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Abstract

This paper constructs a dataset on cross-border assets and liabilities for a group of 18 countries, including both developed and emerging economies. The data covers the years 1980 to 2005 and distinguishes between four asset classes: FDI, equity, debt, and foreign exchange reserves. A number of stylized facts emerge from the dataset. In particular, the findings indicate that bilateral financial linkages are organized in three tiers of financial centres. The first tier is composed of the US, the UK, Singapore, and Hong Kong; the second of Japan, France, Germany, Australia and Canada; with the third composed of the remaining countries. This contrasts with the pattern of bilateral trade, which is predominantly intra-continental and is organized in three clusters: a European cluster (centred on Germany), an Asian cluster (centred on China), and an American cluster (centred on the US).

Key words: international investment, financial liberalization

JEL classification: F2, F3

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Summary

This paper contributes to the understanding of financial globalization by building a dataset of bilateral financial positions for 18 countries, including both developed economies and EMEs. The data distinguishes between four asset classes: FDI, portfolio equity, debt, and foreign exchange reserves. For the first three asset classes, missing data is constructed using gravity models, which have been extensively applied to explain cross-border trade and have been increasingly used to explain financial stocks and flows. The models perform quite well and explain almost 70 percent of the variation in cross-border asset weights. For reserves, we follow a two-step procedure. First, we collect data on the currency composition, using data from the BIS and filling in the gaps using the estimation results in Eichengreen and Mathieson (2000). Then, we translate currency into geographical composition.

A number of interesting findings emerge from the data. Looking at the ratio of assets plus liabilities to GDP, there has been a remarkable increase in the size of financial positions since 1985, most rapidly since 1995. Financial linkages are organized in three tiers of financial centres. The first tier is composed of the US, the UK, Singapore, and Hong Kong; the second of Japan, France, Germany, Australia and Canada; with the third composed of the remaining countries. This contrasts with the pattern of bilateral trade, which is predominantly intra-continental and is organized in three clusters: a European cluster (centred on Germany), an Asian cluster (centred on China), and an American cluster (centred on the US).

This data can be used to analyse a number of interesting questions. For example, it can be used to examine how financial linkages affect the size of cross-border spillovers. Other possible applications include an analysis of whether EMEs have decoupled from advanced economies and whether business cycles in the G7 have become more synchronized.
1 Introduction

Financial globalization is one of the most striking phenomena happening in the world economy since the mid-1990s. Until recently, very little was known about the size and composition of countries’ external financial assets and liabilities. This gap was partly narrowed by the work of Lane and Milesi-Ferretti (2001, 2007), which provides estimates of the total external financial assets and liabilities of 145 countries, from 1970 to 2004. However, very little is known about their geographical composition. This paper contributes to a better understanding of the geographical composition of countries’ external positions by constructing a dataset of bilateral assets and liabilities for a group of 18 countries, covering the period from 1980 to 2005.

This dataset can be used for a number of interesting applications. First, it allows a richer characterization of the recent phenomenon of financial globalization. Lane and Milesi-Ferretti (2007) show that there has been a market increase in the ratio of foreign assets plus liabilities to GDP, particularly since the mid-1990s. This increase has been especially pronounced among industrial countries, where financial integration has exceeded trade integration. The data presented here allows an analysis of which countries have become more interlinked during the process of financial globalization.

Second, the dataset can be used to shed light on the question of whether business cycles among developed countries have become more synchronized. This is particularly important to understand how countries may be affected by fluctuations in the rest of the world. The consensus in the literature is that business cycle co-movement among developed countries rose sharply after the collapse of Bretton Woods and remained high since then. However, while in the 1970s and early 1980s co-movement was mainly due to common shocks, the key drivers from the late 1980s onwards are likely to have been spillovers of country-specific shocks through trade and financial links. A robust finding in the empirical literature is that pairs of countries that trade more with each other exhibit a higher degree of output comovement (e.g. Baxter and Kouparitsas (2005)). Our dataset allows this type of exercise to be done taking into account financial links.

Related to this debate, there has been an increased interest in the past year or so on whether GDP growth in Emerging Market Economies (EMEs) has decoupled and thus become more resilient to the ongoing cyclical downturn in advanced economies. Kose, Otrok, and Prasad (2008) look at this question by decomposing output, investment and consumption fluctuations in a group of 106...
countries into four factors: a global factor, three group specific factors (for industrial countries, emerging markets, and developing countries), country factors, and idiosyncratic factors specific to each time series. They find that during the period of globalization (1985-2005) there has been an increase in business cycle convergence within the group of industrial countries and within the group of EMEs, but there has been divergence (or decoupling) between them. However, in a short chapter on this subject, Claessens and Kose (2008) make an important qualification. They note that the existing evidence in favour of the decoupling hypothesis has mainly focused on real economic linkages, but has left out financial linkages. Therefore, the evidence does not speak to the possibility of financial decoupling (or lack thereof). This is another area where our dataset could lead to important contributions.

Finally, the dataset can be applied to another heated policy debate - the reform of IMF surveillance. The IMF has been under a gradual reform process for several years. An important aspect of this process is the shift in the perspective of surveillance from the country level to a multilateral level, taking into account cross-border spillovers. Having a better understanding of which countries are more closely linked by spillovers is an important step in the development of a framework for multilateral surveillance. By understanding these linkages, the IMF could highlight how a particular country may be affected by developments in other countries and how its policies may generate spillovers to the rest of the world. Our dataset can be used to measure the impact of financial linkages on the magnitude of cross-country spillovers and form groups of countries closely linked by spillovers.

The paper is structured as follows. Section 2 discusses the construction of the dataset, distinguishing between asset classes: FDI, equity, debt, and foreign exchange reserves. Section 3 presents some findings that emerge from the data, comparing cross-country links based on trade with those based on financial positions. It uses network diagrams to visualize which countries are more linked and how those links have evolved over time. Section 4 concludes.

2 Empirical Framework

2.1 General Approach for FDI, Equity, and Debt

The data is constructed at annual frequency and includes 18 countries at different stages of development and located in different continents. Table 1 contains the list of countries included in
The data is disaggregated in four asset classes: FDI, equity, debt, and foreign exchange reserves. The methodology used to construct the data is somewhat different for each asset class. For the first three asset classes, missing data is estimated using gravity models, which have been used extensively in the trade literature. These models explain bilateral asset weights using a variety of variables, including standard gravity variables, such as distance, common language, common border, time difference, and colonial links; and additional regressors, such as bilateral trade, and exchange rate volatility. For foreign exchange reserves, we start by estimating their currency composition and then transform it into geographical composition. Because data on the currency composition of reserves is confidential, we base our estimations on the results reported in previous studies which had access to such confidential data.

