University of Texas Rio Grande Valley

ScholarWorks @ UTRGV

Economics and Finance Faculty Publications and Presentations

Robert C. Vackar College of Business & Entrepreneurship

2010

Foreign Portfolio Investment Inflows to the United States: The Impact of Investor Risk Aversion and U.S. Stock Market Performance

Peter V. Egly
The University of Texas Rio Grande Valley

David W. Johnk

Daniel Perez Liston

Follow this and additional works at: https://scholarworks.utrgv.edu/ef_fac

Part of the Finance Commons

Recommended Citation

Peter Egly, David Johnk, and Daniel Liston. Foreign Portfolio Investment Inflows to the United States: The Impact of Investor Risk Aversion and U.S. Stock Market Performance. North American Journal of Finance and Banking Research. 4, no. 4 (2010): 25–41

This Article is brought to you for free and open access by the Robert C. Vackar College of Business & Entrepreneurship at ScholarWorks @ UTRGV. It has been accepted for inclusion in Economics and Finance Faculty Publications and Presentations by an authorized administrator of ScholarWorks @ UTRGV. For more information, please contact justin.white@utrgv.edu, william.flores01@utrgv.edu.

FOREIGN PORTFOLIO INVESTMENT INFLOWS TO THE UNITED STATES: THE IMPACT OF INVESTOR RISK AVERSION AND US STOCK MARKET PERFORMANCE

Peter V. Egly[1]
The University of Texas - Pan American, USA.
pvegly@broncs.utpa.edu
David W. Johnk[2]
The University of Texas - Pan American, USA.
djohnk@utpa.edu

Daniel Perez Liston[3*]
The University of Texas – Pan American, USA.
dperez8@broncs.utpa.edu

ABSTRACT
This paper examines the relationship of net foreign portfolio investment inflows, namely corporate bonds and stocks, to two pull factors; investor risk aversion and the US stock market. Using a vector autoregressive model, we find that positive shocks to the stock market elicit an insignificant response to the net corporate bond inflow and a significant short term positive response to the net corporate stock inflow. The net corporate stock inflow does not respond to risk aversion, while bond inflows do exhibit a significant midterm response to an increase in risk aversion. Consistent with previous empirical findings, the results show that internal country-specific factors may influence foreign portfolio inflows.

Keywords: portfolio investment; investor risk aversion; vector autoregression

JEL Codes: F30, G11

[1, 2, 3] College of Business Administration, University of Texas - Pan American 1201, West University Drive, Edinburg, TX 78539-2999
[*] Corresponding Author. Tel (956) 607-2411

I. INTRODUCTION

The United States has been the recipient of a substantial and growing net influx of foreign portfolio inflows over the last three decades. A large portion of the inflows have been invested in corporate bonds and equities. For example, Table 1 shows that over the four year period between January 1977 and December 1980, the net foreign inflows associated with US corporate bonds totaled US$ 8.4 billion compared to US$ 534.9 billion over a like period from January 2001 to December 2004. During these two time periods we also see that foreign inflows invested in US corporate stocks increased from US$17.1 billion to US$127.76 billion. The trend in net corporate foreign portfolio inflows to the US raises important issues concerning the factors that motivate said inflows. Recently, on the website CNBC.com, it was stated that during the fourth calendar quarter of 2007 and the beginning of calendar year 2008, net foreign inflows in excess of US$ 27 billion, primarily from sovereign wealth funds, entered the US banking system to provide partial relief to its problems associated with the sub-prime market. The recent recession has spawned renewed interest in the causes of capital flows to the US. For example, the T-bill rate was recently driven to all time record lows, in part, due to foreign portfolio inflows.

Table 1 Net Foreign Portfolio Inflows (Millions of Dollars)

	Investment Type	
Time Frame	USCB	USCS
Jan 77 to Dec 80	$8,439	$17,100
Jan 81 to Dec 84	$17,822	$13,153
Jan 85 to Dec 88	$114,131	$34,572
Jan 89 to Dec 92	$48,621	$992
Jan 93 to Dec 96	$138,023	$31,546
Jan 97 to Dec 00	$330,444	$240,225
Jan 01 to Dec 04	$534,861	$127,740
Jan 05 to Apr 07	$531,141	$194,932

Source: Treasury International Capital Reports (TIC) and authors calculations
USCB represents US corporate bonds and **USCS** stands for US corporate stocks
Net Foreign Portfolio inflows represent the difference between foreign purchases (inflow) and foreign sales (outflow) of domestic securities by type. The sales and purchase amounts are deflated by CPI- base year 1982=100

The extant literature that has focused largely on international portfolio flows *towards* developing countries proposes that global push factors and country specific pull factors help explain the portfolio inflows to developing countries[1]. To our knowledge, there is scant literature that examines the foreign portfolio inflows *into* developed countries such as the US.[2] The absence of current literature coupled with the substantial growth in foreign corporate portfolio inflows into the US raise two interesting research questions: (1) To what extent do US country specific factors, such as the US stock market, explain the net foreign corporate portfolio inflows into the US?[3] (2) What role does investor risk aversion play in corporate portfolio inflows to the US? Answers to these questions are important to, among others, macroeconomic policy makers and investors. The former are interested in promoting macroeconomic stability, while the latter aim to improve their portfolio performance.

