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Distance and International Banking

by

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Abstract:
If the technological revolution which has taken place over the past decades has lowered information costs and if information costs increase in distance, distance should – ceteris paribus – become less important in determining international bank lending. We are using a dataset on assets and liabilities of commercial banks from five countries (France, Germany, Italy, UK, US) in up to 50 host countries for the years 1983 through 1998 to test this hypothesis. For the European banks, distance has remained of the same importance it used to have. For the US, a declining importance of distance was found. Several interpretations of these findings are discussed.

Keywords: cross-border banking, information costs
JEL-classification: F21, G21

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1 Motivation

Distance has a number of economic implications. In international trade, the costs of transportation increase in distance, and some goods might even perish over long distances. Therefore, gravity models of foreign trade typically find a negative impact of geographical distance on bilateral trade links, controlling for other factors.[1] In international finance, distance can have a double-edged impact on investment incentives. On the one hand, correlations of business cycles could be expected to decline in distance. From a portfolio perspective, investments in remote countries might thus provide benefits of diversification. On the other hand, information costs tend to increase in distance, primarily due to an increasing degree of cultural disparity. Since asymmetries in information are one characterizing feature of international financial markets, distance might therefore exert a negative impact on investment choices. In fact, most empirical papers find a negative link between international asset holdings or international capital flows and distance (Portes and Rey 1999, Portes et al. 2001, Wei and Wu 2001).

If the negative impact of distance on international capital flows captures information costs, one might expect that its importance declines over time as technological progress reduces these costs.[2] The mere facts that costs for international telephone calls have been reduced drastically over the past decades, that the internet provides immediate access to information on even geographically remote investment opportunities, and that computer power has

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1 Baier and Bergstrand (2001) empirically assess which factors have contributed to the increase in global trade that has been observed during the past decades. They find that income growth explains more than two thirds of trade growth, followed by reductions in tariff rates (around 25 percent). Declines in transport cost, in contrast, explain less than 10 percent of growth in world trade, which is somewhat at odds with the conventional wisdom. In contrast to earlier gravity models of foreign trade, Baier and Bergstrand use direct measures of transport costs as an explanatory variable rather than distance as a proxy.

2 A similar argument can, of course, be made in relation to transportation costs.

been up-scaled substantially suggest that information is available at substantially lower costs now than it used to be. In fact, in a domestic context, Petersen and Rajan (2000) find that the geographical distance between banks and their borrowers has been increasing over time. This might be interpreted in terms of lower information costs due to technological progress. For international financial data, the changing importance of distance has, to the best of our knowledge, not been analyzed so far, mainly due to a lack of regionally disaggregated data on international capital flows or asset holdings for a sufficiently long time span.

In this paper, we are using a new dataset on international assets and liabilities of commercial banks which has been provided by the Bank for International Settlements (BIS) to shed light on the question whether the importance of distance has changed over time. We are covering a time frame of almost two decades (1983–1999), and we are looking at the foreign activities of banks from five BIS reporting countries (France, Germany, Italy, United Kingdom, United States) in about 50 host countries, including a number of developing markets. The sample is fairly representative because it covers 59 percent of the claims of the BIS reporting countries as well as 89 percent of the host countries (BIS 2000). Both cross-section estimations for each of the years under study as well as panel estimates are used to test the hypothesis that the importance of distance in determining international financial linkages might have changed.

Perhaps somewhat surprisingly, we find that, if anything, distance has become more, not less, important in international bank lending for the European countries in the sample but not for the US. One possible reason for this dichotomy is that the importance of distance has traditionally been above-average for the US market, and that we might be observing a convergence process. The results suggest, at the same time, that lessons concerning the decline in information costs that are derived from US data might not be transferable

immediately to other countries. One explanation for the continued importance of distance in determining international bank lending could be that improvements in information technology have caused a shift away from bank lending towards securitized finance. This disintermediation trend might actually have left the banks behind with a pool of borrowers which are more information-intensive, as evidenced by an increasing share of non-banks in the pool of borrowers. This interpretation supports the results of Eichengreen and Mody (2000) who stress the important role of banks in lending to small and mid-sized borrowers on international financial markets. Our results thus caution us against interpreting the changing importance of distance in terms of information costs without taking structural changes in financial markets into account. Also, to the extent that international banking activities and foreign trade are linked, the distance variable may to some extent pick up physical transportation costs.

In the following second part, we briefly review earlier empirical evidence on the role of distance on financial markets which has been attributed to information costs. Part three presents our own empirical estimates on the changing determinants of international banking activities over time. We also analyze the question to what extent distance or financial market regulations have been responsible for the (home) bias typically observed in international investment portfolios. We follow Ahearne et al. (2000) in defining the bias as the deviation of actual asset holdings in a given country from the share of this country in world GDP. Part four discusses our results, and part five concludes.

2 Distance and Information Costs

The theoretical literature on the link between distance, information costs, and international asset holdings is still pretty much in its infancies.[3] Although a number of portfolios models take some transaction cost measures into account,[4] which can be (directly or indirectly) interpreted as information costs, most of these models remain relatively silent with regard to the precise nature of the information friction considered. At the same time, models which go into more detail in modeling information asymmetries and the implications of distance[5] do not derive immediate implications for international portfolio choices. A general result of this literature is that information costs can be expected to increase in distance, and that this effect might swamp the positive impact that lower return correlations between remote countries might have for portfolio diversification.

The empirical literature on the links between capital flows and distance is somewhat more advanced although it has certainly not yet reached the degree of sophistication of the foreign trade literature where including a measure of geographical distance has been a popular and successful way of explaining movements of goods for quite some time. In international finance, similar gravity-type models have been used more recently only, yet providing strikingly good and consistent results in describing both international capital flows and international asset holdings.

Portes and Rey (1999) are using a dataset on annual bilateral equity flows for the years 1989–1996 for 14 countries. Equity flows are modeled as a function of information and transaction costs, the former being captured through the volume

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3 This is in contrast to the increasing number of papers in the foreign trade literature which motivate the use of gravity models in empirical foreign trade models. See Baier and Bergstrand (2001) for a recent contribution.

