THREE ESSAYS ON INTERNATIONAL FINANCE

DISSERTATION

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By

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Abstract

This dissertation examines three distinct questions within the international portfolio choice literature. In chapter one, I study the change in the equity home bias during the financial panic of 2008. Using a sample of 45 countries, I document that the equity home bias fell. This is puzzling because theories of home bias and portfolio choice under uncertainty predict that during a crisis, the home bias should increase. With a novel methodology, I show that the active trades of investors, which increased the home bias, were subsumed by the passive valuation changes in their portfolio holdings, which decreased the home bias. I find evidence consistent with a role for portfolio rebalancing, increased information asymmetries, and the familiarity bias in portfolio allocations during the crisis.

In chapter two, I analyze the impact of aggregate changes in U.S. demand for foreign stocks on U.S. firm-level stock prices. Separating U.S. net flows into outflows and inflows, I document that stocks with higher sensitivity to outflows earn significantly lower risk-adjusted returns. High outflows-beta firms tend to be smaller, younger, more volatile, and less globally diversified. Using firm-level, risk-adjusted returns, I find that the significantly negative premium is not subsumed by these characteristics or others commonly associated with misvaluation or limits to arbitrage. I show that the return on an outflows-mimicking portfolio is predictable and largely concentrated during periods

when the demand for foreign equity is likely to fall, i.e., following reduced wealth, increased uncertainty, and reduced sentiment. The results are consistent with sensitivity to aggregate changes in U.S. demand for foreign stocks affecting firm-level U.S. stock returns.

In chapter three, I study why U.S. investors' foreign portfolio share nearly doubled from 1994 to 2010. Using a sample of monthly bilateral equity holdings between investors in the U.S. and 45 countries, I document that most of the increase occurred from U.S. investors passively allowing their foreign holdings to appreciate. Controlling for the passive change in the U.S. foreign portfolio share, I find that the portfolio reallocations of U.S. investors are consistent with changes in foreign wealth sending U.S. investors abroad and less so towards markets displaying increased uncertainty and higher misvaluation. I show that over this period, U.S. investors sold substantial portions of domestic equity to foreign investors; however, foreign investors in markets where misvaluation was more severe increased their share of the U.S. stock market at a relatively lower rate.

To my mother, who has supported and encouraged me throughout my life. To my father, with whom I wish I could share this moment.

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INTRODUCTION

The first essay in this dissertation examines the change in the equity home bias during the financial panic of 2008. Theories of home bias and of portfolio choice under uncertainty both predict that the home bias should increase during a financial crisis. In contrast to these theories, using a sample of 45 countries, I document that the equity home bias fell during the financial panic of 2008. Employing a novel methodology to disentangle the active and passive component of portfolio holdings, I find that the trades of investors (the active component) increased the home bias, but the changes due to returns and exchange rates (the passive component) subsumed the active changes and reduced the home bias. Across countries, the change in home bias is consistent with portfolio rebalancing, increased information asymmetries, and familiarity bias during the crisis. The U.S. is the exception to the general global pattern because U.S. active changes outweighed U.S. passive changes, causing the U.S. home bias to increase. I show that U.S. investors reduced their holdings of foreign and domestic stocks, but reduced their holdings of foreign stocks at a higher rate.

The second essay examines the impact of aggregate changes in U.S. demand for foreign stocks on U.S. firm-level stock returns. Separating U.S. net flows into outflows (U.S. investors' net purchases of foreign equity) and inflows (foreign investors' net purchases of U.S. equity), I evaluate the sensitivity of U.S. stocks to innovations in international stock flows. Creating flows mimicking portfolios, I document that stocks with higher sensitivity to outflows earn significantly lower risk-adjusted returns. High outflow-beta firms tend to be smaller, younger, more volatile, and less globally diversified. Using firm-level, risk-adjusted returns, I find that the significantly negative premium is not subsumed by these characteristics or others commonly associated with misvaluation or limits to arbitrage. By construction, when the demand for foreign stocks is lower than expected, the return spread for the flows mimicking portfolio should be low. I show that the return on the outflows mimicking portfolio is predictable and largely concentrated during periods when the demand for foreign equity is likely to fall, i.e., following reduced wealth, increased uncertainty, and reduced sentiment. The results are consistent with sensitivity to aggregate changes in U.S. demand for foreign stocks affecting firm-level U.S. stock returns.

