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WHY DO FOREIGNERS INVEST IN THE UNITED STATES?

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ABSTRACT

Why are foreigners willing to invest almost $2 trillion per year in the United States? The answer affects if the existing pattern of global imbalances can persist and if the United States can continue to finance its current account deficit without a major change in asset prices and returns. This paper tests various hypotheses and finds that standard portfolio allocation models and diversification motives are poor predictors of foreign holdings of U.S. liabilities. Instead, foreigners hold greater shares of their investment portfolios in the United States if they have less developed financial markets. The magnitude of this effect decreases with income per capita. Countries with fewer capital controls and greater trade with the United States also invest more in U.S. equity and bond markets, and there is no evidence that foreigners invest in the United States based on diversification motives. The empirical results showing a primary role of financial market development in driving foreign purchases of U.S. portfolio liabilities supports recent theoretical work on global imbalances.

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I. Introduction

The causes and implications of global imbalances have recently been a major focus of the academic literature in international trade and finance. One of the most contentious aspects of this literature is whether the current system of large global imbalances can continue. Most traditional models suggest that this system will not persist because the United States must stabilize its external debt ratios, and part of this adjustment will involve a large dollar depreciation (Obstfeld and Rogoff (2007) and Blanchard, Giavazzi and Sa (2005)). A more recent series of papers argues that this system of imbalances could continue for an extended period due to factors such as: differences in financial market development that make U.S. assets more attractive (Caballero, Farhi and Gourinchas (2008), Mendoza, Quadrini and Ríos-Rull (2006) and Ju and Wei (2006)), a persistent return differential between U.S. and foreign asset holdings (Gourinchas and Rey (2007) and Lane and Milesi-Ferretti (2007a)), or even "dark matter" (Hausmann and Sturzenegger (2006)). A focus of several papers is the key role of the more developed, liquid and efficient U.S. financial markets in attracting foreign capital. Which side of this debate is correct has important implications for the global financial system.

Although discussions of global imbalances traditionally focused on trade flows and saving-investment imbalances, more recent attention has focused on the corresponding capital flows. Gross capital flows into the United States totaled $7.8 trillion over the five years from 2003 through 2007, increasing each year to reach $2.1 trillion in 2007.[1] Why are foreigners willing to invest an average of over $5 billion every day in the United States—especially given relatively low returns relative to comparable investments in other countries and a widespread expectation of continued dollar depreciation? Moreover, despite the increased role of government and official institutions in U.S. capital inflows, 76% of gross capital flows into the United States from 2003 through 2007 were made by the private sector and 81% of U.S. external liabilities were held by the private sector at end-2007. Understanding the motivation behind the millions of individual decisions that drive these capital inflows is critically important to understanding if this massive net transfer of capital into the United States can last. The stability of these capital inflows is generally believed to be the greatest vulnerability to the current system of global imbalances.

This paper attempts to explain why foreigners, and especially private-sector investors, are willing to invest such large amounts of money into the United States. It begins by documenting who

[1] When combined with the $1.29 trillion of U.S. capital outflows, this funded the U.S. current account deficit of $731 billion. Data from Bureau of Economic Analysis, *Survey of Current Business* (July 2008).

holds U.S. portfolio liabilities and shows that foreigners have earned substantially lower returns on their U.S. investments over the past five years than U.S. investors have earned abroad, even after removing the effects of exchange rate movements and official sector investments. This return differential against foreigners even exists within individual asset classes (equities, foreign direct investment, and to a lesser extent, bonds) and even after making rough adjustments for risk. A simple analysis also shows that standard portfolio allocation models do a poor job explaining patterns of foreign investment in the United States, especially in explaining the large variation in different countries' portfolio allocations to U.S. investments.

There are, however, a number of reasons why foreign, private-sector individuals would invest in the United States—despite earning relatively low returns—that are not incorporated in these simple portfolio allocation models. To test the validity of these different theories, this paper builds on three different literatures: on home bias, on the allocation of investment across countries, and on the macroeconomic determinants of capital flows corresponding to global imbalances. It uses new annual information on foreign holdings of U.S. equities and bonds and essentially runs a "horse race" to evaluate the predictions from the various theoretical models and existing empirical work.

This analysis is different from earlier work in this literature in three ways. First, this paper is the only analysis that focuses on the determinants of investment into only the United States in order to focus on its unique role in attracting foreign capital flows and the corresponding implications for global imbalances. Second, this paper focuses on the determinants of all types of portfolio investment, as compared to most of the empirical work which only focuses on equity flows (despite the greater importance of debt flows and their inclusion in the models).[2] It also includes information on all types of investors (including mutual funds, hedge funds, pension funds, life insurance companies, and government agencies), as compared to some work which only focuses on specific investors (usually mutual funds). Finally, it focuses on what drives foreign individuals and companies to invest in the United States, as well as on the macroeconomic determinants of capital flows, combining what have been very different literatures.

[2] From 2003-2007, 47% of gross capital flows into the United States was in the form of bonds, while only 7% was in equities. Exceptions to this focus on equity markets are: Burger and Warnock (2003, 2007), which focuses on U.S. investment in foreign bond markets and Lane (2006a), which estimates the bilateral composition of international bond portfolios for members of the EMU.

The empirical results suggest that a primary factor driving both equity and bond flows into the United States is a country's level of financial development. Countries with less developed financial markets tend to hold a greater share of their portfolios in the United States, and the strength of this relationship is inversely related to a country's income level. This primary role for financial development supports the recent focus of the theoretical literature on global imbalances. There is also strong evidence that countries with greater trade flows with the United States and fewer capital controls invest relatively more in U.S. equity and debt markets. The results also find some support for "return-chasing" in equity (although not bond) markets, i.e. that foreigners tend to invest more in the United States if their equity markets have recently performed worse relative to U.S. markets. There is some evidence that countries that are "closer" with the United States (through cultural ties as well as distance) and that have stronger corporate governance invest more in U.S. equities. Foreigners do not invest more in either U.S. equity or debt markets if returns in their own markets are less correlated with the United States, providing little support for a diversification motive for foreign investment.

The remainder of this paper is as follows. Section II discusses the data on foreign holdings of U.S. liabilities and documents the return differentials between foreign investments in the United States and U.S. investments abroad. It also describes the substantial variation in countries' portfolio allocations toward the United States. The remainder of the paper presents the main analysis of what determines foreign holdings of U.S. portfolio liabilities. Section III develops a simple model to structure the empirical analysis, links this model to the existing literature, and discusses seven reasons why private-sector investors around the world might invest in the United States. Section IV discusses several econometric issues and then presents empirical results on the determinants of foreign investment in U.S. equity markets. Section V presents results for foreign investment in U.S. bond markets, including an analysis of the differences between private and official-sector investment patterns. Section VI concludes.

II. Background and Data: Foreign Investment in the United States

This section provides some background on patterns of foreign investment in the United States and discusses the main data set on foreign portfolio holdings of U.S. liabilities. It answers three questions: Who is investing in the United States? What returns have foreigners earned from investing in the United States? And have foreigners tended to "over" or "under" invest in the United States as compared to the predictions of standard portfolio models?

II.A. The Data: Who Invests in the United States?

In order to measure foreign investments in U.S. equity and debt markets, this paper primarily uses data from the "Report on Foreign Portfolio Holdings of U.S. Securities," compiled by the U.S. Department of the Treasury, the Federal Reserve Bank of New York, and the Board of Governors of the Federal Reserve System (hereafter referred to as USG). It also performs sensitivity tests and augments certain parts of the analysis using an additional data set—the "Coordinated Portfolio Investment Survey," compiled by the International Monetary Fund (hereafter referred to as IMF). Appendix A provides additional information on the data, including details on the differences in the data sets.[3]

Both the USG and IMF data report foreign holdings of U.S. portfolio liabilities broken down by country and security type on an annual basis from 2000/2001 until 2006/7 and offer important advantages over previous data sets.[4] This is the first time that an annual time series (albeit still short) is available for international asset and liability positions. Before 2002 data on U.S. foreign assets and liabilities was only available in five-year intervals, and papers requiring more timely information were forced to calculate international holdings using accumulated flow data combined with estimated valuation adjustments. As has been well-documented, data on cross-border capital flows is highly problematic and estimates of asset and liability positions based on accumulated flow data can differ significantly from actual holdings (due to various challenges such as tracking flows to their originating country).[5] Another advantage of these two data sets is that they encompass holdings of U.S. liabilities by all types of private foreign investors. In contrast, many other papers have focused only on mutual fund investments—thereby ignoring important investor groups, such as hedge funds, banks, pension funds, and insurance companies. One shortcoming of both data sets, however, is that they only include portfolio investment and do not include foreign direct investment.[6]

The primary data set used in this paper—the USG data—is collected under the authority of the International Investment and Trade Services Survey Act and reporting is mandatory for all

[3] Griever, Less and Warnock (2001) provide details on the USG data and a comparison to the IMF data.
[4] The USG data is available for 2000 and then annually from 2002 through 2007. The IMF data is available annually from 2001 through 2006 (and a more limited version is available for 1997).
[5] See Cleaver and Warnock (2003) and Griever, Lee and Warnock (2001).
[6] Foreign direct investment is defined as a holding of at least 10% of the value of the firm, creating a somewhat random division with equity portfolio investment. Foreign direct investment was 14% of total U.S. liabilities in 2007, while equity and debt liabilities were 52%.

institutions meeting the Survey's reporting criteria (which includes U.S. resident issuers of securities and U.S. resident custodians that manage the safekeeping of U.S. securities for foreign resident entities).[7] The USG data provides information on the stock of foreign holdings of U.S. equities and debt securities (both short- and long-term), and also includes reserves held by foreign official institutions. Significant penalties can be imposed for non-reporting, so compliance and data quality are believed to be very good. One concern with the data (as well as with all available data on international portfolio assets and liabilities) is that it can over-report the asset holdings of major financial centers that are intermediaries for transactions from other countries. This includes investment in mutual funds, which then invest the mutual fund assets in foreign companies.[8] Experts who collect this data believe that this misreporting through third parties is much less of a problem in this data on foreign holdings of U.S. liabilities than in data on capital flows (including the U.S. government data on capital flows) and other sources of data on international asset positions. Nonetheless, it is still a concern and is addressed in the sensitivity tests.

The total USG sample includes information on $9.77 trillion of U.S. portfolio liabilities in 2007 held by just over 200 countries/entities. Of these liabilities, $3.13 trillion are equities and $6.64 trillion are debt securities. Figure 1 graphs the 25 largest reported holdings in 2007. The three largest reported holdings of U.S. portfolio liabilities are Japan (with $1,197 billion), China (with $922 billion) and the United Kingdom (with $921 billion). The distribution of U.S. holdings by size is heavily skewed, with only 24 countries holding U.S. portfolio assets of over $100 billion. The division of countries' holdings between equity and debt securities also varies significantly across countries. For example, Japan holds 18% equities and 82% debt, while Canada holds 73% equities and 27% debt.

The IMF data is similar to the USG data, but has several important differences. One major disadvantage is that it has more limited country coverage—with 71 countries/entities and $6.25 trillion of U.S. portfolio liabilities included for 2006 (versus 200+ countries/entities and $7.78 trillion for the USG data in the same year). Several countries included in the USG data and

[7] Since the data set only includes information from U.S. custodians and non-U.S. custodians based in the United States, it does not capture purchases and sales of U.S. assets by non-U.S. custodians located outside the United States. This issue is largely mitigated by the common use of U.S. custodians to hold U.S. securities on behalf of foreign custodians, which are included in the USG dataset.

[8] See Lane (2006b) for details on Ireland, in which a large share of foreign investment in Irish equities is actually investment in Irish mutual fund companies which then invest largely in non-Irish equities. McKinsey Global Institute estimates that mutual funds comprised about 19% of global assets under management in 2006. The sensitivity analysis addresses this issue by removing financial centers from the analysis and including a dummy for financial centers. Neither extension has an impact on the key results.

excluded from the IMF data are important holders of U.S. liabilities, such as China and Middle Eastern oil exporters. A second disadvantage of the IMF data is that it is collected by different governments using different reporting standards and therefore is not as consistently calculated across countries. Despite these important disadvantages, however, the IMF data is still worth using for sensitivity tests and analyses that differentiate between private sector and overall investment patterns.[9] As shown in Figure 2, foreign official entities currently hold about 19% of foreign holdings of U.S. liabilities and were particularly important for bond markets. These foreign official holdings are not included in the IMF data, but are included in the USG data (although not disaggregated from private foreign investment).

II.B. What Returns Have Foreigners Earned from Investing in the United States?

Whether foreigners have earned high returns from investing in the United States has recently been debated in the academic literature. Gourinchas and Rey (2007) show that over long periods of time (since 1952 or 1973) foreigners earned substantially lower returns on their U.S. investments than U.S. investors earned abroad, even within specific asset categories (FDI, equities, bonds and bank loans). Cline (2005) also finds a positive return differential on aggregate investment positions since 1992, but argues this is mainly due to different rates of return on FDI and significant return differentials did not exist in other asset classes. Lane and Milesi-Ferretti (2007a) show that return differentials between U.S. and foreign investors are highly dependent on exchange rate movements and only exist in short periods between 1994 and 2005. More recently, Curcuru, Dvorak and Warnock (2008) find systematic errors in the data used to calculate these returns and show that the average return differential for equities and bonds on U.S. investment abroad versus foreign investment in the United States was close to zero from 1994 through 2005. Lane and Milesi-Ferretti (2007b) focus on the return differential for all types of investment (not just equities and bonds) and also argue that previous estimates of return differentials have been overstated due to systematic measurement errors in capital gains on the U.S. external portfolio.

Table 1 estimates returns for a more recent period (and the period that will be the focus of the empirical analysis)—from 2002 through 2006—and addresses the concerns raised in recent work about measurement error. Although long-term return differentials are important in studying the dynamics of the U.S. current account deficit, investors are more likely to base current asset allocation decisions on returns over the last five years (or even less). Calculating these return

[9] Both datasets include investment by government-sponsored investment funds that do not constitute official reserve holdings, such as sovereign wealth and pension funds.

differentials involves a number of issues (discussed in Appendix B), but focusing on the more recent data allows a more accurate calculation of returns, especially for specific asset classes.[10] Table 1 shows that foreigners earned an average annual return of only 4.3% on their U.S. investments over the last five years, which is substantially less than the 11.2% return that U.S. investors earned on their foreign investments. The last line of the table reports the Sharpe ratio for U.S. and foreign investment and shows that these return differentials continue to exist even after making this rough adjustment for risk. Some of this return differential is due to the depreciation of the dollar since 2002.[11] The right side of the table, however, shows that even after removing the impact of exchange rate movements, foreigners investing in the United States earned less than half of what U.S. investors earned abroad from 2002 through 2006.

