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ON THE SIGNIFICANCE OF GLOBAL FACTORS IN PORTFOLIO INVESTMENTS

Mingfei Li
mli3@wellesley.edu

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Mingfei Li

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AUTHOR:
MINGFEI LI'17
WELLESLEY COLLEGE

THESIS ADVISOR:
JOSEPH P. JOYCE
WELLESLEY COLLEGE

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Abstract

Capital inflows to emerging market economies (EMEs) plunged during the global financial crisis (GFC) but surged afterwards. Both country-specific factors and global factors, which are outside the source and host countries, have affected investment decisions around the world. My thesis focuses on a comparison of the significance of country-specific and global factors in explaining portfolio investment from advanced economies (AEs) to EMEs before and after the GFC, so as to shed light on the drivers of capital inflows to EMEs. I employ a gravity-model with data from 2001-07 and 2010-14 for 20 AEs and 20 EMEs. The results suggest that VIX, a measure of global volatility, gained a higher significance in affecting portfolio debt investment from AEs to EMEs after the GFC.

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Section 1. Introduction

Many economists believe that capital inflows can contribute to economic growth in a country. The former chairman of the U.S. Federal Reserve, Alan Greenspan, has spoken of financial globalization by referring to "the increasing effectiveness of financial markets in facilitating the flow of trade and direct investment, which are so patently contributing to ever higher standards of living around the world". On the other hand, the volatility of capital flows has disrupted financial markets and economic activity. For instance, in 2013 bond yields in emerging market economies (EMEs) rose and there were capital outflows when the Federal Reserve announced that it would be cutting back on its purchases of securities in U.S. financial markets. Capital inflows to the EMEs plunged during the global financial crisis (GFC) but surged afterwards. Therefore, identifying the drivers of capital inflows into emerging market economies could shed light on potential solutions to help emerging market economies reach higher living standards, while pointing to the sources of volatility that may be outside their control.

Country-specific factors, such as the size of an economy, have been effective in explaining the differences in portfolio investment across source and host countries. On the other hand, economists have observed tighter global financial integration, as investors around the world become more and more attuned to global financial markets and their development. As a result, global factors, which are outside the source and

host countries, have been affecting the investment allocation decisions around the world. U.S. variables in particular, such as the U.S. ten-year Treasury bond yield and the volatility index (VIX), have been not only influencing the domestic market in the U.S. and countries that receive U.S. investment, but also the investment decisions elsewhere.

However, existing literature that focuses both on the country-specific determinants and on global determinants of capital inflows to EMEs is scarce. Therefore, in this paper, we consider the following questions: (1) How does the explanatory power differ for country-specific and global factors in explaining portfolio investment from AEs to EMEs? (2) Has the significance of country-specific and global factors in explaining portfolio investment from AEs to EMEs changed after the GFC? (3) Do the factors have different explaining power in determining portfolio equity or portfolio debt? We undertake this analysis using a bilateral gravity model of portfolio investments by advanced income countries in a sample of EMEs. This work is the first to investigate the impact of global factors in a bilateral gravity model.

The rest of our research paper is outlined as followed. Section 2 provides a brief review of the relevant past literature. Section 3 describes our data and methodology. Section 4 discusses our results, and Section 5 concludes.

Section 2. Past Literature Review

To inform our selection of variables that might be associated with capital flows to EMEs, we draw from the literature on identifying country-specific determinants as well as on analyzing global determinants that are orthogonal to idiosyncratic characteristics. Each of these literatures is extensive and only briefly summarized below.

A number of studies have utilized gravity models to model trade flows between pairs of countries. These models are useful in explaining international trade patterns because they include variables such as distance between countries that capture informational frictions in the bilateral transactions. Portes and Rey (2002) showed in their pioneering study that gravity models could also explain international transactions in financial assets at least as well as goods trade transactions. The models allow the research analyst to use both "push" (i.e., source) and "pull" (i.e., host) variables. The authors demonstrated that cross-border equity flows depend on asset market size both in the source and in the destination country as well as trading costs, in which information frictions play a role.

Faruqee, Li and Yan (2004) also applied the gravity model to analyze the determinants of international portfolio holdings. With most of the explanatory power in their analysis coming from the financial-market-size and distance variables, they concluded that financial market size and information asymmetry are major

determinants of international portfolio choice.

Lane and Miles-Ferretti (2008) also found that bilateral portfolio positions are related to various informational and financial frictions, whose costs could be proxied by an array of gravity-type variables, as well as bilateral trade. They note that holding equity in country A from which country B imports can be used as a risk-sharing mechanism against output shocks in country A. Moreover, the volume of trade also has the potential value to serve as an information variable.

Galstyan, Lane, Mehigan and Mercado (2016) also provide evidence for the importance of gravity-type factors in the cross-border distribution of portfolio securities. More specifically, they conclude that for investors in both advanced and emerging economies, the distance effect is negative and statistically significant for international portfolio equity holdings.

Yeyati, Panizza and Stein (2007) apply the gravity model to the determinants of bilateral trade to analyze FDI allocation. In addition to the logged GDPs of both economies and the distance between them, they also include the short-term interest rate in the source country to take into account the evolution of financing costs at home and abroad in the behavior of FDI flows. In accordance with Reinhart and Reinhart (2001), who showed that on average FDI flows to developing economies tend to be higher when the US monetary policy is lax, they conclude that for the US, FDI flows tend to be countercyclical with respect to the interest rate, i.e., increase when interest rates are low and fall when rates rise.

Dabla-Norris, Honda, Lahreche and Verdier (2010) also include an interest rate in the source country in addition to push and pull factors in their regressions to determine drivers of FDI flows to developing countries. Their results show that low-income countries are particularly sensitive to interest rate movements in the advanced countries. However, we note that the interest rate in the source country is still a country-specific factor and the idiosyncratic movements in flows that caused by it are not truly global capital flows.

Other empirical studies have concentrated on the role of global variables that are orthogonal to idiosyncratic characteristics in determining capital flows into the EMEs that are absent from the bilateral gravity models. A reason for this investigation is the work of Rey (2015), who reports evidence of a global financial cycle in capital flows and asset prices. She find that the Volatility Index (VIX), computed by the Chicago Board Options and utilized as proxy for the combination of perceived risk and risk aversion, was the cause of movements in the financial variables.

Ahmed and Zlate (2014) report that global risk appetite is a statistically and economically important determinant of net private capital inflows to the EMEs. They use the quarterly average of VIX, and concluded that greater global risk aversion has a significant negative effect on net portfolio inflows into the EMEs. Moreover, this impact has increased in the aftermath of the global financial crisis.

Forbes and Warnock (2012) use a similar approach in analyzing extreme capital flow episodes, i.e., capital surges (massive inflows), stops (reversal of inflows), flight

(massive outflows) and retrenchment (reversal of outflows). They also use the VIX as an indicator for risk aversion and economic uncertainty. Their results indicate that waves of capital flows are primarily associated with global factors, and global risk, proxied by VIX, is the only variable that consistently predicts each type of extreme capital flow episodes.

Avdjiev et al. (2017) report that VIX is negative and statistically significant in affecting portfolio debt inflows to emerging markets, but it is insignificant in affecting portfolio equity inflows.

