.888** | -1.032** |
| | (0.120) | (0.118) | (0.113) | (0.435) | (0.417) | (0.416) |
| Log(GDP) | 0.703*** | 0.758*** | 0.997*** | 1.165*** | 0.987*** | 1.161*** |
| | (0.079) | (0.078) | (0.053) | (0.125) | (0.122) | (0.108) |
| English | 0.570*** | 0.753*** | 0.900*** | 0.472 | 1.074** | 1.476*** |
| | (0.169) | (0.171) | (0.158) | (0.553) | (0.533) | (0.526) |
| Log(FS) | 2.590*** | 1.900*** | 1.930*** | 1.022*** | 0.093 | -0.050 |
| | (0.286) | (0.324) | (0.321) | (0.269) | (0.278) | (0.274) |
| Log(TEL) | 0.478*** | 0.354*** | | 0.892*** | 0.426*** | |
| | (0.077) | (0.081) | | (0.082) | (0.096) | |
| Log(Internet) | | 0.388*** | 0.603*** | | 0.347*** | 0.457*** |
| | | (0.096) | (0.089) | | (0.042) | (0.034) |
| Constant | -1.976 | -0.276 | 5.754*** | -13.877*** | -0.403 | 8.473** |
| | (1.820) | (1.817) | (1.181) | (4.212) | (4.339) | (3.837) |
| Year dummy included | yes | yes | yes | | | |
| Observations | 664 | 661 | 699 | 664 | 661 | 699 |
| R-squared | 0.661 | 0.672 | 0.657 | 0.579 | 0.629 | 0.607 |
| Number of country | 38 | 38 | 38 | 38 | 38 | 38 |

Source: author's calculation.

Notes:

1. Standard errors in parentheses
2. *** p<0.01, ** p<0.05, * p<0.1
3. Coefficients for year dummy variables not shown

**Table 4-1. Foreign residents' transactions in US Treasury bonds and notes[1,2]**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent variable | Log(TB) | | | | | |
| Estimation | Pooled OLS[3] | | | Random effects | | |
| Log(DIST) | -0.189 | -0.134 | -0.291** | -0.295 | -0.331 | -0.578 |
| | (0.121) | (0.119) | (0.118) | (0.441) | (0.421) | (0.435) |
| Log(GDP) | 0.663*** | 0.715*** | 1.220*** | 1.029*** | 0.984*** | 1.197*** |
| | (0.079) | (0.078) | (0.056) | (0.123) | (0.125) | (0.114) |
| English | 0.394** | 0.571*** | 0.980*** | 0.880 | 0.952* | 1.499*** |
| | (0.170) | (0.172) | (0.165) | (0.560) | (0.538) | (0.551) |
| Log(FS) | 1.666*** | 0.988*** | 1.244*** | 0.016 | -0.093 | -0.242 |
| | (0.286) | (0.323) | (0.333) | (0.261) | (0.285) | (0.290) |
| Log(TEL) | 0.848*** | 0.725*** | | 0.664*** | 0.599*** | |
| | (0.078) | (0.081) | | (0.080) | (0.098) | |
| Log(Internet) | | 0.402*** | 0.732*** | | 0.055 | 0.209*** |
| | | (0.096) | (0.093) | | (0.043) | (0.036) |
| Constant | -12.187*** | -9.625*** | 0.431 | -6.905 | -4.970 | 8.033** |
| | (1.835) | (1.825) | (1.296) | (4.250) | (4.391) | (4.015) |
| Year dummy included | yes | yes | yes | | | |
| Observations | 667 | 664 | 702 | 667 | 664 | 702 |
| R-squared | 0.650 | 0.662 | 0.618 | 0.605 | 0.610 | 0.533 |
| Number of country | 38 | 38 | 38 | 38 | 38 | 38 |

Source: author's calculation.