Since the construction of data for FDI, equity, and debt follows a similar approach, it is useful to describe the general approach before discussing the elements that are specific to each asset class. The construction of data for these three asset classes follows a seven-steps procedure:

- **Step 1.** Collect available data on bilateral assets from a variety of sources.
  The data sources are discussed in more detail in the next sections.
- **Step 2.** Compute geographical weights.
  By dividing the assets of country $i$ in country $j$ ($X_{ijt}$) by the total assets of country $i$ ($X_{it}$), we obtain the percentage of assets of country $i$ which are held in country $j$ ($w_{ijt}$):

$$w_{ijt} = \frac{X_{ijt}}{X_{it}}$$

where total assets are obtained from the same sources as bilateral assets.

Weights do not necessarily add up to 100, since the 18 countries in the sample do not account for a country’s total foreign assets. For example, for UK FDI, the sum of the weights is approximately 70% in the 1980s, but falls to about 40% in the 2000s. Among the countries excluded from our sample, the one that accounts for a larger share of UK FDI assets is the Netherlands, which has an offshore financial centre (the Netherlands Antilles). The share of UK FDI assets in the Netherlands has been increasing, especially since the 1990s: it was only
7% in 1990 and increased to above 25% in 2003\textsuperscript{1}. Because offshore financial centres operate mostly as intermediaries rather than as final destination for investment, there is no large loss from not including them in the sample. As long as the geographical allocation of the assets invested through these financial centres resembles the geographical allocation of the assets invested directly, our analysis provides an accurate description of bilateral financial linkages.

- **Step 3.** Estimation of gravity models for geographical weights.

Missing data is estimated using gravity models, which are the workhorse models for trade in goods. They explain trade flows between countries \(i\) and \(j\) using a variety of variables, such as distance, common language, common border, colonial links, etc. More recently, they have been applied to explain asset flows and stocks, and have been found to perform quite well, typically explaining more than 70% of the variation in cross border flows and stocks of foreign assets. For example, Portes and Rey (2005) use a gravity model to explain cross-border equity flows and conclude that it performs at least as well as when used to explain trade in goods.

The idea that variables such as distance and cultural affinities may explain a large proportion of cross border asset flows and stocks might be surprising. Unlike goods, assets are not subject to transportation costs. Also, if investors want to diversify their portfolios, they might choose to invest in more distant countries, if their business cycles have a low or negative correlation with their own country’s business cycle. The fact that gravity variables perform at least as well in explaining financial positions as in explaining goods trade suggests that financial markets are not frictionless, but are segmented by information asymmetries and familiarity effects.

We use the following specification for the gravity models:

\[
\log \left( \frac{w_{ijt}}{1 - w_{ijt}} \right) = \phi_i + \phi_j + \phi_t + \alpha X_{ij} + \beta Z_{ijt} + \varepsilon_{ijt}
\]  

This is estimated separately for each asset class: FDI, equity, and debt. \(w_{ijt}\) is the proportion of assets of country \(i\) held in country \(j\) in year \(t\). The dependent variable is the logit of weights. This is a standard transformation to deal with proportions data, transforming (1) into a linear model which can be estimated by OLS (Greene (1997)). The downside of this transformation is that taking logs eliminates observations for which the weights are zero. However, given the small proportion of zeros in the data (less than 10%), eliminating them should not have much influence on the results.

\(\phi_i\) and \(\phi_j\) are dummy variables for each source and host country and \(\phi_t\) are time dummies. The host country fixed effects control for characteristics that explain why some countries are more attractive to foreign investors than others. The source country fixed effects control for

\textsuperscript{1}These numbers are from UNCTAD (2005).
characteristics that explain why some countries invest larger shares abroad than others. In addition to these fixed effects, we include a set of bilateral variables, $X_{ij}$, which are standard in trade gravity models and measure the geographic and historical proximity between economies: common border, common language, colonial links, distance, and time difference. The colony dummy is asymmetric and is equal to 1 if country $i$ is a former colonizer of country $j$. We construct this variable asymmetrically to reflect the fact that while former colonizers may have preferential status when they invest in former colonies, former colonies may not have preferential status when investing in former colonizers. The time difference between countries $i$ and $j$ is included as a measure of information asymmetry and transaction costs. It has been found to be significant in previous studies (Daude and Stein (2007)). $Z_{ijt}$ is a set of time varying regressors.

- **Step 4.** Combine ‘actual’ with estimated weights.

After estimating gravity models for geographical weights, we use the estimated coefficients to obtain out of sample predictions of weights for those years and country pairs for which data is missing. We then combine the ‘actual’ weights with those predicted values to obtain a dataset on asset weights with no missing observations.

- **Step 5.** Rescaling.

In this step, we rescale the weights obtained in step 4 so that the weights in our sample add up to 100%. The reason why we do this is to eliminate some of the discontinuities introduced by the estimation. Even though the gravity models explain a large fraction of the variation in the data (with R-squareds of almost 70%), in some cases there is a large discontinuity between actual and estimated weights. An example of this is data on portfolio equity assets for Argentina. In 2001, when actual data from the CPIS is available, the sum of the weights accounted for by our sample of 18 countries is 99%. However, the sum of the estimated weights in 2000 is only 10%. The gravity model is clearly underestimating the weights for Argentina’s equity assets. This is an extreme example and the problem does not arise for most countries in the sample. Also, since the model is fitted to the cross-country average, there will naturally be some countries for which the fit is not as good. In any case, we decided to rescale all weights to 100% to get around these discontinuities. We denote the rescaled weights by $\tilde{w}_{ijt}$.

In doing this, we are implicitly assuming that the countries in our sample are only connected among themselves and ignore linkages with countries that are not in the sample. This is clearly a very simplistic assumption. However, the countries in our sample accounted for about 83%
of the world’s total equities, bonds, and bank assets in 2006\(^2\). This is a large proportion. Most of the remainder is accounted for by offshore financial centres. However, since these financial centres are typically not the final destinations of investment, we do not lose much by excluding them. To the extent that the geographical allocation of assets through these financial centres is similar to the direct geographical allocation, our methodology will produce accurate measures of bilateral financial linkages.