In identifying the global determinants of waves in financial globalization, Bryne and Fiess (2016) include the three-month U.S. Treasury bill rate as the short-term interest rate and the ten-year U.S. government bond yield as the long-term interest rate. They find that real U.S. long-term interest rates are important determinants of disaggregate bank and equity capital inflows to EMEs, whereas U.S. monetary policy, which operates through short-term interest rates, may be having a relatively less powerful effect in EMEs.

Our work, therefore, bridges two areas of research in the literature. We us a gravity model specification to investigate the holdings of portfolio securities of advanced economy investors in emerging market economies. But we include "global variables" such as the VIX and U.S. interest rates to see how they may have affected the bilateral allocation of capital. We also seek to determine whether the effect of these global variables, if any, has changed since the global financial crisis.

Section 3. Data & Methodology

3.1 Data Sources

To analyze the determinants of bilateral portfolio investment, we obtain data for 40 countries, which include 20 advanced economies[1] and 20 emerging market economies[2], over the periods of 2001-2007 (pre-GFC) and 2010-2014 (post-GFC). We exclude 2008 and 2009 since economic activities are turbulent and abnormal during the GFC and our main interest lies in the normal periods. We do not include small financial centers with oversized financial holdings, including Hong Kong, Iceland, Ireland, Luxembourg and Singapore. We also exclude countries where oil exports take a large part of economic activity. We also exclude the United States from the sample of source countries because we define the global variables - namely VIX, U.S. short-term interest rate (EFFR) and U.S. long-term interest rate (ten-year Treasury-bond yield) - as variables that are exogenous to the source and host country samples. Therefore, if we include the U.S. in our sample of source countries, what we refer to as the "global variables" are not strictly exogenous to the source countries and may not truly be "global".

For data on bilateral portfolio distributions, we rely on the *Coordinated Portfolio*

1 The sample of AE includes: Australia; Austria; Belgium; Canada; Denmark; Finland; France; Germany; Greece; Israel; Italy; Japan; Netherlands; New Zealand; Norway; Portugal; Spain; Sweden; Switzerland, and United Kingdom.

2 The sample of EME includes: Argentina; Brazil; Chile; China (Mainland); Colombia; Costa Rica; Egypt; India; Indonesia; Lebanon; Malaysia; Mexico; Pakistan; Panama; Philippines; South Africa; Thailand; Turkey; Uruguay; Venezuela.

Investment Survey (CPIS) complied by the International Monetary Fund. Each participating economy provides data on its holdings of portfolio investment securities, which are composed of equity securities, and long- and short-term debt securities that are not part of the balance of payments data categories of direct investment or reserve assets. As the CPIS survey notes, more reliable detailed cross border positions data can usually be collected on an economy's holdings of portfolio investments because the holder (creditor) will usually know what securities its residents hold. On the liabilities side, the issuer of a security (debtor) may not know the residency of the holder because foreign custodians or other intermediaries may be the holder of the securities. Therefore, we acquire the data on portfolio securities an advanced economy holds in an emerging market economy by looking at the assets of advanced economies instead of at the liabilities of the emerging market economies. We obtain bilateral data for total portfolio assets, as well as its components, portfolio equity securities and portfolio debt securities (sum of long- and short-term debt securities). The average portfolio equity to total asset ratio and the average portfolio debt to total asset ratio is reported by year in Table 1a.

We take the country-specific control variables from the literature on the gravity-model in determining asset allocation. We include the real GDP of the host and the source countries, whose data are obtained from World Bank's *World Development Indicators*. Following Lane and Miles-Ferretti (2008), we use the imports an AE has from an EME as a proxy for the volume of bilateral trade between

the two countries, since trade can be used as a mechanism against output shocks and can reflect the information frictions between the two countries. The bilateral data on trade is obtained from the *Direction of Trade Statistics* (IMF). For control variables, we also include stock market capitalization as a proxy for financial market size in the source country, whose data are taken from World Bank's *Financial Structure and Development Dataset*. The summary statistics for these right-hand-side variables are reported in Table 1b.

We include three global variables as global determinants of capital inflows to EMEs. The first one is the Volatility Index (VIX), which measures the volatility of the S&P 500 stock index. We access annual average data on the VIX, which is calculated by the Chicago Board Options Exchange, from the Federal Reserve Bank of St. Louis. We perceive the VIX as a proxy for global risk-aversion as well as perceived risk. The annual average VIX for 2001-2014 is plotted in Figure 1, which shows a drastic increase in stock volatility during the GFC and gradually dropped to lower levels in the period afterwards. Despite the relatively low level of VIX in the post-GFC period, we expect to see the VIX as having a more influential impact on determining the portfolio inflows from AEs to EMEs as investors around the world became more vigilant to risks that are potentially associated with their investments.

Finally, we also take from the FRED database both a short-term and a long-term U.S. nominal interest rate - the nominal Effective Federal Fund's rate (EFFR) and the U.S. ten-year Treasury bond yield, which we consider as global factors that could

potentially affect the short- and long-term interest rates in other economies, and eventually influence the portfolio inflows to EME. The annual averages of nominal EFFR and the U.S. ten-year Treasury bond yield are plotted in Figure 2. The nominal EFFR was near the zero lower bound in the years following the GFC.

3.2 Empirical Specification

The conventional Gravity-model is non-linear. We take the log of the original model to re-write it as the following OLS regression:

$$\log(prt_{jit}) = \beta_0 * postgfc + \beta_1 \log(gdp_{it}) + \beta_2 \log(gdp_{it}) * postgfc + \beta_3 \log(gdp_{jt}) + \beta_4 \log(gdp_{jt}) * postgfc + \beta_5 \log(stky_{it}) + \beta_6 \log(stky_{it}) * postgfc + \beta_7 \log(trade_{jit}) + \beta_8 \log(trade_{jit}) * postgfc + \beta_9 \log(us_t) + \beta_{10} \log(us_t) * postgfc + \beta_{11} \log(vix_t) + \beta_{12} \log(vix_t) * postgfc + \varepsilon$$

in which prt_{ji} is the amount of portfolio investment securities hold by source country j in host country i in year t; gdp_j and gdp_i are the real GDP of source country j and host country i in year t respectively; $stky_i$ is the stock market capitalization of host country i in year t; $trade_{jit}$ is the volume of goods source country j imported from host country i in year t; either $us10_t$ is U.S. interest rate in year t or EFFR in year t, and vix_t is the annual average VIX in year t; postgfc is a dummy variable that is equal to 1 if year t is between 2010-2014.

We are aware that there are many zero observations in the CPIS data, for example, source country j reports zero holdings of portfolio investment in host country i. As

Galstyan and Lane (2012) suggest, the logged specification should drop the zero observations. Even though the data could be transformed to include the zero observations by including a constant, we follow the practice of Galstyan and Lane and opt to exclude these observations in order to focus on differences in adjustment patterns across non-trivial holdings. Otherwise, the zero observations could distort the analysis towards EME with very minor portfolio inflows from AE.