Notes:

1. Standard errors in parentheses
2. *** p<0.01, ** p<0.05, * p<0.1
3. Coefficients for year dummy variables not shown

**Table 5-1. US residents' transactions in foreign corporate stocks[1,2]**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent variable | Log(FSTOCK) | | | | | |
| Estimation | Pooled OLS[3] | | | Random effects | | |
| Log(DIST) | -0.158* | -0.126 | -0.152* | 0.266 | 0.142 | -0.105 |
| | (0.087) | (0.086) | (0.081) | (0.294) | (0.284) | (0.269) |
| Log(GDP) | 0.841*** | 0.878*** | 1.038*** | 1.117*** | 1.041*** | 1.419*** |
| | (0.057) | (0.057) | (0.038) | (0.107) | (0.107) | (0.092) |
| English | 0.485*** | 0.601*** | 0.729*** | 0.351 | 0.645* | 1.343*** |
| | (0.122) | (0.124) | (0.113) | (0.376) | (0.368) | (0.344) |
| Log(FS) | 3.670*** | 3.230*** | 3.317*** | 1.591*** | 1.119*** | 1.052*** |
| | (0.205) | (0.234) | (0.228) | (0.242) | (0.264) | (0.268) |
| Log(TEL) | 0.316*** | 0.234*** | | 0.978*** | 0.759*** | |
| | (0.056) | (0.059) | | (0.074) | (0.089) | |
| Log(Internet) | | 0.259*** | 0.368*** | | 0.173*** | 0.360*** |
| | | (0.070) | (0.063) | | (0.039) | (0.033) |
| Constant | -6.317*** | -5.479*** | -2.057** | -22.436*** | -16.131*** | -1.016 |
| | (1.312) | (1.326) | (0.886) | (2.992) | (3.206) | (2.539) |
| Year dummy included | yes | yes | yes | | | |
| Observations | 670 | 667 | 705 | 670 | 667 | 705 |
| R-squared | 0.795 | 0.800 | 0.800 | 0.664 | 0.688 | 0.691 |
| Number of country | 38 | 38 | 38 | 38 | 38 | 38 |

Source: author's calculation.

Notes:

1. Standard errors in parentheses
2. *** p<0.01, ** p<0.05, * p<0.1
3. Coefficients for year dummy variables not shown

**Table 6-1. US residents' transactions in foreign bonds[1,2]**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent variable | Log(FBOND) | | | | | |
| Estimation | Pooled OLS[3] | | | Random effects | | |
| Log(DIST) | -1.031*** | -1.016*** | -1.037*** | -0.763* | -0.704* | -0.957** |
| | (0.123) | (0.124) | (0.116) | (0.420) | (0.419) | (0.400) |
| Log(GDP) | 0.946*** | 0.963*** | 1.055*** | 1.261*** | 1.302*** | 1.591*** |
| | (0.081) | (0.082) | (0.055) | (0.132) | (0.136) | (0.118) |
| English | 0.751*** | 0.800*** | 0.829*** | 0.897* | 0.765 | 1.361*** |
| | (0.173) | (0.178) | (0.162) | (0.535) | (0.538) | (0.509) |
| Log(FS) | 2.371*** | 2.185*** | 2.187*** | 0.086 | 0.305 | 0.266 |
| | (0.292) | (0.336) | (0.326) | (0.288) | (0.316) | (0.315) |
| Log(TEL) | 0.182** | 0.143* | | 0.591*** | 0.687*** | |
| | (0.079) | (0.085) | | (0.088) | (0.108) | |
| Log(Internet) | | 0.106 | 0.212** | | -0.077 | 0.092** |
| | | (0.100) | (0.091) | | (0.047) | (0.039) |
| Constant | 5.108*** | 5.661*** | 7.738*** | -4.171 | -7.029 | 7.174* |
| | (1.871) | (1.905) | (1.270) | (4.133) | (4.485) | (3.727) |
| Year dummy included | yes | yes | yes | | | |
| Observations | 671 | 668 | 706 | 671 | 668 | 706 |
| R-squared | 0.603 | 0.602 | 0.602 | 0.527 | 0.518 | 0.526 |
| Number of country | 38 | 38 | 38 | 38 | 38 | 38 |

Source: author's calculation.

Notes:

1. Standard errors in parentheses
2. *** p<0.01, ** p<0.05, * p<0.1
3. Coefficients for year dummy variables not shown