4 See Calvo and Mendoza (2000), Rowland (1999), or Stulz (1981).

5 See, for instance, Dell'Ariccia (1998).

of telephone traffic, the number of bank branches abroad, the efficiency of the judicial system, the effectiveness of the legal system, and the sophistication of financial markets. Control variables comprise GDP, population, and regional dummies. They find that distance has a negative impact on bilateral equity flows, the coefficients ranging between –0.19 to –0.84, depending on the specification chosen. One reason for the different coefficients on distance is that other variables capturing information costs are included which pick up some of this effect.

In a follow-up paper, Portes et al. (2001) apply essentially the same empirical methodology to a different dataset to obtain very similar results. The dependent variable are now bilateral capital flows between the US and a set of 40 advanced and emerging markets.[6] One advantage of the dataset is that it breaks down the securities into corporate equities, bonds and treasury bills. Ceteris paribus, we would expect that asymmetries in information are less severe for government borrowers, hence distance should play a less important role here. When comparing bonds to equities, no differences in the distance coefficient are found. When comparing government to corporate bonds, however, the prior is confirmed: (US) government bonds appear to be a relatively homogenous asset which is held by investors also in relatively distant countries.

Buch (2000) uses the same dataset which will be employed below to analyze the importance of regulations versus information costs for banks' international asset choices. Information costs as proxied through distance, the presence of a common language, and a common legal system are shown to have an impact on international investment decisions of banks. The only effect which is relatively consistent across countries is, again, the negative impact of distance, taking values between –0.2 and –1. When weighing the relative importance of

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6 These data, as Warnock and Mason (2000) note, have the shortcoming that they capture the country in which an equity trade is conducted, not necessarily the issuer .

information costs and regulations, results differ between countries. This suggests that the internationalization strategies of banks are following different patterns. While some expand into markets to which they have close cultural ties or which are close geographically, others prefer to access markets with relatively low entry barriers. In particular banks from Spain seem to exploit comparative advantage stemming from the presence of a common language and a common legal system.

A related contribution, which is looking at the distance between banks and their clients on a domestic level, is the paper by Petersen and Rajan (2000) in which they use data from the 1993 National Survey of Small Business Finance. They find that there has been a growing distance between banks and their clients over time, and that more impersonal means of communication tend to be chosen. Mainly, the changes are attributed to improvements in the productivity of banks rather than industry consolidation or a re-location of borrowers.

3 New Evidence from International Bank Portfolios

3.1 Distance and International Banking Activities

In this section, we are using data taken from the locational statistics, as published by the Bank for International Settlements in its *Quarterly Review.* Since early publications do not include information about the assets and liabilities between the reporting countries, the published data have been complemented by unpublished data for five reporting countries (France, Germany, Italy, United Kingdom, United States) which have kindly been provided by the BIS. We use year-end data on the log of foreign assets and liabilities of the BIS reporting banks in about 40–50 host countries as a dependent variable. This allows us to

interpret some of the coefficients as elasticities. The baseline equation we are estimating is thus given by:

(1)

$$\log(X_{ij,t}) = b_0 + b_1 \log(GDPCAP_{j,t}) + b_2 \log(POP_{j,t}) + b_3 \log(DIST_{ij,t}) + b_4 DUMFIN_{j,t} + e_t$$

where $X_{ij,t}$ = stocks of assets (liabilities) of reporting country i in country j in million US-Dollar, $GDPCAP_{j,t}$ = GDP per capita in country j in million US-Dollar, $POP_{j,t}$ = population in country j (million), $DIST_{ij,t}$ = distance between country i and j, measured in 1,000 miles, and $DUMFIN_{j,t}$ = dummy for the presence of financial centers. Dummy variables for individual countries have been included to ensure that the residuals are normally distributed. Robust standard errors are reported to account for potential heteroskedasticity of the residuals. Equation (1) is first estimated separately for the five reporting countries and for each of the years 1983–1999 (i.e. $t = i = 1$). Subsequently, we also estimate the equation in form of a panel with $t = 16$ for each reporting country.

We are including GDP per capita as a measure of the state of development of the host economy and population as one measure for the size of the market. Hence, we would expect a positive sign on both of these variables. The financial center dummy controls for the presence of a liberal regulatory regime towards foreign banks. For none of these explanatory variables would we expect that it is influenced by the financial linkages with any one of the reporting countries considered. Hence, the issue of the potential endogeneity of the RHS variables does not arise. As regards the link between distance and bank lending, two factors are potentially at work. On the one hand, if correlations between business cycles are declining in distance, portfolio considerations would imply a positive coefficient. On the other hand, if information costs increase in distance, the link would be negative, which is a result commonly found in empirical papers.

Hence, if technological progress reduces information costs, we would expect to find not only a negative coefficient on distance but also one which becomes smaller — in absolute terms — over time.

Results for the international asset holdings and liabilities of each reporting country for the year 1983 and 1998 are reported in Tables 1 and 2, respectively.[7] The statistical fit of the regressions in terms of explanatory power and significance of the coefficients is fairly high. The five variables considered are significant in almost each regression, have the expected signs, and they explain at least half of the variance of the dependent variable.

As regards the individual estimated coefficients, it seems as if the state of development of the host economy has become more important in banks' international lending decisions since all coefficients on GDP per capita have increased between 1983 and 1998. This increase is also visible for foreign liabilities, but not quite as pronounced. One possible explanation is that our sample starts right after the foreign debt crises in 1982 when banks still had a fairly high exposure to developing countries. Since then, banks might have reduced their exposure to these regions. As for population, there is an increase in the coefficient over time for foreign assets, possibly reflecting lending to some large countries in the sample such as Brazil and Russia (we lack data for these countries for the early sample period). For both GDP per capita and population, we find an average elasticity of about 0.5, although the results differ between years and countries.

Also, our control variable for (few) regulatory restrictions in financial centers has the expected positive sign and is significant throughout. It takes a value between 1 to 3, hence links with financial centers are up to three-times as large as

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7 To save space, we do not report the estimated equations for all of the 18 years. However, we will elude to the coefficients estimated for distance over time below.

what would one expect of countries with similar structural characteristics.[8] Interestingly, this effect is consistently higher for foreign liabilities, suggesting that banks use financial centers relatively more to raise than to invest funds.

Finally, the main variable of interest in this paper — the distance between the reporting and the host country — has the expected negative sign in all equations and is highly significant throughout. The exception is the United Kingdom where distance has been insignificant in the early sample period.