Conventional gravity-models usually include proxies for informational asymmetries such, as distance, or institutional proximity, such as common language, which could affect the level of portfolio investment from AEs to EMEs and are correlated with the gravity variables in the regression model. Therefore, our model could suffer from omitted variable bias since we do not have proxies that control for the heterogeneity in history, culture, politics and etc. However, we think that all the relevant historical, cultural or political factors are hard to observe, and might be even harder to quantify; therefore, we decide to control for these factors with "country-pair" fixed-effects, which helps us control for pair-specific factors that do not vary over time and that may be correlated with the bilateral portfolio investment and with the control variables on the right-hand side. For example, "Australia - China" is a unique country-pair that would control for factors that do not vary across time, which includes factors such distance between the countries. With the "country-pair" fixed effects, our logged model could potentially avoid suffering from the omission of a variable fixed in value.

Section 4. Results

4.1 Results of Regressions Excluding the Crisis Year (2008&2009)

Our results for the country-specific control variables are generally consistent with the findings in past literature. Table 2 reports the results when we use the nominal U.S. ten-year Treasury bond yield as the interest rate in the U.S. The coefficients for the logged host country GDP and for the logged source country GDP are highly significant (mostly at the 1% level) in the pre-GFC period. The coefficients of the interaction term of host country GDP and the post-GFC dummy are positive and highly significant - at 1% level for total assets and at 5% level for portfolio equity, indicating that the GDP of the host country became more significant in drawing portfolio equity investment from the AEs to the EMEs.

The coefficients for logged stock-market capitalization of the host country are positive and significant at the 1% level for total assets, portfolio equity and portfolio debt respectively in the pre-GFC period. The stock-market capitalization is an indicator of the size of the equity market in the host country; in the pre-GFC period, with one percentage point increase in the stock-market capitalization of the host country, the portfolio equity investment that flows into the country would go up by about 0.74 percentage points. Portfolio debt investment into the host country would go up by about 0.34 percentage points following a one-percentage point increase in its stock-market capitalization. After the GFC, the stock market capitalization became

even more significant in influencing portfolio investment from AEs to EMEs: following a one percentage point increase in stock market capitalization in the host country, the portfolio equity investment goes up by approximately 0.94 of a percentage point and portfolio debt investment increases by roughly 0.61 of a percentage point.

This result could indicate that investors in the source country take the stock-market capitalization of the host country as a signal for the wellbeing of its overall financial markets as well as institutions. The stock-market capitalization could also be an indicator of liquidity in the bond market. The explanatory power of stock market capitalization in the host country we find here is in line with the findings of past literature, including Aggarwal, Kearney and Lucey (2011). They report that the development of equity markets in both the originating and destination countries exerts a positively significant effect on both debt and equity cross-border foreign portfolio investment holdings, with the magnitude of the coefficients being greater for equity than for debt. Chan, Covrig and Ng (2005) also examined the influence of the development of equity markets on portfolio investment allocation. They found that mutual funds, which manage assets on the behalf of individual investors and have similar trading strategies as those of other institutional investors, are heavily influenced by host country stock market development. They interpret this result as showing that the stock market development variable exerts a large influence on foreign bias (foreign investors under or overweighting the overseas markets).

The coefficient of logged trade is significant at the 1% level for portfolio equity before the GFC. A one percentage point increase in bilateral trade would increase portfolio equity investment into the host country by 0.13 of a percentage point. This confirms that trade boosts portfolio equity investment. However, the coefficient of the interaction term of logged trade and post-GFC dummy is negative and is significant at the 1% level. This means that in the post-GFC period, with a one percentage point increase in trade, portfolio equity investment into the host country would decrease by 0.14 of a percentage point. In other words, after the GFC, trade no longer has an impact on the portfolio equity investment into EMEs. Since the coefficients of trade for portfolio debt are insignificant in both periods, the coefficients of trade for total asset follow the same pattern as those for portfolio equity. The findings here indicate that while the significance of some country-specific variables, such as GDP of source country, remained the same or increased after the GFC, the significance of some country-specific variables, i.e. trade, fell. This result also shows that equity investors respond to different variables than do debt investors.

As for the global variables, the coefficient of the logged U.S. ten-year Treasury bond yield is negative and highly significant at the 1% level for portfolio debt investment, which means that as the result of a one percentage point increase in the U.S. ten-year Treasury bond yield, the portfolio debt investment into the host country would drop by roughly 0.77 percentage points. The negative relationship could be the result that investors from the AEs treat the U.S. bond market as an alternative option

for their portfolio debt investment into the EMEs. Therefore, when the bond yield increases in the U.S., they would channel less debt investment into EMEs. The coefficient for the interaction term of logged U.S. ten-year Treasury bond yield and the post-GFC dummy is around 0.79 and is significant at the 5% level. This implies that after the GFC, with a one percentage point increase in the U.S. ten-year Treasury bond yield, the portfolio debt investment into the host country would go up by around 0.01 percentage point, which is trivial. While the sign of the coefficient of U.S. Treasury bond yield now becomes positive, the economic significance is virtually zero. This may reflect the nature of the U.S. ten-year bond yield after the crisis, when it fell and remained at historically low levels.

In addition, Hofman and Takats (2015) find evidence that U.S. short- and long-term interest rates significantly affect the corresponding rates in other economies and the spillovers reflect in part policy spillovers. Therefore, we consider that the long-term interest rate in the EMEs could go up as a result of the increase in U.S. ten-year Treasury bond yield, and therefore more portfolio debt investment are drawn to the EMEs after the GFC. Moreover, we note that the coefficient for logged U.S. ten-year Treasury bond yield as well as that for the interaction term is insignificant for portfolio equity. This finding is consistent with Taylor and Sarno (1997), in which they specify that the change in bond flows appears to be relatively more strongly determined by global factors than by domestic factors, while equity flows are relatively more responsive to changes in country-specific factors.

The coefficient for logged VIX is negative and significant at the 10% level for portfolio debt in the pre-GFC period: With a one percentage point increase in VIX, the portfolio debt investment into the host country would decrease by 0.17 percentage points. Moreover, the interaction term of logged VIX and the post-GFC dummy is negative and highly significant at the 1% level, which means after the GFC, with one percentage point increase in VIX, the portfolio debt investment into a host country would decrease by roughly 1.1 percentage points. This confirms our hypothesis that after the GFC, investors around the world are becoming more vigilant to risk and that they would take the VIX as an indicator for global risk, including the risk in the bond markets of EMEs. However, the coefficient for VIX is insignificant for portfolio equity in either period.

Much of the recent literature on this issue report similar findings. Forbes and Warnock (2014) reach similar conclusions when they analyze the determinants of gross capital inflow and outflow. They find evidence that the VIX risk measure is significantly related to debt-led extreme movements (surges, stops, retrenchment and flight) in aggregate capital flows. However, this measure has little or no significant relationship with equity-led episodes. Similarly, when Cerutti, Claessens and Puy (2015) analyze the behavior of gross capital inflows across the EMEs, they also find that the VIX is very significant for portfolio debt but less so for portfolio equity. The finding that portfolio debt investment responds to measures of risk more strongly than portfolio equity investment, though possibly seemingly counter-intuitive, may

indicate that individual and institutional investors who invest in the bond markets of the EMEs are more risk-averse than those who invest in the equity markets. In periods such as post-GFC where measures of risk are high, the significance and magnitude of VIX would be larger for portfolio bond than for portfolio equity.

