



The U.S. Fiscal Stimulus and the Sustainability of International Capital Flows: An Empirical Analysis

Duc Tran, Brandeis University '13

In response to the Great Recession of 2008-2009, the U.S. federal government decided to pass a series of fiscal stimulus packages of \$830 billion between 2009 and 2019 to foster the recovery of the U.S. economy.¹ How would foreign holdings of U.S. financial assets change with the U.S. fiscal position? Would the U.S. fiscal policy negatively affect international capital flows to the United States? This paper is an attempt to provide more insights and evidence into the relationship between the U.S. fiscal stimulus and foreign capital flows into the United States. I presume that the fiscal stimulus will significantly affect how foreigners perceive and identify investment opportunities in the United States. As a result, foreign individuals and institutions will gradually adjust their rates of acquisition of U.S. securities after the announcement of a series of fiscal stimulus packages. This hypothesis motivates me to examine whether foreigners will increase their portfolio investment in the United States, and whether such an increase will be sustainable in the long run.

This study is important for several reasons. First, it examines whether U.S. fiscal policy has any significant impact on foreign demand for U.S. assets. Since foreign capital flows into the United States help finance public consumption, industry projects, and government activities, an understanding of the relationship between fiscal policy and international capital flows will provide meaningful policy implications. Second, it gives new insights into the determinants of capital flows, which contributes to the academic literature on foreign capital flows and investment into United States. Thus, it helps explain the causes of global imbalances and predict future adjustment in cross-border capital flows. Third, it gives more insight into the determinants of foreign investment in different types of U.S. securities, which include agency bonds, corporate bonds, equities, and treasury bills.

I. Background and Descriptive Data

As of the most recent survey of foreign portfolio holdings of U.S. securities conducted for June 2012, total foreign holdings were estimated to be \$13.2 trillion, with \$4.2 trillion held in equities, \$5.3 trillion in treasuries, \$1 trillion in agencies, and \$2.7 trillion in corporate bonds. Between 2002 and 2012, foreign acquisitions of U.S. securities grew strongly with an average increase of 12 percent each year. Such acquisitions experienced growth in all types of security, among which foreigners increased their holdings of U.S. Treasuries at the fastest rate, from \$1.14 trillion in 2002 to \$5.31 trillion in 2012. Changes in foreign acquisitions of U.S. Treasuries largely took place after 2007, when foreign investors and institutions began to consider their buying of U.S. Treasuries as safe-haven investment. Figure 1 documents the sizable and growing share of U.S. securities held by foreign investors between 2002 and 2012. While foreign purchases of

¹ American Recovery and Reinvestment Act of 2009.

Treasuries steadily increased without any falls, there were big drops in foreign acquisitions of other types of securities during the financial crisis. Although equities began to attract foreign investors again after the crisis, corporate bonds and agencies no longer regained their pre-crisis status in foreign portfolios.

II. Literature Review

A key friction in the literature on international capital flows is that the U.S. financial market strongly attracts foreign capital by its liquidity, efficiency, and high level of development, which could sustain the system of imbalances for an extended period. However, the global financial crisis of 2008-2009 has raised concerns about the attractiveness of the U.S. financial markets and inspired discussions on the determinants of foreign investment into the United States as well as the future adjustment in global imbalances.

In modern portfolio theory, the Capital Asset Pricing Model (CAPM) provides a basis for examining foreigners' incentives to allocate resources through investment in the United States. The underlying assumption in CAPM is that investors are risk-averse, so they try to avoid losses and look for investments producing higher than expected returns (Ross, Westerfield, and Jaffe 2010). Hence, an individual who holds a diversified portfolio cares about the contribution of each security to the expected return and the risk of the portfolio. CAPM encourages investors to keep assets that are not strongly correlated with each other in their portfolios to maximize the diversification effect. Therefore, CAPM's rational approach to investing could imply that foreigners invest in the U.S. assets to diversify their portfolios and protect their capital through holding shares in large U.S. corporations. But CAPM assumes that potential shareholders prefer lower risks to higher risks and that economic agents want to optimize over a short-term period. In fact, new stock traders may not avoid paying for risk when they do not have equal access to information over the financial market. Investors with longer-term plans may also prefer long-term bonds to short-term securities. Thus, CAPM does not explain why many foreign investors still invest in the United States despite earning relatively low returns after the financial crisis.

To investigate the reasons behind foreign investment in U.S. securities despite their low returns relative to the world, Forbes (2010) tests variables related to home bias, diversification, and macroeconomic factors. She argues that the primary factors driving both equity and bond flows into the United States is a country's level of financial development and trade relationship, which means foreigners will invest more in the United States if their countries have less developed financial markets and trade more with the United States. Similarly, Bertaut (2008) finds that future foreign demand for U.S. securities would strongly depend on the comparative advantages of the U.S. financial market and the economic or cultural ties between their countries and the United States. While economic ties are mutual trade flows, cultural ties suggest the role of language and geographic distance in foreign investment decisions. Both Forbes and Bertaut support recent literature on global imbalances, which suggests that developing countries have inefficient financial systems that encourage savings and discourage investments (Ju and Wei, 2006), or that developing countries are willing to run current account surpluses to acquire high-quality financial assets in industrial economies (Mendoza, Quadrini, and Rios-Rull, 2007).

On the other hand, Gruber and Kamin (2009) find little evidence to demonstrate that differences in the level of financial development play a significant role in attracting foreign capital. By estimating panel regressions that relate the ratio of the current account balance to output growth, fiscal balances, and stock market capitalization, they conclude that different quantity measures of financial development, such as private credit outstanding, neither appeared to influence current account balances nor explained the large developing country surpluses or the large U.S. deficits. Moreover, by comparing bond yields between the United States and other countries, they reject the conventional wisdom that U.S. financial assets are exceptionally attractive, even compared to those of other developed nations.

Gruber and Kamin support Bernanke's "global savings glut" theory (2007), which argues that the rise in net savings in developing Asia, oil exporters in the Middle East and the former Soviet Union over the last two decades has enabled these countries to switch from being net borrowers to being net lenders. According to Bernanke, the rise in net savings happened due to the declines in investment after the Asian financial crisis of 1998, sharp increases in crude oil prices, and rapid growth of saving rates in China. Therefore, those emerging-market countries could acquire assets of industrial countries like the United States, contributing to the substantial increase in net capital flows into the United States and the widening of the U.S. current account deficits. However, Bernanke differs from Gruber and Kamin in his viewpoint of the role of financial development in attracting foreign capital. He believes the United States run unusually large current account imbalances under the effects of the global savings glut because its high productivity growth and deep capital markets are particularly attractive to foreign investors.

In addition to the literature focusing on economic relationships, a number of papers have looked at the effect of relational-capital type variables such as information and communication on foreign portfolio investment in U.S. assets. For example, Bertaut (2008) tests variables such as country risks, contract enforcement, and internet and finds that investors in countries which telephoned and visited U.S. internet sites also placed significantly more money in U.S. stocks and bonds than other investors. Therefore, she concludes that communication is an important factor in explaining foreign demand for U.S. portfolio assets. Bertaut belongs to the group of scholars who focus on the relational-capital type variables—including language, currency, membership in international organizations, and communication methods that the United States share with other countries—to explain and forecast future foreign demand for U.S. assets.

Nevertheless, some like Michael (2008) criticizes the previous literature on both economic relationships and relational-capital type variables for not being powerful enough to explain and predict foreign demand for U.S. investments. He suggests a transactional theory that focuses on the way foreigners actually demand, buy, and sell U.S. securities. According to Michael, while foreigner demand for U.S. securities is influenced by fundamental factors such as their appetite for risks and their level of savings, it depends much more on their contacts with the U.S. financial market. He finds statistical evidence that the presence of U.S. broker-dealer in a country is positively related to holdings by those countries' citizens of U.S. securities. As country fixed effects are found to be strong, Michael concludes that the particular country of an investor is still the best indicator of his foreign portfolio investment decisions.

While both the economic relationships and relational capital literatures have attempted to explain the determinants of capital flows into the United States, their focus has remained distinct in many

ways. In particular, a sustained focus in the economic relationships literature has accumulated evidence that trade relationship between the United States and other countries and the level of U.S. financial development influence capital flows into the United States. On the other hands, the relational capital literature has emphasized that foreign demand for U.S. assets is subject to specific nonmarket features such as home bias and communication between an investor's country and the United States. Nevertheless, these two literatures are not mutually exclusive, and in fact are much related, in that economic and nonmarket factors may interact and reinforce each other. For example, any incentives to acquire liquid, high-quality U.S. securities would be accentuated if foreign investors have a strong network of relationships with Wall Street agents or U.S. broker-dealers in their own countries.

Interestingly, different approaches to the study of why foreigners invest in the United States and cross-border capital flows have led to different implications about future foreign demand for U.S. securities. Many economists believe that foreigners will continue to invest in U.S. securities in the near future even though the capital flows into the United States will not be as strong as they were before the crisis (Forbes, 2010; Bernanke et al., 2011; Bertaut, 2008; Favilukis et al., 2010). Forbes (2010) states that, the sharp increase of foreign holdings of U.S. T-bills during the peak of the crisis in 2008 implied sustainable demand for U.S. government bonds. Similarly, Bernanke et al. (2011) and Favilukis et al. (2010) both articulate strong demand for U.S. Treasuries from emerging economies in Asia as well as foreign governments. Bertaut (2008) emphasizes the foreign underinvestment in U.S. securities as an indicator of considerable room in foreign portfolios for increased holdings of U.S. assets, taking into account foreigners' need for reserve holdings and the potential for further diversification of official holdings. While they believe that foreigners will still invest in the United States, Forbes and Bertaut both claim that there are a growing number of attractive alternatives to U.S. securities due to the development of financial markets in Asia, such as China and India.

Otherwise, a number of economists are more pessimistic about future foreign demand for U.S. assets. Kumhof and Laxton (2010) believe fiscal stimulus packages would widen fiscal deficits, thereby deteriorating U.S. current account deficits. Such deteriorations in current account deficits may have implications for the perceived advantages of investing in the United States. In fact, even Forbes (2010) briefly states that if countries with less developed financial markets begin to question the relative advantages of U.S. financial markets, there may arises a rapid adjustment in U.S. capital inflows, global imbalances, and asset prices. Disagreement about whether capital flows into the United States would be sustainable has remained relatively unresolved, owing to the difficulty in determining the impact of increasing U.S. fiscal deficits on foreign portfolio holdings of U.S. securities.

My paper, studying how foreign portfolio investment decisions would change with the fiscal position, will hopefully shed some light on this inconclusive problem. To better capture the determinants of foreign capital flows into the United States, I expand on the literatures on economic relationship and relational-type capital to include economic variables of both types in my empirical analysis. The empirical testing also takes into account the effect of home bias on foreign investment in U.S. securities, which appear in paper by Michael (2008), by examining changes in holdings of U.S. securities by country to find out country-specific effects. Such testing may give insight into the advantages of U.S. assets over other countries' assets.

III. Model and Data

A. Theoretical Framework

This paper's aggregate approach is motivated by several previous theories, of which the two most important theoretical rationales are the Mundell-Fleming model (Pugel, 2010) and the modern portfolio theory (Bodie, Kane, and Marcus, 2011). The Mundell-Fleming model provides a framework for analyzing how fiscal policy influences exchange rates, interest rates, and capital flows. Moreover, the basic assumptions of the Mundell-Fleming model are perfect capital movement, flexible exchange rate, and independent monetary policy, which almost present how the U.S. economy functions. The Mundell Fleming model suggests the interaction of the Investment—Saving (IS), Liquidity Preference—Money Supply (LM), and Balance of Payments (BoP) curves in an open economy under floating exchange rates is essentially captured by the equilibrium at which the IS-LM equations are:

$$\text{The IS curve: } Y = C(Y - T(Y)) + I(i - E(\pi)) + G + NX(e) \quad (1)$$

$$\text{The LM curve: } M/P = L(i - E(\pi), Y_{-1}) \quad (2)$$

$$\text{The BoP curve: } CA + KA \quad (\text{BoP})$$

For these equations (1) and (2), Y is national output, Y_{-1} is national output in the previous period, C is national consumption, $T(Y)$ is taxes, I is investment, G is government spending, NX is net exports, i is domestic nominal interest rate, $E(\pi)$ is expected inflation rate, e is nominal exchange rate, M is money supply, P is price level, and L is money demand.