One partial explanation for this lower rate of return for foreigners is that a portion of U.S. capital inflows reflect official sector purchases—purchases that place less importance on expected returns.[12] A related explanation for this return differential is the composition of foreign investment in the United States versus U.S. investment abroad. Foreigners that invest in the United States prefer assets with lower volatility, despite lower expected returns, while U.S. investors may prefer higher-risk assets with corresponding higher expected returns.[13]

Table 2 adjusts for both of these effects by reporting average annual returns on U.S. and foreign private-sector investments in FDI, bonds and equities from 2002 through 2006.[14] The table shows that even within specific asset classes, non-official sector investors from outside the United States have earned significantly lower returns on their U.S. holdings than U.S. investors have earned abroad. For example, foreign investors earned only 7.6% on their U.S. equity holdings and 5.3% on their U.S. bond holdings, while U.S. investors earned 17.4% and 6.7% abroad, respectively.

[10] More specifically, important details necessary to calculate return differentials by asset type and to adjust for systematic differences in revisions are only available for recent years.
[11] The dollar depreciated by 19% from January 2002 through year-end 2006, based on the broad trade-weighted exchange index compiled by the U.S. Federal Reserve System.
[12] For example, Dooley, Folkerts-Landau and Garber (2003) argue that foreign governments may purchase U.S. assets in order to maintain undervalued exchange rates and/or to accumulate highly liquid, low-risk reserve assets.
[13] Lane and Milesi-Ferretti (2007a) discuss this "hedge fund" characteristic of the United States (and many other industrial countries) in the sense that it is "long in foreign equity and short in foreign debt". Gourinchas and Rey (2007) describe the United States as a "venture capitalist", because its assets tend to be concentrated in shorter-term, higher return assets such as equity and FDI, while foreigners tend to hold a larger share of their portfolio in longer-term, lower-return assets (such as bank loans and debt).
[14] The statistics include U.S. official reserve assets, but these are very small (only 1.6% of total U.S.-owned assets abroad at year-end 2007) and should not affect the overall return calculations. Moreover, since most U.S. official holdings of foreign assets are government bonds and other conservative investments, this would generate a downward bias in these estimates of U.S. returns on foreign investments.

For all portfolio securities (equities and bonds), foreign investors earned less than half of what U.S. investors earned abroad. These return differentials continue to exist, especially for equity and FDI, even after making a rough adjustment for risk and exchange rate movements.

These return differentials should not be interpreted as evidence that foreigners have made poor investments or that U.S. investors are somehow "better" than foreign investors. Foreigners may choose to invest in the United States for a range of reasons (discussed in more detail in Section III) other than simply to earn high returns. Moreover, these recent return differentials largely reflect the recent performance of U.S. versus foreign equity and bond markets. From 2002 through 2006 the return on a broad U.S. equity market index was less than 8%, while the return on a broad global equity market index (excluding the United States) was almost 14%.[15] Over the same period the return on a broad U.S. bond market index was about 5%, while the return on a broad global bond index (excluding the United States) was just over 8%.[16] In fact, from 2002 through 2006 the average annual return for the U.S. equity market index was the lowest in a sample of 52 equity markets, and the U.S. bond market return was lower than 43 out of 47 bond markets around the world.[17] Of course, this underperformance of U.S. markets over the past five years may not continue in the future, especially since an important factor in this underperformance is the depreciation of the dollar over this period. Investors may place some weight on past returns when making asset allocation decisions (as discussed in Section III.C.), but expectations of future returns is even more important.

II. C. Do Foreigners Over- or Under-Invest in the United States?

Using the data discussed in Section III.A, it is possible to calculate a measure of exposure by individual countries to U.S. equity and debt securities. I calculate this "$USExposure_{i,j}$" of country *i* to U.S. security *j* using the equation:

$$USExposure_{i,j} = \frac{USInvestments_{i,j}}{TotalPortfolio_{i,j}}, \qquad (1)$$

where $USInvestments_{i,j}$ is total holdings of U.S. portfolio liabilities by country *i* of security *j* from the USG or IMF data (as discussed in Section II. A.). $TotalPortfolio_{i,j}$ is the entire portfolio

[15] The U.S. equity index is the S&P 500 and the foreign index is the MSCI EAFE. Data is from Bloomberg.
[16] The U.S. bond market index is constructed as a weighted average of U.S. agency, corporate and Treasury bonds, with weights equal to foreign holdings of each bond type. The foreign bond index is the Lehman foreign bond index. All indices are reported by Bloomberg and are unhedged returns.
[17] Based on equity and bond returns calculated in U.S. dollars and reported by Datastream. See Appendix C for more detailed information on data sources.

holdings by country *i* of security *j* and is calculated as total domestic market capitalization for country *i* of security *j* plus total foreign assets held by country *i* of security *j* less all foreign holdings of country *i*'s liabilities of security *j*. Securities *j* can be either equity or debt securities. Data on domestic market capitalization for equities is taken from Standard & Poor's (2006) and for debt securities is taken from the Bank of International Settlements.[18] Data on total foreign assets held by country *i* and foreign holdings of country *i*'s liabilities is taken from the IMF data for the corresponding calculations. This data is not available in the USG data, so I use estimates of foreign equity assets and liabilities reported in Lane and Milesi-Ferretti (2007) and foreign debt assets and liabilities reported by IMF (2008).[19]

I calculate this ratio using the USG and IMF data for each type of security and then drop extreme outliers (defined as $USExposure_{i,j}$ with values less than 0 or greater than 100%), the SEIFiCs, and Luxembourg.[20] Table 3 lists summary statistics for the 25 countries with the greatest foreign exposure for equity and debt markets in 2006 based on the preferred USG data. It also reports debt holdings based on the IMF data to show how private sector holdings differ from the USG data which also includes official-sector reserve holdings. The table shows that there is substantial variation in different countries' exposure to U.S. equity and debt. Foreign exposure to U.S. debt markets also tends to be greater than that for equity markets—especially for the USG data which includes official-sector reserve holdings.

Table 3 also shows that foreign exposure to U.S. markets is quite low and, in most cases, substantially less than predicted by standard portfolio allocation models. Standard portfolio theory (discussed in more detail in Section III.A.) predicts that under basic assumptions, investors should hold the global market portfolio. Most countries, however, have substantially less exposure to U.S. assets than the U.S. share of the global portfolio—a pattern well-documented in most countries and referred to as "home bias". More specifically, in 2006 the U.S. equity market was 36% of global equity market capitalization, and U.S. debt markets were 38% of global debt

[18] Data is from the *BIS Quarterly Review*, Tables 11, 16A and 16B (September 2006). Available online at http//www.bis.org/statistics/secstats.htm.

[19] Special thanks to Lane and Milesi-Ferretti for providing updated (and unreleased) data on international equity positions. Lane and Milesi-Ferretti (2007) provide more detailed information on international equity positions than IMF (2008).

[20] SEIFiCs are: Aruba, Bahamas, Barbados, Bermuda, British Virgin Islands, Cayman Islands, Cyprus, Gibraltar, Guernsey, Isle of Man, Jersey, Lebanon, Macao, Malta, Mauritius, Netherlands Antilles, Panama, Turks and Caicos, and Vanuatu. Extreme outliers are mainly financial centers and countries that would be dropped from the empirical analysis anyway due to data availability for other variables. For example, in 2006 for the USG data on equity holdings, no observations have a value of *USExposure* greater than 100% and Ireland, Luxembourg and Uruguay are the only countries with calculated values less than zero.

markets.[21] Mean foreign holdings of U.S. equities and debt, however, were only 4.3% and 14.8% of countries' portfolios, respectively, and median holdings were even lower.

Moreover, Table 4 shows that countries exhibit home bias towards most other large countries, especially in equity markets, although on average they are more underweight the United States than other major financial markets.[22] For example, foreigners hold an average of 4.2% of their debt portfolios in Germany, as compared to a market portfolio weight of 5.9%, so they have 71.7% of the "optimal" global portfolio of German debt. Foreigners hold an average of 21.7% of the optimal equity and 37.9% of the optimal debt portfolio for the major financial markets, as compared to an average of 13.5% and 24.9%, respectively, for the United States.[23] Investors, however, are even more underweight some markets than the United States. Foreigners hold only 3.8% of the optimal portfolio in Japanese debt and 6.0% in Canadian equities.

These results raise several important questions. If countries are not investing in the United States according to the predictions of standard portfolio models, what factors determine their optimal holdings of U.S. liabilities? Will foreigners continue to invest in the United States in the presence of consistently lower returns than if they kept their money at home? What factors explain the substantial variation in different countries' exposure to U.S. equity and debt markets?

III. The Model and Data: Why do Foreigners Invest in the United States?

III. A. Background

Three different literatures provide a framework to analyze the determinants of foreign investment in the United States: the literature on home bias, on the allocation of investment across countries, and on the macroeconomic determinants of global imbalances.

First, standard portfolio theory shows that if investors care only about the mean and variance of the real return of their invested wealth, if markets are efficient, and the cross-border barriers to

[21] This includes international and domestic debt securities, as well as government, corporate and financial debt. Based on data from the *BIS Quarterly Review* (2006).

[22] For a more detailed analysis of cross-border investment patterns, see Bertaut and Kole (2004) and Chan, Covrig and Ng (2005). Bertaut and Kole (2004) also find that foreigners exhibit home bias toward most countries and tend to underweight U.S. equities by more than they underweight foreign equities in general.

[23] If foreign countries reduced their home bias against the United States, this would not necessarily generate an increase in net U.S. capital inflows because U.S investors could simultaneously reduce their home bias and increase gross capital outflows (which could be even great than the increase in gross capital inflows).

investment are small, then investors should hold the world market portfolio of stocks. An extensive literature on "home bias", however, shows that investors deviate substantially from this prediction and tend to hold a larger share of domestic assets in their portfolios.[24] The literature on home bias explores several possible reasons: explicit barriers and costs to international investment, informational asymmetries leading to different valuations of foreign and domestic assets, investors' desire to hold a larger share of domestic equities to hedge against inflation or other risks, tax and legal systems that generate different expected returns for citizens of different countries, behavioral biases (such as investors exaggerating the risks of investing abroad or being overly optimistic about returns of domestic companies), and ownership of "domestic" multinational companies that have substantial international exposure.

A second (and related) literature examines how investors allocate their investment across different countries. For example, Lane and Milesi-Ferretti (2008), Bertaut and Kole (2004), and Faruqee, Li and Yan (2004) estimate the determinants of international equity holdings for a cross-section of countries in either 1997 or 2001. Lane (2006a) estimates the bilateral composition of international bond portfolios for the Euro area and individual EMU member countries. Instead of focusing on a cross-section of countries, several papers focus on the determinants of U.S. investment abroad, such as Leuz, Lins and Warnock (2008), Aggarwal, Klapper and Wysocki (2005), and Burger and Warnock (2003, 2007). Cai and Warnock (2006) is the only paper to consider the opposite—the determinants of foreign investment in the United States—by focusing on security-level, U.S. equity investments in a sample of U.S. and foreign institutional investors.[25] An additional series of papers focuses on how specific factors can affect the allocation of capital across countries, such as the impact of corporate governance, accounting standards, institutions, distance or other cross-country linkages. No papers in this literature, however, have yet focused on the determinants of country-level holdings of U.S. portfolio investment, or on the determinants of foreign holdings of both U.S. equities and bonds.

[24] For example, see Chan, Covrig and Ng (2005), Ahearne Griever, and Warnock (2001), Tesar and Werner (1995), Cooper and Kaplanis (1994) and French and Poterba (1991). For a recent summary of work on home bias, see Kho, Stulz, and Warnock (2006).

[25] This analysis is fundamentally different than the analysis in this paper, however, as it focuses on how characteristics of specific securities (i.e., firm characteristics such as size, dividend yield and other financial ratios) affect foreign and domestic investment, instead of evaluating how characteristics of the foreign investor (such as linkages to the United States, financial market development, capital controls, etc.) affect investment. Cai and Warnock (2006) also only focuses on institutional investment in equities, rather than this paper's broader focus on all types of investments in both equities and bonds.

A final (and more recent) related literature is on the macroeconomic determinants of capital flows corresponding to global imbalances. These papers model how macroeconomic variables such as financial market development, growth, productivity, the demand for savings, and trade flows can affect capital flows across countries. Several of the most recent and noteworthy papers (discussed in more detail in Section III.C.) focus on the role of financial development and include Caballero, Farhi and Gourinchas (2008), Mendoza, Quadrini and Ríos-Rull (2006) and Ju and Wei (2006).

III. B. The Model

This paper uses a modeling framework with substantial flexibility in order to incorporate the insights from each of these three different literatures on international capital flows and investment patterns. The model closely follows Cooper and Kaplanis (1986) and its adaptation in Chan, Covrig and Ng (2005). Begin with a standard assumption that a representative investor in country *i* maximizes the expected return of his investments for a given level of variance:

$$Max\left(w_i' R - w_i' c_i\right), \tag{1}$$

subject to: $w_i' V w_i = v$ and (2)

$$w_i' I = 1, \tag{3}$$

where w_{ij} is the proportion of individual *i*'s total wealth invested in securities of country *j*, w_i is the corresponding (*J* x 1) vector of these portfolio weights, *R* is a (*J* x 1) vector of pre-tax expected returns, c_{ij} is the cost to investor *i* of investing in country *j,* c_i is the corresponding (*J* x 1) vector, *V* is the (*J* x *J*) variance/covariance matrix of gross returns, *v* is the given constant variance and *I* is a unity column vector.

Next, form a Lagrangean of the maximization problem in equations (1) through (3), with λ and μ_i as the Lagrangean multipliers on equations (2) and (3), respectively. Then, set the derivative of the Lagrangean with respect to w_i equal to zero and it is possible to solve for the optimal portfolio for investor *i*:

$$w_i = \left(V^{-1} \big/ \lambda\right)\left(R - c_i - \mu_i I\right) \tag{4}$$

with $\mu_i = \left(I' V^{-1} R - I' V^{-1} c_i - \lambda\right) \big/ \left(I' V^{-1} I\right).$

Aggregate the individual portfolio holdings to obtain the market clearing condition for the world capital market equilibrium:

$$\sum P_i w_i = w^*, \tag{5}$$

with P_i the proportion of world wealth owned by country i, w_i^* is the proportion of the world market capitalization in country i's market, and w^* is the corresponding column vector of w_i^*'s.

Then, define z as the global minimum variance portfolio:

$$z = \left(V^{-1}I\right) / \left(I'V^{-1}I\right) \quad , \tag{6}$$

and combine equations (4) through (6) to obtain:

$$\lambda V\left(w_i - w^*\right) = \left(\sum P_i c_i - c_i\right) - z'\left(\sum P_i c_i - c_i\right)I. \tag{7}$$

Equation (7) shows the standard result that if there is no cost for investor i to access both domestic and foreign markets (i.e. that c_{ij}=0 for all i and j) then every investor will hold the world market portfolio. If the costs to investing in different countries are not equal to zero, however, then the portfolio holdings of each investor (representing each country) will differ from the world market portfolio.