In order to test the change in significance of the global variables, we did F-tests for the coefficients of the global variables and their post-GFC interaction terms for total assets, portfolio equity and portfolio debt respectively. For total assets, the F-statistic for the four coefficients β_9, β_{10}, β_{11} and β_{12} is 2.57, which shows that, the global variables - nominal U.S. ten-year Treasury bond yield and the VIX - are significant in influencing the total assets an AE holds in an EME. Moreover, the F-statistic for β_{10} and β_{12} is 3.42, indicating that the global variables gained a higher significance after the GFC. For portfolio equity, the F-statistic for β_9, β_{10}, β_{11} and β_{12} is 0.57 and that for β_{10} and β_{12} is 0.35. The global variables do not seem to have an impact on affecting portfolio equity investment. For portfolio debt, on the other hand, the F-statistic for β_9, β_{10}, β_{11} and β_{12} is 13.91 and that for β_{10} and β_{12} is 13.83, which confirms that the global variables play important roles in affecting portfolio debt investment, particularly after the GFC. The F-test results for portfolio debt also explains the rejection of the null hypothesis in the F-test for total assets: while the global variables are jointly insignificant for portfolio equity, they are jointly significant for total assets since they are jointly significant for portfolio debt.

Previous studies found that both the U.S. short- and long-term interest rates

significantly affect portfolio investment allocation as well as the corresponding rates in other economies. Therefore, in the regressions presented in Table 3 use the EFFR as the other global variable in addition to VIX.

Our results are very similar to those presented in Table 2, and the results for the country-specific control variables are generally consistent with past studies. The coefficients of the logged host country GDP and those of the logged source country GDP are all highly significant at the 1% level for total assets, portfolio equity and portfolio debt for the entire period. In the post-GFC period, host country GDP becomes even more significant in affecting total assets and portfolio equity assets that an AE holds in an EME, while the significance of the source country GDP does not change.

For stock market capitalization of the host country, the coefficients are highly significant at the 1% level for total asset, portfolio equity and portfolio debt for the entire period, and increase in size after the GFC. More specifically, with a one percentage increase in the stock market capitalization of the host country, the total assets that a resident of an AE holds in an EME is expected to increase by roughly 0.49 percentage point before the crisis, portfolio equity would increase by roughly 0.72 of a percentage point and portfolio debt would increase by around 0.36 of a percentage point in the pre-GFC period. The coefficients of the interaction terms of host country stock market capitalization and the post-GFC dummy are all positive and highly significant, implying that after the GFC, stock market capitalization has a even

more important role in affecting portfolio inflows to EME: following a one percentage point increase in stock market capitalization in the host country, the total assets an AE resident holds in an EME would go up by approximately 0.7 of a percentage point, portfolio equity would go up by around 0.92 of a percentage point and portfolio debt would go up by 0.62 of a percentage point.

The coefficient for logged bilateral trade is positive and significant at the 10% level for total asset and at the 1% level for portfolio equity. However, the coefficient of the interaction term of logged trade and the post-GFC dummy is negative and highly significant and comparable in value, which means the economic significance of bilateral trade decreased in the post-GFC period. As a result, in the post-GFC period trade had virtually no impact on the total asset and portfolio equity assets that an AE resident holds in an EME. Since trade is insignificant in influencing portfolio debt, the change of significance of trade for total asset is solely due to the change of significance for portfolio equity.

For logged EFFR, its coefficient is negative and highly significant for portfolio debt before the crisis - with a one percentage point increase in EFFR, the portfolio debt would decrease by around 0.1 of a percentage point. Since logged EFFR is insignificant for portfolio equity in the pre-GFC period, it is only significant at the 10% level for total assets. However, the interaction term of logged EFFR and the post-GFC dummy is insignificant for portfolio debt, but it is positive and highly significant for portfolio equity. In other words, EFFR remain the same for portfolio debt after the

GFC, but it becomes positive and significant for portfolio equity. In the post-GFC period, with a one percentage point increase in EFFR, the portfolio equity an AE holds in an EME would go up by roughly 0.42 of a percentage point. And because of the drastic increase in significance of EFFR for portfolio equity, the significance of EFFR also becomes positive and increases to 5% level for total assets after the GFC. These results for the post-crisis period reflect several aspects of the data. First, we were constrained to use nominal values because the model imposes logarithmic values of the variables and real interest rates were negative at times. Second, the Federal Funds rate was at the zero lower bound for much of the post-crisis period, which means that there was little variation in the data.

The coefficient of logged VIX is negative and significant at the 5% level for portfolio debt in the pre-GFC period: with a one percentage point increase in VIX, portfolio debt investment into the host country would decrease by roughly 0.24 of a percentage point. The coefficient of the interaction term of VIX and the post-GFC dummy is negative and significant at the 1% level. In other words, after the GFC, with a one-percentage point increase in VIX, the portfolio debt investment into the host country would drop by around one percentage point. The result here again reflects that after the GFC investors are taking the indicator of risk more seriously.

To gain a deeper understanding of the change in significance of the global variables, we conduct F-tests for the coefficients of the interaction terms of the global variables and the post-GFC dummy for total assets, portfolio equity and portfolio debt

respectively. The F-statistic for for β_9, β_{10}, β_{11} and β_{12} is 2.89 for total assets and that β_{10} and β_{12} is 2.77, implying the global variables - the EFFR and the VIX - are jointly significant for total asset holdings. Moreover, the significance of the global variables further increases after the GFC, which is consistent with our expectation that investors become more attuned to global variables in light of greater global financial integration after the GFC. For portfolio debt, the F-statistic for β_9, β_{10}, β_{11} and β_{12} is 13.96 and that for β_{10} and β_{12} is 9.38, which indicate that global variables has always been important in influencing investors' decisions about their debt investment into the EME. After the GFC, the roles of global variables became even more influential. But for portfolio equity, the F-statistic for β_9, β_{10}, β_{11} and β_{12} is 3.10 and that for β_{10} and β_{12} is 5.94, which means we fail to reject the null hypothesis for portfolio equity. We therefore believe the change in significance of the global variables for total assets comes from the change in significance of for portfolio debt.