For equation (BoP), $CA = NX$, where CA is current account balance and NX is net exports (as denoted in equation (1)); $KA = z(i - i^*) + k$, where i is domestic nominal interest rate (as in equation (1), (2)), i^* is foreign nominal interest rate, k is the exogenous component of financial capital flows, z is the interest sensitive component of capital flows, and function z has its derivative as the degree of capital mobility.

The Mundell-Fleming model suggests that a fiscal expansion like the provision of fiscal stimulus packages would be associated with an increase in government spending, thereby raising U.S. real interest rates relative to global average interest rates. As a matter of facts, foreign capital flows into the United States would increase as foreign investors seek to purchase higher returning U.S. assets. Because these foreign investors are exchanging their foreign currency for U.S. dollar, their demand would make the U.S. dollars stronger compared to foreign currencies. On the other hand, the increase in government spending would put upward pressure on national income and domestic spending on import, causing the currency to become weaker. Since capital mobility is strong in the United States, increasing capital flows into the United States would dominate the domestic spending on import, and the U.S. dollar would appreciate. However, the model also implies that, as capital flows into the United States increase, U.S. real interest rates would gradually drop back to its original state, which would diminish the attractiveness of U.S. assets. While the appreciation of the U.S. dollar would also lower net exports and decrease national output, foreign demand for U.S. securities depends on whether they continue to find U.S. assets

attractive after a future drop in U.S. real interest rates. Thus, the model suggests an increase in capital flows into the United States in the short run after the announcement of fiscal stimulus packages, but it implies there is no *priori* answer to the sustainability of international capital flows without doing an empirical analysis.

Moreover, an understanding of foreign investors' motives is of critical important in determining the sustainability of international capital flows to the United States. As mentioned in Section III, The Modern Portfolio Theory (MPT) assumes that rational investors are risk-averse and usually prefer the less risky portfolio given two with the same expected return. But it also means investors who want higher expected returns must accept more risk since increased risk is compensated by higher expected returns. Moreover, the MPT emphasizes that a rational investor always wants to diversify his portfolio to minimize risk. Diversification is simply achieved when an investor holds a combination of financial instruments that are not perfectly positively correlated. In short, the MPT suggests that risk, expected returns, and diversification are the three important criteria an investor looks for before making his investment decisions.

This paper's theoretical framework attempts to reflect the underlying ideas of the Mundell-Fleming model and the Modern Portfolio Theory. Upon studying the implications of the two theories, I present for the empirical analysis several key macroeconomic variables that are frequently examined in both the literature on foreign investment in the United States and these theoretical models. The empirical analysis is supposed to capture the impact of changes in macroeconomic variables such as U.S. government spending, debt level, net exports, nominal exchange rate, national income, and interest rates relative to those of other countries because they are primarily associated with changes in foreign holdings of U.S. assets. Most economists agree that the relative advantages or disadvantages of U.S. assets over other countries' assets strongly influence a foreign investor's decision to either purchase or sell them. Furthermore, many consider the U.S. levels of fiscal deficits, current account deficits, public debt, and national output growth as signals about the health of the U.S. economy to foreign investors (Bertaut, 2008; Kumhof and Laxton, 2010; Favilukis et al., 2012). These signals, depending on being positive or negative, can either reinforce or distort foreigners' incentives to hold U.S. securities in their portfolios. Moreover, this paper also tests the effects of increasing U.S. trade relationships with other countries and returns on U.S. assets relative to foreign assets on foreign capital flows to the United States since CAPM and some papers like Forbes (2010) argue that they could be determinants of foreign acquisition of U.S. assets.

B. Variables and data

The main analysis, which uses time-series quarterly data, centers on the relative advantages of each type of U.S. security in comparison to other countries' security. From a list of thirty-one top holders of U.S. securities in 2012 provided by the TIC, I construct a sample of 16 countries in which all necessary data are available from 2000:I to 2011:II (See Table 2). They together hold 56% of total foreign portfolio of U.S. securities. Taking into account the MPT, variables that affect a country's investment in the United States can be classified into three categories: risk, expected return, and diversification. The risk variables include the ratios of U.S. fiscal balance/GDP, current account balance/GDP, government debt/GDP, and real GDP growth rate to those of other countries, respectively. The expected return variable measures the ratio of the real

interest rates on U.S. assets to those on other countries' assets. The diversification variable is a country's total trade with the United States calculated as percentage of its GDP.² These variables are calculated according to formulas below:

$$FiscalBalance_{US,i,t} = (FiscalBalance_{US,t}/GDP_{US,t}) / (FiscalBalance_{i,t}/GDP_{i,t})^3 \quad (i)$$

$$CurrentAccountBalance_{US,i,t} = (CurrentAccount_{US,t}/GDP_{US,t}) / (CurrentAccount_{i,t}/GDP_{i,t}) \quad (ii)$$

$$RealGDPGrowth_{US,i,t} = (RealGDPGrowth_{US,t}/RealGDPGrowth_{i,t}) \quad (iii)$$

$$Debt_{US,i,t} = (Debt_{US,t}/GDP_{US,t}) / (Debt_{i,t}/GDP_{i,t}) \quad (iv)$$

$$Return_{US,i,t} = [(E_{i,US,t+1} - E_{i,US,t}) + E_{i,US,t+1} * (i_{US,t} - \pi_{US,t})] / [E_{i,US,t} * (i_{i,t} - \pi_{i,t})]^4 \quad (v)$$

$$Trade_{US,i,t} = TotalTrade_{i,US,t} / GDP_{i,t} \quad (vi)$$

The data on U.S. fiscal deficits and national debt is extracted from the database of the White House, which has datasets on the budget deficits and federal debt generally from 1940 or earlier to the present. The U.S. Bureau of Economic Analysis provides data on U.S. GDP, current account deficits, real GDP growth rates, inflation rates, and trade flows between the United States and other countries. Data on U.S. nominal interest rates on each type of U.S. securities is collected from the Federal Reserve Bank of St. Louis. The International Financial Statistics and IHS Global Insight provide respective data for the selected sixteen countries. Eurostat, the database of the European Union, is also a source of data on fiscal deficits and government debts of European countries in the sample.

V. Estimation and results

A. Estimation & Methodology

1. Rationale and Approach to Empirical Testing

This paper looks at foreign investors' decision to invest in the United States as a result of their examination of the advantages of U.S. securities relative to those of their own country's securities as well as to other countries' securities. The assumptions behind this approach is that foreigners would purchase the U.S. assets rather than their country's assets if they believe owning U.S. assets provides relative advantages; but at the same time, they would purchase the securities of other countries rather than U.S. securities if the relative advantages belong to other countries' assets. Hence, the empirical analysis aims at measuring the change in holdings of

² Total trade = (Bilateral) Imports + Exports, between the United States and a foreign country

³ For these formulas, *i* denotes a foreign country in the sample; *t* denotes a quarter during the period 2000:I-2011:II; and *t*+1 denotes the following quarter.

⁴ *E* denotes the exchange rate between a country's currency and the U.S. dollars, average over a quarter.

U.S. securities by country i as a function of U.S. economic variables relative to those of country i (as specified in Equation (3)), as well as the change in holdings of U.S. securities by country i as a function of U.S. economic variables relative to those of all other countries but country i (as specified later in Equation (4)). Testing the outcomes suggested by both of these functions can provide interesting implications for foreign investment in the United States since they capture the decision-making process of a country's investors who want to purchase securities abroad.

First, I consider the change in holdings of U.S. securities by country i as a function of U.S. economic variables relative to those of country i . Combining the variables and data discussed in Section IV provides the following model for estimation (country and quarter dummies included):

$$\Delta Portfolio_{US,i,t} = \alpha_i + \beta_1 FiscalBalance_{US,i,t} + \beta_2 CurrentAccountBalance_{US,i,t} + \beta_3 RealGDPGrowth_{US,i,t} + \beta_4 Debt_{US,i,t} + \beta_5 Return_{US,i,t} + \beta_6 Trade_{US,i,t} + \delta_t + \varepsilon_{i,t} \quad (3)$$

where $\Delta Portfolio_{i,t}$ is the quarterly change in the group of a country i 's holdings of U.S. portfolio liabilities at time t ; α_i is the country i 's specific effects; the variables respectively measure relative ratios between the United States and country i for each of sixteen countries in the sample: fiscal balance/GDP, current account balance/GDP, real GDP growth rate, debt/GDP, real interest rate, and bilateral trade relationship with the United States over time t or at the end of time t ; δ_t is the time dummy variables, and $\varepsilon_{i,t}$ is the error term. Equation (3) is constructed separately for each asset: agency bond, corporate bond, stock, and Treasury bill.

2. Ordinary Least Squares Regression

The empirical analysis begins with the pooled regression, which is concerned with only Equation (3). First, I pool each type of U.S. asset across all countries in the sample, using the Ordinary Least Squares (OLS). The estimates from such pooled OLS regression give an impression of the statistical meanings of the variables and provide a general picture the impact of the variables on foreign investment in the United States. But these estimates are likely to be not very correct since the variances among countries' variables are very different. The difference stems from a diverse group of countries with considerable gaps in economic size, level, and trade relationship with the United States. Such difference implies the presence of heteroscedasticity in the sample, which can violate the OLS assumption that the data are normally distributed and, therefore, invalidate the statistical test of significance. To reduce the effect of heteroscedasticity in the sample, I also pool each type of asset across six countries in the group that holds more than 3% of U.S. securities: Japan, United Kingdom, Canada, Belgium-Luxembourg, Ireland, and Switzerland.⁵ These countries are all developed countries and more similar in terms of economic level as well as economic relationship with the United States.

⁵ Since the TIC reports Belgium's and Luxembourg's holdings of U.S. securities as one country until 2000:II, in this analysis I consider Belgium-Luxembourg as one country holding the sum of these two countries' holdings of U.S. securities. This country's ratios are obtained by taking the average ratios of Belgium and Luxembourg.

In addition, pooled OLS regression is then applied to the data on all four types of U.S. securities for each country. By pooling the data and estimating a single model, I constrain the variance of the residual to be the same in the four groups. If the error term is known to have the same variance in the four groups, the standard errors obtained from the pooled OLS regression are better and, therefore, more efficient. If the variances are very different, then the pooled OLS regression produces wrong standard errors.

3. *Seemingly Unrelated Regressions*

To effectively capture the effects of the variables on each type of U.S. assets, I use a system of four seemingly unrelated regression (SUR) equations, each having its own dependent variable and different sets of explanatory variables. Every equation has the same five explanatory variables, which are *Fiscal Balance*, *Current Account Balance*, *Real GDP Growth*, *Debt*, and *Trade*. The variable *Return* varies according to the type of the asset. By using SUR, I assume that the error terms in the equations are correlated across the equations, which might very likely happen because the four types of U.S. securities together make up foreign portfolio holdings of U.S. financial assets and are influenced by similar macroeconomic factors. The SUR method is first applied to equation (3) to check the results provided by the OLS method and examine foreigners' motives to invest in the United States rather than their home countries. In SUR regressions for U.S. assets, the sample sizes for four types of asset are balanced.