This paper contributes to the literature in the following distinct ways. First, we redirect our focus towards corporate portfolio inflows *to* a developed country to explore whether investor risk aversion and the US stock market performance are useful in explaining the variability in corporate portfolio inflows to the US. Second, we focus on two distinct corporate portfolio capital inflows, namely US corporate bonds and stocks. Relative to total portfolio inflows, corporate portfolio inflows account for the largest proportion. Lastly, we employ a vector autoregressive model to investigate the impact that pull factors have on corporate portfolio inflows.

Using a vector autoregressive model we find that the stock market positively influences net stock inflows to the US, however, net stock inflows do not respond to shocks in risk aversion.

The remainder of the paper is organized as follows: Section 2 presents a review of the literature. Section 3 describes the research methodology and identifies the data and its sources. In Section 4, we discuss the findings. Finally, Section 5 concludes the article.

II. LITERATURE REVIEW

There are two primary streams of literature that are pertinent to our study. One deals with the determinants of capital flows, with emphasis on studies that employ measures of risk aversion, while the other deals with the motivation and modeling of capital flows. With the exception of the work from Warnock and Warnock (2005), to our knowledge the literature centers on the flow of capital funds from developed/industrialized nations towards developing/emerging nations.

Section I: Determinants of capital flows

The keystone paper written by Calvo, Leiderman, and Reinhart (1993) uses monthly international reserves and real exchange rate data to proxy for capital flows, given the absence of monthly capital flow data at that time, to examine 10 Latin American countries for the period January 1988 to July 1992. In their paper, they also investigate the role that external factors play in capital flows and put forth economic implications of capital inflows to these developing countries. To conduct their empirical analysis, they initially derive the first two principal components for a series of external "push" factors such as various US Treasury interest rates, deviations from the trend in US real disposable income, and indices on US stock returns and real estate markets. Then they develop a structural VAR in which they incorporate the principal components and the international reserves and real exchange rate series and find that roughly 50% of the variance of the forecast errors in the international reserves and real exchange rate series are explained by the external factors.

Baek, Bandopadhyaya, and Du (2005) construct a country specific variable called the risk appetite index (RAI) which is based on rankings of monthly returns and historic volatility of returns of each stock market. They include RAI as an independent variable with other economic variables in their study of the determinants of market-assessed sovereign premium (using the Brady bond stripped yield spread as the dependent variable). They find that the RAI is significant, and has a larger impact than the other variables in their study. Baek (2006) uses the same RAI variable and finds that this variable was an important "push" factor for foreign portfolio investment in Asian countries, but not in Latin American countries.

Section II: Motivation and modeling of capital flows

Chuhan, Claessens, and Mamingi (1998) extend the work of Calvo et al. (1993) by directly studying the behavior of monthly US capital flows, namely bond and equity flows, to nine Latin American countries and nine Asian countries over the time period covering January 1988 to September 1992 using a panel data approach. Their results show the importance of both external and country-specific factors in motivating the capital inflows. They also find that to the extent they are able to explain capital flows, approximately half of the explained increase in the flows to Latin American countries is traced to the drop in US interest rates and the slowdown in the US economy, while for Asian countries, country specific factors outweighed external factors in explaining capital inflows. They also explain, by drawing from prior literature, that the finance viewpoint on the issue of capital flows stresses the relative tradeoff

between expected risk and return with the implication that changes in expected risk and returns can lead to realignment in stock positions, that is, capital flows in the international framework.

Mody and Murshid (2005) studying the capital flows-domestic investment relationship for 60 developing countries from 1979 to 1999, find that in the advent of financial liberalization of the 1990s, foreign capital encouraged less domestic investment compared to the prior decade. Inflows to the developing countries were for the most part channeled through portfolio flows yielding weak domestic investment stimulus. They explain that when an economy opens up to private capital flows, the impact of investments hinge on the domestic investment environment and on the objectives of investors. To illustrate this issue, they present two situations: (1) the relationship between foreign capital flows and domestic investment strengthens when the marginal returns to capital are high in relation to world rate of interest, and (2) when domestic returns are low, or no higher than the world rate of interest, foreign capital may still enter the country to achieve diversification.