Finally, to derive the central equation for estimation, it is useful to make the simplifying assumption that the covariance matrix (V) is diagonal with all variances equal to s^2. Then each country will invest in country j (with $i \neq j$) an amount that deviates from the world market portfolio according to:

$$\lambda s^2\left(w_{ij} - w_j^*\right) = \left(z'c_i - c_{ij}\right) - \left(z'\sum P_i c_i - \sum P_k c_{kj}\right). \tag{8}$$

The first term on the right of equation (8) is the weighted average marginal cost for investor i to invest anywhere in the world. The second term is the cost for investor i to invest in country j. The third term is the world-weighted average marginal cost of investing, and the last term is the weighted average marginal cost for all countries to invest in country j. The equation shows the

intuitive result that each country *i*'s share of its portfolio allocated to country *j* will depend on that country's relative cost of investing in country *j* (the first parentheses on the right) versus the relative cost for all countries of investing in country *j* (the last parentheses on the right).

Since this analysis will only focus on investment in one country—the United States—then *j=U.S.*, and equation (8) can be further simplified to:[26]

$$\left(w_{i,US} - w_{US}^{*}\right) = -\theta\left(c_{i,US} - z'c_i + \chi\right), \tag{9}$$

With θ and χ as constants, $\theta = 1/\lambda s^2$ and $\chi = z'\sum P_i c_i - \sum P_k c_{k,US}$.

Equation (9) shows the intuitive result that holding everything else equal, countries with a higher cost of investing in the United States relative to investing elsewhere will tend to have lower shares of their portfolio invested in the United States (i.e., $w_{i,US} - w_{US}^{*} < 0$). The equation also shows that foreign investment in the United States is determined by two sets of variables: the cost of investing specifically in the United States ($c_{i,US}$) and the cost of investing abroad in general (c_i).

III. C. The Variables: Theory and Data

This general theoretical framework can incorporate the range of factors identified in the literature on home bias, international investment patterns, and global imbalances to predict investment by other countries in the United States. More specifically, the model suggests that a country's investment in the United States (relative to the U.S. global market weight) is determined by variables that affect the country's general cost (or benefit) from investing abroad (c_i) and its cost (or benefit) of investing specifically in the United States (c_{ij}). The remainder of this section discusses the theoretical and empirical motivation for including seven variables to measure these effects: each country's controls on capital flows, financial market development, corporate governance and institutions, return differential with the United States, correlation in returns with the United States, distance and informational links with the United States, and bilateral trade

[26] Since the U.S. share of the global market portfolio changes across time, it is necessary to include the w_{US}^{*} in the left-hand side variable instead of absorbing it into the constant for the panel estimation in Sections IV and V.

flows with the United States.[27] It also discusses the data sources and construction of each variable.[28] Appendix C reports additional details on the variables.

Capital Controls

One factor determining a country's cost of investing abroad is the country's capital controls, and especially its restrictions on private sector capital flows. For example, Ahearne, Griever, and Warnock (2004) show that restrictions on ownership of foreign equities significantly reduces foreign equity ownership by U.S. investors. Burger and Warnock (2003) find that U.S. investors' foreign bond portfolios are overweight countries with more open capital accounts.

Measuring a country's capital controls, however, is not straightforward (see Forbes, 2007a and 2007b, and Magud and Reinhart, 2007). Moreover, most measures of capital controls are extremely broad and do not focus on portfolio investment, which is the key component for this analysis. Therefore, I construct a new measure of capital controls that focuses on controls on capital account transactions by the private sector relative to the purchases of equity and debt securities. The index ranges from 0 to 3 and is based on detailed country information from the International Monetary Fund's Annual Report on Exchange Rate Arrangements and Exchange Restrictions (AREAER).

Financial Market Development

A focus of recent models on global imbalances is the incentive for countries with less developed financial markets and limited domestic investment opportunities to invest abroad (especially in the United States) in order to gain the benefits of a more liquid and efficient financial sector. Caballero, Farhi and Gourinchas (2008) develop a model in which high-growth economies (such as emerging markets and oil-exporting nations) generate a demand for saving instruments, and given the limited instruments available in their own economies, they purchase U. S. instruments. Mendoza, Quadrini and Ríos-Rull (2006) model a world in which countries with less developed

[27] The first variable (controls on capital outflows) affects the country's general cost of investing abroad. The last 4 variables (return differential, correlation in returns, distance and informational links, and bilateral trade flows with the United States) all affect the country's cost of investing specifically in the United States. The variables measuring the country's financial market development and corporate governance/institutions can capture both aspects—as they incorporate not only the potential gains from investing abroad, but also the gains from investing in the country with the best (or among the best) financial market development and corporate governance/institutions.

[28] In some cases a number of statistics could have been used to measure each variable. The final statistics selected were chosen to balance existing theory and evidence with data availability for a broad cross-section of countries. The sensitivity analysis also explores the effect of using different variable definitions.

financial systems accumulate foreign assets in countries with more advanced financial markets, so that countries with negative net foreign asset positions can receive positive factor payments (as experienced by the United States). Ju and Wei (2006) develop a model in which poor countries have less efficient financial sectors but high returns to investment, generating large outflows of financial capital from the developing countries but inflows of foreign direct investment.[29]

Several papers, however, have argued that the relationship between financial market development and foreign portfolio investment may be positive instead of negative. For example, Martin and Rey (2004) develop a model that focuses on transactional frictions in asset markets and predicts that larger countries will have deeper domestic equity markets and hold more foreign assets. Lane and Milesi-Ferretti (2008) find evidence that countries with more developed stock markets tend to have larger foreign equity holdings and argue that barriers to international investments may fall as countries develop more financial market sophistication in their domestic markets. Gruber and Kamin (2008) look at the broader issue of the determinants of current account balances and find that financial development does not explain international patterns of current account balances.[30]

Therefore, the impact of a country's financial market development on its investment in the United States remains an empirical question, and I use several different measures of financial market development to test its role. To measure financial market development for the regressions analyzing foreign investments in U.S. equity markets, I begin by using the ratio of stock market capitalization to GDP. For regressions analyzing investments in U.S. bond markets, I begin by using the ratio of private bond market capitalization to GDP. I focus on these measures as they most closely follow the theoretical work on financial market development, but sensitivity tests also use a variety of other measures of financial development.

Corporate Governance and Institutions

Just as foreigners may choose to invest in the United States in order to benefit from its liquid and efficient financial markets, foreigners may also choose to invest in the United States in order to benefit from its strong corporate governance, accounting standards and institutions—all of which would raise their expected returns from investment. Several papers find evidence that corporate

[29] In related work that does not explicitly focus on global imbalances, Caballero and Krishnamurthy (2006) develop a model in which emerging market economies have significant growth potential but limited domestic financial instruments, generating capital flows to developed economies and bubbles in emerging markets.

[30] Kamin points out, however, that this does not necessarily imply a negative relationship between a country's level of financial development and its demand for U.S. liabilities.

governance affects capital flows, and especially that countries with stronger corporate governance receive more investment.[31] Kim, Sung and Wei (2008), however, argue that there should be a positive (instead of negative) correlation between a country's level of corporate governance and its exposure to countries with strong corporate governance (such as the United States). They study foreign investment in Korean companies and find that countries with stronger corporate governance are more likely to avoid investment in companies with weaker corporate governance, while countries with weaker corporate governance do not discriminate between high- and low-governance firms.

Since a number of different variables are needed to capture the various aspects of a country's corporate governance, accounting standards and overall institutional environment affecting investment, I create an index to measure a country's relevant aspects of corporate governance. The index is the first standardized principal component of: control of corruption, rule of law, regulatory quality, and property rights. The index takes on higher values for countries with a better environment for investment and is constructed to have a mean of zero.[32]

Returns

Several papers have documented that investors tend to "chase returns" by increasing investments in stocks, countries or funds that have overperformed and decreasing investment in securities that have underperformed. For example, Froot, Scharfstein and Stein (1992) show that institutional investors tend to buy equities when the market rises and sell when the market falls. Bohn and Tesar (1996) show that U.S. investors underweight countries that have recently had weaker stock market performance. Sirri and Tufano (1998) show that consumers invest disproportionately in mutual funds that have recently performed well, and Zhao (2005) shows that international equity fund investors sell funds with lower returns. Taking a different approach, Caballero and Krishnamurthy (2006) develop a model in which emerging markets tend to invest more at home when domestic returns increase. This generates "bubbles" and simultaneously reduces capital outflows to more developed countries with more highly developed financial markets.

[31] For example, Daude and Fratzscher (2006) find that portfolio investment is higher in OECD countries with greater transparency, stronger investor protection, and lower levels of corruption. Aggarwal, Klapper and Wysocki (2005) and Gelos and Wei (2005) show that U.S. mutual funds invest more in emerging markets with stronger corporate governance. Leuz, Lins and Warnock (2008) find that firm-level corporate governance measures are an important determinant of U.S. investment in countries with weak corporate-level governance and disclosure rules.

[32] The sensitivity analysis also considers a number of alternate measures of corporate governance.

More recent work, however, challenges this evidence on return chasing for international investments. Thomas, Warnock and Wongswan (2007) argue that previous measures of return chasing (or momentum trading) based on flow instead of stock data is flawed. When they use their preferred measure and new data on U.S. holdings of foreign equities, they find that U.S. investors do not show evidence of return chasing in foreign equity markets over the last 25 years. In preliminary work, Hau and Rey (2007) also find no evidence of return chasing in a sample of international equity funds from 1997 through 2002.

In order to test for any effect of return chasing on foreign portfolio investment in the United States, I include a variable in the empirical analysis measuring the return differential between each country and the United States over the past year. This measure captures whether the domestic equity or bond market has recently outperformed or underperformed the U.S. market. For regressions estimating foreign investment in U.S. equities, I control for the percent difference in equity market returns (using the broadest equity index available for each country). For regressions estimating investment in U.S. bonds, I control for the percent difference in bond market returns (using an index that includes corporate, government and agency bonds for each country).[33] In each case I focus on returns expressed in U.S. dollars.

Correlation/Diversification Benefits

Standard finance theory (and the model developed in Section III.B.) shows that when investors construct their portfolios, they seek to maximize their expected returns subject to a minimum variance. Demand for an asset will depend on the correlation between that asset's returns and the returns of other assets in the portfolio.[34] Since investors tend to hold large shares of their portfolios in their home assets (home bias), then if returns in the United States are less correlated with returns in the home country, investors should hold a greater share of U.S. assets to receive the benefits of diversification. This prediction has received mixed support in the empirical literature on international investment patterns. For example, Burger and Warnock (2003) find that U.S. investors' foreign bond portfolios are overweight countries whose bond returns are less correlated with U.S. returns. Chan, Covrig and Ng (2005), however, find that investors place higher portfolio weights on equity markets which are more (not less) correlated with their own country's returns. Lane and Milesi-Ferretti (2008) focus on correlations in growth rates and find that investors hold larger positions in countries with more correlated business cycles.

[33] Detailed information on the specific equity and bond indices is available in Appendix C.
[34] For a formal example of this concept, see Davis, Nalewaik and Willen (2001).

In order to test if diversification benefits are an important determinant of foreign investment in the United States, I measure the correlation in stock and bond returns between each country's markets and the U.S. markets. More specifically, for regressions estimating foreign investment in U.S. equities, I control for the correlation in monthly dollar stock returns between each country's broadest equity index and a broad U.S. equity index over the last three years.[35] For regressions estimating investment in U.S. bonds, I control for the correlation in monthly dollar bond returns between each country's broad bond market index (including corporate, government and agency bonds) and a broad U.S. bond market index over the last three years.

"Closeness" / Distance

Several papers provide empirical evidence that investors prefer to invest in countries that are "closer"—with closeness measured not only by geographic distance, but also by familiarity and "connectivity". For example, Portes, Rey and Oh (2001) show that information flows measured by variables such as telephone traffic and tourism are significant determinants of U.S. cross-border capital flows, especially for transactions in equities and corporate bonds. Bertaut and Kole (2004) find that regional and political ties and distance are important determinants of cross-border diversification patterns. Daude and Fratzscher (2006) find that informational frictions (measured by distance, the volume of bilateral telephone traffic, trade in newspapers and periodicals, and the immigrant stock) significantly affect capital inflows for OECD economies, although they have less effect on equity and debt securities than on FDI and loans. Coval and Moskowitz (1999) even find that within the same country, investors are more likely to invest in companies headquartered closer to their home city. Lane and Milesi-Ferretti (2008), however, find no significant role for "closeness" when predicting cross-border asset holdings and suggest that informational frictions may matter more for turnover and capital flows than asset positions.

In order to test if any of these aspects of "closeness" affect foreign investment in U.S. portfolio liabilities, I construct an index to incorporate the various aspects of distance, familiarity and connectivity between each country and the United States. More specifically, the index is the first standardized principal component of six variables: the log of distance between the country and the United States, the cost of a phone call to the United States, and dummy variables for whether the country shares a common language (English), shares a border, was a former colony of the

[35] Detailed information on the specific equity and bond indices is available in Appendix C.

United States, and has a currency union with the United States. The index takes on higher values for "closer" countries and is constructed to have a mean of zero.

Bilateral Trade Flows

Several theoretical papers have predicted a relationship between bilateral trade flows and international asset positions or capital flows, although the empirical evidence on any relationship is inconclusive. For example, Obstfeld and Rogoff (2001) show that even if global financial markets are complete, frictions in product markets will generate a home bias in equity positions. Antràs and Caballero (2007) develop a model of a world with heterogeneous financial development and show that trade and capital flows are complements in less-financially developed economies (which is the opposite of the classical Heckscher-Ohlin-Mundell paradigm). Lane and Milesi-Ferretti (2008) find empirical evidence that bilateral imports are a strongly correlated with bilateral equity holdings. Ahearne, Griever, and Warnock (2004), however, find no significant impact of trade flows on foreign asset holdings.

In order to capture any potential relationship between trade flows and foreign investment in the United States, I include a variable in the empirical analysis controlling for total trade (exports plus imports) between each country and the United States divided by the country's GDP.

III. D. Summary Statistics

The previous section discussed seven variables that are be included in the base estimates of the determinants of foreign portfolio investment in the United States. Tables 5 and 6 report summary statistics and a correlation matrix when these seven variables are combined with the USG data on foreign portfolio holdings of U.S. liabilities discussed in Section II.[36]

IV. Estimation and Equity Market Results

IV. A. Estimation

Combining the model resulting in equation (9) with the variables and data discussed in Section III yields the following model for estimation. I also include country and year dummies.