A comparison across countries shows that distance has been least important for the UK (coefficient of around –0.3), followed by France and Germany (around –0.5 to –0.6), and Italy and the United States (–1 or below). These differences can be interpreted in terms of different strategies towards internationalization that banks from these countries have taken. While the former three countries have traditionally had relatively important international banks and/or had links to former colonies, international activities of Italian and US banks have been more regionally concentrated.

A quite interesting picture emerges if one compares the coefficient on the distance variable over time. For the European countries distance has, if anything, become more, not less important: banks have tended to invest closer to their home market. We will elude to possible explanations of this somewhat counter-intuitive result in the following section. The opposite picture is found for the US. Here, the coefficient on distance has declined in absolute terms over time.[9]

As regards the significance of these changes, however, Wald tests have shown that only those for liabilities are actually significant (Table A2). For international

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8 Notice that the percentage change in the (logged) dependent variable with respect to a change in a dummy variable which enters with a coefficient a is given by $(e^{a} - 1) * 100$.

9 Only for the UK, this result has been sensitive to the choice of other explanatory variables. If, for instance, GDP is used instead of GDP per capita and population, distance is significant also for the UK in the early sample period, taking a value of around –0.3. For the other countries, results remain largely unchanged if GDP is used with the exception of the US where the declining trend in the importance of distance becomes less pronounced.

asset holdings, the estimated coefficient on distance might have changed between 1983 and 1998, but these changes have not been significant. When comparing the coefficient estimates between the European countries and the US for 1998, distance has also been significantly more important for US banks than for those in France, Germany, and UK.

It might well be the case that, by looking at the year 1983 and 1998 only, we are taking snapshots of somewhat special years only. After all, 1983 marks the year after the outbreak of the international debt crisis; at the end of 1998, international financial markets had hardly recovered from the financial crises in Asia or Russia.

In order to check whether the choice of these particular years has influenced our results, Graph 1 plots the development of the distance coefficients for individual cross-section regressions for each of the years 1983 and 1999. The picture is, indeed, very similar to the one obtain by comparing the cross-section results at the beginning and at the end of the sample only: the importance of distance has increased slightly for the European banks in the sample, and it has declined only for the US banks.

In order to check the robustness of our results, we have additionally estimated equation (1) in the form of a balanced panel for each of the reporting countries and for 16 years and between 31 (Italy) and 43 (UK) cross sections.[10] As in time-series studies, the potential non-stationarity of the data must be taken into account in analyzing panel data. Therefore, we have used the two-stage Engle Granger cointegration test to find the long-run determinants of banks' international activities (Engle and Granger 1987). For this purpose, equation (1) has been estimated to generate the long-run coefficients. In a second step, the

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[10] Hence, we are pooling the constant term across countries. Estimation in the form of a fixed effects model would not allow us to include the distance variable because distance has no variation over time. Hence, it would be picked up by the fixed effects.

residuals from estimating (1) were tested for stationarity by means of panel unit root tests.

In terms of the magnitude and the ranking of the coefficients across countries, we obtain similar results as found earlier for the cross-sections. For the entire sample period (not reported), we obtain the highest parameter estimates (in absolute terms) for Italy and the US with, respectively, and the lowest for the UK and France. Germany lies in between.

In order to check whether the coefficient on distance has changed over time, we have interacted distance with a dummy variable set equal to one for each of the years. Results are presented in Table 3. All estimated coefficients are highly significant and are pretty much in line with those found before. In fact, if comparing the development of the coefficients over time, it appears somewhat smoother than those estimated for the individual years in the cross-section, which may have to do with the fact that the sample size is now held constant. More specifically, we find the greatest importance of distance for the US (coefficient of around –1) and Italy (–0.85), and the lowest coefficient for the UK (–0.2). Germany and France lie in between (–0.3 to –0.4). In contrast to the results reported above, we do find very stable coefficients for all countries (including the US) except Germany where distance now seems to have declined in importance.

Three different tests have been used to check whether the residuals of (1) are stationary. Levin and Lin (LL) (1993) have adjusted the standard ADF-tests for unit roots to panel data, allowing for time trends and short-run dynamics. As in the ADF-test, the Null that the variable contains a unit root is tested against the alternative that the variable is stationary.[11] The second test we use is the one

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[11] We are using this test in a modified version suggested by Breitung (2000). This test corrects for a bias in the *t*-statistic, which occurs if more than one lagged endogenous variable is included, by estimating the model in deviations from the mean.

developed by Im, Pesaran, and Shin (IPS) (1997) which gives more flexibility with regard to the autocorrelation coefficient under the alternative hypothesis by performing ADF-tests for all cross sections and averaging over the estimated coefficients. Additionally, we report the results of the test proposed by Breitung and Meyer (BM) (1994). If the tests yield different results, we assume the degree of integration indicated by the majority of the tests. As regards the specification of the unit root tests, a constant term and six lagged endogenous variables have been included initially, and insignificant lags have been dropped subsequently.

Generally, evidence for the presence of a long-run cointegration relationship between the variables under study is mixed. While we find some evidence that the variables are cointegrated for France, Germany, and Italy,[12] no cointegration is found for the UK and the US.

3.2 Distance and the Home Bias

Additionally, we have used a similar methodology as Ahearne et al. (2000) in order to assess whether the „home bias“ in the portfolios of commercial banks can be explained by distance and the other explanatory variables used above. In contrast to Ahearne et al. (2000), who are using the share of a country in the world stock market as a proxy for the optimal portfolio shares, we are using the share in world GDP as a proxy. Hence, the bias for country *j* is the home bias as calculated as:

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12 Even in these cases, the finding that the residuals are stationary has been sensitive to the choice of the lag length. One reason for this could be that we have not included proxies for regulatory restriction such as the Basle Capital Accord or the EU Single Market Program which are likely to affected international asset choices of commercial banks. As shown in Buch (2000), including these variables leaves the remaining coefficients estimates largely unchanged but provides greater evidence for cointegration.

$$(2) \qquad Bias_{ij,t} = \left(\frac{GDP_{j,t}}{\sum_{k=1}^{N_t} GDP_{k,t}} - \frac{Claims_{ij,t}}{\sum_{k=1}^{N_t} Claims_{i,k,t}} \right) \cdot 100$$

where $Claims_{ij,t}$ are the cross-border claims of reporting country *i* on country *j*. Subsequently, we have run regression (1), using *Bias* as a dependent variable. Results for the first and the last year of the sample are reported in Table 4 and, again, the estimated coefficients are also plotted over time for the cross-section regressions in the interim years (Graph 2).