Building from equation (3), another similar model is provided to estimate how a country i 's holdings of U.S. securities change with an increase or a decrease in U.S. economic ratios relative to the average economic ratios of a group of the other fourteen countries (Belgium and Luxembourg are combined into one), in which the country i is excluded. This model is applied to examine how a country purchases or sells U.S. assets if the U.S. economy perform relatively better or worse than the group of other countries but country i on average.

$$\Delta PortfolioUS_{i,t} = \alpha_i + \beta_1 FiscalBalance_{US,j,t} + \beta_2 CurrentAccountBalance_{US,j,t} + \beta_3 RealGDPGrowth_{US,j,t} + \beta_4 Debt_{US,j,t} + \beta_5 Return_{US,j,t} + \beta_6 Trade_{US,j,t} + \delta_t + \varepsilon_{i,t} \quad (4)$$

(j denotes the average of the other fourteen countries excluding country i).

Equation (4) is also estimated for each asset by using SUR. However, it is applied to only countries that own more than 3% of total foreign holdings of U.S. securities. These countries in the sample are Japan, United Kingdom, Canada, Belgium-Luxembourg, Ireland, and Switzerland. The reason for this selection is that taking the average of other fourteen countries' ratios eliminates the variances among them and may not lead to statistically significant estimates if the selected country does not hold a substantial amount of U.S. assets relative to others.

One advantage of Seemingly Unrelated Regressions over Ordinary Least Squares (OLS) is that SUR produces more efficient estimates than OLS in non-identical prediction equations. In fact, the four equations can produce consistent estimates by using standard OLS. But in case the set of equations has contemporaneous cross-equation error correlation, the SUR method is more efficient than OLS because SUR weighs the estimates by the covariance of the residuals from the individual regressions and, therefore, improves the large-sample efficiency of estimation. However, there are pitfalls which may result from using the SUR method. SUR can produce less

stable estimates than OLS because the correlations across different assets are generally unstable over time. Also, if the error terms turn out to be uncorrelated across the equations, the equations become truly unrelated and SUR is equivalent to OLS. Therefore, I will check the stability of the SUR estimates against the OLS estimates by testing the correlation among the error terms.

B. Central Results

1. Four Types of U.S. Security

The regression results predicting foreign investment in U.S. assets by pooling each type of U.S. securities across 16 countries as specified in Equation (3) are provided in section “All Countries” in Table 5. The OLS method produces consistently small and insignificant coefficient estimates. The only variable that is significant is *Debt*, which is statistically significant for both U.S. agency bonds and treasury bills. This implies the big impact of the Debt/GDP ratio between the United States and foreign countries on foreign investment in U.S. assets. According to the estimates, for one standard deviation increase in the relative Debt/GDP ratio between the United States and the sample, foreign holdings of U.S. agency bonds and treasury bills would decrease by approximately \$360 million and \$830 million, respectively. These estimates do not measure demand effect of the variables for each country in the group, but they provide an overall measure of cross-country demand for U.S. securities. Since the pooled OLS regression by U.S. security across countries generally yield standard errors relative large to the statistics, the countries in the group are likely to not be relatively similar or homogeneous.

To test the statistical significance of the variables when the countries are more homogeneous, I pool the top 6 holders of U.S. securities in the sample: Japan, United Kingdom, Belgium-Luxembourg, Canada, Switzerland, and Ireland (as explained in Section V. part A). The results, provided in the “Top 6 Holders” section in Table 5, are generally of more statistical significance and magnitude than those in previous pooled OLS regression. Also, standard errors are not relatively large to the statistics, which implies greater homogeneity among these countries. Although the estimates do not provides measures for each country in the group and are limited in economic magnitude by pooling together the data of all countries, they suggest that *Debt* and *Trade* have much larger impact on foreign investment in U.S. assets than *Fiscal Balance* and *Return*, given that countries are similar. To further examine the impact of the variables on foreign acquisition of U.S. securities, a look at pooled OLS regression by country across assets is necessary before applying another approach like the SUR method.

2. U.S. Securities⁶

Table 6 reports the regression results predicting foreign investment in U.S. securities by pooling all U.S. securities by each country using the OLS method. The small and insignificant coefficient estimates on *Fiscal Balance* and *Real GDP Growth* imply weak or no impact of changes in these variables on foreign investment in U.S. securities. The coefficients on *Debt* are not large and significant for many countries, which is unexpected since a rise in U.S. Debt/GDP ratio is predicted to strongly influence foreign investors’ decision to acquire U.S. assets in the

⁶ Four types of U.S. securities are examined together, not separately.

previous pooled OLS regression. The coefficients on *Current Account Balance* and *Return* are significant for more countries than *Debt*, but they are not large in terms of economic magnitude.

The coefficient estimates on *Trade* are large and significant for many countries. Most of them have negative signs, which indicate the negative impact of a greater trade relationship with the United States on these countries' holdings of U.S. securities. This implies foreign investors' tendency to diversify their portfolios away from holding U.S. assets when their countries trade more with the United States to avoid correlating their portfolios' performance with U.S. business cycles. This implication is different from the conclusion in Forbes (2010) that countries which trade more with the United States tend to buy more of U.S. securities. But Forbes's dataset covers a lot more countries, including emerging markets like China or India, so the results in this pooled regression might not describe the overall effect of trade relationship. The estimates on *Trade* predict that if there is an increase of 1% of a Japan's GDP in total trade volume between the United States and Japan, Japan would sell \$3.6 billion U.S. securities. For a similar change in trade volume with the United States, United Kingdom, Switzerland, Netherlands, Denmark, and France would sell \$28.7 billion, \$8.65 billion, and \$6.41 billion U.S. securities in their portfolios, respectively. Such a strong reaction from these countries to a closer trade link with the United States can be explained by the fact that their portfolios of U.S. securities are made up mostly of U.S. stocks and corporate bonds, whose values can go down during U.S. recessions.

Although the results in the pooled OLS regression across U.S. assets by each country provide an overall measure of demand effects of the variables for U.S. securities, they do not measure such demand effects of the variables for each type of U.S. securities. Moreover, the OLS method's assumption that the errors are uncorrelated among observations is not likely to hold in the pooled OLS regression because financial assets are usually correlated, either positively or negatively, in the financial markets. This happens as a result of portfolio diversification in which investors can sell stocks and use the proceeds to bonds or vice versa. Such financial correlations are recognized in the Capital Asset Pricing Model (CAPM) arguing in favor of an increase in diversification to reduce the risk of holding a portfolio of various assets. Since this paper's theoretical framework is based on the Modern Portfolio Theory, in which the CAPM plays a key role, the SUR approach is essential to take into account such financial correlations among U.S. assets and produce reliable regression results.

C. Financial Correlation Tests: Four Types of U.S. Securities

1. Foreign Investment in U.S. Agency Bonds

Table 7 reports the regression results predicting foreign investment in U.S. agency bond as specified in Equation (3) using the SUR estimation technique as discussed in Section V. A. Many of the coefficients estimates in Table 7 have the expected sign and are highly significant, while others have fluctuating significance and even varying sign. More specifically, the coefficients on *Current Account Balance* and *Return* are quite small and not significant for many countries. The coefficients on *Debt* or *Trade* are consistently large and significant for more countries than those on *Current Account Balance* or *Return*. The coefficients on *Debt* predict that Belgium-Luxembourg would decrease almost 10% of its holdings of U.S. agency if the relative Debt/GDP ratio between the United States and Belgium-Luxembourg increases by one standard deviation. Denmark and Netherlands would decrease 30% and 3.3% of their holdings of U.S. agency bonds, respectively, for a similar rise in the relative Debt/GDP ratio between the

United States and their countries. But there would be only 1% increase in its holdings of U.S. agency bonds for one standard deviation increase in the relative debt level between the United States and Ireland. This is not surprising since agency bonds are backed by U.S. government sponsored entities or federal government agencies, and therefore negatively influenced by a potential decrease in the U.S. government's capacity to pay debts.

Many of the coefficients on *Trade* are positive and large. This suggests that countries trading more with the United States tend to invest more in U.S. agency bonds than others. The coefficients on *Trade* predict that Japan would raise its holdings of U.S. agency by 2% if Japan's total trade volume with the United States rises by 1% of its GDP. For a similar increase in total trade volume with the United States, Belgium-Luxembourg, Switzerland, and Netherlands would increase their holdings of U.S. agency by 21.4%, 11%, and 13.8%, respectively. In fact, when countries trade more with the United States, their investors are able to collect more information about U.S. government-backed assets and, therefore, more likely to purchase them.

The coefficients on *Fiscal Balance* and *Real GDP Growth* are small and insignificant for all countries. These coefficient estimates provide no support for the argument that a fiscal expansion or a recovery of the economy should attract foreign capital flows into the United States. However, since foreign holdings of U.S. agency comprise only a small proportion of total foreign holdings of U.S. securities (less than 7.7% for all countries and less than 6% for countries in the sample) and U.S. agency bonds are usually less attractive than other types of U.S. assets in terms of liquidity and return, it is easy to understand why there is no large impact of changes in such variables on foreign investment in U.S. agency bonds.

To see more clearly how foreign investors view U.S. agency bonds, I compare the coefficient estimates in Table 7 to those estimates in Table 11, which reports the regression results as specified in Equation (4). According to Table 11, the coefficients on *Trade* are large and positive, indicating that the top holders would invest more in U.S. agency if other countries also trade more with the United States on average. In fact, a country tends to improve its trade relationship with United States if other countries trade heavily with the United States to benefit from the trade relationship. An improved trade relationship with the United States would enable a country to collect more information about U.S. agency bonds and invest more in them. The estimates on *Trade* predict that Japan would increase its holdings of U.S. agency by 3.9% and Belgium-Luxembourg 19% if other countries excluding Japan, or Belgium-Luxembourg, increase their total trade volume with the United States by 1% of their GDP on average.

Besides *Trade*, the coefficients on *Debt* are also large but they have varying signs. Specifically, Japan would increase 10% of its holdings of U.S. agency bonds and Canada 33% if the relative Debt/GDP ratio between the United States and other countries excluding Japan, or Canada, rises by one standard deviation. This should result from the fact that Japan and Canada both have high Debt/GDP ratios relative to other countries, so U.S. agency bonds are still attractive despite a decline in the U.S. liquidity. But for a similar increase in the relative debt level between the United States and the sample excluding Belgium-Luxembourg, Belgium-Luxembourg would sell 12% of its holdings of U.S. agency bonds since it is less confident in U.S. debt securities than Japan and Canada. Table 11 reports neither large nor significant estimates on *Fiscal Balance*, *Current Account Balance*, *Real GDP Growth*, and *Return*.

2. *Foreign Investment in U.S. Corporate Bonds*

Moving from agency bond to corporate bond, Table 8 reports results predicting foreign investment in U.S. corporate bonds as specified in Equation (3) using the SUR method. The results in Table 8 suggest that the strongest determinants of the change in foreign holdings of U.S. corporate bonds are U.S. government Debt/GDP ratio and a country's trade relationship with the United States. These results are expected and quite similar to those in Table 7.