4.2 Robustness and Extensions

4.2.1 Regressions Including the Crisis Years

In hope of gaining deeper insights into the changes in the significance of the global variables after the crisis, we also conduct regression analysis including the data from the GFC years (2008 and 2009), and those results are reported in Table 4 and Table 5. The results in these two tables compare the post-GFC period (2010-2014) to

the pre-GFC and GFC (2001-2009). Even though the majority of the results resemble those reported in Table 1 and Table 2, in which we compare the post-GFC period to the pre-GFC period, some of the results - those for VIX in particular - are different. In Tables 1 and 2, the coefficient for ln(VIX) is hardly significant (only at the 10% level for portfolio debt and total asset) and the coefficient for the interaction term of postGFC and ln(VIX) is only significant for portfolio debt when we compare the post-GFC period to the pre-GFC period. However, when we include data form the crisis years, the coefficient for ln(VIX) is negative and become significant at the 1% level for total asset, portfolio equity and portfolio debt. The coefficient of the interaction term of postGFC and ln(VIX) is positive and is at the 10% level for portfolio equity and negative and significant at the 1% level for portfolio debt, indicating the portfolio equity investment into EMEs were negatively influenced by the volatility index before the crisis ended but not in the years following the crisis; on the other hand, VIX was negatively influencing portfolio debt investment into EMEs before 2010 and the scale of the influence become much larger in 2010 and onwards. The findings here confirm our finding in Table 2 and Table 3, that VIX has lowered portfolio debt investment into the EMEs. The difference in the significance of the coefficient for ln(VIX) is mainly a result of the data applied: For the results in Table 4 and Table5, the increased significance of VIX for portfolio equity is mainly driven by the drastically increased VIX in the crisis years, in which risk-aversion reached the highest level in the periods we covered in this paper.

4.2.2 Regressions with Lagged Country-specific Variables

To address for potential endogeneity, that is, any impact of the dependent variables (total asset, portfolio equity and portfolio debt an AE holds in an EME) on the country-specific variables (source country GDP, host country GDP, host country stock market capitalization and bilateral trade), we lagged the country-specific variables by a year so that there is no feedback from the portfolio assets to those variables. In other words, portfolio assets in year t could not have affected the country-specific variables in year t-1. The results of the regressions with lagged country-specific variables are reported in Table 6 and Table 7. The magnitude and significance of some of the country-specific variables did change slightly: this is not unexpected, since the coefficients are describing the effect of the country-specific variables from the previous year on the portfolio investment from AEs to EMEs in year t. Moreover, the adjusted R-squared drops by 0.2 on average compared to previous results, indicating the regression models with lagged country-specific variables do not fit the data as well as the previous models.

The coefficients of ln(VIX) and that of the interaction term ln(VIX)*postGFC, however, confirmed our main result from previous regressions: VIX decreases portfolio debt investment into EME and the effect strengthened after the GFC. However, the significance of VIX and its interaction term on portfolio equity did change. In previous regressions, VIX is hardly significant for portfolio equity. But here, VIX is negative and significant at the 1% level for portfolio equity, while its

interaction term with postGFC is positive and significant at the 1% level for portfolio equity. This implies that higher level of VIX decreases portfolio equity investment into EMEs before the GFC. While this effect fell after the GFC, the net effect was still negative in the post-GFC period.

Moreover, the U.S. long- and short-term interest rates and their interaction terms with the postGFC gained higher significance, but the algebraic signs diverged. We see different results for the impact of the interest rate on portfolio equity than we saw in Table 2 and Table 3. More specifically, in Table 6, we can see that with one percentage point increase in the U.S. ten-year Treasury-bond yield, portfolio equity investment would decrease by roughly 2.92 of a percentage point in the pre-GFC period. After the GFC, the effect of U.S. ten-year Treasury-bond yield on influencing portfolio equity decreased. Portfolio equity investment would only decrease by 0.2 of a percentage point.

Portfolio equity would decrease by roughly 0.3 of a percentage point following a one-percentage point increase in EFFR in the pre-GFC period. After the GFC, portfolio equity would surprisingly increase by approximately 0.1 of a percentage point. Even though the sign of the coefficient of EFFR for portfolio equity changed after the GFC, we could argue that the scale of the effect in the post-GFC period is so miniscule that it could be treated as zero.

The results presented in Table 6 and Table 7 confirmed the result that VIX gained a higher negative influence over portfolio debt in the post-GFC period. They also

pointed out that the significance of the U.S. long-and short-term interest rates over portfolio equity dropped after the GFC, which might have been the result that the EFFR was zero for most of the post-GFC period.

Section 5. Conclusion

Our results show that the factors that influence investors in advanced economies who hold portfolio equity in emerging markets overlap in some cases with those who hold portfolio debt, but also differ. Both equity and debt investment respond to host and source country GDP and the size of the host country stock markets. On the other hand, trade has been a significant determinant for equity holders, although its influence has diminished in the post-crisis period. U.S. interest rates lower the amount of portfolio debt held by AE investors, but the size of the impact fell to approximately zero after the crisis. Risk aversion has clearly lowered debt investments in the emerging markets, and the impact has risen greatly since the crisis. While these results are consistent with many of the studies cited in Chapter 2, our results are the first to show the nature of the significance of risk, as measured by VIX, in the context of a bilateral gravity model.

While we have pointed out that VIX could be a source of volatility in portfolio debt investment into EMEs, we think future studies can focus on identifying policies that could buffer the impact of VIX on portfolio investment into EMEs. Such policies could potentially help EME policy-makers design policies to suffer less from volatilities that are outside their control. In particular, we are interested in analyzing whether EME with capital controls could suffer less from VIX: as capital control restrict portfolio investment into a country, the influence of VIX over portfolio

investment could also be diminished by capital control policies.

We also could consider whether the flexibility of the exchange rate regime could also alter the influence of VIX over portfolio debt investment into EME. One hypothesis is that under a flexible exchange rate, capital inflows will drive up the exchange rate and therefore the value of the domestic assets, which would lower their appeal.

Finally, future work should seek to determine whether the role of VIX in driving a global financial cycle, as proposed by Rey (2015), is a temporary or permanent phenomenon. It could represent a response to the massive asset purchases of central banks, and in particular, the Federal Reserve. If this is the source of the linkage, it should fade as the Federal Reserve begins to shrink its balance sheet. But if it is permanent, EMEs may see capital outflow to the AEs during periods of high volatility. If that occurs, policymakers in emerging market countries should consider how to design policies to buffer the effect of risk that is out of their control.