With a very few exceptions, distance is the only parameter explaining the bias in international investment portfolios, and about 25 percent of the variance in the bias across countries can be attributed to distance. Generally, the estimated coefficients on distance are in a somewhat similar range (between 1 and 2) for France, Germany, and Italy. A one percent increase in the distance between two countries would, according to these results, lead to a more than proportional change in the home bias as defined above. For all these countries, there is some downward trend in the estimated coefficients. For the UK and the US, we find a U-shaped behavior since distance becomes less important during the middle of the sample period, which is decidedly more pronounced for the US. Also, the magnitude of the effect for the two countries differs considerably with values of below one for most of the observation period for the UK and values of above two for the early 1980s for the US.

Of course, these results are only a very first approximation to explaining the bias in international investment portfolios and mainly serve the point to illustrate that distance is in fact an important parameter. Future research would have to improve upon the measurement of other variables that might affect the bias, upon linking asset and liability choices, and measuring the bias as such.

4 Discussion of Results

If the technological revolution which has taken place over the past decades has lowered information costs and if information costs increase in distance, distance should – ceteris paribus – become less important in international bank lending. Yet, the data tell the opposite story, except for the US. In this section, we discuss possible explanations for these findings.

Take the difference between developments in Europe and in the US first. One immediate explanation could be that the New Economy has gained a stronger foothold in the US so far, and that it may take time until their effects spread out to other countries. After all, in July 1999, the number of internet hosts per 10,000 people was 1,508 in the US, 270 in the UK, 111 in France, 174 in Germany, and only 68 in Italy (World Bank 2000). However, since the countries under study are all highly developed industrialized countries, it is unlikely that different rates of penetration of new technologies are behind the different trends in the importance of distance in international bank lending. Rather, two alternative explanations are more likely to explain the observed dichotomy between Europe and the US:

First, distance has historically been a greater concern for US than for European banks, as evidence by the consistently higher coefficient estimates. This may be a result of the large domestic market which, due the regulations that have affected regional branching activities,[13] also provided the incumbent banks with relatively safe profit opportunities. After these regulations were lifted, beginning in the 1980s, US banks have felt the need to expand into new markets, including those further abroad. Notice that although distance has declined in importance, it is still more important than for the European banks. Hence, we might just be

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13 See Berger et al. (1995) for a survey of the deregulation of the US banking industry.

observing that the US banks are approaching something like a long-run equilibrium level.

Second, not only have financial markets in the US been (regionally) deregulated in the 1980s and early 1990s, European financial markets have also taken a great leap towards deregulation and integration. This may have made investments in Europe more attractive both for the European banks (thus reducing distance) and for the US banks (thus increasing distance). We have tried to capture this effect by running each regression including a dummy variable for EU members as well. Before 1992, this variable would capture simply the fact that countries were members of the EU, after 1992, it also reflects the fact that the EU members have agreed to create a Single Market for capital, although the timing of implementation has varied between countries (EU 1997).[14]

For Germany, we find that the EU dummy is insignificant throughout while the distance coefficient becomes somewhat smaller. For France, the EU dummy is positive and significant after 1994, and including it lowers the coefficient on distance to –0.3, i.e. the increasing importance of distance that we see in Graph 1 after 1993 might indeed be explained by the Single Market program. A similar effect occurs for Italy. At least for these three countries, the hypothesis that distance has become more important could thus partly be explained by an EU effect. At best, then, the importance of distance would have remained unchanged over time. No such EU effect is found for the UK and the US: For the former, the EU coefficient is positive but does not affect the estimated coefficient on distance. For the latter, the EU dummy is insignificant, and the distance coefficient is unchanged.[15]

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[14] In Buch (2000), it is shown that the effects of EU membership and the Single Market program on international portfolio choices differ. While the Single Market has clearly had a positive effect, membership alone seems to have had a negative impact on international assets and liabilities of commercial banks.

[15] We are including the EU dummy also for the US because the creation of a Single Market may have increased the attractiveness of investments in Europe for investors located outside of Europe.

The question remains as to why distance does not seem to have declined in importance over time, as the technology story would suggest. Five explanations are conceivable:

First, structural shifts in financial markets may have occurred. After all, we are looking at aggregated data on international assets and liabilities of commercial banks which lump together financial positions of sectors which might differ considerably in their sensitivity to information costs. If the composition of borrowers had changed from those on which it is relatively easy to obtain information (such as large banks and governments) to those on which information is less readily available (smaller banks and non-financial firms), this could explain why distance has remained important.

Stylized facts on the structure of the recipient of international bank lending support this view. Graph 3 shows that, between the mid-1980s and the late 1990s, banks have been the most importance group of borrowers on international financial markets. While their share in total loans has remained relatively stable, borrowing by the public sector has declined quite substantially from a little less than 30 to around 10 percent. This decline has been mirror-imaged by the increase in lending to the non-bank private sector. Hence, if one subscribes to the view that in particular the latter group of borrowers is relatively opaque as compared to the other two, this change in the composition of borrowers might partly be behind the continued importance of distance.

Second, improvements in information technology may not have come to the benefit of banks but rather non-bank financial institutions and banks might therefore find themselves with a pool of relative information-intensive clients. The overall structure of international capital flows has indeed shifted away from international bank lending to bond finance. Between 1990 and 1995 alone, the share of bond finance in global capital inflows increased from 24 to 33 percent.

Over the same period, the share of bank loans (other liabilities) halved from 54 to 23 percent.[16] This (bank)-disintermediation trend could therefore indeed be part of the story. This view would reconfirm Eichengreen and Mody (2000) in that banks are likely to remain important sources of finance for small and mid-sized borrowers on international markets, and that they are unlikely to be crowded out by other financial institutions.

Third, a host of empirical papers estimating gravity models finds that the intensity of trade links is a function of geographical distance. Distance, in these regressions, is mainly seen as a proxy for (physical) transportation rather than information costs. Hence, to the extent that international lending and borrowing activities of commercial banks are trade-related, the distance variable in our regressions might simply capture this effect. In order to check whether this is indeed the case, we have re-estimated all equations, adding bilateral trade as a regressor. One problem of this approach is the potential endogeneity of trade, which is linked to our measures of market size and degree of development. In fact, this multicollinearity problems leads to insignificant coefficients on GDP per capita and population in most of the equations. With the exception of France, where also the distance variable becomes insignificant when trade is included, the coefficient on distance remains largely unchanged for the other countries both with regard to its magnitude and significance. This finding can be taken as support of the hypothesis that distance is not only proxying physical transportation but information costs as well.