The coefficients on *Debt* and *Trade* are consistently significant to the most countries in comparison to the estimates on other variables. The coefficient estimates on *Debt* indicate that Canada, Brazil, Netherlands, and Germany would all decrease their holdings of U.S. corporate bonds for a higher U.S. Debt/GDP ratio relative to theirs. Specifically, Germany would decrease about 2% of its holdings of U.S. corporate bonds for one standard deviation increase in the relative Debt/GDP ratio between the United States and Germany. Responding to a similar increase in the relative ratio between the U.S. and their debt level, Netherlands would sell 1.5% of its holdings of U.S. corporate bonds, Canada 1.65%, and Brazil almost 7.5%. Since Brazil does not own a substantial amount of U.S. corporate bonds, it is certain that Brazilian investors can respond more strongly to a negative signal of the U.S. liquidity level. But Ireland, one of the top holders of U.S. securities, would increase its holdings of U.S. corporate bonds by 4% for a standard deviation rise in the relative ratio between the U.S. and its Debt/GDP ratio. This implies that Irish institutions and investors are more optimistic than other countries in the sample in investment opportunities abroad, especially in the United States, which could stem from the fact that Ireland is also burdened with high-level government debt.

The coefficient estimates on *Trade* are consistently negative and large. The statistically significant estimates on *Trade* for Belgium-Luxembourg, Canada, Switzerland, Brazil, and Netherlands suggests that these countries would all tend to decrease their holdings of U.S. corporate bonds if they trade more with the United States. The negative impact of a closer economic link between a country and the United States on its holdings of U.S. corporate bonds is not supported in the literature, for example Forbes (2010), but it could be explained by taking into account the diversification motives of foreign investors. Corporate bonds are less liquid than government-backed securities such as government treasury bonds. Also, the values of corporate bonds are often correlated with the performance of companies on the stock indexes. Therefore, foreign investors have the tendency to diversify their portfolios by holding less U.S. corporate bonds if their countries trade more with the United States. Hence, they would not incur the risk of owning corporate bonds of insolvent U.S. corporations.

The regression estimates on *Current Account Balance* and *Fiscal Balance* are small and not statistically significant for many countries. These results do not support the argument that an increase in the U.S. fiscal deficit and current account deficit lead to stronger foreigner investment in U.S. corporate bonds. Similarly, the coefficients on *Real GDP Growth* and *Return* are insignificant in terms of both economic magnitude and statistical meaning, indicating that these variables are not important determinants of foreign capital flows into the United States in the form of the acquisition of U.S. corporate bonds.

Considering the abroad factor in a foreign investor's decision to purchase corporate bonds from the United States or another country, I run a regression model for U.S. corporate bonds as specified in Equation (4). Table 12 reports coefficient estimates that convey a similar meaning to those in Table 8. The regression results on *Fiscal Balance*, *Real GDP Growth*, and *Return* are small and insignificant for all the top holders. The estimates on *Debt* and *Trade* are significant for several countries and consistently negative. Table 12 predicts that Belgium-Luxembourg and Ireland would decrease about 1% and 2.25% of their holdings of U.S. corporate bonds, respectively, if the relative ratio between the U.S. and the sample's average Debt/GDP ratio, excluding Belgium-Luxembourg or Ireland, goes up by one standard deviation. Although Table 8 shows that Ireland should respond more positively a rise in the U.S. debt level, the result in Table 12 is not unreasonable. In fact, Ireland would be discouraged from investing in the United States if the U.S. liquidity is low relative to that of other countries on average.

Also, the coefficients on *Trade* predict a tendency to sell rather than purchase U.S. corporate bonds if other countries trade more with the United States. Ireland could sell 1.75% of its holdings of U.S. corporate bonds if other countries excluding Ireland increase their total trade volume with the United States by 1% of their GDP on average. The regression estimates on *Current Account Balance* are positive and statistically significant for most of the top holders. They indicate that Belgium-Luxembourg, Canada, Switzerland, or Ireland would hold 1% to 1.5% more of U.S. corporate bonds in its portfolio for one standard deviation increase the relative current account deficits/GDP ratio between the United States and other countries. This might suggest that the increasing capital flows from these top holders to the United States help finance the U.S. current account deficits. It could also mean the weaker U.S. dollar, which results from increasing U.S. current account deficits, would enlarge the value of such countries' holdings of U.S. corporate bonds when they use their national currencies in transactions.

3. *Foreign Investment in U.S. Stocks*

Table 9 reports the main regression results predicting foreign investment in U.S. stocks from Equation (3) using the SUR method for each country in the sample. Like those for U.S. corporate bonds, the regression results in Table 9 suggests that the most influential factor in foreign investment in U.S. stocks is the trade relationship between the United States and other countries. The estimates on *Trade* are significant to the most number of countries in the group, large, and consistently negative. The countries in which *Trade* is statistically significant are Japan, United Kingdom, Switzerland, and Netherlands. These countries are all among the top holders of U.S. stocks as well as U.S. securities. The coefficients on *Trade* predict that for a 1% of its GDP increase in total trade volume with the United States, Japan, United Kingdom, Switzerland, or Netherlands would decrease its holdings of U.S. stocks by 2.4%, 12%, 10.4%, or 13.4%, respectively. This is similar to what would happen to U.S. corporate bonds. In fact, diversification motives encourage foreign investors to turn away from financial assets that are highly correlated with the performance of the U.S. economy such as corporate bonds and stocks.

The coefficients on *Debt* are neither large nor significant for as many countries as in previous regressions for U.S. agency and corporate bonds. This is reasonable given the fact that bonds are more dependent on the liquidity level of the issuing agencies than stocks. The coefficients on *Fiscal Balance*, *Real GDP Growth*, and *Return* are relatively insignificant in terms of economic

magnitude and statistical meaning for countries in the group. This implies that foreign investors invest in U.S. stocks not because they find returns on U.S. stocks attractive. Therefore, one of foreigners' motives to purchase U.S. stocks is likely to diversify their portfolios. The resources and productivity of American great companies generally serve as a guarantee for the safety of their stocks. Since the U.S. debt level is not a major concern for foreigners investing in U.S. stock, it is clear that the U.S. fiscal deficits do not capture much of their attention. Those for *Current Account Balance* are small, indicating a limited impact of changes in U.S. current account deficits relative to other countries on foreign holdings of U.S. stocks.

Comparing the regression results in Table 9 with those in Table 13, which considers the abroad factor in a foreign investor's decision as specified in Equation (4), I notice considerable difference between them. According to the regression results in Table 13, only the coefficients on *Current Account Balance* are significant for all six top holders of U.S. securities. The regression estimates for *Current Account Balance* in Table 13 predict that if for one standard deviation increase in the relative current accounts deficits/GDP ratio between the United States and other fourteen countries, Japan would increase its holdings of U.S. stocks by 1.8%. The increase in holdings of U.S. stocks by investors from United Kingdom, Belgium-Luxembourg, Canada, Switzerland, or Ireland for a similar rise in the relative ratio between the United States and the sample average's current account deficits/GDP ratio, excluding their country, is 3.2%, 2.6%, 2.3%, 2.25%, or 3.6%, respectively. Like those for U.S. corporate bonds in Table 12, these estimates suggest increasing capital flows from abroad, especially from these top holders, to America in the form of the acquisition of U.S. stocks to finance greater U.S. current account deficits. The depreciation of the U.S. dollar, which happens as a result of increasing U.S. current account deficits, would either encourage greater foreign acquisition of U.S. assets or enlarge the values in dollar of their portfolios when foreign currencies are used in transactions.

The consistent small magnitude and insignificance of the coefficients on other variables in Table 13 confirm the little impact of changes in the U.S. fiscal deficit, government debt, real GDP growth rate, and stock market returns relative to other economies on foreign holdings of U.S. stocks. This means foreign investors do not find U.S. companies particularly attractive or unreliable even if the U.S. economy performs better or worse than other ones. Therefore, diversification is probably the main drive behind foreigners' decision to purchase U.S. stocks. Also, when the United States trades more with the world, the tendency of foreign investors to sell out U.S. stocks becomes invalid as it is no longer possible for them to avoid a correlation between their portfolios and the U.S. economy.

4. Foreign Investment in U.S. Treasury Bills

Foreign demand for U.S. treasury bills is supposed to be largely influenced by the U.S. liquidity. Table 10 reports the regression results predicting foreign investment in U.S. treasury bills from Equation (3) using the SUR method. The coefficients on *Debt* are consistently large and significant to more countries than those on other variables. They predict that for one standard deviation rise in the relative ratio between the U.S. and its Debt/GDP ratio, Belgium-Luxembourg, Switzerland, Brazil, Sweden, or France would increase its holdings of U.S. treasury bonds by 1%, 1.5%, 2.46%, 5.3%, or 2.1%, respectively. These positive estimates for *Debt* suggest that, despite high U.S. Debt/GDP ratio, the U.S. treasury bills are still attractive and

heavily purchased by foreign investors once the United States issues more of them. Greater U.S. borrowing needs would drive stronger foreign demand for U.S. government bonds.

The coefficients on *Fiscal Balance*, *Current Account Balance*, and *Return* are all statistically significant for two countries. Specifically, the regression estimates on *Fiscal Balance* are significant for Canada and Brazil. For a standard deviation increase in the relative fiscal deficits/GDP ratio between the United States and their countries, Brazil would hold 1.4% more of U.S. treasury bills in their portfolio and Canada 2% more.

The regression estimates for *Current Account Balance* are statistically significant for United Kingdom and Norway. They suggest that United Kingdom would sell 3.6% of its holdings of U.S. treasury bills if the relative ratio between the U.S. and its current account deficits/GDP increases by one standard deviation. But Norway would increase 4% of its holdings of U.S. treasury bills for a similar rise in U.S. current account deficits level relative to its level. In fact, while United Kingdom has a current account deficit, Norway has a surplus. Therefore, for one standard deviation in the relative current account deficits/GDP between the United States and Norway, Norway would put the United States in a stronger position to attract foreign demand for U.S. securities. The coefficients on *Return* are very small, indicating no significant implications.

Out of all countries in the sample, only Netherlands has a statistically significant coefficient on *Real GDP Growth*. Netherlands is predicted to increase its holdings of U.S. treasury bills by 2.2% if the relative ratio between the U.S. and its real GDP growth rate goes up by one standard deviation. This change is expected since an increase in the U.S. output would put upward demand for U.S. securities. The coefficients on *Trade* are mostly negative and quite large, and are statistically significant for three countries: Japan, United Kingdom, and Belgium-Luxembourg. According to these estimates, Japan and United Kingdom would sell 1.1% and 7.9% of their holdings of U.S. treasury bills, respectively, if each country's total trade volume with the United States increases by 1% of its GDP. However, Belgium-Luxembourg would increase its holdings of U.S. treasury bills by almost 12% for a similar rise in its total trade volume with the United States. Since these countries are all top holders of U.S. securities, it is likely that, despite the diversification motives, investors from Belgium-Luxembourg are more confident in the safety of their investment in U.S. treasury bills than those from Japan and United Kingdom when their countries trade more with the United States.

To examine the abroad factor in foreign investors' investment decision, I compare Table 10 to Table 14, in which the results are obtained by using the model as specified in Equation (4). The coefficients in Table 14 have the expected signs and are relatively similar to those in Table 10. According to Table 14, the coefficients on *Trade* and *Real GDP Growth* are statistically significant for two countries, while those on other variables are all statistically significant for one country. The estimates for *Trade* indicate an increase of 0.69% or 0.48% in the holdings of U.S. treasury bills by Japan or Belgium-Luxembourg, respectively, if the average total trade volume of other fourteen countries with the United States increases by 1% of the average GDP of these countries. Also, the coefficients on *Real GDP Growth* show an increase of 3.4% and 0.5% in the holdings of U.S. treasury bills by United Kingdom or Switzerland for a standard deviation rise in the relative ratio between U.S. and other fourteen countries' average real GDP growth rate.