III. RESEARCH METHODOLOGY AND DATA

According to Claessens, Dooley, and Warner (1995) empirical research on international capital flows has divergent views regarding their treatment as being either exogenous with respect to the country in question, in our case the US, or endogenous. Given the mixed results in the relevant literature regarding the factors that explain the variability in capital flows, and the increasing degree of financial integration and corporate portfolio flow mobility, we elect to employ a parsimonious econometric model to conduct our study.

Section I: Empirical model

In this paper, a vector autoregression (VAR), as described by Sims (1980), methodology is used to assess the relationships amongst the relevant variables. This methodology has several advantages: (1) an important benefit of using a VAR is that all the relevant variables are endogenous in the model, and (2) the model avoids the problem of endogeneity by placing all the contemporaneous terms on the left-hand side of the equation and all of the lagged terms on the right-hand side. A mathematical representation of an unrestricted VAR is as follows:

$$y_t = A_0 + A_1 y_{t-1} + \ldots + A_p y_{t-p} + Bx_t + e_t$$

where y_t is a k vector of endogenous variables and x_t is a d vector of exogenous variables. A_1 thru A_p and B are matrices of coefficients to be estimated. In addition, e_t is a vector of innovations. In this study two VAR models are

estimated. In the first model, the y_t vector of endogenous variables will consist of the risk aversion proxy (Baa –Aaa bonds), the S&P 500 index, and the ratio of gross purchases by foreigners- to gross sales by foreigners of U.S. corporate stocks. In the second model, the US corporate stock variable is replaced with a US corporate bond variable which was constructed in similar fashion as our US corporate stock variable.

The generalized impulse response function and the variance decomposition are the main tools used for the interpretation of the results. For a detailed discussion of the generalized impulse response function see Pesaran and Shin (1998). The benefit of using these generalized responses is that ordering of the VAR does not impact them[4]. In this model, an innovation is defined as a generalized one standard deviation. The graphs for the generalized impulse responses include confidence bands developed by using a Monte Carlo procedure with 1000 repetitions.

The inclusion of the S&P 500 index, which proxies as a US stock market performance measure, has been commonly used in empirical modeling of portfolio flows (Baek (2006), Chuhan et al. (1998), and Calvo et al. (1993)). While a different measure of risk aversion is captured by a quality spread variable, the concept of a risk aversion variable was employed by Baek (2006) in his study of determinants of portfolio investment flows to Asia and Latin America.

Section II: Data and descriptive statistics

The data in this study are in a monthly frequency and span from 1977M01 through 2007M12. Therefore, the sample includes 372 monthly observations. We obtain the data from various sources. The risk aversion (Baa – Aaa) data comes from the Federal Reserve Economic Data (FRED) database. The data for the S&P 500 comes from DataStream. The data for the ratio of gross purchases by foreigners-to gross sales by foreigners of U.S. corporate stocks and US corporate bonds comes from The Treasury International Capital System or TIC; provided by the United States Department of the Treasury. The TIC data has a starting point of January 1977, thus is the reason that all of the series in our study begin on said date.

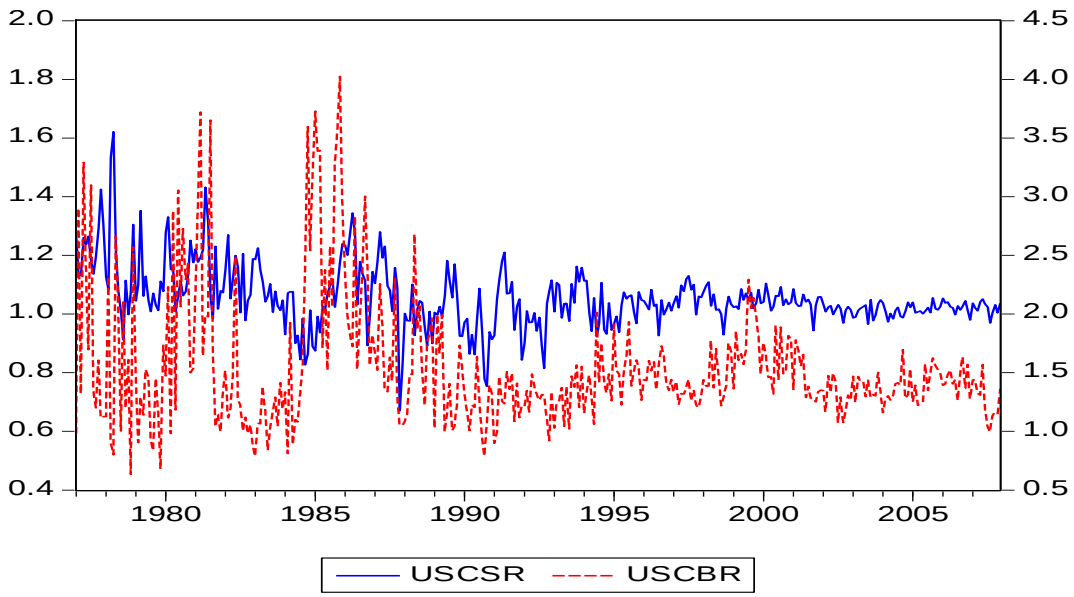
The TIC data are aggregate, and are compiled using information on international portfolio capital claims and liabilities. As required by U.S. law (22 U.S.C 286f, 22 U.S.C 3103; E.O. 10033; 31 C.F.R 128) the market participants (U.S banks, securities brokers, and dealers with foreigners) must provide this information via TIC forms. On these forms bankers, brokers and dealers report information on transactions consisting of the gross amount of purchases and sales among foreigners and US residents. TIC bond flow data has some