Fourth, because data have not been available for all countries for all years, in particular not for the early observation period, the fact that some emerging markets are included in the later samples might also bias our results. We have therefore re-run the regressions with a constant sample. For France, Germany,

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16 Calculated from Tesar (1999, Table 5.7).

and the UK, the distance coefficient becomes somewhat smaller in absolute terms but overall trends are the same. For Italy and the US, the results are fairly unchanged.

Fifth, we have so far neglected the deregulation trends and the abolition of capital controls that have been characterizing financial markets during the past decades. As a consequence, commercial banks have resumed lending to emerging markets, a process which has eventually contributed to the financial crises at the end of the 1990s.[17] However, this deregulation effect would work into exactly the opposite direction: we would expect to see a decline in the importance of distance, rather than an increase. In fact, a dummy for the presence of capital controls has been insignificant in almost all equations.

5 Conclusions

The purpose of this paper has been to test the hypothesis that distance has become less important for international bank lending as information technology has advanced. For the past 20 years, data for Europe do not support this hypothesis: distance has remained of the same importance it used to have. For the US, a declining importance of distance was found. On the one hand, this could be the result of the fact that new technologies have gained a stronger foothold in the US already. On the other hand, the data rather suggest that the importance of distance for international bank lending of US banks is merely approaching an average international level. In any case, the results suggest caution in transferring new technology effects that are observed in the US to other markets.

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[17] Notice that we have already controlled for the state of development of the host country by including GDP per capita.

The importance of distance as a determinant of international bank lending is one manifestation of the home or regional bias typically found in investment portfolios, and it seems to be relatively persistent over time. The results of this paper suggest, at the same time, that one should be careful in interpreting distance as a proxy for information costs only. Due to the link between foreign bank lending and foreign trade, distance may to some extent be capturing physical transportation costs. Also, one should not disregard structural shifts in international financial markets such as the increased borrowing of non-banks. Moreover, improvements in information technology might show up in the disintermediation of financial services away from banks rather than a decline in the importance of distance for bank lending per se.[18]

As regards areas for future research, it would be of interest to explore further the link between the asset and the liability side of banks' balance sheets. As in earlier work (Buch 2000, Moshirian and van der Laan 1998), the results of this paper confirm that foreign assets and liabilities are complements and are driven by very similar factors. However, distance has not exactly the same impact on the two sides of the banks' balance sheets, and the causes for this dichotomy could be explored further. Finally, more refined proxies for information costs could be included.

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[18] To some extent, banks may also shift from on-balance to off-balance sheet activities (Boyd and Gertler 1995). However, lacking data on the (international) off-balance sheet activities of commercial banks, we cannot empirically assess the importance of this factor.

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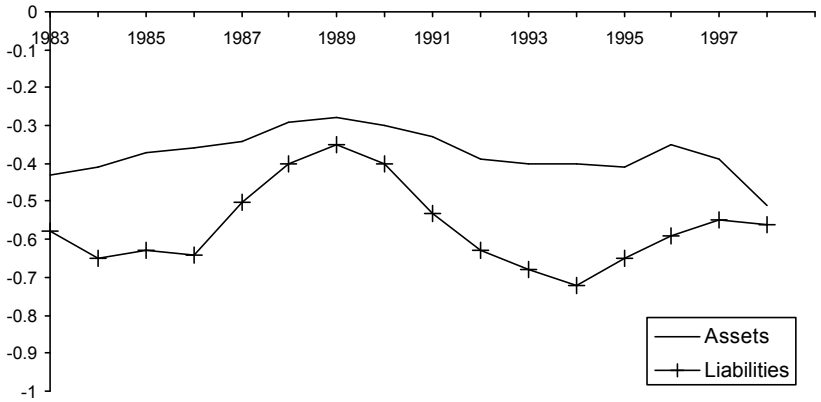
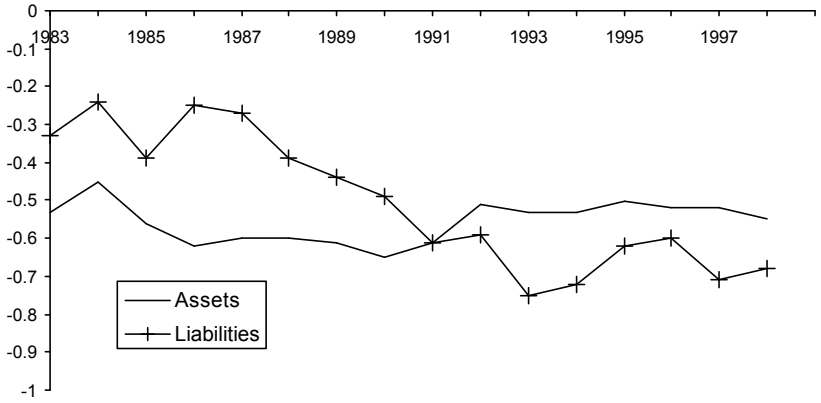
Graph 1 — Distance and International Banking Activities, 1983–1998