Appendix

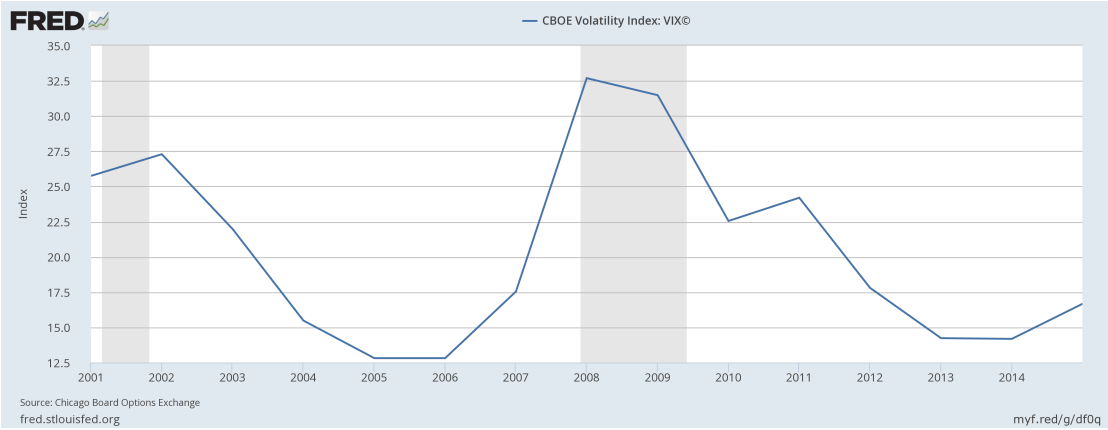

Figure 1

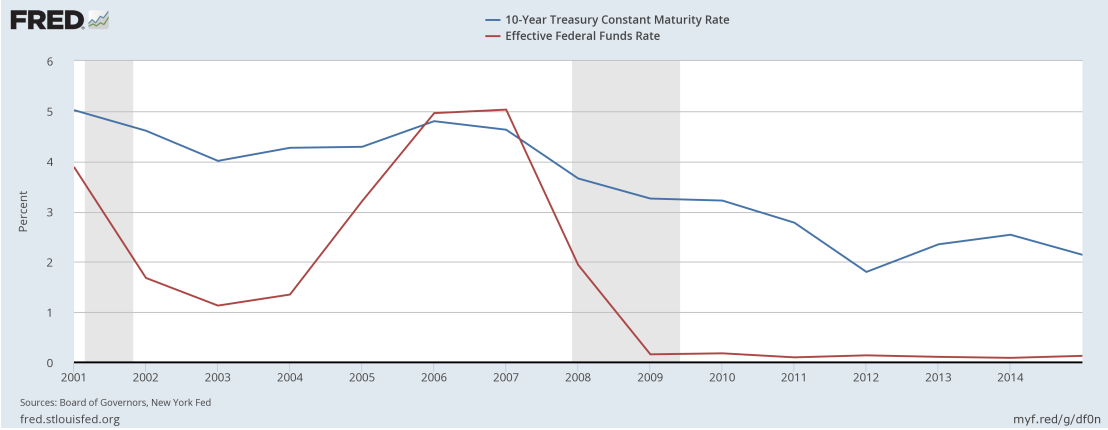

Figure 2

Table 1a Distribution of Portfolio Equity and Portfolio Debt

Year	PrtEqt/TotalAsset	PrtDbt/TotalAsset
2001	.447413	.6093255
2002	.4443256	.5844603
2003	.5026265	.5558534
2004	.5123616	.578419
2005	.508164	.5506386
2006	.5239295	.5142912
2007	.5549451	.4751708
2008	.5056262	.5264178
2009	.5651417	.4809555
2010	.5649732	.4719287
2011	.5478692	.4979836
2012	.5485487	.5063431
2013	.4814089	.5514471
2014	.4600172	.5861793
Total	.5131097	.5335234

Note: The portfolio equity to total asset ratio and the portfolio debt to total asset ratio reported in this table are the averages across source and host country pairs within a given year.

Table 1b Summary Statistics

	Mean	Standard Deviation	Min	Max
Total Asset	1669.749	4976.754	.0103293	127154.5
Portfolio Equity	903.6062	2474.008	.0011637	37554.82
Portfolio Debt	851.4001	3401.309	.0010487	107114.3
Host Country GDP	821582.4	1303665	16124.6	8230121
Source Country GDP	1438995	1357694	118124.9	5644659
Host Country Stock Market Capitalization	58.71819	52.82681	.3447142	256.4981
Bilateral Trade	2510.139	8637.879	0	151509.3
US 10-Year Treasury Bond Yield	3.611571	.9866521	1.8	5.02
EFFR	1.685912	1.80399	.09	5.03
VIX	20.43248	6.543249	12.81	32.69
N	3838			

Note: The number of observations in the dataset is larger than the number of observations in the regressions because some observations are dropped when they have missing values. The unit of Total Asset, Portfolio Equity, Portfolio Debt, Host Country GDP, Source Country GDP and Bilateral Trade is Millions of Dollars. Stock Market Capitalization is measured as percentage of GDP.

Table 2 Determinants of Portfolio Investment: VIX and U.S. 10-year Treasury Bond Yield

VARIABLES	(1) Total Asset	(2) Portfolio Equity	(3) Portfolio Debt
postGFC	-1.831	-4.220**	3.203
	(1.527)	(2.014)	(2.176)
ln(Host GDP)	1.724***	1.952***	0.569**
	(0.155)	(0.201)	(0.225)
postGFC *ln(Host GDP)	0.101***	0.129***	-0.00366
	(0.0341)	(0.0454)	(0.0486)
ln(Source GDP)	5.126***	5.780***	5.981***
	(0.341)	(0.467)	(0.517)
postGFC * ln(Source GDP)	-0.0217	0.0790	-0.101*
	(0.0386)	(0.0506)	(0.0554)
ln(Host Stock Market Capitalization)	0.491***	0.740***	0.344***
	(0.0493)	(0.0645)	(0.0706)
postGFC*ln(Host Stock Market Capitalization)	0.206***	0.200***	0.270***
	(0.0319)	(0.0457)	(0.0452)
ln(Trade)	0.0550*	0.127***	-0.0441
	(0.0312)	(0.0417)	(0.0457)
postGFC * ln(Trade)	-0.0694***	-0.143***	0.0351
	(0.0220)	(0.0294)	(0.0318)
ln(US10)	-0.409**	-0.286	-0.769***
	(0.177)	(0.228)	(0.254)
postGFC * ln(US10)	0.538**	0.184	0.781**
	(0.216)	(0.281)	(0.309)
ln(VIX)	-0.126*	-0.0128	-0.169*
	(0.0663)	(0.0860)	(0.0954)
postGFC *ln(VIX)	-0.148	0.0771	-0.937***
	(0.136)	(0.177)	(0.193)
Constant	-183.7***	-211.9***	-174.7***
	(8.907)	(12.12)	(13.52)
Observations	3,145	3,001	2,973
R-squared	0.537	0.486	0.347
Country-pair FE	YES	YES	YES

Note: The dependent variable for column (1), (2) and (3) is total asset, portfolio equity and portfolio debt an AE holds in an EME respectively. The dummy variable "postGFC" is equal to 1 if the year is within 2010-2014. GFC years (2008&2009) are excluded. Significance at the 0.01, 0.05 and 0.10 levels are indicated by ***, **, *, respectively.