[36] To create the final data set, I drop observations with: (1) no information on holdings of U.S. equities or debt in either the USG or IMF data sets; (2) no information on GDP; or (3) no information on either equity market capitalization or total debt securities (which are needed to create the U.S. exposure variables).

$$DevUS_{i,t} = \alpha_i + \beta_1 CapitalControls_{i,t} + \beta_2 FinancialDevelopment_{i,t} + \beta_3 CorporateGovernance_{i,t} + \beta_4 Returns_{i,t} + \beta_5 Correlation_{i,t} + \beta_6 Closeness_{i,t} + \beta_7 Trade_{i,t} + \delta_t + \varepsilon_{it}; \quad (10)$$

where $DevUS_{i,t}$ is the log deviation of each country i's holdings of U.S. portfolio liabilities from the world market portfolio in year t[37]; α_i are the country-specific effects; $CapitalControls_{i,t}$, $FinancialDevelopment_{i,t}$, $CorporateGovernance_{i,t}$, $Returns_{i,t}$, $Correlation_{i,t}$, $Closeness_{i,t}$, and $Trade_{i,t}$ are variables measuring capital controls, financial development, corporate governance, market returns, market correlations, closeness, and trade (as defined in Appendix C) for each country i over year t or at the end of year t; δ_t are the year dummy variables and ε_{it} is the error term. Equation (10) is estimated separately for each asset (equities or debt).

One potential issue with equation (10) is endogeneity with the measures of financial development. More specifically, stock market capitalization and private bond market capitalization (the measures of financial market development for the base equity and debt regressions, respectively) are components of the calculation of foreign exposure to U.S. equity and debt markets. To address this problem in the equity regressions, I instrument for stock market capitalization using stock market value traded to GDP.[38] In the debt regressions, I instrument for private bond market capitalization using the share of private bond market capitalization in total bond market capitalization and the ratio of private credit by deposit money banks and other financial institutions to GDP.[39] The sensitivity analysis also shows that the key results are robust to using different measures of financial development and different instrument sets.

In addition to endogeneity, there are several other econometric issues with estimating equation (10): the limited time-series variation in several of the explanatory variables, the correlation between the country-fixed effects and other explanatory variables, and the structure of the error term. More specifically, most of the variance in several of the explanatory variables is across

[37] I focus on results using the logarithmic deviation, ln ($w_{i,,t,US} / w_{t,US}$*), for the dependent variable instead of the difference for two reasons. First, the logarithmic form more closely approximates a normal distribution and is a better fit for the data. Second, this is the form more commonly used in other work on the cross-country determinants of portfolio investment based on similar models, such as in Chan, Covrig and Ng (2005). The sensitivity analysis also reports results using the difference in each country i's holdings of U.S. portfolio liabilities from the world market portfolio and shows that the key results are robust.

[38] The correlation between stock market value traded and stock market capitalization (both relative to GDP) is 74%. The correlation between stock market value traded and the dependent variable is 23%.

[39] The correlation between private bond market capitalization to GDP and the share of private in total bond market capitalization is 73%. The corresponding correlation with the private credit variable is 60%. The correlation of the two variables with the dependent variable is -18% and -16%, respectively.

countries and not across time. To take an extreme example, the "closeness" between each country and the United States (as measured by distance, cost of a phone call, and dummy variables if the country has a common language, shared land border, former colonial relationship or is in a currency union with the United States) is constant or close to constant for most countries across years. Therefore, using estimators that only focus on the within-country variation across time (such as fixed effects) are not desirable. Another issue is that the error term has a complex structure, not only because portfolio holdings of U.S. assets tend to be highly correlated from year to year for each country, but also because the error terms have different variances across countries. Therefore, it is necessary to utilize an estimator that has sufficient flexibility to incorporate this error structure.

In order to address each of these issues, I use a cross-sectional, time-series FGLS estimator that allows for the error terms to be heteroscedastic and autocorrelated within each panel (i.e., country), but uncorrelated across countries. (The sensitivity analysis also reports results for different estimators.) The autocorrelation term is assumed to be AR1 and allowed to vary across countries. In other words, the error term follows the structure:

$$E[\varepsilon_{it}] = \rho_i \varepsilon_{i,\,t-1} + \mu_{it},$$

$$E[\mu_{it}] = 0, \qquad (11)$$

$$Var[\mu_{it}] = \sigma^2_i, \text{ and}$$

$$Cov[\mu_{it}\ \mu_{is}] = 0, \text{ if } t \neq s \text{ and } i \neq j.$$

IV. B. Central Results: Equity Markets

Table 7 reports the main regression results predicting foreign investment in U.S. equities as specified in equation (10) using the FGLS estimation technique discussed in Section IV.A. Columns (1) and (2) report the central results based on the USG data, with and without a variable controlling for lagged GDP per capita. Since this variable is usually significant and due to concerns that *Corporate Governance*, *Financial Development*, and *Capital Controls* are highly correlated with *GDP per capita* (as shown on Table 6), I continue to include a control for lagged GDP per capita in the reported regressions. (Excluding this control has no effect on the key

results.) Column (3) reports results using the IMF instead of the USG data.[40] Column (4) reports a specification when *Trade* is dropped, due to the high correlation between *Trade* and *Closeness.*

Many of the coefficient estimates in these first 4 columns of Table 7 have the expected sign and are highly significant, while others have fluctuating significance and even varying sign. More specifically, the coefficients on *Financial Development*, *Capital Controls*, and *Returns* are all consistently negative and significant, indicating that countries with lower levels of financial development, fewer controls on private-sector capital flows, and lower equity market returns (relative to U.S. returns) tend to hold a greater share of their portfolios in U.S. equities. The coefficient on *Trade* or *Closeness* is positive and significant, although the coefficients on both are often not significant in the same regression. This is not surprising given the high multicollinearity between these two variables.[41] This suggests that countries that are "closer" and trade more with the United States also tend to invest more in U.S. equity markets—although it is difficult to differentiate between the effects of these two variables. The positive coefficient on *Corporate Governance* suggests that countries with higher levels of corporate governance tend to invest more in U.S. equity markets, supporting the analysis by Kim, Sung and Wei (2008). The coefficient on *Correlation* is usually positive (and its sign and significance is not robust to the following series of sensitivity tests), providing no support for the diversification argument that countries whose stock market returns are less correlated with U.S. stock returns invest more in U.S. equity markets.

The coefficient estimates in Table 7 also suggest that the magnitude of the effects of some of these variables on foreign investment in U.S. equity markets can be large. More specifically, take the example of Italy—which held $29.1 billion (2.4% of its total equity portfolio) in U.S. equities in 2006 according to the USG data. Using the specification in Column 1, the coefficient on *Financial Development* predicts that if Italy increased its stock market capitalization to GDP to the level France[42], its holdings of U.S. equities would fall by $3.7 billion to 2.1% of its total equity portfolio. If Italy removed its remaining capital controls (reducing its index measure from 1 to 0) and held everything else constant, the coefficient on *Capital Controls* predicts that Italy would increase its holdings of U.S. equities by $7.1 billion. If Italy's equity market returns

[40] I repeat all of the tests discussed in this section using the IMF data. The key results and conclusions are unchanged, so I focus on reporting results using the preferred USG data.
[41] The variables used to create the index for *Closeness* are also the same variables often used to instrument for trade flows between countries.
[42] This is an increase from 46.4% to 85.1%, which is less than one-half a standard deviation.

increased by 5% (relative to returns in U.S. equity markets), then the coefficient on *Returns* predicts that Italy would reduce its holdings of U.S. equities by $3.0 billion. The impact on U.S. equities would be even greater for changes in countries that currently have very large holdings of U.S. equities. For example, if Japan increased its stock market capitalization to GDP to the level of the United Kingdom, the coefficient estimates suggest it would reduce its U.S. equity holdings by $26.3 billion.[43] If Japan's stock market returns increased by 5% per year (relative to returns in the United States), it would reduce its U.S. equity holdings by $20.3 billion.[44]

Next, to further explore this relationship between financial development and foreign investment in U.S. equities, I test if this relationship varies with a country's income.[45] I begin by including an interaction term between *Financial Development* and *GDP per capita*. As shown in column (5) of Table 7, the coefficient on *Financial Development* continues to be negative and highly significant, and the coefficient on the interaction term between *Financial Development* and *GDP per capita* is positive and highly significant. This suggests that the negative impact of financial development on foreign investment in U.S. equities tends to diminish as income levels increase.[46] Then I reestimate the base model for two sub-samples: high-income countries and low/middle income countries.[47] Columns (6) and (7) show the results. The estimated coefficient on *Financial Development* is significantly larger (more negative) in the low/middle income group. This further suggests that the negative impact of financial development on investment in U.S. equities is greater for lower income countries.

Even if a country's level of financial development is a key factor affecting its decision to invest in U.S. equities, it still may not be an important determinant of overall foreign investment and capital flows into the United States if it is not an important factor for the countries responsible for the majority of investment into the United States. More specifically, as shown in Figure 1 and discussed in Section II, a small number of countries are responsible for the majority of investment

[43] Japan held $194.5 billion of U.S. equities at the end of 2006 (according to the USG data). Its stock market capitalization to GDP was 93.8%, as compared to 134.7% for the United Kingdom.
[44] For comparison, total U.S. equity market capitalization was $19.4 trillion at year-end 2006.
[45] The literature on financial development, capital account openness, and growth suggests that these relationships may be nonlinear and depend on a country's income level. For example, Klein (2003) shows that there is a positive and significant effect of capital account openness and stock market liberalization on economic growth for middle-income countries, but not for poor countries nor for rich countries.
[46] Including a squared interaction term to capture any non-linearities in this relationship does not improve the fit of the regression and the coefficient on the squared term is insignificant.
[47] Income divisions for this analysis are based on World Bank classifications. There is not a consistently significant difference between middle and low income countries, but the sample size of low income countries is so small that it is impossible to draw any meaningful conclusions for this sample.

into the United States. Foreign holdings of U.S. equities are heavily skewed, with an average holding of $10.6 billion and median holding of $22.0 million in 2006. To control for this and focus on the key determinants of overall investment in the United States, I perform two additional tests. Column (8) of Table 7 repeats the main regression analysis, but only includes observations for which countries hold at least $50 billion of U.S. equity liabilities.[48] Column (9) repeats the main analysis, but weights observations by GDP.[49] It also includes the additional interaction term between *Financial Development* and *GDP per capita* (which does not affect the main results). In each case, the coefficient on *Financial Development* remains negative and significant, suggesting that financial development is an important factor determining overall investment levels in the United States and not just the investment patterns of small countries.

IV. C. Concerns and Sensitivity Tests: Equity Markets

The key results reported above are subject to a number of potential concerns, such as the measure of financial development, estimation technique, and role of outliers. This section attempts to address each of these concerns and then performs an additional series of sensitivity tests. All of these tests are also repeated using the IMF data, which has no impact on the key results.

Since the impact of financial market development on foreign investment in the United States is a key focus of this paper, the left side of Table 8 begins by taking a closer look at alternative measures of financial market development.[50] Columns (1) and (2) measure financial market development using stock value traded to GDP and then the stock turnover ratio. Column (3) reports results using an index of financial market development in equity markets, which is constructed as the first standardized principle component of: stock market capitalization to GDP, stock market turnover, and private credit by deposit money banks and other financial institutions to GDP. Column (4) uses the initial measure of stock market capitalization to GDP to measure financial development, but uses a broader set of instruments (stock market value traded to GDP, stock market turnover, and private credit by deposit money banks and other financial institutions to GDP). The negative and significant coefficients on these different measures of financial

[48] This is close to the mean plus one standard deviation.
[49] I also weight observations by the country's U.S. equity holdings, and the key results are unchanged.
[50] The table reports results that include the controls for *GDP per capita* and its interaction with *Financial Development* because both variables are consistently significant in the regressions. Key results are unchanged if one or both of these controls are excluded. Variables used to construct the different measures of financial market development are from Beck, Demirgüç-Kunt and Levine, (2000), using the revised version of the data through 2005 and available at: http://econ.worldbank.org.

development support the result that less financially-developed economies (no matter how financial development is measured) hold a greater share of their portfolios in U.S. equities.

Next, I use several different estimation techniques. First, column (5) of Table 8 ignores the time-series variation in the data and estimates equation (10) using a cross-section, with each variable averaged across all available periods. Errors are also adjusted for heteroscedasticity. Second, column (6) returns to using panel data, but estimates the model using pooled OLS with errors adjusted for clustering by countries and heteroscedasticity. Third, column (7) estimates equation (10) using a tobit model (in order to adjust for the restriction that no country can hold less than 0% or more than 100% of their equity exposure in the United States). Fourth, Column (8) uses a quantile model in order to estimate the median (instead of the mean) of the dependent variable and therefore to reduce the impact of outliers and skewness in the dependent variable. The tobit and quantile regressions include bootstrapped standard errors adjusted for heteroscedasticity and clustering by country. Finally, column (9) calculates the dependent variable as the difference between each country *i*'s holdings of U.S. portfolio liabilities and the world market portfolio in year *t* (instead of using the logarithmic form). Although the significance of most of the coefficient estimates fluctuates across these different estimation techniques, the coefficients on *Financial Development* and its interaction with *GDP per capita* remain negative and significant.

Due to possible concerns with the data (as discussed in Section II), I next perform several tests for the impact of outliers and sample selection. I drop major financial centers due to concerns that investment in the United States by financial centers may be over-reported because of their role as financial intermediaries (including as the base for many mutual funds). [51] I also include a dummy variable for financial centers. The dummy is usually positive and significant, but has no impact on the other key results. Finally, I drop the 10 largest outliers and then drop one country at a time. Some of these results are reported in columns (10) and (11) of Table 8. These tests indicate that financial centers and outliers are not affecting the key results. When I repeat the main regression and drop one country at a time, the coefficients on *Financial Development* and its interaction term are each always significant at the one percent level.

[51] Major financial centers are defined as: Hong Kong, Ireland, Japan, Singapore, Switzerland, and the United Kingdom. The SEIFiCs were already dropped from the sample.

For another series of sensitivity tests, I use different definitions for key variables.[52] First, I measure *Returns* and *Correlation* over different time horizons, and also measure *Correlation* as the correlation in growth rates with the United States (instead of in equity returns). Second, I drop the period dummies. Third, I use several different indices of corporate governance, combining variables such as: corruption, the rule of law, regulatory quality, protection of property rights, and accounting disclosure.[53] In most cases the coefficient on the various indices of corporate governance is positive and significant. When the measures of corporate governance are included individually instead of aggregated into an index, however, the coefficients are sometimes positive, sometimes negative, and have varying significance levels. Many of the coefficient signs and significance vary across different specifications. This suggests that as a whole, countries with better corporate governance may invest more in U.S. equities, but due to the high multicollinearity between the different measures of governance, it is extremely difficult to disentangle exactly which components of corporate governance are most important.

As a final set of sensitivity tests, I include additional control variables in the base regression. First I add controls for regional dummy variables. These regional dummy variables are jointly highly significant.[54] Second, because investors may seek to hold foreign assets with lower currency risk, I include a dummy variable equal to one if the country has its currency pegged to the U.S. dollar.[55] This dummy variable is usually negative (instead of positive) and often significant. Third, in order to test for any non-linearities in the impact of income on foreign investment in U.S. equities, I include controls for GDP per capita squared and/or cubed. Fourth, since countries with large exchange rate movements or a high inflation rate could have a higher demand for U.S. assets, I add a control variable measuring the percent change in the exchange rate (versus the dollar) over the past year or the annual rate of CPI inflation.[56] The sign and significance of the income, exchange rate and inflation variables fluctuate based on the specification and data set.