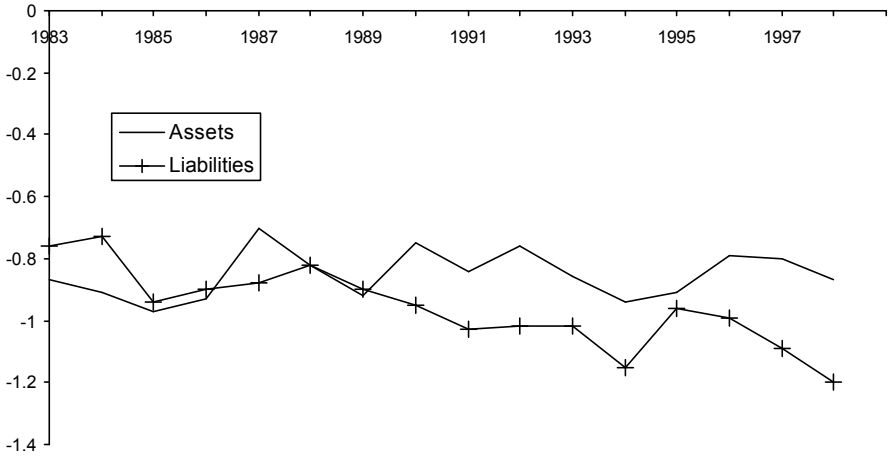
a) France



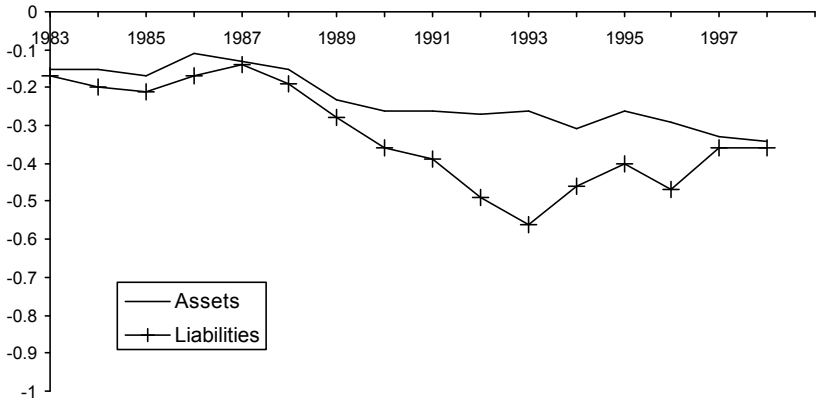
b) Germany



c) Italy

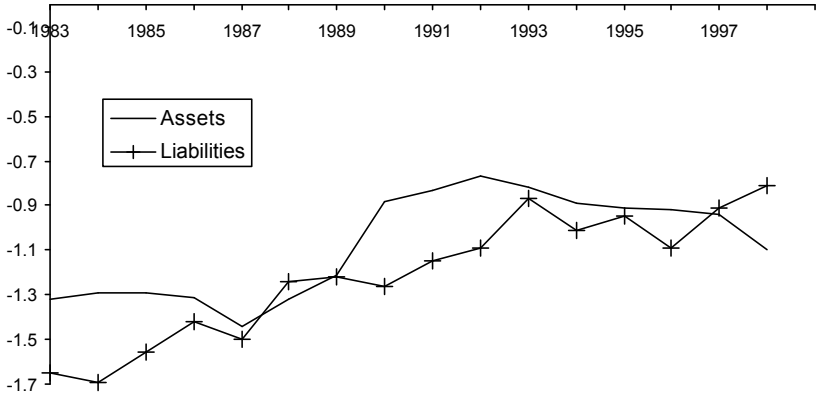


c) United Kingdom*



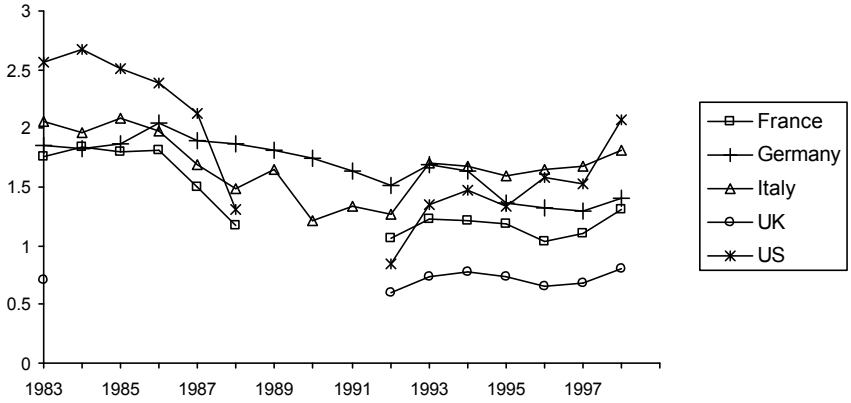
*) Coefficients before 1989 are statistically insignificant.

d) United States



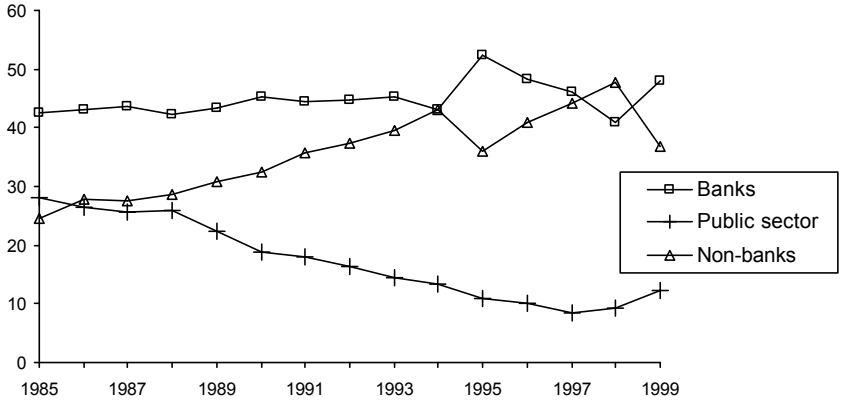
These graphs plot the coefficients b_3 in equation (1) for cross-section estimates for the years 1983 through 1998.

Graph 2 — Distance and the Home Bias, 1983–1998



These graphs plot the coefficients b_3 in equation (1) for cross-section estimates for the years 1983 through 1998, using Bias as the dependent variable. Significant coefficients are reported only.

Graph 3 — Composition of Borrowers on International Capital Markets, 1985–2000



These shares have been calculated from the BIS Consolidated International Banking Statistics, Table 7, historical data (http://www.bis.org/statistics/consstats.htm).