problems, as reported by Warnock and Warnock (2005), "The aggregate nature of the TIC transactions data does not allow for the detailed editing and checking that is possible with security – or account – level data" (p. 7). They also go on to point out that it is a very large task to maintain high quality data with the increasingly complex international financial systems. Being aware of the possible problems regarding the accuracy of the capital flow in the TIC data and not having a direct way to validate its consistency, Warnock and Warnock (2005) devised an indirect approach to address their data issues. They formed flows-based holding estimates from the TIC data, and compared them to recently conducted TIC annual "high quality" security- level benchmark surveys of foreigner's holdings of U.S. securities. The results showed there are inaccuracies in the TIC bond data, (as an extreme example, for the period from July 2001 to June 2002 the TIC system indicated foreign purchases of agency bonds were $206 billion where the benchmark survey indicated only $68 billion). Subsequently, Warnock and Warnock (2005) made adjustments to the TIC bond data using the TIC benchmark survey data. Warnock and Cleaver (2003) also find inaccuracies in capital flows estimates due to geographical mismatch in flows data. Their findings do not apply to this study since we examine aggregate level data as opposed to country level data. Hau and Rey (2004) use TIC data in unadjusted form and state, "The best public data on international equity flows come from the U.S. Treasury (TIC data)" (p. 126). The TIC data is also used "as-is" by Hau and Rey (2006), even though they note in their paper that the TIC data has some flaws. Chuhan et al. (1998) also employ the TIC data "as-is" in their study, but note there are some inaccuracies in the reporting of transactions, saying "these transactions are likely to be small, and in any case likely to be motivated by the same factors underlying the trading or issuing of bonds from the developing country itself" (p. 446). Acknowledging that there are some inaccuracies in the TIC data; we decide to employ it for use in our study because it is the best publically available data we could find on U.S. capital flows to and from foreign countries.

The quality spread (QSFED) is defined as the difference between the Baa and Aaa corporate bond yield and is expressed as a percentage. This variable is a proxy for risk aversion. The larger the spread the more risk aversion exists in the bond market. That is, investors require more compensation, relative to the Aaa bond for taking on the additional default risk that exists in a Baa bond. Fama and French (1993) show that the quality spread explains average returns on stocks and bonds. In addition, we define the continuous returns of the S&P 500 (RSP500) as the log natural of ($S\&P\ 500_t / S\&P\ 500_{t-1}$) multiplied by 100 to express the returns in percentage form. The rationale for the use of this variable is to

proxy for the continuous returns in the market. Finally, dividing gross monthly purchases- by gross monthly sales by foreigners of corporate stock (corporate bonds) we develop our main variables of interest. The net corporate stock inflow (USCSR) and the net corporate bond inflow (USCBR)[5]. If $USCSR_t$ ($USCBR_t$) > 1 foreign investors bought more securities than what they sold, at time *t*. If $USCSR_t$ ($USCBR_t$) < 1 investors sold more US securities than they bought. Figure 1 illustrates the dynamics, over time, of these two variables.

Figure 1 Net Corporate Stock and Bond Inflows (USCSR and USCBR)



The left (right) axis represents the ratio of gross of purchases by foreigners of U.S. corporate stock divided by gross sales by foreigners of U.S. corporate stock (gross purchases by foreigners of U.S. corporate bonds divided by gross sales by foreigners of U.S. corporate bonds).