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[52] The estimates for the remainder of this section are not reported due to space constraints and because the main results summarized at the end of this section do not change. Any estimates that differ from the main conclusions are discussed in detail. All estimates are available from the author.

[53] The measures of property rights and the corruption index are from the Heritage Foundation, *Index of Economic Freedom*, available at http://www.heritage.org/index/. The index of accounting disclosure is from La Porta, López-de-Silanes and Shleifer (2006). Other data sources are listed in Appendix C.

[54] For example, when I include the regional dummy variables in a regression using the USG data and including controls for *GDP per capita* and its interaction with *Financial Development*, the $\chi^2(6)$ test statistic of the joint significance of the regional dummy variables is 185.6.

[55] This includes countries that have adopted the U.S. dollar. The variable is from Shambaugh (2004) and available at: http://www.dartmouth.edu/~jshambau/.

[56] Data source for both statistics is the IMF's *International Financial Statistics*, CD-ROM.

Several patterns become apparent in this full series of sensitivity tests. The coefficient that is consistently significant (usually at the 5% and always at the 10% level) in all specifications is the negative coefficient on *Financial Development*—even when financial development is measured using very different definitions (as shown in Table 8). Countries with less developed financial markets have a greater share of their equity investments in the United States—even after controlling for a variety of other factors that influence investment. Furthermore, this relationship appears to be stronger as income levels fall; in other words, the negative impact of financial market development on foreign investment in U.S. equities is greater for lower income countries.

Several other variables predicting foreign investment in U.S. equities are usually (but not always) significant across these sensitivity tests. The coefficients on *Capital Controls* and *Returns* are usually negative and significant. The coefficient on *Corporate Governance* is also often (although not always) positive and significant. The coefficient on either *Closeness* or *Trade* is usually positive and significant—with the effect of *Trade* appearing to be stronger than for *Closeness*, although it is difficult to differentiate between these two highly correlated variables. The sign and significance of the coefficient on *Correlation* fluctuates across specifications (although it is more often positive than negative).

This series of empirical results provides evidence that certain variables proposed in the theoretical literature are more important predictors of foreign investment in U.S. equities than other variables that also have strong theoretical support. Countries with less developed financial markets appear to hold a larger share of their portfolios in U.S. equities—especially for low and middle income countries. Countries with fewer controls on private sector capital flows, with lower returns in their domestic equity markets (relative to returns in the United States), and better corporate governance tend to invest more in the United States. Countries that trade more with and are "closer" to the United States also tend to invest more in U.S. equity markets. In contrast to theoretical predictions, countries with less correlated market returns with the United States do not tend to invest more in U.S. equity markets.

V. Bond Market Results

V. A. Central Results: Bond Markets

Moving from equity to debt markets, Table 9 reports results predicting foreign investment in U.S. debt markets (including corporate, government and agency bonds) as specified in equation (10).

The first two columns report the base results, with and without a control for *Trade.* Next, since the sample size for these base regressions is close to half that for the equity regressions and a disproportionate share of the dropped countries are low- and middle-income economies, Column (3) modifies the specification to increase sample size.[57] More specifically, it measures *Financial Development* using private credit by deposit money banks and other financial institutions to GDP and drops the controls for *Return* and *Correlation* (which are usually not significant in the bond market regressions). These changes increase the sample size from 32 to 53 and increase the number of low and middle income countries from 13 to 34. Column (4) includes a control for *Financial Development* interacted with *GDP per capita*. Columns (5) and (6) report estimates for middle/low and high income countries, respectively. These columns suggest that the impact of financial development on investment in U.S. bond markets decreases with income per capita.

Next I repeat the extensive series of sensitivity tests discussed in Sections IV. C., and since the coefficients on *GDP per capita* and its interaction with *Financial Development* are both significant, I continue to include them in the tests. The remainder of Table 9 reports a selection of these sensitivity tests. Columns (7) and (8) focus on estimates for countries with the largest holdings of U.S. debt by including only countries that hold over $50 billion in U.S. bonds or using GDP-weights, respectively. Columns (9) and (10) use different measures of financial development in bond markets[58] and column (11) drops financial centers due to data concerns related to their use as third-party intermediaries for purchases of U.S. securities.

These results estimating the determinants of foreign investment in U.S. bond markets (and the full set of results that are not reported due to space constraints), agree with some, but not all, of the preceding results for foreign investment in U.S. equity markets. *Financial Development* continues to be consistently negative and highly significant, indicating that countries with less developed financial markets tend to invest a larger share of their portfolios in U.S. bonds. Moreover, the positive and significant coefficient on the interaction between *Financial Development* and *GDP per capita* suggests that this effect continues to decrease with income per capita, i.e. that the effect of financial development on investment in U.S. bonds is weaker for higher income

[57] The sample size decreases mainly because the market information necessary to construct the variables for *Financial Development*, *Returns* and *Correlation* is not as widely available for bond as equity markets.
[58] Column (9) uses private credit by deposit money banks and other financial institutions divided by GDP. Column (10) uses an index of bond market development that is the first standardized principle component of private bond market capitalization, public bond market capitalization, and private credit by deposit money banks and other financial institutions (all divided by GDP). All variables are from Beck, Demirgüç-Kunt and Levine (2000), using revised data through 2005 available at: http://econ.worldbank.org.

countries. The coefficient on *Capital Controls* is often negative and significant (although this is not robust across all specifications and appears to be partially caused by a few countries with stringent capital controls). The coefficient on *Correlation* continues to usually be positive and is often insignificant, indicating that the correlation between a country's returns and the U.S. market is not important in predicting foreign investment in U.S. bonds or equities.

Most of the other coefficient estimates in Table 9, however, differ from the estimates predicting foreign investment in U.S. equity markets. The coefficients on *Corporate Governance* and *Returns* are often insignificant. The coefficient on *Closeness* is now never positive and significant, and instead is often negative and significant. Column (2) shows that it no longer becomes positive and significant when *Trade* is excluded from the regression (as occurred in the equity market regressions). This may indicate that "closeness" is less important in predicting foreign investment in bond markets than equity markets. The coefficient on *Trade* is more consistently positive and usually (but not always) highly significant, possibly suggesting that trade with the U.S. is a more important predictor of investment in bond than equity markets.

The results from regressions predicting foreign investment in U.S. bonds have a lower degree of explanatory power and less consistent results across specifications for many variables than the regressions predicting foreign investment in U.S. equities. The most consistent result, however, continues to be the negative relationship between a country's level of financial market development and its investment in U.S. portfolio liabilities. Moreover, the magnitude of this effect can be large. To take an extreme example, consider the case of China. China held $695 billion of U.S. bonds at the end of 2006—the second largest holdings after Japan—and has fairly undeveloped domestic debt markets. The base regression results (column (1) in Table 9) predict that if China developed its debt markets so that its private bond market capitalization to GDP increased to the sample mean (to about the level for South Korea) and everything else remained constant, then China would reduce its holdings of U.S. debt by about $200 billion.[59]

V. B. Private versus Official Sector Investment: Bond Markets

One important difference between foreign investment in U.S. equity and debt markets is the role of the official sector.[60] Although official holdings of U.S. equities have been small, Figure 2

[59] This is equivalent to about 2% of marketable U.S. Treasury, agency and corporate debt.
[60] "Official" sector investment is foreign official reserve holdings and does not include assets held or invested by quasi-government agencies.

shows that official holdings of U.S. debt, and especially U.S. government and agency bonds, are substantial.[61] From 2003 through 2007, about 24% of U.S. capital inflows were foreign official purchases of U.S. agency and Treasury bonds. Foreign official investment in U.S. portfolio assets may be affected by different factors than foreign private sector investment.

To test for different factors driving private and official investment in U.S. bonds, Table 10 repeats the main analysis using the IMF data instead of the USG data. As discussed in Section II.A., the IMF data only includes private sector investment, while the USG data also includes official sector reserve holdings. Columns (2) through (4) also report a selection of alternate specifications based on the IMF data. These results (and the full series of sensitivity tests that are not reported) show that the key results predicting foreign investment in U.S. bond markets do not change when official sector investments are excluded. Financial market development continues to have a negative and significant effect on foreign investment in U.S. bonds, and this effect continues to decrease as income per capita increases. Other coefficient estimates also have similar sign and significance (or lack therefore) as the base regressions in Table 9. The one noteworthy change is the magnitude of the coefficient estimates for *Financial Development* and its interaction term. The coefficient estimates tend to be larger for the IMF data than the USG data, suggesting that the impact of financial market development on investment in U.S. debt markets may be greater for the private sector than the official sector.

As a final test for differences between official and private investment in U.S. debt, I add a control variable for each country's official reserve holdings to GDP.[62] If a country has larger reserve holdings, it is more likely to accumulate the "safe-haven asset" of U.S. bonds (especially Treasuries).[63] Column (5) of Table 10 reports results for private sector investment in U.S. bonds (using the IMF data), and column (6) reports the same regression when official sector investment is included (using the USG data). Column (7) reports results for foreign investment in U.S. equity markets.[64] The coefficient on reserves is only positive and significant in the regression predicting

[61] As of June 2007, foreigners owned 11.3% of U.S. equities, of which 8.5% were official institutions. Foreigners owned 56.9% of marketable U.S. Treasuries, of which 73.9% were official institutions. Foreigners owned 21.4% of U.S. agency bonds and 24.0% of corporate and other debt, of which 57.5% and 3.6%, respectively, were official institutions. Source: U.S. Treasury Report on Foreign Portfolio Holdings of U.S. Securities, Tables 2 and 6. (April 30, 2008)

[62] The data on reserve holdings (less gold) is from the IMF's IFS CD-ROM.

[63] Portes and Rey (1998) discuss how the role of the dollar as the major reserve currency affects the demand for U.S. assets.

[64] Results using the IMF data are basically the same as those based on the USG data.

foreign holdings of U.S. bonds when official sector investment is included.[65] These intuitive results suggest that countries with larger reserve holdings tend to hold greater shares of their bond portfolio in U.S. debt markets when the bond portfolio includes official as well as private sector assets. There is no evidence that countries with larger reserve holdings, however, hold a greater share of their private-sector bond portfolio or equity portfolio in U.S. investments.

VI. Conclusions

Although foreigners investing in U.S. equity and bond markets have earned lower returns over the past five years than if they had invested in the same asset classes in their own countries, there are still several reasons why they might choose to continue investing in the United States and financing the large U.S. current account deficit. More specifically, foreign investors may choose to purchase U.S. portfolio investments in order to benefit from the highly developed, liquid, and efficient U.S. financial markets, from the strong corporate governance and institutions in the United States, and/or to diversify risk (especially if returns in U.S. financial markets have a low correlation with returns in their own country's domestic financial markets). Investors outside the United States may also choose the United States over other countries due to their strong linkages with the United States through trade flows or other measures of "closeness" (such as distance, inexpensive communications, or sharing a common language).

This paper evaluates which of these factors suggested in the theoretical and empirical literature are actually significant determinants of foreign investment in the United States. The strongest and most consistent result is that a country's financial development is an important factor affecting its investment in both U.S. equity and debt markets. More specifically, countries with less developed financial markets invest a larger share of their portfolios in the United States and the magnitude of this effect decreases with income per capita. Countries with fewer controls on capital flows and larger trade flows with the United States also invest more in U.S. equity and debt markets. Return differentials may also be important in predicting U.S. equity (although not bond) investments, as foreigners invest more in U.S. equities if they have had relatively lower returns in their own equity markets. The "closeness" between each country and the United States may play some role in determining equity (although not bond) investment in the United States. Finally, despite strong

[65] When I attempt to capture the impact of reserve accumulation in the bond market regressions by including more indirect measures—such as a country's trade balance to GDP or a dummy variable if the country's currency is pegged to the United States—these coefficients are usually insignificant.

theoretical support, diversification motives appear to have little impact on patterns of foreign investment in the United States.

These results—and especially the primary role of a country's financial market development in determining its investment in the United States—have three important implications. First, the results support a recent trend in the theoretical literature on global imbalances that emphasizes the role of the highly liquid and efficient U.S. financial markets. Although the exact mechanism varies across models, a key theme in recent papers is that lower levels of financial market development in other countries will continue to support capital flows into the United States, thereby supporting the U.S. current account deficit and large global imbalances without major changes in asset prices. A second (and related) implication is that as countries around the world continue to develop and strengthen their own financial markets, this will gradually reduce this important driver of capital flows into United States. These adjustments would likely occur slowly, however, as developing financial markets (especially in low-income countries) is a prolonged process. Finally, and potentially more worrisome, since the liquid and efficient financial markets of the United States are a major impetus behind U.S. capital inflows, anything that undermines the perceived advantages of U.S. equity and bond markets could present a serious risk to the sustainability of U.S. capital inflows. If countries with less developed financial markets begin to question the relative advantages of U.S. financial markets, this could lead to a more rapid adjustment in U.S. capital inflows, global imbalances and asset prices.

Appendix A: Data on U.S. Foreign Portfolio Liabilities

As discussed in Section II.A., this paper focuses on the USG data on foreign portfolio liabilities, but it also selectively uses the CPIS data from the IMF to perform additional tests and sensitivity checks. The IMF data is the only cross-country source of information on international assets and liabilities. It provides data on the stock of cross-border holdings of equities and debt securities valued at market prices and broken down by counterparty country. This information is collected by the authorities in each participating country, subject to a set of guidelines and standards established by the IMF. The information on portfolio liabilities is derived from each partner country's reported values of its portfolio assets.[66] The IMF sample includes information on $6.25 trillion of U.S. portfolio liabilities in 2006, of which $5.06 is held by 71 non-official sector entities and the remainder is reserves held by governments and international organizations.

Although the IMF data has many benefits and is the only cross-country source of information on international assets and liabilities, it also has several shortcomings. First, as discussed in Section II. A., country coverage is limited and several countries with significant international portfolio positions have not participated in the survey. Table A1 shows that of the $1.52 trillion difference between the IMF and USG data sets in 2006, $1.21 trillion can be explained by differences in coverage (with $1.16 trillion in just 4 countries/regions—China, Middle East Oil Exporters, Taiwan, and the British Virgin Islands). Second, even for countries that do report data, in some cases holdings are under-reported due to incomplete coverage.[67] For both of these reasons, U.S. international liabilities reported in the IMF data are lower than actual U.S. international liabilities. Third, although the IMF has provided a set of data guidelines, different countries use different sources and methods of compiling the data.[68] Fourth (and related to the above concerns), some of the observations in the IMF data appear to be inaccurate, suggesting serious reporting problems.[69] A final important difference between the IMF and USG data is that the IMF data does not include U.S. liabilities held by foreign official institutions as reserves in the data broken out by country.[70] For confidentiality reasons, it only reports information on official reserves as an aggregate sum.