Table 3 Determinants of Portfolio Investment: VIX and EFFR

VARIABLES	(1) Total Asset	(2) Portfolio Equity	(3) Portfolio Debt
postGFC	-0.863	-2.565	3.561
	(1.524)	(2.007)	(2.172)
ln(Host GDP)	1.777***	2.036***	0.600***
	(0.152)	(0.197)	(0.221)
postGFC * ln(Host GDP)	0.102***	0.130***	-0.00735
	(0.0341)	(0.0453)	(0.0485)
ln(Source GDP)	5.206***	5.900***	6.014***
	(0.341)	(0.466)	(0.517)
postGFC * ln(Source GDP)	-0.0210	0.0791	-0.100*
	(0.0386)	(0.0505)	(0.0554)
ln(Host Stock Market Capitalization)	0.488***	0.718***	0.364***
	(0.0496)	(0.0648)	(0.0711)
postGFC * ln(Host Stock Market Capitalization)	0.209***	0.204***	0.267***
	(0.0319)	(0.0457)	(0.0453)
ln(Trade)	0.0567*	0.131***	-0.0431
	(0.0312)	(0.0416)	(0.0457)
postGFC * ln(Trade)	-0.0690***	-0.141***	0.0344
	(0.0220)	(0.0294)	(0.0318)
ln(EFFR)	-0.0450*	-0.0305	-0.0954***
	(0.0230)	(0.0297)	(0.0331)
postGFC * ln(EFFR)	0.231**	0.451***	-0.0705
	(0.100)	(0.131)	(0.142)
ln(VIX)	-0.148*	-0.0252	-0.236**
	(0.0767)	(0.0990)	(0.111)
postGFC * ln(VIX)	-0.137	-0.122	-0.784***
	(0.136)	(0.176)	(0.193)
Constant	-187.9***	-217.8***	-177.4***
	(8.764)	(11.93)	(13.33)
Observations	3,145	3,001	2,973
R-squared	0.537	0.487	0.347
Country-pair FE	YES	YES	YES

Note: The dependent variable for column (1), (2) and (3) is total asset, portfolio equity and portfolio debt an AE holds in an EME respectively. The dummy variable "postGFC" is equal to 1 if the year is within 2010-2014. GFC years (2008&2009) are excluded. Significance at the 0.01, 0.05 and 0.10 levels are indicated by ***, **, *, respectively.

Table 4 Determinants of Portfolio Investments:
VIX and U.S. 10-year Treasury Bond Yield (with Crisis Years)

VARIABLES	(1) Total Asset	(2) Portfolio Equity	(3) Portfolio Debt
postGFC	-2.290	-4.338**	2.613
	(1.479)	(1.947)	(2.094)
ln(Host GDP)	1.563***	1.754***	0.440**
	(0.152)	(0.197)	(0.219)
postGFC * ln(Host GDP)	0.104***	0.125***	0.00823
	(0.0330)	(0.0439)	(0.0467)
ln(Source GDP)	4.529***	4.826***	5.715***
	(0.328)	(0.448)	(0.491)
postGFC * ln(Source GDP)	-0.0260	0.0578	-0.0944*
	(0.0373)	(0.0488)	(0.0532)
ln(Host Stock Market Capitalization)	0.492***	0.738***	0.344***
	(0.0473)	(0.0620)	(0.0674)
postGFC * ln(Host Stock Market Capitalization)	0.195***	0.179***	0.257***
	(0.0308)	(0.0440)	(0.0433)
ln(Trade)	0.0274	0.0910**	-0.0616
	(0.0299)	(0.0400)	(0.0435)
postGFC * ln(Trade)	-0.0604***	-0.124***	0.0301
	(0.0213)	(0.0284)	(0.0305)
ln(US10)	-0.420**	-0.285	-0.788***
	(0.175)	(0.226)	(0.250)
postGFC * ln(US10)	0.542**	0.165	0.802***
	(0.214)	(0.279)	(0.304)
ln(VIX)	-0.360***	-0.340***	-0.306***
	(0.0585)	(0.0760)	(0.0837)
postGFC * ln(VIX)	0.0265	0.329*	-0.836***
	(0.132)	(0.173)	(0.187)
Constant	-161.8***	-178.7***	-163.2***
	(8.367)	(11.39)	(12.59)
Observations	3,379	3,230	3,194
R-squared	0.519	0.463	0.338
Country-pair FE	YES	YES	YES

Note: The dependent variable for column (1), (2) and (3) is total asset, portfolio equity and portfolio debt an AE holds in an EME respectively. The dummy variable "postGFC" is equal to 1 if the year is within 2010-2014. GFC years (2008&2009) are included. Significance at the 0.01, 0.05 and 0.10 levels are indicated by ***, **, *, respectively.

Table 5 Determinants of Portfolio Investments: VIX and EFFR (with Crisis Years)

VARIABLES	(1) Total Asset	(2) Portfolio Equity	(3) Portfolio Debt
postGFC	-1.755	-3.357*	2.921
	(1.466)	(1.929)	(2.081)
ln(Host GDP)	1.516***	1.672***	0.465**
	(0.144)	(0.187)	(0.209)
postGFC * ln(Host GDP)	0.108***	0.131***	0.00485
	(0.0328)	(0.0436)	(0.0465)
ln(Source GDP)	4.779***	5.145***	5.980***
	(0.328)	(0.447)	(0.494)
postGFC * ln(Source GDP)	-0.0231	0.0594	-0.0911*
	(0.0372)	(0.0485)	(0.0531)
ln(Host Stock Market Capitalization)	0.510***	0.742***	0.375***
	(0.0475)	(0.0622)	(0.0678)
postGFC * ln(Host Stock Market Capitalization)	0.191***	0.176***	0.251***
	(0.0307)	(0.0438)	(0.0433)
ln(Trade)	0.0365	0.102**	-0.0518
	(0.0298)	(0.0398)	(0.0434)
postGFC * ln(Trade)	-0.0612***	-0.123***	0.0283
	(0.0212)	(0.0283)	(0.0304)
ln(EFFR)	-0.112***	-0.128***	-0.121***
	(0.0201)	(0.0260)	(0.0287)
postGFC * ln(EFFR)	0.258***	0.495***	-0.0619
	(0.0987)	(0.129)	(0.140)
ln(VIX)	-0.452***	-0.484***	-0.341***
	(0.0572)	(0.0740)	(0.0819)
postGFC * ln(VIX)	0.107	0.250	-0.698***
	(0.127)	(0.166)	(0.180)
Constant	-167.9***	-185.4***	-172.4***
	(8.031)	(10.96)	(12.15)
Observations	3,379	3,230	3,194
R-squared	0.523	0.469	0.340
Country-pair FE	YES	YES	YES

Note: The dependent variable for column (1), (2) and (3) is total asset, portfolio equity and portfolio debt an AE holds in an EME respectively. The dummy variable "postGFC" is equal to 1 if the year is within 2010-2014. GFC years (2008&2009) are included. Significance at the 0.01, 0.05 and 0.10 levels are indicated by ***, **, *, respectively.

Table 6 Determinants of Portfolio Investments:
VIX and U.S. 10-year Treasury Bond Yield
(Lagged Country-specific Variables)