Descriptive statistics are reported in Panel A of Table 2. All four of the variables exhibit positive means. The range of the stock market return is 37.92 percent, with a minimum of -24.68 percent and a maximum 13.24 percent. The standard deviation for the net corporate bond inflow is quite large at a value of 0.545 when compared to the value of the net corporate stock inflow which is 0.106. The standard deviation of the stock market return is 4.063 percent, while the standard deviation of risk aversion is 0.423 percent. Both the net corporate stock and bond inflows are positively skewed with values of 1.96 and 1.02 respectively. The stock market return is negatively skewed with a value of -0.805,

while risk aversion is positively skewed at a value of 1.48. All four variables are leptokurtic with a kurtosis values ranging from 5.18 to 7.44. The Jarque-Bara test, which is a joint test of the null hypothesis that the data has a skewness value of zero and a kurtosis value of three (thus indicating normality), is rejected for all four variables. The *p*-values are all zero, this strongly indicates non-normality. The correlation matrix is reported in Panel B of Table 2. All correlations are significant with values of 1 percent or less, with the exception of the correlation of the stock market with both risk aversion and net corporate bond inflows.

Table 2
Panel A
Descriptive Statistics

	USCSR	USCBR	RSP500	QSFED
Mean	1.053878	1.544226	0.706694	1.056577
Median	1.036820	1.406142	1.042684	0.920000
Maximum	1.620870	4.025010	13.23900	2.690000
Minimum	0.670455	0.634503	-24.68381	0.550000
Std. Dev.	0.105531	0.545231	4.063861	0.422806
Skewness	1.022639	1.956400	-0.804549	1.481499
Kurtosis	7.211053	7.439806	6.915035	5.183430
Jarque-Bera	338.7869	541.3800	276.9622	209.4097
Probability	0.000000	0.000000	0.000000	0.000000
Sum	390.9888	572.9077	262.1834	391.9900
Sum Sq. Dev.	4.120606	109.9926	6110.538	66.14315
Observations	371	371	371	371

Panel B
Correlation Matrix

	USCSR	USCBR	RSP500	QSFED
USCSR	1.00			

USCBR	0.12	1.00		
	(0.01)	---		
RSP500	0.12	0.08	1.00	
	(0.01)	(0.11)	---	
QSFED	0.18	0.16	0.008	1.00
	(0.00)	(0.00)	(0.87)	---

Note, parentheses represent *p*-values

IV. EMPIRICAL FINDINGS

Section I: Preliminary analysis

Before running the VAR an examination of the order of integration of the variables is performed. That is, we examine whether the series are stationary or not. To facilitate the investigation into whether the series are stationary we use the unit root procedure developed by Dolado, Jenkinson, and Sosvilla-Rivero (1990)[6]. The first step is to run an Augmented Dickey-Fuller test, on the series of interest, of the following form:

$$\Delta y_t = \alpha_0 + \gamma y_{t-1} + \alpha_2 t + \sum_{i=1}^{p} \beta_i \Delta y_{t-i} + \varepsilon_t$$

If $\gamma = 0$ the hypothesis of a unit root cannot be rejected. Unit root tests have low power, this is well established; therefore, if the null of a unit root is rejected with the least restrictive specification we can conclude that the series does not contain a unit root. Table 3 shows the results for the unit root tests based on the Augmented Dickey-Fuller and the Dickey-Fuller GLS tests. Three out of the four variables show no evidence of a unit root; however the risk aversion measure shows mixed results. Since the risk aversion is of central interest to the study, we decide to include the variable, with the caveat that the variable might be nonstationary.