- **Step 6** Multiply geographical weights by total assets from the Lane and Milesi Ferretti (2007) dataset to obtain stocks of foreign assets.

To transform geographical weights into stocks of foreign assets, we multiply the weights obtained in step 5 by the total assets of country \(i\) reported in the Lane and Milesi-Ferretti (2007) dataset:

\[
\tilde{X}_{ijt} = \tilde{w}_{ijt} \times X_{it,LMF}
\]

- **Step 7** (symmetry). Construct liabilities from assets.

The data is constructed taking the assets perspective. This is because gravity models are more suitable to estimate assets than to estimate liabilities. When deciding their portfolio allocation, investors take into account a variety of variables (proximity, returns, trade, etc.) which are used as regressors in the gravity model. The last step in the data construction explores the fact that assets and liabilities should be symmetric and constructs liabilities from assets:

\[
Liabilities_{ijt} = Assets_{jit}
\]

Liabilities of country \(i\) with country \(j\) at year \(t\) equal assets of country \(j\) in country \(i\) at year \(t\).

### 2.2 FDI

#### 2.2.1 Data

The main source of data on FDI assets is the OECD International Direct Investment by Country database. This contains FDI data at book value reported by OECD members, starting in 1981. There are many missing values in the data. To the extent possible, missing observations are filled in with data from the United Nations Conference on Trade and Development (UNCTAD). The two datasets do not report exactly the same numbers when the data overlap, but the discrepancy

\(^2\)This share is computed based on the numbers in Table 3 of the IMF GFSR (April 2008).
is not large and they are broadly consistent. Even after combining the datasets, there are still important gaps in the data, with no observations for FDI assets of Argentina and Mexico.\(^3\) Missing data accounts for approximately 44% of the sample.

There is a large degree of imprecision in FDI data, which is clear from the large asymmetry between reported assets and liabilities. For example, we would expect the value of FDI assets reported by China in Hong Kong to be equal to the value of FDI liabilities reported by Hong Kong in China. However, the two are remarkably different: China reports a value of FDI assets in Hong Kong at US $24,632 millions in 2003, while Hong Kong reports FDI liabilities in China at US $99,197 millions, a value more than four times larger.

This discrepancy is due to the way FDI liabilities are reported, following the Ultimate Beneficiary Owner (UBO) principle, according to which the source of inward FDI is allocated to the country of ultimate ownership. The equivalent principle on the assets side would be the Country of Ultimate Destination (CUD) principle, according to which outward FDI would be allocated to the country of final destination. However, while the UBO principle is widely adopted in the production of FDI statistics, the CUD principle is not the norm. This generates large discrepancies between reported assets and liabilities. For illustration suppose that, in the example above, China channels part of its investment in Hong Kong through Taiwan. When reporting its FDI assets in Hong Kong, China includes only investment that goes directly to Hong Kong, excluding investment channeled through Taiwan. Hong Kong, on the other hand, follows the UBO principle and reports its liabilities with China including investment that is channeled through Taiwan. Thus, Hong Kong’s reported liabilities are much larger than China’s reported assets.

This suggests that we should work with data on FDI liabilities, since it is a more comprehensive measure of bilateral linkages, including investment channeled through a third country. To transform liabilities into assets, we would use country \(j\)’s reported liabilities with country \(i\) as being equal to country \(i\)’s assets in country \(j\). The problem with this approach is that our estimation procedure focuses on bilateral weights rather than levels. To compute weights, we need to divide bilateral assets by total assets. In order to construct total assets of country \(i\) from the liabilities reported by the recipient countries, we would need to know the liabilities of all

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\(^3\)The UNCTAD FDI Country Profiles for Argentina and Mexico contain information on FDI assets by geographic destination. However, this data is derived from the liabilities reported by the recipient countries. Given the different reporting methods used for inward and outward FDI, we decided not to use this derived data.
recipient countries with country $i$. Because this information is not available for all countries, we cannot follow this approach. Therefore, we compute weights by dividing country $i$’s reported bilateral assets by country $i$’s reported total assets and make no use of data on liabilities.

With this approach, we only capture direct linkages and exclude investment channeled through third countries. While this is a limitation, it is worth noting that our sample does not include offshore financial centres, which play an important role in intermediating capital flows. This minimizes the loss introduced by ignoring indirect linkages. Also, since we are focusing on bilateral asset weights, the implicit assumption we make is that the geographical allocation of indirect linkages mirrors the geographical allocation of direct linkages. For example, we assume that the share of Chinese assets allocated to Hong Kong through Taiwan matches the share of Chinese assets allocated directly to Hong Kong. We believe this is a reasonable assumption.

2.2.2 Estimation

FDI asset weights are estimated using model (1). The bilateral variables, $X_{ij}$, are obtained from the Distance Database compiled by the Centre d’Etudes Prospectives et d’Informations Internationales (CEPII). The set of time varying regressors, $Z_{ijt}$, includes GDP per capita in countries $i$ and $j$, and the degree of openness of country $j$ to inward FDI. GDP per capita captures the degree of development and is obtained from the World Bank, World Development Indicators. It is measured at constant prices and is PPP-adjusted. The degree of openness of country $j$ to inward FDI is measured as a time varying index. For most countries, it is constructed from the tables in Kaminsky and Schmukler (2003), which report the chronology of stock market liberalization and classify countries into three degrees of liberalization over time:

- **No liberalization**: foreign investors are not allowed to hold domestic equity and cannot repatriate capital, dividends, and interest before five years of the initial investment.
- **Partial liberalization**: the country is open to foreign investment, but with restrictions
- **Full liberalization**: foreign investors are allowed to hold domestic equity and to repatriate capital, dividends and interest without restrictions.
We transform this classification into a numerical variable which takes the value 0 if country $j$ is not liberalized in year $t$, 1 if it is partially liberalized, and 2 if it is fully liberalized.

Some of the countries in our sample are not studied by Kaminsky and Schmukler (2003). For those countries, we use information on the timing of stock market liberalization from other studies and code it according to the criteria used by Kaminsky and Schmukler (2003). For China, we use information in Bekaert, Harvey, and Lundbland (2007), Prasad and Wei (2005) and OECD (2000), and for India, we use Ahluwalia (2002) and Reserve Bank of India (2006). Table 2 reports the index on liberalization to FDI investment for those countries that were not fully liberalized throughout the whole period.