Debt is no longer the most significant determinant of foreign investment in U.S. treasury bills in Table 14, but the statistically significant coefficient on *Debt* for Switzerland is also positive. It indicates that Switzerland would raise its holdings of U.S. treasury bills by 0.61% for one standard deviation increase in the relative Debt/GDP ratio between the United States and the sample excluding Switzerland. The coefficients on *Fiscal Balance* are very small and of no statistical importance. The coefficients on *Current Account Balance* and *Return* are both statistically significant for Belgium-Luxembourg. According to these regression estimates, Belgium-Luxembourg's holdings of U.S. treasury bills would increase by 0.95% if the relative ratio between the U.S. and other fourteen countries' current account deficits/GDP ratio goes up by one standard deviation, and decrease by 1.1% for one standard deviation increase in the relative return on treasury bonds between the United States and other fourteen countries.

5. The Impact of Financial Correlation on Regression Results

The regression results reported in Table 7, 8, 9, and 10 predicting foreign investment in four different types of U.S. securities reveal several major statistical differences from those in Table 5 and 6. The differences among results obtained by the SUR and OLS methods are subject to concerns over the impact of financial correlations across four types of U.S. assets on the efficiency of regression estimates. The pooled OLS regression in Table 5 confirms the statistically significant impact of U.S. Debt/GDP ratio and trade relationship with other countries on foreign demand for U.S. assets, particularly debt securities. But Table 5 shows little impact of changes in U.S. current account deficits or real GDP growth rates on foreign investment in U.S. assets, which is relatively different from Table 7-14 and even from Table 6.

Additionally, the pooled OLS regression in Table 6 provides no statistically significant estimates for *Fiscal Balance*, which Table 8, 9, and 10 reports differently. Also, Table 6 shows statistically significant coefficients on *Debt* for only two countries, which is less than what is provided in any SUR regressions in Table 7, 8, 9, and 10. As noted in Section V-Part B, the pooled OLS regression results in Table 6 do not measure demand effects for each type of U.S. securities. Therefore, the pooled OLS regression estimates have relatively small economic magnitude and, therefore, are limited in terms of statistical meaning. The SUR regression estimates generally have much larger economic magnitude, which is a good reflection of what usually happens in reality, and therefore more accurate.

Furthermore, by checking the correlation among error terms of SUR equations for four types of U.S. securities, I notice medium-high to high correlation among them for almost every country (See Appendix). This rules out the OLS assumption that errors are uncorrelated among observations and confirms the efficiency of the SUR method over the OLS approach. Since the observations are collected by quarters over a relatively long period of time (2000:I to 2011:II), such correlation among the error terms testifies the presence of financial correlations among different types of assets, which is a central idea in the Modern Portfolio Theory. Thus, this paper will consider regression results obtained by the SUR method from Table 7 to Table 14, instead of the pooled OLS regression results in Table 5 and 6, to be the key results.

VI. Implications for Foreign Investment in the United States

This section provides further discussion of the key results from Table 7 to Table 14 to roughly estimate how changes in the variables, particularly U.S. fiscal deficit, could affect capital flows and investment into the United States. The estimates from Table 11 to 14 should be interpreted cautiously given the small number of countries in the sample and the limited variances among observations. Nonetheless, the estimates indicate several noteworthy results and mostly support the results from Table 7 to 10. In fact, Table 7, 8, 11, and 12 report no substantial impact of changes in the U.S. fiscal deficit on foreign investment in U.S. agency and corporate bonds. But Table 9, 10, 13, and 14 reveal that an increase in U.S. fiscal deficit/GDP ratio would be associated with stronger acquisition of U.S. stocks or treasury bills from Japan, United Kingdom, Canada, Mexico, and Brazil. Only Switzerland would sell U.S. stocks for a rise in the relative fiscal deficit/GDP ratio between the United States and the sample excluding Switzerland. Nevertheless, the changes in these countries' holdings of U.S. stocks or treasury bills are predicted to be relatively small.

Since there is a positive correlation between fiscal deficit and government debt, the coefficients on *Fiscal Balance* could understate the impact of the U.S. fiscal policy on foreign demand for U.S. assets. When the United States is running a budget deficit, it has to borrow the money through issuing Treasury Bills and, therefore, increase its national debt in the long run. The regressions estimates for *Fiscal Balance* could reveal how changes in the U.S. fiscal deficit would affect foreign investment in the United States in the short run. But to address the concern over the sustainability of capital flows and investment into the United States, the coefficients on *Fiscal Balance* and *Debt* must be taken into account together.

From Table 7 to 14, the regression results predict that changes in the U.S. debt level have a relatively strong impact on many countries' holdings of U.S. assets, especially debt securities. This is expected, as explained in Section V, because the Debt/GDP ratio represents a country's liquidity level and is always an important indicator of its capacity for debt payment. The estimates predict that for a rise in the U.S. debt level relative to other countries' level, holdings of U.S. agency bonds by Belgium-Luxembourg, Denmark, and Netherlands would substantially decrease. At the same time, Canada, Brazil, Netherlands, and Germany would significantly reduce their holdings of U.S. corporate bonds. Only Ireland's holdings of U.S. agency and corporate bonds would increase slightly despite a rise in the relative ratio between the U.S. and its debt level. Also, the rise in U.S. debt level would be associated with decreasing holdings of U.S. stocks by Australia, Mexico, and Denmark, but increasing acquisition of U.S. treasury bills from Belgium-Luxembourg, Switzerland, Brazil, Sweden, and France. The abroad factor, which is examined in Table 11, 12, 13, and 14, also suggests strong purchases of U.S. agency bonds from Japan and Canada and of U.S. treasury bills from Switzerland for a rise in the relative ratio between the U.S. and other countries' average debt level. But for a similar increase in the U.S. debt level, it expects sharp declines in Belgium-Luxembourg's holdings of U.S. agency and corporate bonds and in Ireland's holdings of U.S. corporate bonds. Considering the magnitude of these effects, it can be said that the negative impact of a rise in the U.S. debt level on foreign investment in the United States is larger than its positive impact.

The key regression results predict little impact of a change in the U.S. real GDP growth rate or interest rates on foreign investment in U.S. assets. Only Mexico and Belgium-Luxembourg respond more strongly than others to a rise in the U.S. interest rate with sales of U.S. agency and treasury bonds, respectively. But such changes in their holdings of U.S. assets are not large and can only be attributed to country-specific effects. The effect of a rise in the U.S. current account deficit on foreign demand for U.S. assets is inconsistent across countries. Several countries, especially the top holders of U.S. securities, respond strongly to an increase in the relative current account deficits/GDP ratio between the U.S. and the sample excluding them, while others do not. According to the regression estimates for *Current Account Balance*, Sweden and Norway would strongly sell U.S. agency and corporate bonds, respectively, for a rise in the U.S. current account deficit relative to their deficits. But Norway would heavily purchase U.S. treasury bills to compensate for the decrease in its holdings of U.S. corporate bonds. United Kingdom and Australia would also decrease their holdings of U.S. stocks for a rise in the U.S. current account deficit against their deficits, but the changes in their holdings are small. Nevertheless, almost every top holder of U.S. securities in the sample would adjust its holdings of U.S. corporate bonds and stocks significantly for an increase in the relative current account deficits/GDP ratio between the United States and other fourteen countries. Specifically, six top holders of U.S. securities in the sample would heavily purchase U.S. stocks, and four of them (excluding Japan and United Kingdom) would strongly buy U.S. corporate bonds for such an increase in the U.S. current account deficit. Belgium-Luxembourg would slightly also increase its holdings of U.S. treasury bills, along with its purchases of U.S. corporate bonds and stocks.

Furthermore, the key results confirm the importance of the U.S. trade relationship with other countries as a determinant of foreign demand for U.S. assets. Generally, an increase in total trade volume with the United States would be associated with stronger purchases of U.S. agency bonds, but sharp decreases in foreign holdings of U.S. corporate bonds and stocks. The impact of trade relationship with the United States on foreign demand for U.S. treasury bills is less than for other types of assets and varies by countries. With greater total trade volume with the United States, while Japan and United Kingdom would sell a large portion of their holdings of U.S. treasury bills, Belgium-Luxembourg would heavily purchase such treasury bonds. It can be inferred that countries that trade more with the United States tend to hold less U.S. treasury bills than those that trade less with the United States.

These key results could be biased because the limited coverage of low- and middle-income countries in the sample can understate the aggregate impact of real GDP growth rates and current account deficits on foreign acquisition of U.S. assets, especially debt securities. As the U.S. fiscal stimulus packages should raise the U.S. GDP and domestic demand for imported goods, foreign capital flows into the United States and the U.S. current account deficits are likely to increase. The depreciation of the dollar, a result of increasing U.S. current account deficits, could encourage stronger foreigners' purchases of U.S. securities. Many of the top countries which export to the United States, such as China, South Korea, India, and Taiwan, are also among top holders of U.S. securities, but they not included in the analysis. Moreover, the sample also lacks other emerging economies including Russia and oil-producing countries in the Middle East, which allocate most of their savings from oil sales to buy safe financial assets from abroad, of which U.S. treasury bills are the most attractive.

VII. Conclusion

The key empirical results predict that a change in the U.S. fiscal deficit would have only a small impact on foreign holdings for U.S. securities. In the short run, a rise in the U.S. fiscal deficit is likely to be associated with increasing foreign acquisition of U.S. stocks and treasury bills, but not stronger foreign demand for U.S. agency or corporate bonds. Besides the U.S. fiscal deficits, the strongest and most consistent result is that a higher U.S. debt level tends to be associated with decreases in foreign holdings of U.S. agency bonds, corporate bonds, and stocks. While regression results and recent statistics on foreign holdings of U.S. assets predicts that such reduction in foreign holdings of these three types of U.S. security should be compensated by an increase in foreign acquisition of U.S. treasury bills, it might still result overall decrease in foreign holdings of U.S. securities in the long run. Nonetheless, the fiscal stimulus packages, worth less than \$1 trillion, might not have a big impact on the U.S. current government debt of \$16.4 trillion. Therefore, it is highly unlikely that the U.S. fiscal stimulus could lead to a strong increase in the U.S. government debt that would be negatively correlated with foreign capital flows and investment into the United States in the long run.

As the U.S. fiscal stimulus increases the U.S. fiscal deficit and debt, would foreign capital flows into the United States be sustainable? The answer is probably yes, given the strong foreign demand for U.S. treasury bills and the small impact of the fiscal stimulus on the U.S. liquidity. However, if the U.S. government debt and current account deficits become too large that they are intractable, both the regression results and the literature on international capital flows suggest that foreign capital flows into the United States would begin to decline. But this possibility might not become true in many years; and even if it happens, it will not be a consequence of the current U.S. fiscal stimulus packages. If such a possibility occurs, there would certainly be enormous and rapid adjustments not only in U.S. capital flows, but also in global imbalances.