Table 3

Unit root tests

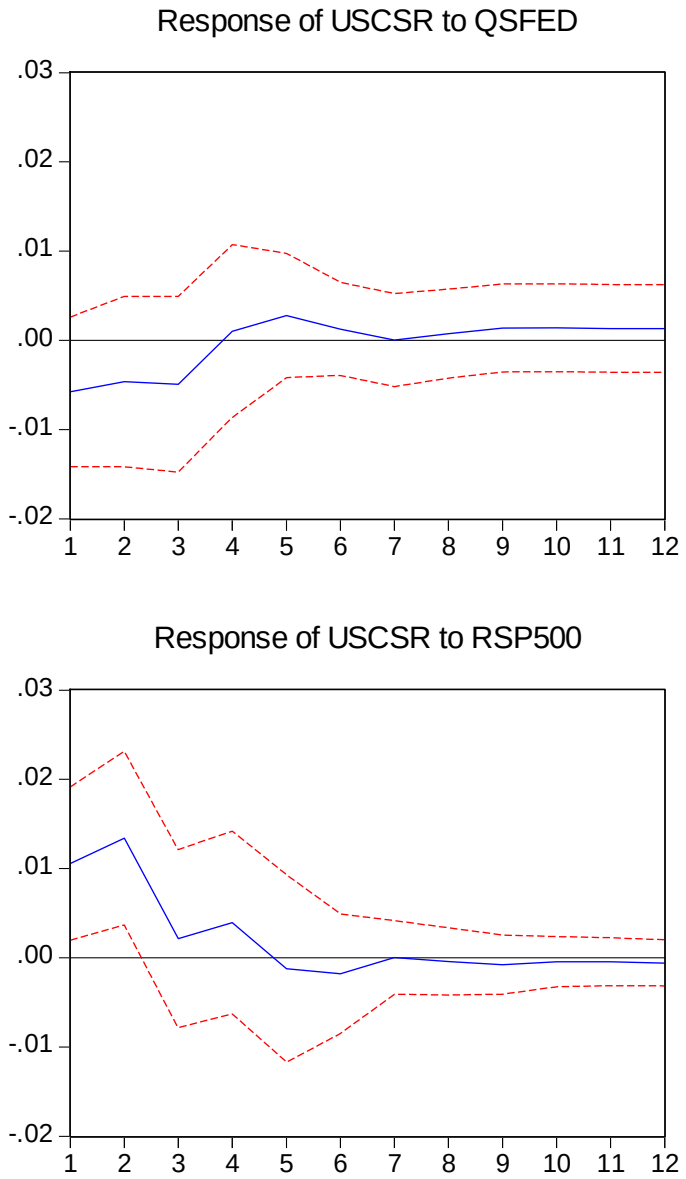
	ADF		DF-GLS	
	Intercept	Intercept and Trend	Intercept	Intercept and Trend
QSFED	(2.37)	(2.99)	(2.35)**	(2.73)*
RSP500	(18.60)***	(18.58)***	(2.74)***	(4.59)***
USCSR	(5.91)***	(10.28)***	(2.37)**	(5.04)***
USCBR	(5.10)***	(5.25)***	(3.52)***	(4.29)***

*, **, *** denote significance at the 10%, 5%, 1% level

Section II: Impulse responses

Figure 2 illustrates the generalized impulse response functions for the VAR which models the net corporate stock inflow, risk aversion, and stock market. Net corporate stock inflows respond significantly and positively to a stock market return shock. At impact, the shock is positive and significant; then becomes insignificant between the second and third month after the shock.

Figure 2
Impulse Responses for Net Corporate Stock Inflows (USCSR) to Risk Aversion (QSFED) and Stock Market Returns (RSP500)



This result is to be expected. As foreign investors recognize that returns are increasing in the United States they will acquire more U.S. securities, thereby, capitalizing on the higher returns provided by the stock market. However, the shock is short-lived meaning that foreign investors seek the opportunities rather quickly. Net corporate stock inflow does not show a statistically significant response to an innovation

in the risk aversion. A possible explanation might be that foreign investors do not consider the risk aversion in their stock investment decisions.

Figure 3
Impulse Responses for Net Corporate Bond Inflows (USCBR) to Risk Aversion (QSFED) and Stock Market Returns (RSP500)