As well as being used as a control in regression (1), this index is used to fill in some of the missing data prior to estimation. Table 3 illustrates how this is done, using as an example FDI assets of the UK in China. Using the liberalization index on inward FDI in China, we are able to fill in the missing values from 1980 to 1990. Because China was closed to inward FDI in those years, there would have been no inwards flows to China from the rest of the world. We know the stock of assets of the UK in China in 1991, while China was still closed. Because there would have been no inward flows to China during the period 1980 to 1990, the stock of assets in that period should equal the stock in 1991 adjusted for valuation effects due to changes in exchange rates and asset prices. To adjust for valuation effects, we assume that the bilateral stocks of the UK in China in the period from 1980 to 1990 grow at the same rate as total Chinese FDI liabilities. Therefore, we take the value is 1991 as the starting point and build stocks backwards using the growth rate of total Chinese liabilities, computed using UNCTAD data.

Turning to the estimation results, we might expect the host country fixed effects to account for most of the explanatory power in regression (1). To study this, we estimate a model where FDI asset weights are only explained by the host country fixed effects. The results are reported in column (1) of Table 4. The predictive power is not negligible, with an $R^2$ of 41%. Column (2) adds source host country fixed effects, with an improvement in the $R^2$ to 50%. This suggests that some source countries are more diversified than others, investing a smaller share in a larger number of countries. Including bilateral variables further increases the $R^2$ to 68%, which is remarkably high and is consistent with the results found in other empirical studies.
The bilateral variables are significant and have the expected signs: FDI weights are larger for countries that share a common border or a common language and have colonial links. Distance and time difference have a significant negative effect on FDI weights. These variables are time invariant. One might expect that bilateral FDI stocks would vary significantly over time as a result of financial development and capital market liberalization. This would call for the inclusion of time varying controls in the model, which is done in column (4). Countries with larger GDP per capita receive larger shares of FDI investment. The same happens in countries whose markets are more liberalized to FDI. However the improvement in the $R^2$ from including these time varying controls is only marginal. Most of the explanatory power comes from the source and host country fixed effects and the bilateral variables.

We also experimented with additional controls. One variable which has been found in previous studies to have a significant effect on bilateral asset holdings is bilateral trade. There are at least two reasons why this may be the case. First, bilateral trade may capture an additional familiarity effect, over and above the gravity variables. Second, countries may use financial investment to hedge against shocks in countries with which they trade. For example, if country A imports from country B, a potential hedge against output shocks in country B is to hold equity in that country: an increase in the domestic demand for imports from country B would be compensated by higher dividend yields from holding equity in country B. We extended the model to include trade weights, measured as the ratio of trade between countries $i$ and $j$ (exports plus imports), over total trade of country $i$, using data from the IMF Direction of Trade Statistics (DOTS). Trade weights were found to have an insignificant effect in explaining FDI weights and were not included in the model used for prediction.

Another variable we experimented with was the volatility in bilateral exchange rates, measured as the standard deviation in the rate of change of monthly bilateral exchange rates on a three-year rolling window. Exchange rates were obtained from the IMF International Financial Statistics (IFS). This is a common explanatory variable in gravity models for financial stocks and flows. The idea is that bilateral investment may be smaller when the bilateral exchange rate is more volatile, since there is more uncertainty about the returns. This variable turned out to have an insignificant effect on FDI asset weights, which is consistent with previous studies.$^4$

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$^4$Portes and Rey (2005) use it to explain bilateral equity flows and find an insignificant effect. The same result arises in Lane and Milesi-Ferretti (2008) for portfolio equity stocks.
2.3 Equity

2.3.1 Data

Data on portfolio equity assets is collected from the IMF Coordinated Portfolio Investment Survey (CPIS), which covers all countries in our sample except China, who did not participate in the survey. The time coverage though is quite limited: a pilot survey was conducted in 1997 and a regular annual survey was introduced in 2001 for an extended group of participating countries. Given this limited data availability, 69% of the data is missing and needs to be estimated.

2.3.2 Estimation

Table 5 reports the results of estimating model (1) on equity weights. The host country fixed effects only explain 46% of the variation in equity weights. Introducing source country fixed effects increases the $R^2$ to 55%, indicating that some source countries are more diversified and invest smaller shares in a larger number of destinations. The bilateral variables, $X_{ij}$, are the same as in the regression for FDI weights. They are all significant and have the expected signs except for the indicator for colonial links, which turns out negative. This suggests that investors may prefer to invest in countries with a similar degree of development as their home country, regardless of historical colonial links. The inclusion of these bilateral variables leads to a significant improvement in the $R^2$, which rises to 71%.

The set of time varying controls, $Z_{ijt}$, includes GDP per capita in country $j$, bilateral exchange rate volatility, and the degree of openness of country $j$ to inward equity investment. GDP per capital in country $i$ and the stock market capitalization in country $j$ turned out to be insignificant. The results suggest that investors invest more in countries that are more open to inward equity investment and have a larger GDP per capita. They also invest more when the volatility of the bilateral exchange rate is smaller. However, these time varying variables do not have a large explanatory power and lead to a very small improvement in the $R^2$.

We experimented with other variables to capture stock market returns and correlation in returns (averages, standard deviations, and correlation coefficient of daily MSCI indices in the host and source countries). These variables were insignificant and therefore were not included in the final regressions. Trade weights also turned out insignificant, as in the regression for FDI.
The degree of openness of country \( j \) to equity investment was constructed in the same way as the one for FDI. In fact, FDI can be seen as a type of portfolio equity investment where the degree of ownership exceeds 10% of the firm’s equity. However, countries may liberalize their stock markets to foreign portfolio equity investment and remain closed to FDI by introducing a ceiling on the percentage of total equity that can be owned by foreign residents. While this may be true for other countries, the only country in our sample where the index of liberalization to equity investment differs from the one for FDI is Korea, where foreign portfolio equity investment was partially liberalized in 1991, while foreign FDI investment remained restricted. Both types of investment were then fully liberalized in 1998. For all other countries, the liberalization index for equity coincides with the index for FDI reported in Table 2.