Table A1: U.S. Portfolio Liabilities in USG and IMF Data Sets in 2006 (bn$)

Total in USG data		***7,778***
Total in IMF data		***6,254***
Countries included in USG but not in IMF data		*1,211*
	China	699
	Middle East Oil Exporters[1]	243
	Taiwan	135
	British Virgin Islands	78
	New Zealand	12
	Others	43

Notes: (1) Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and UAE. This excludes Bahrain, which is in the IMF data.

[66] The IMF requires that each country report its international portfolio assets, but only "encourages" countries to report their liabilities.
[67] For example, the Cayman Islands reports portfolio holdings by the banking sector but not mutual funds.
[68] For example, some countries use end-investors and others use custodians as sources of the data. Some countries require that data is reported to the compiler in aggregate, while others report on a security basis.
[69] This is most problematic for the SEIFiCs and Luxembourg. Warnock (2007) finds that the Euro area holds 800% of the Luxembourg stock market in 2001 in the IMF data, reflecting intermediaries' holdings.
[70] Both data sets include official sector holdings that are not labeled reserves, including sovereign wealth and pension funds.

Appendix B: Return Calculations

The equation used to calculate the returns on U.S. investment abroad and foreign investment in the United States is:

$$Return_t = \left(Income_t + \Delta Valuation_t\right) / \left(Stock_{t-1} + 0.5 * Flow_t\right), \qquad \text{B1}$$

where $Return_t$ is the return on the asset over period t; $Income_t$ is the income stream earned on the asset over period t (such as interest payments on bonds, dividend payments on equities, or receipts on foreign direct investment); $\Delta Valuation_t$ is the change in the valuation of the asset over period t due to changes in prices and exchange rates,[71] $Stock_{t-1}$ is the stock of the asset or liability at the start of period t, and $Flow_t$ is the net flows or purchases of the asset over period t.

The data is from the Bureau of Economic Analysis' (BEA) *Survey of Current Business*. The "original" estimates are from the initial data release published in July of each year (or if not available, the reported "published" statistic in the first available revision). The "revised" estimates are from the most updated versions of the relevant tables, as reported on the BEA website as of June 15, 2007 (or if not available, from the July 2007 revisions).

Data on U.S. stocks of assets and liabilities is from the table on the International Investment Position of the United States at Yearend (IIP). All statistics use direct investment at market value. The data on valuation changes is also from Table 1 on the IIP for each year (and since revisions to this table are not available, the "original" release is used for all calculations). Data on income and flows is from the table on International Transactions Accounts Data (ITA). Some of the information on specific asset categories (corporate bonds, corporate stocks, agency bonds, and U.S. Treasury bonds and bills) is only broken out in the annual revisions. Also, none of the estimates includes the impact of financial derivatives (which just began to be reported in 2007).

Some of the reported data only includes private sector investment. Although the BEA differentiates between private and official investment in the asset/liability data and in U.S. income receipts, it does not explicitly make this differentiation in income flows corresponding to foreign-owned U.S. liabilities. In order to make this calculation, I make several assumptions. First, I assume that all income payments on direct investment, interest on U.S. corporate bonds, and dividends on U.S. corporate stocks are payments to non-official sector investors. This should tend to overstate the returns to foreign, non-official sector investment in the United States, as some official entities may hold small amounts of corporate stocks, bonds and direct investment in their portfolios. Any such holdings, however, are small in aggregate and should only have a minor effect on return estimates.[72] Next, I assume that interest payments on U.S. Treasuries (including bonds, notes, and bills) are divided between the official sector and non-official sector in the same proportion as the corresponding shares of U.S. Treasury instruments held by each group in each year. Finally, non-official sector holdings of "corporate and other bonds" includes non-official sector holdings of agency bonds. Therefore I calculate the corresponding income

[71] In addition to valuation effects due to price and exchange rate changes, the BEA also reports valuation effects due to "other changes". These other changes usually result from changes in coverage and methodology, so I do not include them as part of the valuation effect.

[72] For example, in 2006 foreign official holdings of U.S. liabilities that were not U.S. government liabilities and not liabilities of U.S. banks (and therefore includes more than foreign official investment in direct investment, corporate stocks and corporate and agency bonds) was only $350 billion or 2.8% of total non-official investment in the United States. The corresponding statistic for 2000 was 1.0%, however, suggesting that foreign purchases of non-traditional U.S. liabilities have increased recently.

stream as the total interest on corporate bonds plus the share of total interest payments on U.S. agency bonds based on the share of total U.S. agency bonds held by non-official investors.

For the return calculations, I focus on unrevised data instead of revised BEA data for two reasons. First, the BEA fully revises position data based on new benchmark surveys, but only partially revises the corresponding data on capital flows, likely due to challenges in attributing the flows to different sources. As shown in Curcuru, Dvorak, and Warnock (2008), this mismatch in revisions leads to greater estimates of the return differentials between U.S. and foreign investors using the (partially) revised data instead of the original data. A second (and related) reason for focusing on the unrevised data is that it reports valuation changes each year, and breaks these valuation changes into changes due to price movements, exchange rate movements, and other effects (such as changes in coverage and methodology). In contrast, the revised data does not break out valuation changes by source—or even report the overall valuation change per year—and there are significant series breaks from the end of one year to the start of the next year (especially for bond data). As shown in Curcuru et al. (2008) and Lane and Milesi-Ferretti (2007b), this leads to significant errors in the calculation of valuation changes and has a substantial impact on estimates of return differentials.

To show the impact of these effects, Table B1 reports average returns from 2002 to 2006 using the original BEA data, revised data, and revised data combined with valuation changes based on the original data (to adjust for series breaks). The table shows that the major difference in estimates between the different data releases is due to the errors in the calculations of valuation changes in the revised data due to the series breaks across years. The return differential between U.S. investment abroad and foreign investment in the United States, however, continues to exist within each asset class—no matter which data series are utilized. The return differential is slightly smaller using the original data than the revised data (as reported in Curcuru et al. (2008)), so the estimates reported in Section II.B. of this paper are the most conservative estimates.[73]

Table B1
Average Return Calculations Using Different BEA Data Releases, 2002-06 (in percent)

	Original BEA Data		Revised & Original BEA Data[1]		Revised BEA Data	
	U.S. Assets Abroad	Foreign Assets in U.S.	U.S. Assets Abroad	Foreign Assets in U.S.	U.S. Assets Abroad	Foreign Assets in U.S.
Total Investment	11.2	4.3	11.1	4.2	15.3	5.8
Non-official investment						
FDI	16.3	5.6	16.6	5.6	16.4	4.8
Equities	17.4	7.6	17.4	7.5	20.7	10.3
Bonds[2]	6.7	5.3	7.7	5.5	14.9	1.9
Portfolio Securities[3]	14.3	5.9	14.3	6.0	18.8	5.0

Notes: (1) Uses revised data for stocks and flows, but unrevised data for valuation changes.(2) Includes corporate, agency and Treasury bonds. (3) Equities and bonds.

[73] Curcuru et al. (2008) show that there is no significant difference between the returns foreigners earned investing in U.S. portfolio securities relative to what U.S. investors earned abroad. A close comparison of their estimates with this paper shows that the key difference in results is due to different time periods. Curcuru et al. focus on a longer period of time—from 1994 through 2005—instead of 2002 through 2006. Otherwise estimates are virtually identical.

Appendix C: Variable Information

Variable	Definition	Source	Additional Notes
Capital Controls	Index ranging from 0 to 3. Country receives 1 point for a capital control in each of these categories: capital market securities, capital transactions for personal capital movements, and capital transactions for institutional investors.	Calculated using data from the International Monetary Fund's *Annual Report on Exchange Rate Arrangements and Exchange Restrictions* (AREAER), years 1997-2005.	If data is not available for a specific component of the index then it is assumed to be 0.
Closeness	Index constructed as the first standardized principal component of: distance to U.S., cost of phone call to U.S., and dummy variables if the country has a common language, shared land border, former colonial relationship or is in a currency union with the U.S.	Data on phone calls is from http://www.phone-rate-calculator.com. Remainder of data is from Rose and Spiegel (2002) and Clark, Sadikov, Tamirisa, Wei, and Zeng (2004). Data is available at websites: http://faculty.haas.berkeley.edu/arose/RecRes.htm and www.nber.org/~wei.	Distance is the log of the great circle distance in miles between the capital city of each country and the United States. Cost of phone call is the lowest cost available for a 5-minute international phone call from the country to the United States during business hours.
Corporate Governance	Index constructed as the first standardized principal component of: control of corruption, rule of law, regulatory quality, and property rights.	Data on corruption, rule of law and regulatory quality is from World Bank (2006). Data on property rights is from Heritage Foundation, *Index of Economic Freedom*, available at http://www.heritage.org/index/.	Corruption measures extent to which public power is exercised for private gain, including petty and grand forms of corruption, and "capture" of state by elites and private interests. Rule of law measures extent to which agents have confidence in and abide by the rules of society, including contract enforcement and likelihood of crime and violence. Regulatory quality measures ability of government to formulate and implement sound policies and regulations that permit private sector development. Property rights is assessment of the ability of individuals to accumulate private property, secured by clear laws enforced by the state.
Correlation	Correlation in monthly returns over the last three years. Returns are stock returns for equity regressions and bond returns for bond regressions.	Constructed using data on stock and bond return indices in U.S. dollars from Datastream. Bond indices include corporate, agency and government bonds.	Stock return indices based on Datastream's index if available. If Datastream does not calculate the index, then I use the S&P/IFC index, and if this is not available, then I use the Dow Jones index (all of which are reported by Datastream). See notes on *Return* for details on bond indices.
Financial Development	Measured by stock market capitalization to GDP for equity regressions. Measured by private bond market capitalization to GDP for bond regressions.	From Beck, Demirgüç-Kunt and Levine (2000), revised version with data through 2005 available at: http://econ.worldbank.org.	Private bond market capitalization includes private domestic debt securities issued by financial institutions and corporations. Financial development is instrumented for in both the equity and bond regressions.
Returns	Percent difference in average monthly returns with the U.S. over the last year. Returns are stock returns for equity regressions and bond returns for bond regressions.	Stock and bond return indices in U.S. dollars from Datastream. Bond indices include corporate, agency and government bonds.	Bond returns from Citigroup's WGBI, All Maturities Total Return Indices for developed countries and JPMorgan's EMBI Global Diversified Bond Return Indices for developing countries. If neither source is available, then I use Citigroup's ESBI index, then Merrill Lynch's USD Emerging Sovereign Index. See notes on *Correlation* for details on stock indices.
Trade	Sum of total exports and imports between the United States and the country divided by the country's GDP.	Data on imports and exports from: International Monetary Fund, *Direction of Trade Statistics*. Data on GDP from World Bank, *World Development Indicators CD-ROM* (2006).	Exports and imports are total merchandise imports, and imports including cost, insurance and freight (c.i.f.).

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Table 1
Total Return on Investment Positions (in percent)

	Includes Effect of Exchange Rate Movements		Excludes Effect of Exchange Rate Movements	
	U.S. Assets Abroad	U.S. Foreign Liabilities	U.S. Assets Abroad	U.S. Foreign Liabilities
2002	-4.9	-5.5	-8.7	-5.9
2003	21.2	10.5	14.2	9.8
2004	12.6	5.8	9.1	5.4
2005	9.9	2.6	14.2	3.0
2006	17.4	8.0	14.0	7.7
Average annual return				
2002-06	***11.2***	***4.3***	***8.6***	***4.0***
Sharpe Ratio[1]	***0.68***	***-0.02***	***0.42***	***-0.06***

Notes: Direct investment at market value. Returns include income flows and valuation changes (which include price changes and exchange rate movements). See Appendix B for details on return calculation.
(1) The Sharpe ratio is a risk-adjusted performance measure, calculated as: $(R_i - R_f)/\sigma_i$ with R_i the mean return for asset i; σ_i the standard deviation of returns for asset i; and R_f the risk-free interest rate (which is measured as the average interest rate on the 10-year U.S. Treasury bond over this period).
Source: Based on original data from the Bureau of Economic Analysis. See Appendix B for details.

Table 2
Returns on Private Sector Investment Positions: 2002-2006 (in percent)

	Direct Investment[1]		Equities		Bonds[2]		All Securities (Equities & Bonds[2])	
	U.S. Assets Abroad	U.S. Foreign Liabilities	U.S. Assets Abroad	U.S. Foreign Liabilities	U.S. Assets Abroad	U.S. Foreign Liabilities	U.S. Assets Abroad	U.S. Foreign Liabilities
2002	-10.6	-18.8	-16.0	-21.8	14.6	9.3	-8.9	-4.2
2003	33.8	21.9	40.7	28.0	9.6	6.0	32.7	13.7
2004	19.8	8.8	19.4	11.5	4.8	5.6	15.1	8.0
2005	14.6	3.5	17.0	4.9	-0.4	0.7	12.1	2.4
2006	24.0	12.5	25.8	15.6	5.0	5.1	20.7	9.5
Average Returns								
2002-6	*16.3*	*5.6*	*17.4*	*7.6*	*6.7*	*5.3*	*14.3*	*5.9*
Exclude ER[3]	*12.9*	*5.6*	*12.0*	*7.6*	*4.9*	*4.6*	*9.9*	*5.4*
Sharpe Ratio[4]	*0.72*	*0.08*	*0.62*	*0.18*	*0.41*	*0.31*	*0.65*	*0.21*

Notes: Private sector refers to "non-official" asset positions for foreign-owned assets in the United States. Returns incorporate income receipts plus valuation changes (which includes price changes and exchange rate movements). See Appendix B for details on return calculations
(1) Direct investment at market value.
(2) Bonds include corporate, government and agency bonds.
(3) Average returns exclude the impact of exchange rate movements.
(4) See Table 1 for definition.
Source: Based on original data from Bureau of Economic Analysis. See Appendix B for details.