Table/Figure 1. Estimated foreign holdings of U.S. securities by types of security

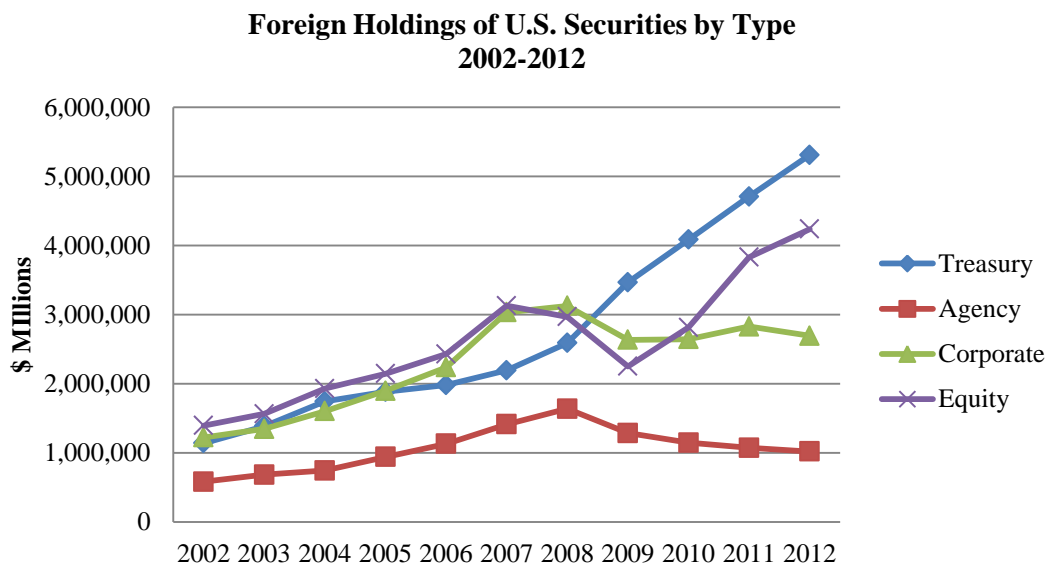


Table 2. List of 16 Selected Countries' Holdings of U.S. Securities in 2012 (in \$Millions)

Country	Agency	Corporate	Equities	Treasury	Total
Japan	249,509	163,155	313,645	1,108,872	1,835,181
Belgium-Luxembourg	39,481	646,587	314,626	284,248	1,284,942
United Kingdom	12,165	372,915	494,762	127,738	1,007,580
Canada	3,410	107,029	471,016	53,274	634,729
Switzerland	19,581	110,663	263,471	172,179	565,894
Ireland	45,678	207,871	108,365	90,653	452,567
Brazil	1,669	2,166	3,552	244,531	251,918
Netherlands	12,109	62,204	151,041	25,788	251,142
Germany	6,255	77,976	78,794	64,069	227,094
France	2,092	54,315	119,861	48,796	225,064
Norway	801	19,793	124,275	68,045	212,914
Australia	4,374	19,735	111,993	25,216	161,318
Mexico	39,843	7,665	23,088	51,183	121,779
Sweden	934	13,345	69,759	27,695	111,733
Denmark	715	23,740	36,675	15,289	76,419
TOTAL	438,616	1,889,159	2,684,923	2,407,576	7,420,274
Percentage⁷	43%	70.1%	63.4%	45.3%	56%

⁷ Note: This represents the percentage of the value of the sample's holdings of each type of U.S. assets in the total foreign holdings of each type of U.S. assets.

Table 3. Average Change in Holdings of U.S. Assets by Country from 2000:I - 2011:II
(in \$Millions)

Country	Agency	Corporate	Stock	Treasury	Total
Japan	4728.34	2605.88	3643.20	13035.93	24013.35
United Kingdom	-354.78	6938.01	3734.12	942.62	11259.96
Canada	1.59	1686.49	5584.22	619.01	7891.30
Switzerland	190.37	2374.22	2121.91	1807.21	6493.71
Belgium-Luxembourg	402.86	13826.98	5063.58	3268.81	22562.23
Ireland	486.03	2640.92	1796.90	590.22	5514.06
Australia	90.70	526.90	1907.01	224.42	2749.03
Norway	186.98	479.31	2606.57	509.76	3782.62
Brazil	19.20	10.46	21.67	4423.40	4474.73
Netherlands	35.02	997.69	1578.94	279.43	2891.08
Mexico	513.67	222.20	475.59	447.91	1659.37
Sweden	-21.78	230.02	901.30	435.80	1545.35
Denmark	8.28	366.88	489.99	107.44	972.59
Germany	15.33	1094.19	-88.94	0.06	1020.63
France	22.98	1105.04	2158.20	451.88	3738.10
TOTAL	6324.78	35105.17	31994.27	27143.89	100568.12
Percentage	6.29%	34.91%	31.81%	26.99%	100.00%

Source: TIC Final Report on Foreign Portfolio Holdings of U.S. Securities (2013).

Table 4. Summary of Quarterly Change in 16 Countries' Holdings of U.S. Securities from 2000:I to 2011:II (in \$Millions)

Country	Average	Standard Deviation	Lowest⁸	Highest⁹
Japan	24013.4	26774.0	-44367.0	102288.7
United Kingdom	11260.0	44315.2	-136902.0	93752.7
Canada	7891.3	25504.1	-98564.3	54769.7
Switzerland	6493.7	14172.8	-38464.7	35084.3
Belgium-Luxembourg	22562.2	35086.7	-136799.7	71562.0
Ireland	5514.1	9676.2	-36198.7	26594.0
Australia	2749.0	7815.4	-26041.0	17092.3
Norway	3782.6	8799.7	-16047.3	32262.7
Brazil	4474.7	9768.4	-16228.0	29874.7
Netherlands	2891.1	13978.7	-62264.0	20598.7
Mexico	1659.4	5093.5	-16172.0	14074.3
Sweden	1545.4	4881.2	-20037.0	9139.7
Denmark	972.6	2416.4	-8377.7	4516.0
Germany	1020.6	10780.3	-39275.0	21698.7
France	3738.1	13791.4	-51198.3	33110.7

Source: TIC Final Report on Foreign Portfolio Holdings of U.S. Securities (2013).

⁸ Lowest refers to strongest sale of U.S. securities.

⁹ Highest refers to strongest purchase of U.S. securities.

Table 5. Foreign Investment in Each Type of U.S. Assets (in \$Millions)
(Pooled OLS Regression by type of asset)

	All Countries				Top 6 Holders			
	Agency	Corporate	Stock	Treasury	Agency	Corporate	Stock	Treasury
<i>Fiscal Balance</i>	-0.0618 (-0.42)	-0.217 (-0.77)	0.0948 (-0.27)	-0.6 (-1.62)	10.28* (-2.13)	75.53*** (-3.81)	101.4 (-1.18)	-11.55 (-0.52)
<i>Current Account Balance</i>	-0.046 (-1.31)	-0.103 (-1.26)	-0.0784 (-1.31)	-0.11 (-0.91)	70.71 (-1.9)	200.1 (-1.56)	10.6 (-0.06)	-103 (-0.78)
<i>Real GDP Growth</i>	-0.0359 (-0.31)	-0.0936 (-0.33)	0.154 (-0.26)	-0.347 (-0.86)	3.381 (-1.09)	-1.851 (-0.35)	17.97 (-0.41)	-10.86 (-1.14)
<i>Debt</i>	-358.9** (-2.92)	55.48 (-0.39)	575.6 (-1.74)	-834.4* (-2.28)	-1395.6*** (-3.37)	-1130.9* (-2.54)	98.29 (-0.1)	-2654.7* (-2.53)
<i>Return on Agency</i>	-1.117 (-1.82)				-16.24 (-0.47)			
<i>Trade</i>	0.000408 (0.64)	0.000989 (0.69)	-0.0000443 (-0.04)	0.00211 (1.14)	-0.8393 (-0.01)	-687.2*** (-3.75)	-0.396 (-0.00)	-459.6** (-3.25)
<i>Return on Corporate</i>		1.174 (0.83)				15.12* (2.56)		
<i>Return on Stock</i>			2.513 (1.06)				3.075 (1.95)	
<i>Return on Treasury</i>				64.8 (1.52)				262.6* (2.36)
Observations	690	690	690	690	276	276	276	276
R-squared	0.0112	0.0008	0.0028	0.0146	0.0719	0.0904	0.0328	0.0656
F-stat	1.73	0.78	1.66	1.39	3.42	13.09	0.94	3.08

**Table 6. Foreign Investment in U.S. Securities (in \$Millions)
(Pooled OLS Regression by Country)**

	Japan	United Kingdom	Belgium-Luxembourg	Canada	Switzerland	Ireland	Australia	Norway	Brazil	Netherlands	Mexico	Sweden	Denmark	Germany	France
<i>Fiscal Balance</i>	476.9 (0.94)	12.15 (0.39)	16.1 (0.31)	73.77 (1.89)	145.6 (1.29)	46.85 (1.17)	0.505 (0.78)	-27.07 (-0.42)	899.5 (1.36)	-614.6 (-0.89)	38.92 (1.69)	-12.88 (-0.31)	-19.15 (-1.85)	44.97 (1.67)	55.04 (0.72)
<i>Current Account Balance</i>	3347.8 (1.56)	-663.4** (-2.90)	196.1** (3.14)	38.16 (0.21)	2102.9 (0.88)	-36.81 (-1.87)	-1183.4* (-2.10)	5934.1 (1.2)	-45.93 (-1.60)	144.1 (0.37)	-4.568* (-2.33)	159.3 (0.26)	5.261 (0.79)	-32.23 (-0.19)	-0.204 (-0.48)
<i>Real GDP Growth</i>	-17.03 (-0.25)	-45.82 (-1.50)	-30.47 (-0.18)	16.88 (1.95)	2.653 (0.05)	3.484 (0.13)	76.84 (1.27)	-0.362 (-0.26)	-1.624 (-0.17)	878.1 (1.31)	15.21 (1.79)	356.3 (0.91)	-2.675 (-1.87)	3.041 (0.69)	0.9 (1.47)
<i>Debt</i>	5403.9 (0.40)	-11048.5 (-1.13)	1415.8 (0.28)	-3803.5 (-0.63)	538.4 (0.69)	1457.8 (1.39)	-1474.3* (-2.16)	-276.8 (-0.55)	9263.1 (1.17)	-3402.1 (-1.36)	-1203.6 (-0.98)	184.7 (0.24)	-307.5* (-2.27)	-4725.7 (-1.00)	-1174.5 (-0.16)
<i>Return¹⁰</i>	472.8* (2.00)	-12.03 (-0.12)	3.440* (2.43)	-284.5** (-2.90)	-133.4 (-1.45)	176 (1.95)	4.119 (0.21)	25.88 (0.99)	42.69 (0.72)	-51.09*** (-6.06)	13.58 (0.77)	3.037 (1.41)	-67.45* (-2.25)	-70.01* (-2.08)	-1.002 (-1.08)
<i>Trade</i>	-3661.8* (-2.24)	-28702.6*** (-4.63)	-4389.6 (-0.85)	-1531.0 (-1.43)	-8646.4** (-2.73)	-11356 (-0.34)	-2700.4 (-1.90)	-2325.3 (-1.90)	-422.2 (-0.14)	-6411.4** (-2.65)	-335.3 (-1.22)	103.2 (0.07)	-2273.4* (-2.37)	-8092.1 (-1.81)	-5691.6** (-2.69)
Obs	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184
R-squared	0.0803	0.1164	0.0620	0.1797	0.1201	0.0347	0.1076	0.0329	0.0546	0.0647	0.0734	0.0159	0.0862	0.0609	0.0263
F-stat	2.68	4.72	4.38	3.00	3.88	1.77	1.84	0.94	1.44	8.92	1.92	1.02	3.26	2.63	4.22

¹⁰ In this table, *Return* refers to the relative return between the U.S. assets and a foreign country's assets