The third essay of this dissertation examines growth in the foreign portfolio share of U.S. investors. For decades, the U.S. foreign portfolio share remained relatively constant; yet, from 1994 to 2010, the share of equity wealth U.S. investors allocated to foreign markets nearly doubled. Using a sample of monthly bilateral equity holdings between investors in the U.S. and 45 countries, I document that most of the increase occurred from U.S. investors passively allowing their foreign holdings to appreciate.

Traditional portfolio choice theories predict that the gains to holding foreign equity are increasing in wealth. Alternative theories of ambiguity aversion and speculative investment predict that uncertainty and misvaluation impact international portfolio choice as well. Controlling for the passive change in the U.S. foreign portfolio share, I find that the portfolio reallocations of U.S. investors are consistent with changes in foreign wealth sending U.S. investors abroad and less so towards markets displaying increased uncertainty and higher misvaluation. I show that over this period, U.S. investors sold substantial portions of domestic equity to foreign investors; however, foreign investors in markets where misvaluation was more severe increased their share of the U.S. stock market at a relatively lower rate.

CHAPTER 1

WHY DID THE EQUITY HOME BIAS FALL DURING THE FINANCIAL PANIC OF 2008?

1.1 Introduction

Around the world, investors seemingly forgo the gains to international diversification and display a strong tendency to hold most of their equity wealth in domestic stocks (Lewis, 2011). This home bias remains an important puzzle in financial economics and has been the subject of much theoretical and empirical work.[1] Traditional portfolio choice theories frame the home bias to be a function of the benefits of holding foreign equity less the costs. Alternative approaches from the work in ambiguity aversion (Ellsberg, 1961) and familiarity bias (Heath and Tversky, 1991) examine whether portfolio choice under uncertainty can lead to a home bias. While economically distinct, both approaches share one prediction: during financial crises, the home bias should increase. However, using the International Monetary Fund's *Coordinated Portfolio Investment Survey (CPIS)* to create a global sample of the multilateral equity holdings of 45 countries, I find that in the recent financial crisis in 2008, the home bias decreased. Across countries, the share of equity wealth investors allocated abroad, the foreign

[1]For detailed reviews of the home bias literature, see Lewis (2011) and Karolyi and Stulz (2003).

portfolio share, rose by an average of 3.62%, its largest increase over the 2000s. This result seemingly contrasts with the growing retrenchment literature that uses capital flows and transactions data to conclude that investors left foreign markets for home (Milesi-Ferretti and Tille, 2011; Forbes and Warnock, 2011; Fratzscher, 2011).

The difference between my result and that of the literature comes from the impact of valuation changes on holdings. Using a novel methodology, I decompose the change in allocation into its active component due to trades that investors made and passive component caused by differential returns and exchange rates. I find that in 2008, the active change in the foreign portfolio share was -1.02%, which is consistent with the retrenchment literature, but the passive change was much larger, 4.64%. During this period, some countries suffered worse returns than others, and most currencies significantly depreciated against the U.S. dollar (Fratzscher, 2009). My results show that, on average, the economic magnitude of the sales of foreign stocks by investors across the world was significantly less than the positive effect of these relative valuation changes in their foreign portfolio share.