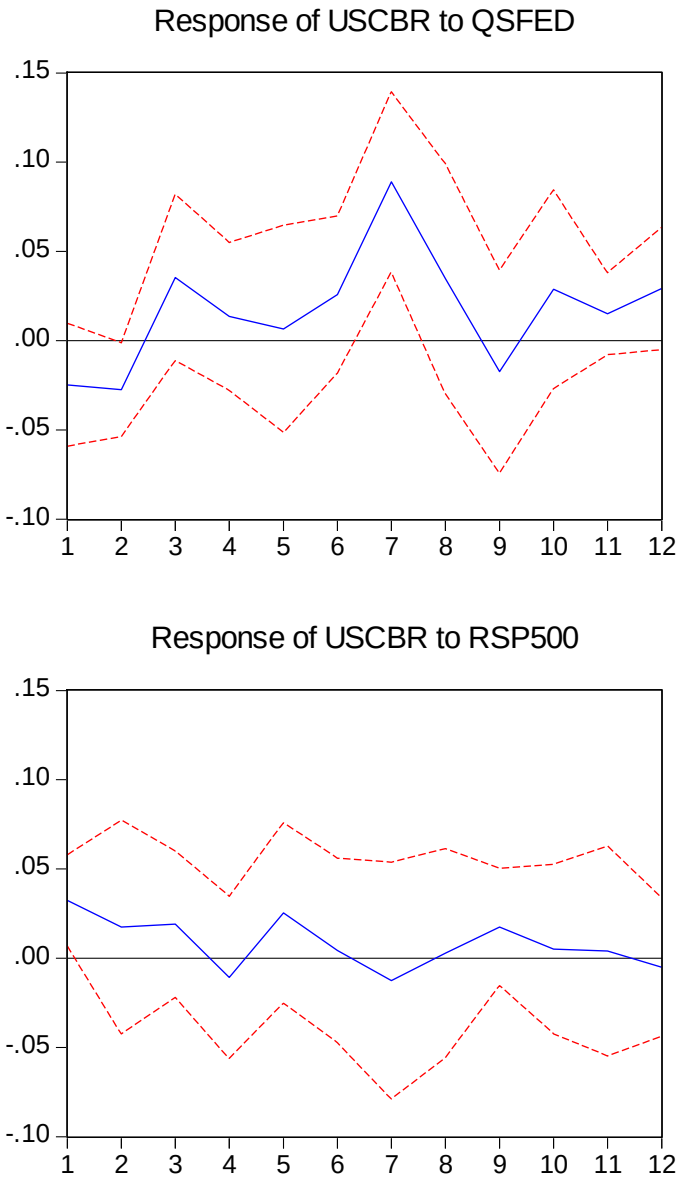


Figure 3 illustrates the generalized impulse response functions for the VAR which models the net corporate bond inflow, risk aversion, and stock market return. An innovation to the stock market does significantly affect the net corporate bond inflow. This short-term response is consistent with the net corporate stock inflows. Favorable shocks to the equity market seem to benefit both capital market sectors (equity and bonds), as far as foreign inflows are concerned. In contrast to the equity sector, the net corporate bond inflows appear to have a strong lagged response, at 7 months, to an innovation in risk aversion. This response may be interpreted as a "flight-to-quality," where foreign investors purchase US bonds in times of perceived increased risk.

Section III: Variance decompositions

Table 4, Panels A and B illustrate the forecast error variance decompositions. Enders (2004) explains variance decomposition as the proportion of the movements in a sequence due to its "own" shocks versus shocks to the other variable. The decompositions are shown at the first, sixth, and twelfth month horizons. The horizons are short given that most of the decomposition of the error variance does not change much after the twelfth month horizon. In Table 4, Panel A the variance decomposition of the net corporate stock inflow shows that most of the forecast error variance is explained by its own shocks. In fact, less than 2 percent of the forecast error variance can be attributable to the other variables in the system. This can be interpreted as the net corporate stock inflow is largely independent of the other two variables. Examination of the variance decomposition of net corporate bond inflow in Table 4, Panel B, shows that most of the forecast error variance of net corporate bond inflow is explained by its own shocks at the 12 month time horizon, however for the same horizon risk aversion accounts for 6.5 percent of the error variance.

Table 4
Variance Decompositions

Panel A
USCSR, QSFED, and RSP500

Variance Decomposition of USCSR:				
Period	S.E.	USCSR	QSFED	RSP500
1	0.080759	100.0000	0.000000	0.000000
		(0.00000)	(0.00000)	(0.00000)
6	0.098718	98.75937	0.434542	0.806093
		(1.39354)	(0.87270)	(1.06181)
12	0.099722	98.60311	0.551411	0.845474
		(1.70928)	(1.18028)	(1.12893)

Panel B
USCBR, QSFED, and RSP500

Variance Decomposition of USCBR:			
S.E.	USCBR	QSFED	RSP500
0.393459	100.0000	0.000000	0.000000
	(0.00000)	(0.00000)	(0.00000)
0.472815	98.05368	1.665612	0.280709
	(1.95611)	(1.64374)	(1.10417)
0.503439	93.09714	6.512160	0.390703
	(3.85492)	(3.50450)	(1.52721)

Standard Errors: Monte Carlo (1000 repetitions)

V. CONCLUSION

This paper takes as its starting point that risk aversion, measured through the quality spread, plays a role in the flow of foreign corporate portfolio investment into the US. We concur with the supporting literature that country specific pull factors, such as stock market return, remain of significant importance in explaining foreign corporate portfolio investment inflows. However, we propose that other non-economic fundamentals such as risk aversion cannot be ignored given that investors' risk aversion may change over time. In this paper, we examine the effects of positive shocks to stock market return and risk aversion on the net bond flow and net stock flow ratios based on VAR models for the period from January 1977 to December 2007.

We find that net corporate bond and stock inflows respond positively to innovations in stock market returns. The empirical results suggest that the net corporate bond inflow exhibits a midterm response to risk aversion while the stock inflow does not respond to positive shocks in risk aversion. Consistent with previous empirical findings, the results show that internal country-specific factors may influence foreign portfolio inflows.