VARIABLES	(1) Total Asset	(2) Portfolio Equity	(3) Portfolio Debt
postGFC	-1.064	-2.071	0.215
	(1.815)	(2.380)	(2.303)
ln(Host GDP$_{t-1}$)	0.0646***	0.0521	0.0641**
	(0.0247)	(0.0320)	(0.0318)
postGFC *ln(Host GDP $_{t-1}$)	-0.0244	-0.0412	-0.00507
	(0.0408)	(0.0536)	(0.0517)
ln(Source GDP $_{t-1}$)	0.0351	0.0360	0.0222
	(0.0284)	(0.0367)	(0.0365)
postGFC * ln(Source GDP $_{t-1}$)	-0.0448	-0.0611	0.0214
	(0.0461)	(0.0603)	(0.0584)
ln(Host Stock Market Capitalization $_{t-1}$)	0.122***	0.137***	0.0753**
	(0.0241)	(0.0313)	(0.0307)
postGFC*ln(Host Stock Market Capitalization $_{t-1}$)	-0.123***	-0.129***	-0.110**
	(0.0375)	(0.0494)	(0.0472)
ln(Trade $_{t-1}$)	-0.0291*	-0.0287	-0.0263
	(0.0154)	(0.0200)	(0.0199)
postGFC * ln(Trade $_{t-1}$)	0.0134	0.0161	-0.00292
	(0.0254)	(0.0332)	(0.0322)
ln(US10 $_{t}$)	-2.498***	-2.925***	-1.994***
	(0.187)	(0.242)	(0.238)
postGFC * ln(US10 $_{t}$)	2.640***	2.781***	2.081***
	(0.242)	(0.317)	(0.306)
ln(VIX $_{t}$)	-1.009***	-1.118***	-0.811***
	(0.0725)	(0.0936)	(0.0924)
postGFC *ln(VIX $_{t}$)	0.124	0.679***	-0.733***
	(0.160)	(0.211)	(0.201)
Constant	9.276***	9.424***	7.412***
	(1.111)	(1.443)	(1.428)
Observations	3,137	2,970	2,966
R-squared	0.318	0.258	0.244
Country-pair FE	YES	YES	YES

Note: The dependent variable for column (1), (2) and (3) is total asset, portfolio equity and portfolio debt an AE holds in an EME respectively. The dummy variable "postGFC" is equal to 1 if the year is within 2010-2014. All the country-specific control variables are lagged by one year. GFC years (2008&2009) are excluded. Significance at the 0.01, 0.05 and 0.10 levels are indicated by ***, **, *, respectively.

Table 7 Determinants of Portfolio Investments: VIX and EFFR (Lagged Country-specific Variables)

VARIABLES	(1) Total Asset	(2) Portfolio Equity	(3) Portfolio Debt
postGFC	1.806	2.362	1.501
	(1.852)	(2.419)	(2.327)
ln(Host GDP$_{t-1}$)	0.0678***	0.0560*	0.0668**
	(0.0251)	(0.0324)	(0.0319)
postGFC * ln(Host GDP $_{t-1}$)	-0.0279	-0.0446	-0.0106
	(0.0414)	(0.0543)	(0.0519)
ln(Source GDP $_{t-1}$)	0.0349	0.0353	0.0215
	(0.0288)	(0.0372)	(0.0367)
postGFC * ln(Source GDP $_{t-1}$)	-0.0436	-0.0630	0.0267
	(0.0468)	(0.0611)	(0.0587)
ln(Host Stock Market Capitalization $_{t-1}$)	0.137***	0.154***	0.0869***
	(0.0244)	(0.0317)	(0.0308)
postGFC * ln(Host Stock Market Capitalization $_{t-1}$)	-0.137***	-0.148***	-0.122***
	(0.0380)	(0.0500)	(0.0473)
ln(Trade $_{t-1}$)	-0.0292*	-0.0291	-0.0258
	(0.0156)	(0.0202)	(0.0200)
postGFC * ln(Trade $_{t-1}$)	0.0132	0.0172	-0.00520
	(0.0257)	(0.0336)	(0.0323)
ln(EFFR $_t$)	-0.248***	-0.290***	-0.207***
	(0.0261)	(0.0337)	(0.0328)
postGFC * ln(EFFR $_t$)	0.148	0.434***	-0.151
	(0.121)	(0.159)	(0.151)
ln(VIX $_t$)	-1.126***	-1.256***	-0.922***
	(0.0865)	(0.111)	(0.109)
postGFC * ln(VIX $_t$)	0.351**	0.687***	-0.420**
	(0.161)	(0.211)	(0.202)
Constant	5.987***	5.592***	4.849***
	(1.076)	(1.396)	(1.371)
Observations	3,137	2,970	2,966
R-squared	0.298	0.239	0.237
Country-pair FE	YES	YES	YES

Note: The dependent variable for column (1), (2) and (3) is total asset, portfolio equity and portfolio debt an AE holds in an EME respectively. The dummy variable "postGFC" is equal to 1 if the year is within 2010-2014. All the country-specific control variables are lagged by one year. GFC years (2008&2009) are excluded. Significance at the 0.01, 0.05 and 0.10 levels are indicated by ***, **, *, respectively.

Reference

Aggarwal, Raj, Colm Kearyney, and Brian Lucey. 2012. "Gravity and Culture in Foreign Portfolio Investment." *Journal of Banking and Finance* 36: 525-38.

Ahmed, Shaghil, and Andrei Zlate. 2014. "Capital Flows to Emerging Market Economies: A Brave New World?" *Journal of International Money and Finance* 48: 221-48.

Avdjiev, Stefan, Bryan Hardy, Sebnem Kalemli-Ozcan, and Luis Servén. 2017. "Gross Capital Inflows to Banks, Corporates and Sovereigns." *NBER Working Paper* no.23116.

Cerutti, Eugenio, Stijn Claessens, and Damien Puy. 2015. "Push Factors and Capital Flows to Emerging Markets: Why Knowing Your Lender Matters More Than Fundamentals." *IMF Working Paper* no.15/127.

Forbes, Kristin, and Francis Warnock. 2012. "Capital Flow Waves: Surges, Stops, Flight, and Retrenchment." *Journal of International Economics* 88: 235-51.

Forbes, Kristin, and Francis Warnock. 2012. "Debt- and Equity-Led Capital Flow Episodes." *Capital Mobility and Monetary Policy* : 291-322.

Galstyan, Vahagn, Philip Lane, Caroline Mehigan, and Rogelio Mercado. 2016. "The Holders and Issuers of International Portfolio Securities." *TEP Working Paper* no.0916.

Hofmann, Boris, and Elod Takats. 2015. "International Monetary Spillovers." *BIS Quarterly Review* : 105-18.

International Monetary Fund. 2010. "FDI Flows to Low-Income Countries: Global Drivers and Growth Implications." *IMF Working Paper* no.10/132.

Lane, Philip R., and Gian Maria Milesi-Ferretti. 2008. "International Investment Patterns." *The Review of Economics and Statistics* 90 : 538-49.

Levy-Yeyati, Eduardo, Ugo G. Panizza, and Ernesto Hugo Stein. 2014. "The Cyclical Nature of North-South FDI Flows." *Journal of International Money and Finance* 26 : 104-30.

Li, Shujing, Hamid Faruqee, and Isabel K. Yan. 2004. "The Determinants of International Portfolio Holdings and Home Bias." *IMF Working Paper* no.04/34.

Portes, Richard, and Hélène Rey. 2005. "The Determinants of Cross-border Equity Flows." *Journal of International Economics* 65: 269-96.

Reinhart, Carmen, and Vincent Reinhart. 2001. "What Hurts Most? G-3 Exchange Rate or Interest Rate Volatility." *NBER Working Paper* no. 8535.

Rey, Hélène. 2015. "Dilemma Not Trilemma: The Global Financial Cycle and Monetary Policy Independence." *NBER Working Paper* no. 21162.

Taylor, Mark, and Lucio Sarno. 1997. "Capital Flows to Developing Countries: Long- and Short-Term Determinants." *The World Bank Economic Review* 11: 451-70.