**Table 7. Foreign Investment in U.S. Agency Bonds (in \$Millions)
(SUR Regression for Each Country in the Sample)**

	Japan	United Kingdom	Belgium-Luxembourg	Canada	Switzerland	Ireland	Australia	Norway	Brazil	Netherlands	Mexico	Sweden	Denmark	Germany	France
<i>Fiscal Balance</i>	408.3 (0.91)	5.791 (0.34)	-9.447 (-0.34)	7.738 (-1.46)	-29.78 (-0.87)	15.62 (0.46)	1.558 (0.56)	14.83 (0.39)	150.4 (0.91)	-102.5 (-0.66)	70.38 (1.26)	7.112 (0.55)	-5.953 (-0.93)	15.94 (0.7)	-24.33 (-0.66)
<i>Current Account Balance</i>	-1183.1 (-0.38)	141.8 (1.2)	109.3** (3.06)	64.15 (1.14)	429.2 (1.11)	10.65 (0.52)	459.1 (0.58)	195.9 (0.09)	-22.05* (-2.29)	-28.39 (-0.28)	-1.526 (-0.42)	-577.2* (-2.13)	1.62 (0.26)	158.1 (1.54)	-0.142 (-0.33)
<i>Real GDP Growth</i>	0.761 (0.01)	13.37 (0.78)	143 (1.83)	-0.0093 (-0.00)	15.7 (1.51)	36.23 (1.39)	73.34 (1.07)	-0.737 (-0.44)	-6.925 (-0.71)	-79.71 (-0.62)	-6.744 (-0.41)	79.63 (0.96)	-0.179 (-0.31)	-2.494 (-0.62)	1.131 (1.79)
<i>Debt</i>	-27901 (-1.12)	-3672.1 (-0.60)	-18683.9**** (-5.89)	2806.3 (1.49)	144.9 (0.84)	1399.0** (3.00)	-1471.6* (-2.57)	381.2 (1.8)	1529.1 (0.93)	-2669.4** (-3.05)	-207.3 (-0.11)	-181.2 (-0.96)	-346**** (-5.69)	-2549.5 (-0.86)	-1630.8 (-0.56)
<i>Return¹¹</i>	798.6* (2.28)	-396.1 (-1.82)	-38.72 (-0.40)	-43.35 (-1.22)	3.462 (0.19)	69.92 (0.88)	41.79 (1.53)	-16 (-1.26)	67.08** (2.71)	-111 (-1.50)	-1979** (-2.89)	0.214 (0.11)	-23.21 (-1.03)	12.31 (0.1)	-230.1 (-1.40)
<i>Trade</i>	4723.6* (2.26)	4843.7 (1.02)	8450.5** (2.66)	621.84 (1.87)	2220.8** (2.64)	342.3 (1.77)	-2542.4 (-1.30)	950.4 (0.87)	680.2 (0.86)	1655.94* (2.44)	-44.09 (-0.08)	-393.3 (-0.89)	-41.2 (-0.08)	-1784.6 (-0.56)	-731.7 (-0.41)
Obs	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46
R-squared	0.2595	0.1120	0.5601	0.1314	0.2081	0.2042	0.1184	0.0955	0.2284	0.2865	0.2616	0.2188	0.4433	0.0755	0.1513
Chi-square	16.22	6.65	59.26	7.46	12.19	12.21	9.51	4.43	15.13	18.76	15.26	12.99	36.69	3.69	5.98

¹¹ In this table, *Return* refers to the relative return between the U.S. agency bonds and a foreign country's treasury bonds

**Table 8. Foreign Investment in U.S. Corporate Bonds (in \$Millions)
(SUR Regression for Each Country in the Sample)**

	Japan	United Kingdom	Belgium-Luxembourg	Canada	Switzerland	Ireland	Australia	Norway	Brazil	Netherlands	Mexico	Sweden	Denmark	Germany	France
<i>Fiscal Balance</i>	783.3** (2.76)	96.19 (1.81)	67.98 (0.51)	37.06*** (5.27)	11.97 (0.09)	33.91 (0.22)	0.12 (0.07)	-61.71 (-1.54)	-122.9*** (-3.62)	144.9 (0.28)	5.842 (0.1)	16.83 (0.74)	-5.792 (-0.50)	92.64 (1.6)	-25.98 (-0.33)
<i>Current Account Balance</i>	-839.5 (-0.43)	-604 (-1.58)	315.7 (1.85)	44.89 (0.61)	973.4 (0.67)	-56.62 (-0.59)	-582.6 (-1.15)	-10086*** (-4.44)	1.407 (0.72)	241.5 (0.71)	-6.162 (-1.80)	53.97 (0.11)	9.626 (0.85)	-110.4 (-0.42)	-0.572 (-0.62)
<i>Real GDP Growth</i>	-4.655 (-0.09)	-21.81 (-0.40)	-550.1 (-1.54)	9.011* (2.23)	35.29 (0.91)	58.41 (0.48)	-28.1 (-0.64)	1 (0.57)	-2.582 (-1.29)	216.4 (0.5)	28.8 (1.84)	15.63 (0.11)	-0.926 (-0.89)	4.948 (0.48)	0.0141 (0.01)
<i>Debt</i>	-9619.6 (-0.63)	13769.9 (0.7)	-7639.6 (-0.53)	-5284.9* (-2.13)	-168.7 (-0.26)	8045.0*** (3.71)	-545.2 (-1.51)	-321.4 (-1.46)	-1616.9*** (-4.77)	-7546.5* (-2.57)	46.88 (0.03)	-278 (-0.86)	78.57 (0.73)	-19207* (-2.48)	-2808.2 (-0.45)
<i>Return¹²</i>	-449 (-1.20)	1.446 (0.01)	-16.1 (-0.34)	-126.4 (-1.91)	-141.3 (-0.75)	638 (1.84)	8.078 (0.35)	36.37 (1.2)	-0.495 (-0.24)	-1.677 (-0.03)	31.79 (0.54)	8.67 (0.74)	-20.68 (-0.63)	-57.59 (-1.14)	-0.685 (-0.45)
<i>Trade</i>	245.5 (0.18)	-22595.1 (-1.48)	-38546.4** (-2.59)	-946.4* (-2.17)	-10184.0** (-3.28)	-257.27 (-0.28)	-832.79 (-0.67)	342.15 (0.29)	-467.2** (-2.80)	-5513.45* (-2.41)	-650.23 (-1.13)	275.27 (0.36)	-1774.9 (-1.86)	-9380.8 (-1.12)	-3782.3 (-0.98)
Obs	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46
R-squared	0.2043	0.1693	0.2901	0.4784	0.2525	0.2843	0.0899	0.3829	0.3719	0.2079	0.1397	0.1268	0.1288	0.2513	0.0308
Chi-square	12.51	9.38	18.86	43.85	16.24	19.25	4.68	29.85	27.64	11.84	7.71	6.47	7.42	14.83	1.52

¹² In this table, *Return* refers to the relative return between the U.S. corporate bonds and a foreign country's stocks

**Table 9. Foreign Investment in U.S. Stocks (in \$Millions)
(SUR Regression for Each Country in the Sample)**

	Japan	United Kingdom	Belgium-Luxembourg	Canada	Switzerland	Ireland	Australia	Norway	Brazil	Netherlands	Mexico	Sweden	Denmark	Germany	France
<i>Fiscal Balance</i>	1613.2** (2.9)	-4.258 (-0.06)	57.43 (0.52)	218.7*** (4.32)	615.2 (1.33)	216 (1.61)	-2.539 (-0.35)	34.88 (0.25)	22.84 (0.56)	-2675 (-1.44)	78.73* (2.24)	-117.5 (-0.78)	-66.15 (-1.55)	95.91 (0.96)	253.4 (1.07)
<i>Current Account Balance</i>	6660.8 (1.74)	-1201.7* (-2.23)	260.7 (1.85)	-90.17 (-0.17)	6071.2 (1.17)	-46.85 (-0.58)	-4017.6* (-2.11)	7459 (0.94)	-1.018 (-0.44)	489.1 (0.4)	-1.398 (-0.67)	1902.4 (0.62)	11.7 (0.28)	27.07 (0.06)	0.477 (0.17)
<i>Real GDP Growth</i>	34.22 (0.32)	-123.9 (-1.60)	227.9 (0.77)	41.41 (1.47)	-90.68 (-0.65)	-101.8 (-0.98)	265.4 (1.58)	1.885 (0.31)	-1.087 (-0.46)	2990.9 (1.9)	23.42* (2.46)	1334.4 (1.42)	-8.686* (-2.26)	9.91 (0.56)	1.418 (0.35)
<i>Debt</i>	12475.3 (0.42)	-35525.4 (-1.28)	18157.3 (1.53)	-7887.5 (-0.44)	-588.2 (-0.26)	-3250.8 (-1.76)	-3804.1** (-2.86)	-250.3 (-0.32)	251.2 (0.61)	-2256.7 (-0.21)	-3357.6** (-3.19)	-55.89 (-0.03)	-812.3* (-2.03)	2659.5 (0.19)	-8681.4 (-0.47)
<i>Return¹³</i>	393.4 (0.57)	-860.9 (-1.02)	2.29 (0.25)	-533.7 (-1.85)	-90.62 (-0.14)	-111.3 (-0.66)	-132 (-0.74)	47.45 (0.81)	10.62* (2.3)	-104.2 (-1.44)	-12.94 (-0.58)	6.246 (0.08)	-180.8 (-0.95)	-227 (-1.92)	-0.805 (-0.08)
<i>Trade</i>	-7556.3** (-2.93)	-59718.3** (-2.81)	2603.8 (0.21)	4313.94 (1.37)	-27335.0* (-2.45)	-514.81 (-0.67)	-7388.1 (-1.62)	-6231.91 (-1.53)	-102.2 (-0.51)	-20131.3* (-2.44)	-4.75 (-0.01)	-603.2 (-0.12)	-5607.2 (-1.55)	-15506.1 (-1.06)	-16213.8 (-1.38)
Obs	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46
R-squared	0.4345	0.2683	0.1521	0.4333	0.2421	0.1096	0.3227	0.0914	0.1964	0.1727	0.3209	0.0718	0.2318	0.0818	0.0787
Chi-square	35.34	17.46	8.22	37.71	14.66	6.10	22.10	4.88	11.41	10.94	22.14	3.55	13.99	8.77	3.92

¹³ In this table, *Return* refers to the relative return between the U.S. stocks and a foreign country's stocks

**Table 10. Foreign Investment in U.S. Treasury Bills (in \$Millions)
(SUR Regression for Each Country in the Sample)**

	Japan	United Kingdom	Belgium-Luxembourg	Canada	Switzerland	Ireland	Australia	Norway	Brazil	Netherlands	Mexico	Sweden	Denmark	Germany	France
<i>Fiscal Balance</i>	-1066.1 (-1.07)	-61.03 (-1.45)	-56.66 (-1.35)	27.33* (1.98)	-14.38 (-0.11)	-62.64 (-0.83)	0.628 (0.39)	-103.9 (-0.62)	3715.7* (2.06)	116.1 (0.35)	-19.13 (-0.29)	61.8 (1.34)	0.0691 (0)	-9.575 (-0.28)	1.096 (0.02)
<i>Current Account Balance</i>	11554.2 (1.69)	-956.1** (-3.18)	103.5 (1.94)	199.7 (1.37)	800.9 (0.55)	-55.31 (-1.21)	-450 (-1.06)	27730.9** (2.93)	-169.9 (-1.63)	-48.16 (-0.22)	-5.372 (-1.37)	-1122.1 (-1.20)	1.254 (-0.06)	-286.4 (-1.85)	-0.708 (-0.93)
<i>Real GDP Growth</i>	-124.4 (-0.66)	-52.07 (-1.20)	67.01 (0.6)	-2.948 (-0.37)	45.71 (1.17)	16.95 (0.29)	48.79 (1.3)	-4.146 (-0.56)	-4.88 (-0.05)	576.5* (2.03)	-1.055 (-0.06)	-62.3 (-0.22)	-0.552 (-0.30)	0.79 (0.13)	1.577 (1.42)
<i>Debt</i>	54936.8 (1.04)	-10378 (-0.66)	14804.5*** (3.3)	-4883.8 (-1.00)	2868.0*** (4.43)	-883 (-0.85)	-103 (-0.35)	-585.4 (-0.63)	40191.3* (2.2)	-1709.8 (-0.89)	-3153.9 (-1.60)	1429.6* (2.23)	-184.1 (-0.97)	5649.2 (-1.2)	12331* (2.4)
<i>Return¹⁴</i>	2071.4 (1.69)	-491.9 (-0.91)	0.361 (0.11)	-29.08 (-0.33)	142.9 (0.67)	-198.1 (-1.55)	-32.67 (-0.78)	47.75 (0.71)	224.9 (1.17)	-2.645 (-0.19)	66.85 (1.48)	-50.93* (-2.02)	104 (1.1)	14.39 (0.33)	9.990** (2.91)
<i>Trade</i>	-12375.6** (-2.68)	-34451.8** (-2.89)	10044.9* (2.17)	-1382.6 (-1.61)	1503.14 (0.48)	-81.02 (-0.19)	-407.63 (-0.40)	-3790.1 (-0.78)	174.89 (0.02)	-1742.46 (-1.17)	-714.27 (-1.07)	1384.25 (0.91)	-2028.25 (-1.18)	-1431.22 (-0.29)	-1824.7 (-0.57)
Obs	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46
R-squared	0.3151	0.3283	0.3376	0.1949	0.4425	0.0894	0.1117	0.1977	0.2370	0.1038	0.1189	0.2289	0.0601	0.1835	0.2376
Chi-square	21.26	22.44	23.44	11.28	36.73	5.27	5.67	11.07	15.35	5.26	6.28	13.64	3.00	10.03	15.42