As for FDI, the liberalization index for equity is used to estimate missing data. However, while for FDI it was possible to take a data point when the host country was still closed as build the data backwards using the growth rate of its total liabilities - as illustrated in Table 3 - for equity the data starts when all countries were already open to inward equity investment. Since it is not possible to build the data backwards in the same way as for FDI, we simply impose zero bilateral weights for the period when the host country was closed to inward equity investment. The only exception to this rule is equity investment of Hong Kong in China. China was closed to inward equity investment until 1992. However, given the strong political and administrative links between the two countries, we do not impose zeros for Hong Kong’s equity investment in China pre 1992.

2.4 Debt

2.4.1 Data

Data on portfolio debt assets is also collected from the IMF CPIS. Given its limited time coverage, we combine it with data from the BIS Locational Banking Statistics, which reports debt assets and liabilities of banks for all countries in our sample, except Argentina, China, Hong Kong, Korea, and Singapore. The BIS data has the advantage of having a much longer time coverage, going back to 1977 for most advanced countries. However, it has the limitation of only reporting debt assets held by banks, while the CPIS has a broader coverage, including not only banks but also other financial institutions, monetary authorities, the government, non-financial corporations, and households. Another difference between the two datasets is that, while the
CPIS only covers portfolio debt, the BIS also covers loans and deposits.

When combining data on debt asset weights from the CPIS and the BIS we are implicitly assuming that assets held by banks have a similar geographical distribution as portfolio debt. This may not be the case, since it is plausible that portfolio debt is less affected by proximity variables than other types of debt (such as loans and deposits). Treasury bonds, in particular, can be seen as relatively homogeneous products. Therefore, it is plausible that those assets require less information intensity than other types of debt instruments and respond less to proximity variables. To test whether it is sensible to combine the BIS and CPIS data, we computed the correlation coefficient between the asset weights generated by the two data sources, which turns out to be quite large (80%). By default, we use asset weights computed from the BIS data, and complete it with weights computed from the CPIS data whenever possible. After combining the two datasets, approximately 43% of the data is missing. The gaps are especially pronounced for China, for which there is no data, and the other countries not covered by the BIS Locational Banking Statistics, for which we only have data after the CPIS was introduced.

2.4.2 Estimation

For FDI and equity, it is reasonable to assume that assets are denominated in the currency of the host country. For debt, however, this equivalence between currency and geographical composition is not so simple, since countries may issue bonds denominated in foreign currencies. Therefore, investors make a simultaneous decision about the geographical as well as the currency composition of their debt investments. This introduces a further complication, since we should model these two choices simultaneously. Here, we simplify by focusing only on the geographical composition of debt and abstracting from its currency composition.

Table 6 reports the results of estimating model (1) on debt weights. The model including only host country fixed effects explains 49% of the variation in debt weights. Including source country fixed effects increases the $R^2$ to 57%. The bilateral variables exclude border, which came insignificant in the estimation. The colony dummy has a negative sign, as in the model for equity. This is an interesting finding and suggests that, for types of investment which imply a larger degree of commitment, such as FDI, former colonizers tend to invest in former colonies. However, for equity and debt investment, they seem to prefer to invest in countries with a similar
degree of development, regardless of colonial links. The inclusion of the bilateral variables improves the $R^2$ significantly to 69%.

Unlike in the models used for FDI and equity, the set of time varying controls, $Z_{ijt}$, does not include the degree of liberalization of the host country to inward debt investment. This is because we were unable to construct an index which captures restrictions only to inward investment. The closest measure we were able to find was a time series index for capital account restrictions, based on the chronology in Kaminsky and Schmukler (2003). This index captures restrictions to borrowing abroad by banks and corporations (which could be interpreted as restrictions to debt capital inflows) as well as exchange rates and other restrictions to capital outflows. Because it confounds restrictions to inward and outward investment, we decided not to use it.

As for equity, the results suggest that investors tend to invest larger shares in more developed countries and in countries with lower exchange rate volatility with respect to the currency of the source country. In contrast with the result for FDI and equity though, bilateral trade weights have a significant and positive effect on debt weights. This result is consistent with the findings in Rose and Spiegel (2004). In their paper borrowers fear that defaulting on their debt may lead to a reduction in international trade. Therefore, countries systematically lend more to countries with which they have closer trade links.

We experimented with including bond market capitalization and measures of bond returns, using the JP Morgan EMBI and Global Bond Index (GBI). These variables turned out insignificant and were not included in the model used for prediction.

2.5 Reserves

The construction of the reserves data follows a different approach from the one used for the other three asset classes. While for FDI, equity and debt, investors choose where to invest, for reserves they choose in which currency to invest. Therefore we follow a two step procedure. First, we obtain the currency composition of reserves. Then, we transform currency into geographical composition: if country $i$ holds an amount $X$ of reserves in US dollars, we take $X$ as being the amount of reserve assets that country $i$ holds in the US. For simplification, we focus on four main reserve currencies: the US dollar, the euro, the pound, and the yen. These should capture the bulk
of countries’ foreign exchange reserves. Also for simplification, we treat reserves of country $i$ denominated in euros as being assets of country $i$ in Germany. For the period before the introduction of the euro, we use the deutsche mark$^5$.

An important limitation in constructing data on the currency composition of reserves is that, given its confidentiality, data is not readily available. The BIS Multilateral Surveillance Statistics contain data on the currency composition of reserves for the countries in the G10 since 1994. This gives us data for six counties in our sample: France, Germany, Italy, Japan, UK, and US. Given the remarkable stability of currency weights over time, we assume that weights stay constant from 1980 to 1994. For the remaining countries, the IMF collects data in the COFER database. Although the numbers are only released as aggregates across industrialized and developing countries, disaggregated data has been used in studies by IMF authors. We use the results reported in those studies to obtain estimates of the currency composition of reserves for the countries in our sample that are not members of the G10.

The studies we use are Eichengreen and Mathieson (2000) and Dooley et al (1989). These papers use the following specification to explain the currency composition of reserves:

\[
\text{share}_{ict} = c + a_1 \text{dollar}_\text{peg}_{ict} + a_2 \text{other}_\text{peg}_{ict} + \\
\beta \text{share}_\text{trade}_{ijt} + \gamma \text{share}_\text{debt}_\text{payments}_{ict} + \varepsilon_{ict}
\]

The dependent variable is the share of foreign exchange reserves held by country $i$ in currency $c$ at time $t$, obtained from COFER. The regression includes a constant term, dummy variables equal to 1 if country $i$ pegs to the US dollar or to another currency, the share of trade between country $i$ and country $j$ at time $t$ (where country $j$ is the country that issues currency $c$), and the share of debt service payments of country $i$ in currency $c$ at time $t$. The share of trade is calculated as the sum of exports and imports between countries $i$ and $j$ divided by total exports.