We propose some direction for future research in this area. It would be insightful to expand the variables to include both push and pull factors, as documented in the empirical literature since the absence of key variables could lead to an omitted variable bias issue from a modeling standpoint. Further, by expanding our variable set, we can explore whether push factors outweigh pull factors in explaining corporate portfolio inflows to the US. Incorporating country specific macroeconomic fundamentals from the foreign sources of corporate

portfolio inflows might offer some insight as to the expected continuity of future inflows from said countries in the coming years. Research could also be conducted to examine the degree of volatility associated with the foreign inflows.

_____

NOTES:

[1] See, among others, Baek, Bandopadhyaya, and Du (2005) and Mody and Murshid (2005)

[2] Caves, Frankel, and Jones (2007) explain that the most significant shift in the economic interaction among industrialized countries during the 1980s was the resulting materialization of substantial US trade deficits which attributed to the international flow of capital to the US and not due to changes in trade policy or competitiveness. They also document that in the 1980s, international capital flows increased significantly among the developed nations with the flows largely motivated by interest differentials between countries and diversification objectives.

[3] Baek (2006) finds the return on the US stock market represented a world stock market performance measure and thus was considered a "push factor" in determining portfolio inflows to Asian and Latin American countries. In our study, since we are examining portfolio inflows to the US, the stock market S&P 500 variable, a commonly used indicator of the US stock market, is treated as a "pull" factor.

[4] The standard Cholesky procedure for orthogonalization of the impulses was used and no meaningful difference was observed.

[5] The rationale for taking the ratio is to avoid any negative values.

[6] Note that Enders (2004) provides a graphical representation of this procedure.

REFERENCES

Baek, I., (2006), Portfolio Investment Flows to Asia and Latin America: Pull, Push Or Market Sentiment? *Journal of Asian Economics*, 17, pp. 363-373.

Baek, I. and A. Bandopadhyaya and C. Du, (2005), Determinants of Market-Assessed Sovereign Risk: Economic Fundamentals or Market Risk Appetite? *Journal of International Money and Finance*, 24, pp. 533-548.

Calvo, G. and L. Leiderman and C. Reinhart, (1993), Capital Inflows and Real Exchange Rate Appreciation in Latin America: The Role of External Factors. *IMF Staff Papers*, 40 (1), pp. 108-151.

Caves, R. and J. Frankel and R. Jones, (2007), World Trade and Payments (10th ed.), Addison-Wesley.

Chuhan, P. and S. Claessens and N. Mamingi, (1998), Equity and Bond Flows to Latin America and Asia: The Role of Global and Country Factors. *Journal of Development Economics*, 55, pp. 439-463.

Claessens, S. and M. Dooley and A. Warner, (1995), Portfolio Capital Flows: Hot or Cold? *The World Bank Economic Review*, 9, pp. 153-174.

Dolado, J. and T. Jenkinson and S. Sosvilla-Rivero, (1990), Cointegration and Unit Roots. *Journal of Economic Surveys*, 4, pp. 249-273.

Fama, E. F. and K. R. French, (1993), Common Risk Factors in the Returns on Stocks and Bonds. *Journal of Financial Economics*, 33, pp. 3-56.

Enders, W., (2004), Applied Econometric Time Series. Singapore: John Wiley & Sons.

Hau, H. and H. Rey, (2004), Can Portfolio Rebalancing Explain the Dynamics of Equity Returns, Equity Flows, and Exchange Rates? Papers and Proceedings of the One Hundred Sixteenth Annual Meeting of the American Economic Association, 94 (2), pp. 126-133.

Hau, H. and H. Rey, (2006), Exchange Rates, Equity Prices and Capital Flows. *Review of Financial Studies*, 19 (1), pp. 273-317.

Mody A. and A. Murshid, (2005), Growing up with Capital Flows. *Journal of International Economics*, 65, pp. 249-266.

Pesaran, H. and Y. Shin, (1998), Generalized Impulse Response Analysis in Linear Multivariate Models. *Economic Letters*, 58, pp. 17-29.

Pisana, B. (2007), Abu Dhabi's cash infusion: Does it save Citi?, CNBC.com , available at http://www.cnbc.com/id/219989653/ .

Sims, C., (1980), Macroeconomics and Reality. *Econometrica*, 48, pp. 1-48.

Warnock, F. and V. Warnock, (2005), International Capital Flows and U.S. Interest Rate Board of Governors of the Federal Reserve System International Finance Discussion Papers. Number 84, pp. 1-46.

Warnock, F and C. Cleaver, (2003), Financial Centers and the Geography of Capital Flows. *International Finance*, 6, pp. 27-59.

Copyright of North American Journal of Finance & Banking Research is the property of Global Business Investment & Publications and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.