Table A1 — Country Samples

Full sample		Restricted sample
Algeria	Pakistan	Australia
Argentina	Panama	Austria
Australia	Peru	Canada
Austria	Philippines	Chile
Bahamas	Poland	China
Belgium	Portugal	Colombia
Bermuda	Russia	Denmark
Brazil	Saudi Arabia	Egypt
Canada	Singapore	Finland
Chile	South Africa	France
China	Spain	Germany
Colombia	Sweden	Great Britain
Czech Republic	Switzerland	Greece
Denmark	Thailand	Hong Kong
Egypt	Turkey	Hungary
Finland	United Arab Emirates	India
France	United States	Indonesia
Germany	Venezuela	Ireland
Great Britain		Israel
Greece		Italy
Hong Kong		Japan
Hungary		Korea South
India		Malaysia
Indonesia		Mexico
Iran		Morocco
Ireland		Netherlands
Israel		New Zealand
Italy		Norway
Japan		Pakistan
Korea South		Philippines
Kuweit		Poland
Liberia		Portugal
Luxembourg		Singapore
Malaysia		South Africa
Mexico		Spain
Morocco		Sweden
Netherlands		Switzerland
New Zealand		Thailand
Norway		United States
		Venezuela

Table A2 — Results of Wald Tests

Two sets of Wald coefficient tests are presented for each country. First, the coefficient estimate on distance for 1998 is compared to the estimate for 1983. No such test was performed for the United Kingdom because the coefficient for 1983 has been statistically insignificant. Second, the coefficient estimates for the European countries in 1998 are compared to those for the US. χ^2 values are given, * (**, ***) = significant at the 1 (5, 10) percent level.

	France	Germany	Italy	United Kingdom	United States
$b_3^{1998} = b_3^{1983}$					
Assets	0.41	0.00	0.10	n.a.	0.70
Liabilities	0.05	11.43***	4.03**	n.a.	7.32***
$b_3^{1998,Europe} = b_3^{1998,US}$					
Assets	4.98***	4.48***	0.79	8.54***	n.a.
Liabilities	0.40	0.19	1.55	2.18	n.a.

Table 1 — Determinants of International Banking Assets (Cross-Section Regressions)

The dependent variable are assets of reporting country *i* in country *j* in million US-Dollar, *GDPCAP* = *GDP* per capita in country *j* in million US-Dollar, *POP* = population in country *j* (million), *DIST* = distance between country *i* and *j*, measured in 1,000 miles, and *DUMFIN* = dummy for the presence of financial centers (= 1 for Bahamas, Great Britain, Hong Kong, Luxembourg, Panama, Switzerland). The dependent variable, GDP per capita, population, and distance are in logs. *** (**, *) = significant at the 1 (5, 10) % level. t-values in brackets. Standard errors have been corrected for potential heteroskedasticity using the method suggested by White (1980). JB is the test statistic for the Jarque-Bera test on the normal distribution of the residuals. Country dummies for Kuweit (Germany 1983 and 1998), Iran (UK 1983), Saudi Arabia (Italy 1983), and Singapore (UK 1998) have been included to ensure that the residuals follow a normal distribution.

	France		Germany		Italy		United Kingdom		United States	
	1983	1998	1983	1998	1983	1998	1983	1998	1983	1998
Constant	6.74***	5.25**	4.94**	4.81*	4.66	3.45	3.70	–2.79**	15.72***	9.96**
	(3.60)	(1.96)	(2.15)	(1.83)	(1.18)	(1.11)	(1.59)	(–2.30)	(4.27)	(2.53)
GDPCAP	0.27**	0.47**	0.43**	0.63***	0.57*	0.76***	0.59***	1.31***	0.26	0.58***
	(2.04)	(2.06)	(2.10)	(2.76)	(1.72)	(2.72)	(2.73)	(14.02)	(1.50)	(2.72)
POP	0.35**	0.71***	0.45***	0.59***	0.34	0.74***	0.24	0.83***	0.30	0.63***
	(2.66)	(4.27)	(3.00)	(3.60)	(1.13)	(3.67)	(1.48)	(12.87)	(1.66)	(3.23)
DIST	–0.43***	–0.52***	–0.53***	–0.53***	–0.82**	–0.87***	–0.14	–0.35***	–1.32***	–1.10***
	(–3.55)	(–3.81)	(–3.94)	(–3.91)	(–2.71)	(–4.35)	(–1.31)	(–4.44)	(–4.23)	(–4.22)
DUMFIN	1.64***	2.67***	1.93**	2.31***	3.06***	3.34***	2.00**	1.25***	2.14***	3.26***
	(4.29)	(3.42)	(2.54)	(–2.87)	(2.86)	(2.96)	(2.27)	(3.42)	(2.99)	(4.56)
$\overline{R}^2$	0.44	0.60	0.50	0.61	0.45	0.57	0.52	0.83	0.34	0.54
JB	0.46	0.17	0.41	0.72	0.84	0.23	0.10	0.31	0.63	0.49
N	44	52	44	52	36	52	46	52	39	46

Table 2 — Determinants of International Banking Liabilities (Cross Section Regressions)

The dependent variable are liabilities of reporting country *i* vis-à-vis country *j* in million US-Dollar, *GDPCAP* = *GDP* per capita in country *j* in million US-Dollar, *POP* = population in country *j* (million), *DIST* = distance between country *i* and *j*, measured in 1,000 miles, and *DUMFIN* = dummy for the presence of financial centers (= 1 for Bahamas, Great Britain, Hong Kong, Luxembourg, Panama, Switzerland). The dependent variable, GDP per capita, population, and distance are in logs. *** (**, *) = significant at the 1 (5, 10) % level. t-values in brackets. Standard errors have been corrected for potential heteroskedasticity using the method suggested by White (1980). JB is the test statistic for the Jarque-Bera test on the normal distribution of the residuals. A country dummy for Singapore (Germany 1998) has been included to ensure that the residuals follow a normal distribution.

	France		Germany		Italy		United Kingdom		United States	
	1983	1998	1983	1998	1983	1998	1983	1998	1983	1998
Constant	4.75	4.41	0.94	2.35	3.06	6.80**	1.61	3.74	16.33***	8.21*
	(1.46)	(1.40)	(0.42)	(1.21)	(0.92)	(2.02)	(0.53)	(1.27)	(5.32)	(1.70)
GDPCAP	0.49**	0.63**	0.65***	0.94***	0.69***	0.71**	0.72***	0.68***	0.36**	0.51*
	(2.09)	(2.48)	(4.08)	(6.40)	(2.86)	(2.52)	(3.09)	(2.92)	(2.49)	(2.01)
POP	0.51**	0.51***	0.46***	0.70***	0.51**	0.52**	0.49***	0.53***	0.48***	0.67***
	(2.63)	(2.93)	(3.74)	(5.88)	(2.20)	(2.49)	(3.22)	(3.46)	(2.96)	(3.42)
DIST	–0.58**	–0.62***	–0.34**	–0.73***	–0.76***	–1.20***	–0.17	–0.36**	–1.65***	–0.81**
	(–2.60)	(3.94)	(–2.04)	(–6.28)	(–2.88)	(–5.45)	(–0.98)	(–2.61)	(–6.53)	(–2.64)
DUMFIN	3.16***	3.32***	3.38***	2.02***	3.57***	3.82***	3.23***	2.23***	3.68***	3.50***
	(4.38)	(4.33)	(6.38)	(3.72)	(4.61)	(3.93)	(4.31)	(3.70)	(9.39)	(4.46)
$\overline{R}^2$	0.50	0.61	0.62	0.75	0.46	0.61	0.43	0.54	0.61	0.53
JB	0.62	0.62	0.32	0.81	0.67	0.39	0.96	0.24	0.76	0.72
N	44	52	44	52	43	52	46	52	39	46