¹⁴ In this table, *Return* refers to the relative return between the U.S. treasury bills and a foreign country's treasury bonds

Table 11. Foreign Investment in U.S. Agency Bonds (in \$Millions)
(SUR Regression for Each Country in the Group of Top Holders)

	Japan	United Kingdom	Belgium- Luxembourg	Canada	Switzerland	Ireland
<i>Fiscal Balance</i>	166.7 (1.21)	-22.54 (-0.41)	3.451 (0.39)	-38.4 (-1.36)	13.69 (0.53)	0.917 (0.16)
<i>Current Account Balance</i>	4483.5 (1.66)	1795.7 (1.0)	1763 (1.44)	-2.426 (-0.00)	-178.1 (-0.72)	-40.33 (-0.09)
<i>Real GDP Growth</i>	-199.2 (-1.20)	-54.81 (-0.54)	-51.36 (-0.54)	-80.62* (-2.10)	-8.523 (-0.47)	-6.357 (-0.87)
<i>Debt</i>	16049.4* (2.57)	-139.4 (-0.02)	-34621.2*** (-5.41)	9854.1* (2.43)	355.3 (0.29)	-1604.8 (-0.95)
<i>Return (on Agency)</i>	-1037.5 (-0.94)	-824.1 (-0.99)	-46.81 (-0.08)	321.2 (1.3)	51.36 (0.49)	-23.1 (-0.15)
<i>Trade</i>	9643.47*** (4.5)	4754.13 (0.92)	7491.47* (2.02)	583.13 (1.95)	1874.25 (1.9)	3.55 (0.01)
Obs	46	46	46	46	46	46
R-squared	0.4311	0.0636	0.4443	0.2553	0.1683	0.0573
Chi-square	36.49	3.44	36.80	15.51	9.17	2.77

Table 12. Foreign Investment in U.S. Corporate Bonds (in \$Millions)
(SUR Regression for Each Country in the Group of Top Holders)

	Japan	United Kingdom	Belgium- Luxembourg	Canada	Switzerland	Ireland
<i>Fiscal Balance</i>	-126.9 (-1.25)	-97.83 (-0.57)	2.517 (0.07)	3.334 (0.09)	0.481 (0.01)	-0.762 (-0.03)
<i>Current Account Balance</i>	3540.6 (1.87)	9883.5 (1.78)	11997.0* (2.36)	3636.4*** (4.26)	2832.8*** (3.55)	8164.1*** (4.45)
<i>Real GDP Growth</i>	-73.81 (-0.57)	-138.3 (-0.43)	-154.4 (-0.37)	-83.01 (-1.55)	0.415 (0.01)	29.37 (1.03)
<i>Debt</i>	-4212.5 (-0.88)	-30485.4 (-1.53)	-58184.5* (-2.17)	-8214 (-1.44)	-2165.9 (-0.55)	-28671.3*** (-4.35)
<i>Return (on Corporate)</i>	-31.38 (-0.17)	-51.36 (-0.11)	164.7 (1.31)	-61.19 (-0.60)	110.6 (1.09)	23.91 (0.44)
<i>Trade</i>	2001.78 (1.32)	-30801.1 (-1.86)	-29140.48 (-1.86)	-102.33 (-0.24)	-4619.43 (-1.46)	-3603.73*** (-3.91)
Obs	46	46	46	46	46	46
R-squared	0.1419	0.1805	0.3191	0.4958	0.4131	0.4198
Chi-square	7.64	10.09	22.89	45.17	32.97	33.28

Table 13. Foreign Investment in U.S. Stocks (in \$Millions)
(SUR Regression for Each Country in the Group of Top Holders)

	Japan	United Kingdom	Belgium- Luxembourg	Canada	Switzerland	Ireland
<i>Fiscal Balance</i>	-316.4 (-1.72)	-3.065 (-0.01)	11.67 (0.41)	62.07 (0.2)	-628.2* (-2.15)	-1.007 (-0.06)
<i>Current Account Balance</i>	15736.9*** (4.56)	31554.0*** (4.12)	16765.0*** (4.35)	22003.1** (3.22)	12270.9*** (4.53)	7789.2*** (5.62)
<i>Real GDP Growth</i>	-207.6 (-0.92)	-307.9 (-0.71)	-278.7 (-0.92)	-498.5 (-1.18)	-64.1 (-0.32)	-8.47 (-0.40)
<i>Debt</i>	6545.3 (0.77)	9135.8 (0.36)	-13705.7 (-0.68)	868.8 (0.02)	4036.8 (0.3)	-1828 (-0.37)
<i>Return (on Stocks)</i>	87.13 (0.5)	20.42 (0.04)	-71.32 (-0.55)	608.1 (1.54)	-81.37 (-0.35)	-13.77 (-0.40)
<i>Trade</i>	-885.81 (-0.32)	-30203.88 (-1.39)	3732.58 (0.32)	-94.44 (-0.03)	-8122.06 (-0.75)	120.85 (0.17)
Obs	46	46	46	46	46	46
R-squared	0.4714	0.3944	0.3165	0.3210	0.4578	0.4341
Chi-square	41.05	29.95	21.59	26.01	38.74	35.23

Table 14. Foreign Investment in U.S. Treasury Bills (in \$Millions)
(SUR Regression for Each Country in the Group of Top Holders)

	Japan	United Kingdom	Belgium- Luxembourg	Canada	Switzerland	Ireland
<i>Fiscal Balance</i>	-214.8 (-0.60)	289.4* (1.97)	-1.652 (-0.17)	-55.14 (-0.67)	-56.02 (-0.54)	-2.544 (-0.21)
<i>Current Account Balance</i>	5482.5 (0.79)	6116.9 (1.28)	5709.2*** (4.27)	1368.4 (0.76)	688.2 (0.68)	1261.2 (1.3)
<i>Real GDP Growth</i>	280.6 (0.66)	544.0* (2.02)	19.48 (0.19)	-41.32 (-0.37)	150.2* (2.04)	8.684 (0.58)
<i>Debt</i>	-25091 (-1.54)	10273 (0.59)	1065.9 (0.15)	-2061.7 (-0.17)	11366.3* (2.24)	1332.3 (0.38)
<i>Return (on Treasury)</i>	695.8 (0.26)	1337.1 (0.65)	-3025.3*** (-5.23)	-674.5 (-1.02)	-66.46 (-0.13)	-300 (-1.00)
<i>Trade</i>	-17592.17*** (-3.34)	-17309.36 (-1.27)	11363.46** (2.77)	-580.31 (-0.67)	-1419.39 (-0.36)	177.27 (0.36)
Obs	46	46	46	46	46	46
R-squared	0.2868	0.2217	0.5502	0.1222	0.3081	0.0957
Chi-square	18.47	13.42	68.52	7.42	20.45	4.25

Belgium-Luxembourg	Agency	Corporate	Stock	Treasury
Agency	1			
Corporate	0.2732	1		
Stock	-0.1486	0.165	1	
Treasury	-0.3781	-0.384	0.5053	1

Sweden	Agency	Corporate	Stock	Treasury
Agency	1			
Corporate	0.5897	1		
Stock	-0.1177	-0.3763	1	
Treasury	-0.4034	-0.6027	0.0431	1

Ireland	Agency	Corporate	Stock	Treasury
Agency	1			
Corporate	0.6163	1		
Stock	-0.5471	-0.4376	1	
Treasury	-0.4975	-0.3285	0.0975	1

Denmark	Agency	Corporate	Stock	Treasury
Agency	1			
Corporate	-0.383	1		
Stock	0.4276	0.5101	1	
Treasury	0.641	0.1979	0.5094	1

Australia	Agency	Corporate	Stock	Treasury
Agency	1			
Corporate	0.3578	1		
Stock	0.4947	0.7971	1	
Treasury	0.2541	0.5084	0.8095	1

Germany	Agency	Corporate	Stock	Treasury
Agency	1			
Corporate	0.25	1		
Stock	0.0446	0.4277	1	
Treasury	-0.8254	-0.2046	0.3194	1

France	Agency	Corporate	Stock	Treasury
Agency	1			
Corporate	0.135	1		
Stock	0.148	0.4025	1	
Treasury	0.147	0.2922	0.1906	1

IX. References

- Bernanke, Benjamin. (2007). "Global Imbalances: Recent Developments and Prospects." Bundesbank Lecture, Berlin, Germany.
- Bertaut, Carol and Ralph W. Tryon. (2007). "Monthly Estimates of U.S. Cross-border Securities Positions." International Finance Discussion Papers #910. Board of Governors of the Federal Reserve System.
- Bertaut, Carol. (2008). "Assessing the Potential for Further Foreign Demand for U.S. Assets: Has Financing U.S. Current Account Deficits Made Foreign Investors Overweight in U.S. Securities?" International Finance Discussion Papers #950. Board of Governors of the Federal Reserve System.
- Bodie, Zvi, Alex Kane, and Alan J. Marcus. (2011). *Investments and Portfolio Management*. New York, NY: McGraw-Hill Companies.
- Favilukis, Jack, David Kohn, Sydney Ludvigson, and Stijn Van Nieuwerburgh. (2012). "International Capital Flows and House Prices: Theory and Evidence." Unpublished paper, New York University.
- Forbes, Kristin. (2010). "Why do foreigners invest in the United States?" *Journal of International Economics* 80: 3-21.
- Gruber, Joseph and Steven Kamin. (2009). "Do Differences in Financial Development Explain the Global Pattern of Current Account Imbalances?" *Review of International Economics*, 17(4): 667-688.
- Ju, Jiandong and Shang-Jin Wei. (2006). "A Solution to Two Paradoxes of International Capital Flows." NBER Working Paper #12668.
- Kumhof, Michael, and Douglas Laxton. (2010). "Fiscal Deficits and Current Account Deficits." Unpublished paper, International Monetary Fund.
- Mendoza, Enrique, Vincenzo Quadrini and José-Víctor Ríos-Rull. (2006). "Financial Integration, Financial Deepness and Global Imbalances." NBER Working Paper #12909.
- Michael, Bryane. (2010). "Foreign Under-Investment in U.S. Securities and the Role of Relational Capital." Unpublished paper, Stockholm School of Economics.
- Pugel, Thomas. (2012). *International Economics*. New York City, NY: McGraw-Hill Education.
- Ross, Stephen A., Randolph Westerfield and Jeffrey Jaffe. (2010). *Corporate Finance*. New York City, NY: McGraw-Hill Education.