$^5$A more precise way of dealing with euro reserves would be to allocate them according to the relative GDP of each country in the euro area. Here we take a shortcut and allocate all euro reserves to Germany.
plus imports plus debt service payments of country \( i \). The share of debt payments in currency \( c \) is calculated as service payments of country \( i \) on debt denominated in currency \( c \) divided by total exports plus imports plus debt service payments of country \( i \).

Eichengreen and Mathieson (2000) report the results of estimating this model for a sample of 84 emerging and transition economies for the period 1979-1996. We collect data for the right hand side variables and multiply by the estimated coefficients reported in their paper to obtain estimates of the currency composition of reserves\(^6\).

Data on exchange rate regimes is obtained from Levy-Yeyati and Sturzenegger (2005). They report an index which classifies exchange rate regimes in three categories: floating, intermediate, and fixed. We transform this index into a binary variable, which takes the value 0 if the country has a floating regime and 1 if the country has an intermediate regime or a peg. We construct one indicator for US dollar pegs and another for other currency pegs. Data on trade is collected from the IMF Direction of Trade Statistics. Debt service payments are obtained by multiplying the 6-month Euro currency deposit rates, obtained from Datastream, by the amount of debt outstanding, obtained from the World Bank, Global Development Finance.

This approach gives us estimates of the currency composition of reserves which seem sensible. While it is difficult to have a benchmark for comparison, countries occasionally report their reserve shares in announcements and media interviews. For example, China is reported to hold roughly 70% of dollar reserves, 20% in euros and 10% in other currencies. Our estimation gives 79% in dollars and 21% in euros.

3 A Look at the Data

To give a flavour of the dataset, we use network diagrams to show the key stylized facts that emerge from the data. First, we look at the time evolution of financial asset weights, which exhibits remarkable stability. We then focus on the time evolution of the level of financial assets and liabilities, scaled by GDP in the source country. This shows a pronounced increase in cross-border linkages, especially since the mid-1990s. Finally, we compare the geography of financial linkages in 2005 with the geography of trade linkages.

\(^6\)We use the coefficients reported in Table 3 of Eichengreen and Mathieson (2000).
3.1 Financial Weights

Figures 1 to 3 represent the geography of asset weights combining all asset classes in 1985, 1995, and 2005. Weights are computed as the sum of bilateral stocks of foreign assets for all asset classes \((X_{ij})\) divided by the sum of total foreign assets for all asset classes from Lane and Milesi-Ferretti (2007) \((X_{it,LMF})\):

\[
\text{asset weights}_{ij} = \frac{X_{ij}^{FDI} + X_{ij}^{Equity} + X_{ij}^{Debt} + X_{ij}^{Reserves}}{X_{it,LMF}^{FDI} + X_{it,LMF}^{Equity} + X_{it,LMF}^{Debt} + X_{it,LMF}^{Reserves}}
\]

To simplify the diagrams, we impose a cutoff and represent only the strongest linkages (weights above 10%). The strength of the linkages is indicated by the colors and thickness of the arrows. An arrow pointing from country \(i\) to country \(j\) indicates the percentage of country \(i\)'s foreign assets that is held in country \(j\). To better compare weights over time, we fix the position of countries to broadly mirror their geographic location.

A few findings emerge from these figures:

- **The US is the main destinations of foreign investment, followed by the UK.** Even though there are important intra-European and intra-Asian linkages, most arrows point towards the US and, to a smaller extent, the UK.
- **There are no dramatic changes on portfolio asset weights over time.** The only noticeable change is the increase in the concentration of Asian and UK assets in the US from 1995 to 2005. This may be seen as tentative evidence against the decoupling hypothesis for Asian EMEs, although a test of this hypothesis would require more careful analysis.

3.2 Financial Stocks

To take a closer look at financial interlinkages, we go beyond portfolio weights and construct an alternative measure: the sum of the stocks of foreign assets and liabilities divided by the GDP of the source country.
\[ AL_{GDP_{ijt}} = \frac{Assets_{ijt}^k + Liabilities_{ijt}^k}{GDP_{it}} \]

where \( k \) denotes the asset class: all asset classes, FDI, equity, and debt. We do not report the network diagram for reserve assets due to the confidentiality of the data, but reserve assets are included in the ratio of total assets plus liabilities to GDP.

### 3.2.1 All asset classes

Figures 4 to 6 represent \( AL_{GDP_{ijt}} \) for the total of all asset classes, in 1985, 1995, and 2005. Three patterns emerge from these figures:

- **There was a remarkable increase in the size of financial positions from 1985 and 2005.** This can be seen by the larger number of arrows in figure 6 and the increase in the size of the linkages. This increase is particularly pronounced from 1995 to 2005 due to financial globalization and is consistent with the evidence in Lane and Milesi-Ferretti (2007).

- **Foreign assets and liabilities are organized in three tiers of financial centres:** the first tier includes the US, the UK, Hong Kong, and Singapore; the second tier includes France, Germany, Australia, Canada and Japan; and the third tier includes the remaining countries.

- **Strong link between China and Hong Kong.** This is not surprising given the strong historical, administrative and political links between the two countries.

### 3.2.2 FDI

Figures 7 to 9 represent \( AL_{GDP_{ijt}} \) for FDI in 1985, 1995, and 2005. They confirm the large increase in foreign assets and liabilities, especially since 1995. FDI is organized in three clusters: one cluster covers the Americas, including the US, Canada, Mexico, Brazil, and Argentina, but also includes some European countries like Spain and Portugal; another cluster covers Europe; and the third cluster covers Asia. The US and the UK are part of all three clusters, which reflects their systemic importance.
3.2.3 Equity

Figures 10 to 12 represent $AL_{GDP_{ijt}}$ for portfolio equity in 1985, 1995, and 2005. The same trends emerge as for FDI, with a large increase in the size of financial positions in the last two decades, specially since 1995. This increase is particularly concentrated around large financial centres (US, UK, Singapore, and Hong Kong).