Table 3 — Determinants of International Banking Assets (Panel Regressions)

The dependent variable are assets of reporting country *i* in country *j* in million US-Dollar, *GDPCAP* = *GDP* per capita in country *j* in million US-Dollar, *POP* = population in country *j* (million), *DIST* = distance between country *i* and *j*, measured in 1,000 miles, and *DUMFIN* = dummy for the presence of financial centers (= 1 for Bahamas, Great Britain, Hong Kong, Luxembourg, Panama, Switzerland). The dependent variable, GDP per capita, population, and distance are in logs. Variables are significant at the 1 % level. Standard errors have been corrected for heteroskedasticity using the method of White (1980). The time series dimension of the panel is T = 16 (1983–1998). Unit root tests for the residuals have been run with a constant term and six lags, dropping insignificant lags subsequently. The final specification involves 3 lagged dependent variables for France, 1 for Germany, the UK, and the US, and 6 for Italy. * = significant at the 5-percent level (critical value 1.65).

	France	Germany	Italy	United Kingdom	United States
Constant	4.07	4.83	3.46	2.40	11.60
GDPCAP	0.48	0.53	0.61	0.73	0.42
POP	0.56	0.48	0.56	0.46	0.52
DUMFIN	2.57	2.34	3.41	2.64	2.92
			Interaction Terms: log(miles) * year		
1983	–0.36	–0.62	–0.80	–0.20	–1.07
1984	–0.36	–0.62	–0.76	–0.21	–1.07
1985	–0.34	–0.58	–0.71	–0.18	–1.07
1986	–0.34	–0.55	–0.71	–0.18	–1.08
1987	–0.32	–0.52	–0.68	–0.19	–1.09
1988	–0.32	–0.54	–0.72	–0.21	–1.10
1989	–0.32	–0.51	–0.71	–0.22	–1.09
1990	–0.31	–0.47	–0.70	–0.21	–1.11
1991	–0.30	–0.46	–0.62	–0.22	–1.11
1992	–0.29	–0.46	–0.64	–0.23	–1.11
1993	–0.29	–0.45	–0.65	–0.23	–1.11
1994	–0.28	–0.45	–0.66	–0.23	–1.11
1995	–0.27	–0.43	–0.65	–0.23	–1.11
1996	–0.27	–0.42	–0.63	–0.21	–1.09
1997	–0.26	–0.41	–0.61	–0.19	–1.07
1998	–0.26	–0.37	–0.59	–0.18	–1.07
N*T	656	656	496	688	624
$\overline{R}^2$	0.60	0.68	0.51	0.57	0.52
Unit root tests					
BM (1994)	–2.81*	–1.21	–1.79*	0.68	0.08
modified LL (1993)	–1.03	–10.74*	–2.01*	1.01	0.75
IPS (1997)	–3.18*	–3.38*	–1.13	0.16	0.31

Table 4 — Determinants of the „Home Bias“ in International Asset Portfolios

The dependent variable is the home bias as defined in formula 2, *GDP* per capita in country *j* in million US-Dollar, *POP* = population in country *j* (million), *TRADE* = ratio of trade (exports + imports / 2) over GDP in percent (the estimated coefficient has been multiplied with 100), *DIST* = distance between country *i* and *j*, measured in 1,000 miles, and *DUMFIN* = dummy for the presence of financial centers (= 1 for Bahamas, Great Britain, Hong Kong, Luxembourg, Panama, Switzerland). The dependent variable, GDP per capita, population, and distance are in logs. *** (**, *) = significant at the 1 (5, 10) % level. t-values in brackets. Standard errors have been corrected for potential heteroskedasticity using the method suggested by White (1980).

	France		Germany		Italy		United Kingdom		United States	
	1983	1998	1983	1998	1983	1998	1983	1998	1983	1998
Constant	–29.25*	–18.03*	–29.51*	–21.16	–21.79	–19.56	–19.13*	–11.66*	–25.92**	–19.33**
	(–1.85)	(–1.75)	(–1.78)	(–1.66)	(–1.61)	(–1.37)	(–1.78)	(–1.71)	(–2.58)	(–2.41)
GDPCAP	1.54	0.78	1.48	0.94	0.66	0.57	1.22	0.43	0.44	0.22
	(1.37)	(1.12)	(1.27)	(1.03)	(0.66)	(0.57)	(0.77)	(0.93)	(1.23)	(0.56)
POP	1.31	0.48	1.32	0.81	0.44	0.36	1.39*	0.55	0.23	0.06
	(1.33)	(0.72)	(1.27)	(0.98)	(0.44)	(0.35)	(2.02)	(1.30)	(0.66)	(0.13)
DIST	1.76**	1.31***	1.85**	1.42***	2.06**	1.82**	0.71*	0.82***	2.56**	2.07***
	(2.38)	(2.80)	(2.49)	(2.83)	(2.21)	(2.44)	(1.71)	(3.06)	(2.47)	(3.12)
DUMFIN	–2.08	–2.69	–1.80	–3.10	–6.03	–6.18	0.73	–0.57	–3.15	–4.30*
	(–0.70)	(–1.13)	(–0.52)	(–1.05)	(–1.10)	(–1.16)	(0.34)	(–0.53)	(–1.46)	(–1.89)
$\overline{R}^2$	0.28	0.28	0.26	0.28	0.18	0.22	0.34	0.29	0.29	0.33
N	44	52	44	52	44	52	46	52	39	47