Table 3:
Foreign Exposure to U.S. Equity and Debt Markets in 2006

Equity – USG data		Debt – USG data		Debt – IMF data	
Paraguay	27.8%	El Salvador	67.1%	Israel	80.8%
Costa Rica	27.8%	Costa Rica	66.6%	Kazakhstan	50.1%
Singapore	26.4%	Jordan	60.0%	Kuwait	34.8%
Venezuela	25.0%	China	49.2%	Costa Rica	30.9%
Netherlands	22.4%	Kazakhstan	48.4%	Bulgaria	29.8%
Botswana	18.0%	Belgium	39.3%	Bahrain	28.1%
Switzerland	15.2%	Latvia	38.3%	Ireland	19.3%
Canada	15.2%	Singapore	33.9%	Chile	18.8%
New Zealand	12.1%	Mexico	29.4%	Uruguay	15.8%
Norway	11.7%	Hong Kong	26.7%	Hong Kong	15.3%
Uganda	10.3%	Macedonia	26.3%	Norway	13.0%
Denmark	9.7%	Colombia	25.0%	United Kingdom	12.6%
Armenia	8.9%	Switzerland	18.7%	Colombia	9.8%
United Kingdom	8.0%	Indonesia	18.5%	Russian Federation	8.7%
Sweden	7.6%	Chile	17.6%	Singapore	8.6%
Mexico	7.1%	Slovenia	13.8%	Switzerland	8.4%
Swaziland	6.8%	Thailand	13.6%	Estonia	8.2%
Australia	6.3%	Poland	12.7%	Canada	6.8%
Austria	5.7%	Ireland	12.6%	Sweden	6.7%
Ecuador	5.4%	Philippines	12.6%	Argentina	6.0%
Israel	4.9%	Korea, South	11.5%	Australia	5.9%
Japan	4.9%	Turkey	11.4%	Japan	5.7%
France	4.4%	Malaysia	10.1%	Netherlands	5.5%
Bolivia	3.8%	Canada	9.8%	Venezuela	4.9%
Germany	3.7%	United Kingdom	9.4%	Philippines	4.6%
Mean	***4.3%***		***14.8%***		***9.5%***
Median	***1.3%***		***9.1%***		***4.3%***
Std. Deviation	***6.8%***		***17.2%***		***14.6%***
Minimum	***0.0%***		***0.1%***		***0.0%***
Maximum	***27.8%***		***67.1%***		***80.8%***
Observations	***82***		***54***		***51***

Source: See Section III for details on calculation and data.

Table 4
Foreign Exposure to Major Equity and Debt Markets in 2006

		Foreign Exposure			Global Portfolio Weight	% Global Portfolio Weight	
		Mean	**Median**	**Standard Deviation**		**Based on Mean**	**Based on Median**
Australia	Equity	0.3%	0.1%	0.4%	**2.0%**	12.6%	4.1%
	Debt	0.8%	0.3%	2.0%	**1.3%**	60.8%	20.0%
Canada	Equity	0.2%	0.1%	0.3%	**3.1%**	6.0%	1.9%
	Debt	0.3%	0.1%	0.4%	**1.9%**	13.2%	4.4%
France	Equity	1.3%	0.6%	2.0%	**4.5%**	28.3%	13.0%
	Debt	2.0%	1.1%	2.6%	**4.9%**	41.5%	22.1%
Germany	Equity	1.0%	0.3%	1.5%	**3.0%**	33.6%	11.3%
	Debt	4.2%	1.8%	6.4%	**5.9%**	71.7%	31.5%
Japan	Equity	1.2%	0.3%	2.0%	**8.7%**	13.4%	3.6%
	Debt	0.5%	0.1%	1.0%	**12.3%**	3.8%	1.0%
Switzerland	Equity	0.8%	0.3%	1.2%	**2.2%**	34.3%	12.6%
	Debt	0.1%	0.1%	0.1%	**0.4%**	28.2%	15.1%
United Kingdom	Equity	2.2%	0.9%	4.3%	**7.0%**	31.8%	13.3%
	Debt	3.2%	1.5%	4.4%	**5.4%**	59.4%	27.8%
United States	Equity	4.8%	2.0%	7.2%	**35.8%**	13.5%	5.6%
	Debt	9.5%	4.3%	14.6%	**38.2%**	24.9%	11.2%
Average	***Equity***	***1.5%***	***0.6%***	***2.4%***	***8.3%***	***21.7%***	***8.2%***
	Debt	***2.6%***	***1.2%***	***3.9%***	***8.8%***	***37.9%***	***16.6%***

Notes: All calculations based on IMF data. Global portfolio weight is the share of the country's equity or debt market in the global equity or debt market. Equity market capitalization data from Standard & Poor's (2007) and bond market data from *BIS Quarterly Review*, Tables 11, 16A and 16B, December 2007.

Table 5
Summary Statistics

Variable	# Obs.	Mean	Median	Std. Dev.	Min.	Max.
DevUS, equities[1]	410	-2.966	-2.871	1.574	-6.804	0.874
DevUS, bonds[1]	260	-1.684	-1.621	1.269	-5.306	0.804
Capital Controls	520	1.737	2.000	1.019	0.000	3.000
Financial Development, equities	478	0.532	0.280	0.993	0.000	16.017
Financial Development, bonds	476	0.567	0.390	0.446	0.038	2.024
Corporate Governance	503	0.027	-0.446	1.929	-4.173	3.477
Returns, equities	483	0.516	0.291	0.641	0.001	5.281
Returns, bonds	224	0.285	0.215	0.319	0.001	2.652
Correlation, equities	380	0.472	0.727	0.543	-0.939	0.992
Correlation, bonds	285	0.168	0.295	0.577	-0.867	1.000
Closeness	515	-0.001	0.043	1.270	-3.118	6.588
Trade	520	0.099	0.049	0.114	0.003	0.681

Note: (1) Based on USG data.

Table 6
Correlation Matrix

	DevUS, equities	*DevUS*, bonds	*Capital Controls*	*FinDev* equities	*FinDev* bonds	*Corp. Gov.*	*Returns* equities	*Returns* bonds	*Correl.* equities	*Correl.* bonds	*Close-ness*	*Trade*
DevUS, equities	**1.000**											
DevUS, bonds	0.214	**1.000**										
Capital Controls	-0.423	0.132	**1.000**									
Financial Development, equities	0.213	0.038	-0.123	**1.000**								
Financial Development, bonds	0.373	-0.143	-0.346	0.187	**1.000**							
Corporate Governance	0.610	-0.098	-0.513	0.426	0.542	**1.000**						
Returns, equities	-0.115	0.115	0.197	-0.160	-0.172	-0.196	**1.000**					
Returns, bonds	0.066	0.042	-0.021	0.122	0.022	0.063	-0.321	**1.000**				
Correlation, equities	0.154	0.050	-0.129	0.254	0.190	0.217	0.150	-0.006	**1.000**			
Correlation, bonds	0.039	-0.054	-0.144	-0.037	0.058	0.142	-0.405	-0.102	-0.329	**1.000**		
Closeness	0.286	0.108	-0.216	-0.146	-0.087	0.036	0.086	-0.065	0.031	-0.005	**1.000**	
Trade	0.148	0.474	0.127	0.098	-0.168	-0.157	-0.022	0.014	0.028	-0.023	0.515	**1.000**
GDP per capita	0.567	-0.226	-0.532	0.331	0.533	0.905	-0.155	0.045	0.255	0.097	0.109	-0.240

Note: Based on USG data.

Table 7
Regression Results: Foreign Investment in U.S. Equities

	Full Sample (1)	Full Sample (2)	IMF Data (3)	Full Sample (4)	Full Sample (5)	Middle & Low Income[1] (6)	High Income[1] (7)	Largest Holdings[2] (8)	GDP weighted (9)
Capital Controls	-0.217**	-0.195**	-0.208**	-0.200**	-0.143**	-0.283**	-0.102**	0.024	-0.115**
	(0.049)	(0.048)	(0.044)	(0.049)	(0.042)	(0.037)	(0.033)	(0.044)	(0.030)
Financial Development	-0.354**	-0.291**	-0.407**	-0.227**	-11.292**	-1.177**	-0.172**	-0.155*	-14.720**
	(0.085)	(0.086)	(0.090)	(0.077)	(1.363)	(0.179)	(0.073)	(0.091)	(1.517)
Corporate Governance	0.363**	0.514**	0.242**	0.598**	0.350**	-0.071	0.791**	0.673**	0.542**
	(0.041)	(0.073)	(0.054)	(0.072)	(0.070)	(0.057)	(0.055)	(0.097)	(0.051)
Returns	-0.022**	-0.022**	-0.039**	-0.029**	-0.008	-0.010	-0.032*	-0.071**	-0.030**
	(0.007)	(0.007)	(0.009)	(0.007)	(0.006)	(0.007)	(0.019)	(0.030)	(0.008)
Correlation	0.098*	0.105**	0.165**	0.090*	0.135**	0.190**	-0.106	-0.435**	0.053
	(0.053)	(0.052)	(0.076)	(0.050)	(0.049)	(0.068)	(0.088)	(0.165)	(0.053)
Closeness	-0.053	0.037	0.031	0.191**	-0.107	0.043	-0.011	-0.199**	0.018
	(0.059)	(0.068)	(0.058)	(0.042)	(0.071)	(0.057)	(0.050)	(0.039)	(0.045)
Trade	3.261**	2.548**	2.151**		4.477**	3.190**	1.477**	2.835**	1.140**
	(0.699)	(0.813)	(0.473)		(0.816)	(0.775)	(0.677)	(0.561)	(0.539)
GDP per Capita		-0.458**	2.519**	-0.576**	-0.424**			3.070**	-0.545**
		(0.143)	(0.154)	(0.131)	(0.141)			(0.865)	(0.129)
*Financial Development * GDP per capita*					1.112**				1.441**
					(0.137)				(0.149)
Countries	*65*	*65*	*46*	*65*	*65*	*41*	*24*	*8*	*65*
Observations	*319*	*319*	*221*	*319*	*319*	*199*	*120*	*36*	*319*
Wald χ^2	*479.1*	*463.7*	*1161.3*	*572.6*	*576.2*	*437.0*	*542.4*	*1606.1*	*1615.0*

Notes: Explanatory variable is the log of the deviation in each country's holdings of U.S. equity liabilities from the world market portfolio based on USG data. * and ** are significant at the 10% and 5% levels, respectively. Standard errors in parentheses. See Appendix C for variable definitions. Estimates are FGLS and are adjusted for heteroscedasticity and autocorrelation within each country. Regressions include period dummy variables. (1) Based on World Bank definitions. (2) Only includes observations for which country holds over $50 billion in U.S. equities.

Table 8
Regression Results: Foreign Investment in U.S. Equities – Sensitivity Tests

	Different Measures of Financial Development				Different Estimation Techniques[3]					Excludes:	
	St. Value Traded (1)	Stock Turnover (2)	Index[1] (3)	Adds Instrmts[2] (4)	X-section Averages (5)	X-section (6)	Tobit (7)	Quantile (8)	Differ-ences (9)	Financial Centers[4] (10)	Outliers[5] (11)
Capital	-0.143**	-0.084*	-0.126**	-0.211**	-0.513**	-0.338**	-0.335**	-0.310	-0.008**	-0.127**	-0.193**
Controls	(0.042)	(0.047)	(0.039)	(0.030)	(0.172)	(0.148)	(0.161)	(0.211)	(0.003)	(0.045)	(0.038)
Financial	-11.056**	-4.590**	-6.936**	-15.319**	-18.572**	-14.943**	-14.951**	-19.042**	-0.150**	-10.077**	-10.059**
Development	(1.334)	(0.841)	(0.408)	(1.116)	(4.701)	(3.657)	(5.243)	(5.907)	(0.062)	(1.557)	(1.245)
Corporate	0.350**	0.480**	0.452**	0.566**	0.311	0.408*	0.407*	0.382	0.008**	0.357**	0.422**
Governance	(0.070)	(0.072)	(0.056)	(0.060)	(0.224)	(0.206)	(0.221)	(0.256)	(0.003)	(0.074)	(0.069)
Returns	-0.008	-0.017**	-0.005	-0.014**	-0.098	-0.039	-0.040	-0.035	-0.001	-0.008	-0.011**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.134)	(0.028)	(0.028)	(0.037)	(0.000)	(0.007)	(0.005)
Correlation	0.135**	0.123**	0.055	0.217**	1.045**	0.330	0.334	0.280	0.000	0.088*	0.166**
	(0.049)	(0.049)	(0.042)	(0.043)	(0.489)	(0.226)	(0.240)	(0.266)	(0.003)	(0.053)	(0.047)
Closeness	-0.107	0.123*	-0.123**	-0.093	-0.007	0.038	0.038	-0.055	0.005**	-0.054	0.029
	(0.071)	(0.066)	(0.054)	(0.061)	(0.117)	(0.107)	(0.160)	(0.202)	(0.003)	(0.076)	(0.066)
Trade	4.477**	2.095**	4.006**	3.288**	3.191*	3.533**	3.552*	3.221	0.163**	4.464**	3.232**
	(0.816)	(0.770)	(0.549)	(0.659)	(1.605)	(1.584)	(1.904)	(2.406)	(0.032)	(0.859)	(0.716)
GDP per	-0.197	-0.611**	0.173	-0.871**	-0.795**	-0.753**	-0.752**	-0.615*	-0.010	-0.499**	-0.635**
Capita	(0.138)	(0.144)	(0.109)	(0.115)	(0.293)	(0.291)	(0.315)	(0.368)	(0.007)	(0.151)	(0.135)
*Fin.Dev. **	1.088**	0.449**	0.702**	1.515**	1.815**	1.477**	1.478**	1.876**	0.014**	0.988**	0.987**
GDP cap	(0.134)	(0.090)	(0.043)	(0.110)	(0.472)	(0.364)	(0.519)	(0.589)	(0.006)	(0.162)	(0.124)
Countries	*65*	*65*	*62*	*62*	*65*	*65*	*65*	*65*	*65*	*60*	*63*
Observations	*319*	*319*	*303*	*303*	*65*	*319*	*319*	*319*	*319*	*294*	*308*
Wald χ^2	*576.2*	*585.1*	*3061.4*	*1470.1*					*891.3*	*431.1*	*699.4*

Notes: See notes to Table 7. All regressions except column 5 include period dummies. (1) Index is the first standardized principle component of: stock market capitalization/GDP, stock market turnover, and private credit by deposit money banks and other financial institutions to GDP. (2) Includes additional instruments for financial market development: stock market turnover and private credit by deposit money banks and other financial institutions to GDP. (3) Standard errors are clustered by country in columns 6-8. Dependent variable in column 9 is measured as the differences instead of log deviation. (4) Excludes major financial centers: Hong Kong, Ireland, Japan, Singapore, Switzerland, and the U.K. (5) Excludes 10 observations that are largest outliers based on fitted regression.