3.2.4 Debt

Looking at debt, figures 13 to 15 reveal that the US, UK, Singapore, Hong Kong, and also Japan emerge again as important financial centres. In addition, there is some interesting time variation in the size of financial linkages:

- **Japan concentrates less assets and liabilities in 2005 than in 1995.** In 1995, Japan had large positions with Singapore and Hong Kong. In 2005 these linkages were weaker.
- **The UK had a large exposure to the US in 2005.**
- **Between 1995 and 2005 there was an increase in linkages between continental Europe, likely due to the introduction of the Euro.** While in 1995 most arrows in Europe point towards the UK, in 2005 there are more arrows pointing towards France, Germany, Spain and Italy.

3.3 Comparison with Trade

It is interesting to compare the geography of financial linkages with the geography of trade linkages. Figure 16 shows the ratio of the sum of bilateral exports and imports to GDP in the source country in 2005. It can be compared with Figure 6 for financial linkages. The key fact that emerges from this figure is that trade is organized in three clusters: an American cluster, centred on the US; an European cluster, centred on Germany; and an Asian cluster, centred on China and Japan. This contrasts with the geography of financial linkages, which are less intra-continental, but are organized in three tiers of financial centres.
4 Conclusions

This paper contributes to the understanding of financial globalization by building a dataset of bilateral financial positions for 18 countries, including developed economies and EMEs.

A number of interesting findings emerge from the data. Looking at the ratio of assets plus liabilities to GDP, there has been a remarkable increase in the size of financial positions since 1985, most rapidly since 1995. Financial linkages are organized in three tiers of financial centres. The first tier includes the US, the UK, Hong Kong, and Singapore; the second tier includes France, Germany, Australia, Canada and Japan; and the third tier includes the remaining countries. In contrast, trade linkages are more intra-continental and are organized in three clusters: an American cluster, centred on the US; an European cluster, centred on Germany; and an Asian cluster, centred on China and Japan.

While we have tried to use the best models to estimate missing data and have incorporated all possible information, for example using indices of financial liberalization, there is still a health warning that needs to be made. The quality of some of the original data sources is questionable, as illustrated by the lack of symmetry between FDI assets and liabilities. Also, there may be important financial linkages with countries that are not in our sample. For example, the sample does not include any offshore financial centres. Since these typically operate as intermediaries and not as final destinations for investment, our estimates will give an accurate description of financial linkages to the extent that the allocation of investment through offshore financial centres mirrors the allocation of investment that is not intermediated by these centres. To test whether this hypothesis is valid, we would need a more detailed treatment of the role of financial centres.
References


UNCTAD (2005), ‘United Kingdom FDI Country Profile’. 
Table 1. Country coverage

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<tr>
<th>Developed countries</th>
<th>Emerging Markets</th>
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Table 2. Liberalization index on inward FDI

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NOTE: 0 denoted no liberalization; 1 denoted partial liberalization; and 2 denoted full liberalization. Countries in our sample that are not shown in this table, are fully liberalized through the period 1980-2005.

SOURCES: Kaminsky and Schmukler (2003), Table 1, Appendix Table 1, and Annex Table 1. For China: Bekaert, Harvey, and Lundbland (2007), Prasad and Wei (2005) and OECD (2000). For India, Ahluwalia (2002) and Reserve Bank of India (2006).
### Table 3. Using the liberalization index on inward FDI to fill in missing data

<table>
<thead>
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<th>Year</th>
<th>FDI assets of UK in China</th>
<th>Liberalization index on inward FDI in China</th>
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**NOTE:** Highlighted values are filled in using the liberalization index.

**SOURCES:** OECD and UNCTAD, values in millions of US Dollars.
### Table 4. Estimation results for FDI weights

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<th>(1) Host country FE</th>
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<td>Marginal R² of bilateral variables</td>
<td>0.36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marginal R² of time-varying variables</td>
<td></td>
<td></td>
<td></td>
<td>0.04</td>
</tr>
</tbody>
</table>

**NOTE:** Robust standard errors in parentheses. *significant at the 10% level, ** at the 5% level, *** at the 1% level. Regression (4) includes time dummies. The marginal R² of bilateral variables indicates the percentage improvement in the R² from the bilateral variables, over and above the model with only host and source country fixed effects. The marginal R² of time-varying variables indicates the percentage improvement in the R² from the time-varying variables (including time dummies) over and above the model with fixed effects and bilateral variables.
Table 5. Estimation results for Equity weights

<table>
<thead>
<tr>
<th></th>
<th>(1) Host country FE</th>
<th>(2) Host and source country FE</th>
<th>(3) Bilateral variables</th>
<th>(4) Model for prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Border</td>
<td>0.820*** (0.185)</td>
<td>0.820*** (0.187)</td>
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<td></td>
</tr>
<tr>
<td>Language</td>
<td>1.729*** (0.143)</td>
<td>1.736*** (0.141)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colony</td>
<td>-0.792*** (0.203)</td>
<td>-0.805*** (0.192)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log(Distance)</td>
<td>-0.453*** (0.074)</td>
<td>-0.433*** (0.072)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time difference</td>
<td>-0.107*** (0.017)</td>
<td>-0.110*** (0.017)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log(GDPpc&lt;sub&gt;jt&lt;/sub&gt;)</td>
<td></td>
<td></td>
<td>4.063*** (0.769)</td>
<td></td>
</tr>
<tr>
<td>Exchange rate volatility</td>
<td></td>
<td></td>
<td>-0.003** (0.001)</td>
<td></td>
</tr>
<tr>
<td>Index Liberalization Equity&lt;sub&gt;jt&lt;/sub&gt;</td>
<td></td>
<td></td>
<td>2.452*** (0.603)</td>
<td></td>
</tr>
</tbody>
</table>

| N                      | 1341                | 1341                          | 1341                    | 1341                      |
| R<sup>2</sup>          | 0.46                | 0.55                          | 0.71                    | 0.72                      |
| Marginal R<sup>2</sup> |                     |                               | 0.29                    |                           |
| Marginal R<sup>2</sup> |                     |                               |                         | 0.01                      |

NOTE: Robust standard errors in parentheses. * significant at the 10% level, ** at the 5% level, *** at the 1% level. Regression (4) includes time dummies. The marginal R<sup>2</sup> of bilateral variables indicates the percentage improvement in the R<sup>2</sup> from the bilateral variables, over and above the model with only host and source country fixed effects. The marginal R<sup>2</sup> of time-varying variables indicates the percentage improvement in the R<sup>2</sup> from the time-varying variables (including time dummies) over and above the model with fixed effects and bilateral variables.
Table 6. Estimation results for Debt weights

<table>
<thead>
<tr>
<th></th>
<th>(1) Host country FE</th>
<th>(2) Host and source country FE</th>
<th>(3) Bilateral variables</th>
<th>(4) Model for prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>1.081*** (0.077)</td>
<td>1.001*** (0.081)</td>
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<tr>
<td>Colony</td>
<td>-0.261*** (0.078)</td>
<td>-0.170** (0.082)</td>
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<td></td>
</tr>
<tr>
<td>Log(Distance)</td>
<td>-0.423*** (0.042)</td>
<td>-0.367*** (0.044)</td>
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<td></td>
</tr>
<tr>
<td>Time difference</td>
<td>-0.119*** (0.010)</td>
<td>-0.114*** (0.010)</td>
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<td></td>
</tr>
<tr>
<td>Log(GDPpc_jt)</td>
<td>0.892*** (0.120)</td>
<td>1.160*** (0.449)</td>
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<td></td>
</tr>
<tr>
<td>Trade weights_ijt</td>
<td>-0.003*** (0.001)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exchange rate volatility_ijt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

|                  | 4187 | 4187 | 4187 | 4187 |
| N                | 0.49 | 0.57 | 0.69 | 0.70 |
| Marginal R\textsuperscript{2} of bilateral variables | 0.21 |       |     |     |
| Marginal R\textsuperscript{2} of time-varying variables |       |     |     | 0.01 |

NOTE: Robust standard errors in parentheses.* significant at the 10% level, ** at the 5% level, *** at the 1% level. Regression (4) includes time dummies. The marginal R\textsuperscript{2} of bilateral variables indicates the percentage improvement in the R\textsuperscript{2} from the bilateral variables, over and above the model with only host and source country fixed effects. The marginal R\textsuperscript{2} of time-varying variables indicates the percentage improvement in the R\textsuperscript{2} from the time-varying variables (including time dummies) over and above the model with fixed effects and bilateral variables.
Figure 1. Financial weights 1985

Key:

- Black: 10-20%
- Red: 20-40%
- Blue: 40-60%
- Green: 60-80%
- Gray: >80%

Source: UNCTAD, OECD, IMF, BIS, authors' calculations.
Figure 2. Financial weights 1995

Key:
- 10-20%  
- 20-40%  
- 40-60%  
- 60-80%  
- >80%

Source: UNCTAD, OECD, IMF, BIS, authors' calculations.
Figure 3. Financial weights 2005

Key:
- 10-20%  
- 20-40%  
- 40-60%  
- 60-80%  
- >80%

Source: UNCTAD, OECD, IMF, BIS, authors' calculations.
Figure 4. Assets+Liabilities/GDP 1985

Key:
- Black: 0.2-0.3
- Red: 0.3-0.6
- Blue: 0.6-1
- Green: 1-2
- Gray: >2

Source: UNCTAD, OECD, IMF, BIS, authors' calculations.
Figure 5. Assets+Liabilities/GDP 1995

Key:
- Black: 0.2-0.3
- Red: 0.3-0.6
- Blue: 0.6-1
- Green: 1-2
- Gray: >2

Source: UNCTAD, OECD, IMF, BIS, authors' calculations.
Figure 6. Assets+Liabilities/GDP 2005

Key:
- Black: 0.2-0.3
- Red: 0.3-0.6
- Blue: 0.6-1
- Green: 1-2
- Gray: >2

Source: UNCTAD, OECD, IMF, BIS, authors' calculations.
Figure 7. FDI Assets+Liabilities/GDP 1985

Key:
- 0.2-0.3
- 0.3-0.6
- 0.6-1
- 1-2
- >2

Source: UNCTAD, OECD, IMF, BIS, authors' calculations.
Figure 8. FDI Assets+Liabilities/GDP 1995

Key:
- Black: 0.2-0.3
- Red: 0.3-0.6
- Blue: 0.6-1
- Green: 1-2
- Gray: >2

Source: UNCTAD, OECD, IMF, BIS, authors' calculations.
Figure 9. FDI Assets+Liabilities/GDP 2005

Source: UNCTAD, OECD, IMF, BIS, authors' calculations.
Figure 10. Equity Assets+Liabilities/GDP 1985

Key:
- 0.03-0.1
- 0.1-0.2
- 0.2-0.5
- 0.5-0.6
- >0.6

Source: UNCTAD, OECD, IMF, BIS, authors' calculations.
Figure 11. Equity Assets+Liabilities/GDP 1995

Key:

- Black: 0.03-0.1
- Red: 0.1-0.2
- Blue: 0.2-0.5
- Green: 0.5-0.6
- Gray: >0.6

Source: UNCTAD, OECD, IMF, BIS, authors' calculations.
Figure 12. Equity Assets+Liabilities/GDP 2005

Key:
- Black: 0.03-0.1
- Red: 0.1-0.2
- Blue: 0.2-0.5
- Green: 0.5-0.6
- Gray: >0.6

Source: UNCTAD, OECD, IMF, BIS, authors' calculations.
Figure 13. Debt Assets+Liabilities/GDP 1985

Key:

- 0.2-0.4
- 0.4-0.6
- 0.6-1
- 1-2
- >2

Source: UNCTAD, OECD, IMF, BIS, authors' calculations.
Figure 14. Debt Assets+Liabilities/GDP 1995

Key:
- Black: 0.2-0.4
- Red: 0.4-0.6
- Blue: 0.6-1
- Green: 1-2
- Gray: >2

Source: UNCTAD, OECD, IMF, BIS, authors' calculations.
Figure 15. Debt Assets+Liabilities/GDP 2005

Key:
- 0.2-0.4
- 0.4-0.6
- 0.6-1
- 1-2
- >2

Source: UNCTAD, OECD, IMF, BIS, authors' calculations.
Figure 16. Exports+Imports/GDP 2005

Key:
- Black: 0-5%
- Red: 5-20%
- Blue: 20-40%
- Green: 40-60%
- Gray: >60%

Source: IMF, authors' calculations.