Table 9
Regression Results: Foreign Investment in U.S. Bonds

	Base (1)	Base (2)	Base[1] (3)	Base (4)	Middle & Low Income[2] (5)	High Income[2] (6)	Largest Holdings[3] (7)	GDP-weighted (8)	Financial Development measured by: Credit[1] (9)	Financial Development measured by: Index[4] (10)	Excludes Financial Centers[5] (11)
Capital Controls	0.014	0.081**	-0.200**	-0.055	0.026	-0.039	0.089	-0.108**	-0.083**	0.050	0.052
	(0.042)	(0.041)	(0.045)	(0.042)	(0.080)	(0.041)	(0.057)	(0.041)	(0.034)	(0.042)	(0.044)
Financial Development	-0.714*	-0.555**	-0.493**	-21.379**	-1.704**	-0.912**	-203.476**	-31.172**	-15.570**	-5.252**	-18.398**
	(0.375)	(0.263)	(0.150)	(5.611)	(0.641)	(0.445)	(22.981)	(3.435)	(1.958)	(0.773)	(5.750)
Corporate Governance	0.198**	0.283**	0.106**	0.075	-0.004	0.384**	0.125	0.263**	0.286**	0.094	0.130
	(0.077)	(0.061)	(0.038)	(0.087)	(0.087)	(0.118)	(0.167)	(0.082)	(0.053)	(0.072)	(0.101)
Returns	0.002	0.004		0.003	0.002	0.003	0.009	0.006*	0.004	0.000	0.000
	(0.003)	(0.003)		(0.003)	(0.006)	(0.009)	(0.011)	(0.004)	(0.003)	(0.003)	(0.004)
Correlation	0.045	0.040		0.054	-0.014	0.091	0.465**	0.055	-0.017	0.025	0.135*
	(0.057)	(0.068)		(0.057)	(0.183)	(0.114)	(0.143)	(0.076)	(0.059)	(0.056)	(0.072)
Closeness	-0.102**	0.055	-0.304**	-0.245**	0.034	-0.479**	-0.058	-0.342**	-0.322**	-0.313**	0.070
	(0.049)	(0.036)	(0.065)	(0.067)	(0.031)	(0.071)	(0.066)	(0.038)	(0.044)	(0.040)	(0.067)
Trade	2.470**		4.833**	4.334**	3.719**	6.208**	0.473	5.313**	4.654**	5.230**	1.981**
	(0.575)		(0.630)	(0.651)	(0.701)	(0.984)	(1.197)	(0.378)	(0.387)	(0.389)	(0.743)
GDP per Capita	-0.473**	-0.787**	-0.593**	-0.708**			-1.468**	-1.111**	-1.577**	0.560**	-1.140**
	(0.223)	(0.161)	(0.109)	(0.273)			(0.481)	(0.247)	(0.226)	(0.228)	(0.315)
*Fin. Dev. * GDP cap*				2.138**			19.624**	2.965**	1.517**	0.505**	1.887**
				(0.563)			(2.196)	(0.362)	(0.199)	(0.081)	(0.589)
Countries	*152*	*152*	*248*	*152*	*55*	*93*	*38*	*152*	*184*	*152*	*129*
Observations	*32*	*32*	*53*	*32*	*12*	*19*	*10*	*32*	*40*	*32*	*27*
Wald χ^2	*175.1*	*121.2*	*288.2*	*217.3*	*93.8*	*132.2*	*1828.9*	*492.9*	*382.2*	*696.2*	*107.8*

Notes: Explanatory variable is log deviation in each country's holdings of U.S. debt liabilities from the world market portfolio based on USG data. * and ** are significant at the 10% and 5% level, respectively. Standard errors in parentheses. See Appendix C for variable definitions. Estimates are FGLS adjusted for heteroscedasticity and autocorrelation within each country. Period dummies included. (1) Financial Development is measured by private credit by deposit money banks and other financial institutions to GDP. (2) Based on World Bank definitions. (3) Only includes observations for which country holds over $50 billion in U.S. bonds. (4) Financial Development Index is constructed as the first standardized principle component of: private bond market capitalization to GDP, public bond market capitalization to GDP and private credit by deposit money banks and other financial institutions to GDP. (5) Excludes financial centers (as listed in Table 8).

Table 10
Private Sector vs. Official Sector Investment in U.S. Bonds

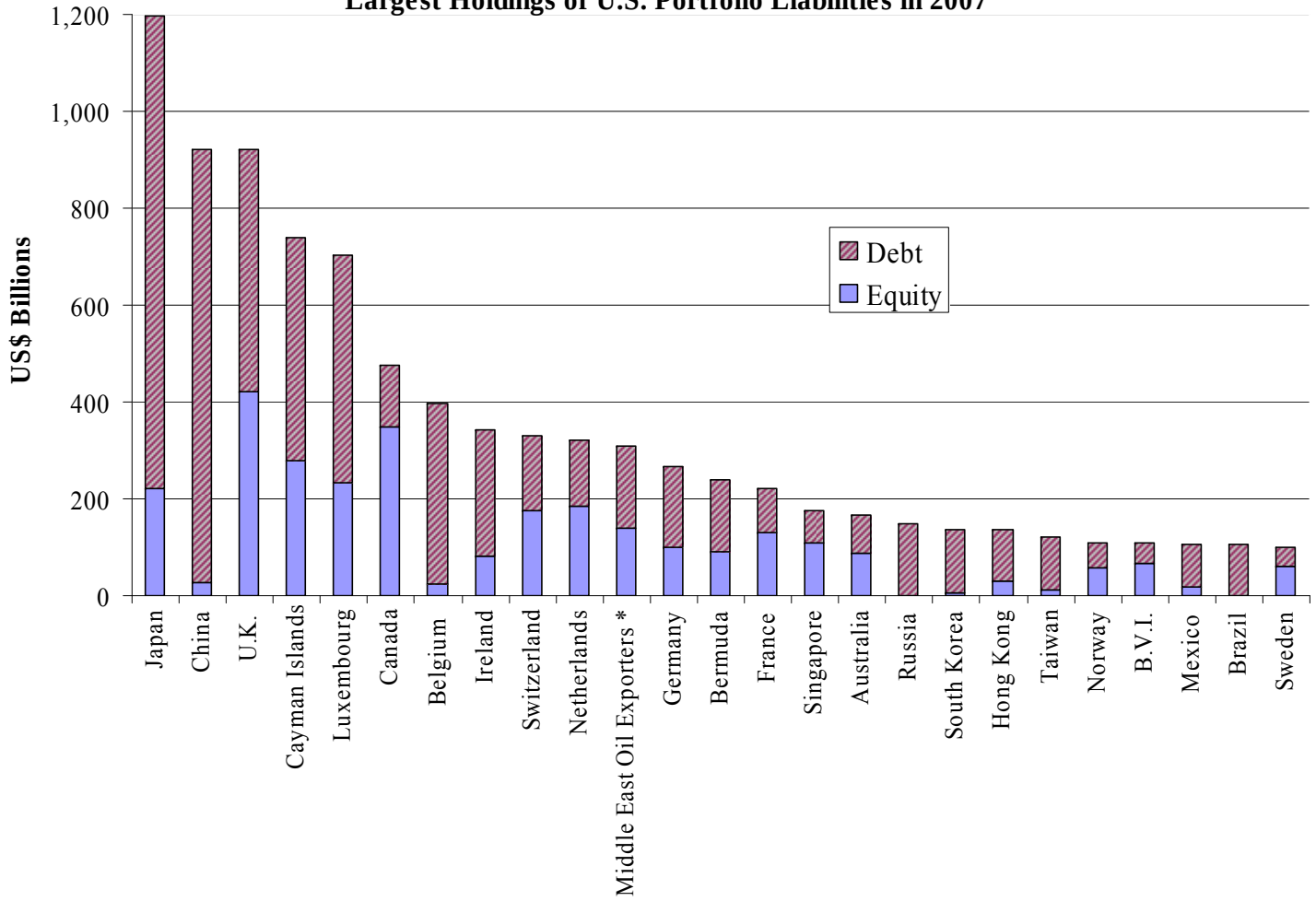
	IMF Data (excludes official sector reserves)					USG Data	
	Base (1)	Largest Holdings[1] (2)	GDP-weighted (3)	Financial Develop. Index[2] (4)	Base (5)	Bond Holdings (6)	Equity Holdings (7)
Capital Controls	-0.072**	-0.150**	-0.111**	-0.011	-0.091**	-0.059	-0.192**
	(0.037)	(0.032)	(0.030)	(0.033)	(0.038)	(0.043)	(0.040)
Financial Development	-41.547**	-97.559**	-42.149**	-9.797**	-41.751**	-30.948**	-9.673**
	(3.220)	(12.097)	(4.430)	(0.891)	(3.225)	(6.180)	(1.240)
Corporate Governance	-0.076	0.014	-0.256**	0.057	-0.079	0.014	0.418**
	(0.053)	(0.098)	(0.063)	(0.055)	(0.053)	(0.084)	(0.046)
Returns	-0.002	-0.012	-0.004**	0.002	-0.002	0.000	-0.006
	(0.002)	(0.009)	(0.002)	(0.002)	(0.002)	(0.003)	(0.006)
Correlation	0.004	0.009	0.047	0.045	-0.003	0.074	0.117**
	(0.054)	(0.101)	(0.050)	(0.060)	(0.054)	(0.056)	(0.047)
Closeness	-0.187**	-0.378**	-0.256**	-0.274**	-0.167**	-0.077	-0.182**
	(0.022)	(0.061)	(0.036)	(0.022)	(0.026)	(0.087)	(0.066)
Trade	2.705**	3.840**	3.284**	2.546**	2.232**	2.900**	5.204**
	(0.460)	(0.504)	(0.480)	(0.378)	(0.557)	(0.909)	(0.798)
GDP per Capita	0.459**	0.324	1.198**	1.830**	0.397**	-0.887**	-0.427**
	(0.154)	(0.487)	(0.179)	(0.217)	(0.158)	(0.297)	(0.121)
*Fin. Dev. * GDP per cap*	4.228**	9.420**	4.167**	0.968**	4.245**	3.139**	0.947**
	(0.323)	(1.166)	(0.437)	(0.088)	(0.325)	(0.613)	(0.124)
Reserves / GDP					0.401	1.780**	-1.272**
					(0.343)	(0.459)	(0.323)
Countries	*31*	*11*	*31*	*31*	*31*	*32*	*65*
Observations	*153*	*46*	*153*	*153*	*153*	*152*	*316*
Wald χ^2	*560.0*	*23352.6*	*323.8*	*648.4*	*556.4*	*188.1*	*863.2*

Notes: Explanatory variable is log of the deviation in each country's holdings of U.S. debt or equity liabilities from the world market portfolio. * and ** are significant at the 10% and 5% level, respectively. Standard errors in parentheses. See Appendix C for variable definitions. Estimates are FGLS adjusted for heteroscedasticity and autocorrelation within each country. Period dummies included.

(1) Only includes observations for which country holds over $50 billion in U.S. bonds.

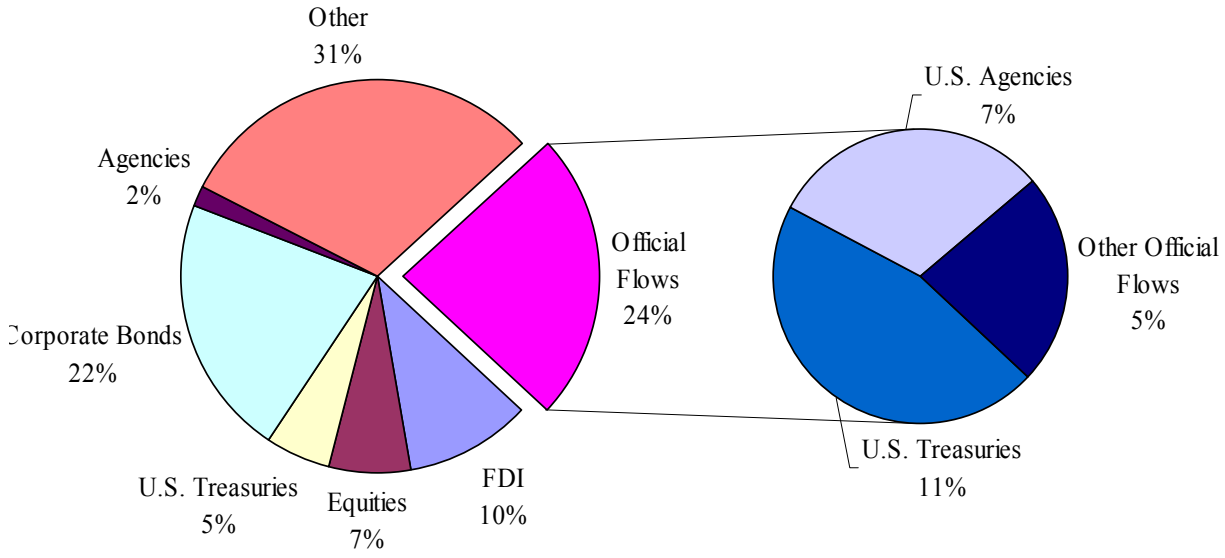
(2) Financial Development Index is constructed as the first standardized principle component of: private bond market capitalization to GDP, public bond market capitalization to GDP, and private credit by deposit money banks and other financial institutions.

Figure 1
Largest Holdings of U.S. Portfolio Liabilities in 2007



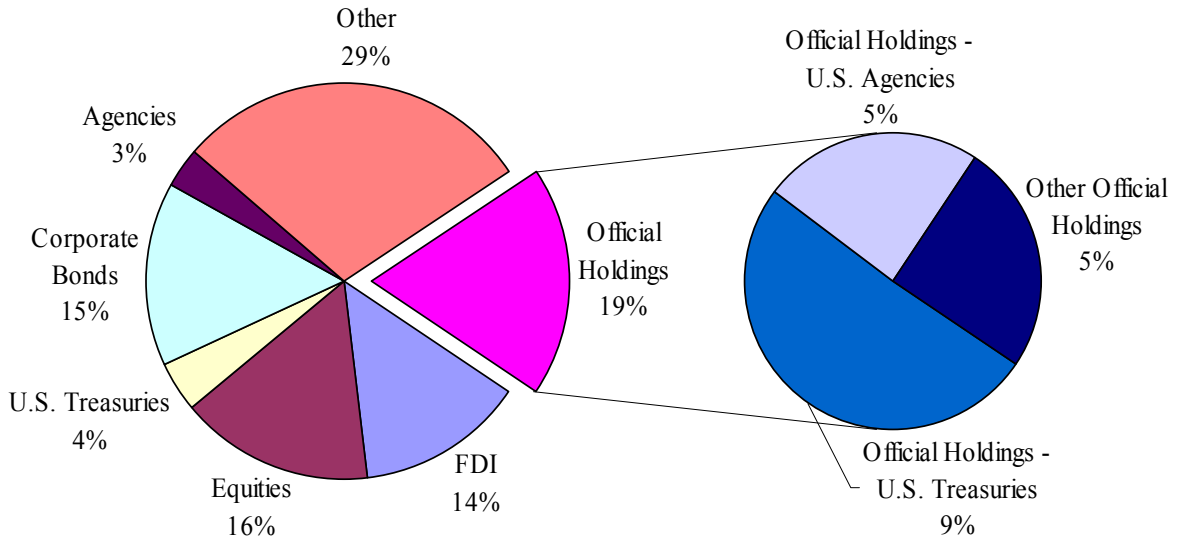
Notes: Based on USG data released on 4/30/2008. Includes official and non-official sector holdings.
* Bahrain, Iran, Iraq, Kuwait, Oman Qatar, Saudi Arabia & United Arab Emirates.

Figure 2a
Composition of Gross Foreign Capital Inflows - 2003-07



Based on data from Bureau of Economic Analysis, *Survey of Current Business* (July 2008), U.S. International Transactions table.

Figure 2b
Composition of Foreign Holdings of U.S. Assets - 2007



Based on data from Bureau of Economic Analysis, Survey of Current Business (July 2008), International Investment Position table.
Direct investment at current cost.