To understand why investors would actively change their holdings, I examine whether the cross-country variation in stock portfolio changes was consistent with portfolio rebalancing, traditional theories of the home bias, or portfolio choice under uncertainty. Assuming investors' target foreign holdings did not change, portfolio rebalancing predicts that investors who do not hold the world market portfolio would want to offset large passive changes in their holdings. This implies that active changes will be negatively associated with passive changes. Second, holding risk aversion

constant, traditional home bias theories predict that if foreign investment is costly, reductions in wealth and increases in information asymmetry during the crisis would cause investors to raise their home bias. Third, there was a massive financial panic in 2008 (Gorton, 2008) that brought great uncertainty (Easley and O'Hara, 2010; Caballero and Krishnamurthy, 2008). All else equal, theories of portfolio choice under uncertainty predict that if investors are ambiguity averse, an increase in uncertainty (Uppal and Wang, 2003; Epstein, 2001) or heightening of familiarity bias (Cao et al., 2011) would cause investors to reduce their foreign portfolio share.

Empirically, I find that the change in equity holdings across countries supports the predictions of portfolio rebalancing, increased information asymmetries, and familiarity bias during the crisis. Consistent with the portfolio rebalancing hypothesis, using the multilateral holdings from the CPIS, I find that active changes in the foreign portfolio share are negatively associated with passive changes in equity allocation in 2008. Investors rebalanced their equity holdings of more liquid countries at a higher rate, which is consistent with liquidity easing rebalancing. Additionally, I find that investors around the world significantly increased their home bias more towards target countries that were relatively distant and less towards countries within their same region or that shared a common culture; in the U.S., investors increased their home bias towards markets that experienced relatively lower returns in 2008. Both findings are consistent with information asymmetries causing a home bias (Brennan and Cao, 1997; Van Nieuwerburgh and Veldkamp, 2010; Andrade and Chhaochharia, 2010; Choe, Kho, and Stulz, 2005) and worsening during a period of crisis (Gelos and Wei, 2005). Finally, I

find that the association between my proxy for familiarity, the growth of a target country in a home country's portfolio from 2001 to 2007, and changes in the home bias of U.S. investors is positive and economically significant. The relation is consistent with U.S. investors reducing their holdings more towards assets with which they were relatively less familiar during the crisis.

The results are less supportive of the predictions of wealth and ambiguity causing investors to change their portfolio allocation in 2008. To examine whether investors that suffer more severe wealth losses increase their home bias more, I proxy each home country's changes in financial wealth with buy and hold market returns. Additionally, I use GDP growth and consumption growth to proxy for changes in non-financial wealth and income. In my sample, only changes in financial wealth are associated with investors reducing the total share of equity wealth they allocate abroad, suggesting that changes in non-financial wealth were not significant drivers of the change in home bias during the recent crisis. Lastly, I do not find that the association between my proxy for increased uncertainty, the ratio of the highest standard deviation of daily market returns for any month in year *t*, divided by the monthly average of the standard deviation of daily market returns in year *t-1,* and changes in the home bias is significantly positive for the global sample or for U.S. investors. This finding does not support the prediction that investors increased their home bias towards markets where uncertainty grew higher.

Though several papers show how investors changed their portfolios in 2008, my paper decomposes the mechanisms through which investors' equity portfolios changed. As such, my contribution is three-fold. First, I directly map allocations from home to

target countries to explain why investors left foreign markets as a function of conditions at home and abroad. Prior literature examines portfolio changes at either the home or target country level (Milesi-Ferretti and Tille, 2011; Forbes and Warnock, 2011; Fratzscher, 2011). I contribute to this research by using data that permit identification of changes in allocation from home to target countries. This allows me to test why investors in each country would enter and exit specific markets. Second, my findings demonstrate the importance of distinguishing between active and passive changes in investors' equity allocation. I show that passive changes were economically significant and on average, were greater than the trades of investors. The importance of passive changes has been absent from papers that either identify aggregate holdings between the U.S. and foreign investors during the crisis (Bertaut and Pounder, 2009; Bernanke et al., 2011) or that use the CPIS to examine changes in the home bias between home and target country pairs (see for example, Andrade and Chhaochharia, 2010; Bekaert and Wang, 2009; Thapa and Pshakwale, 2010). Curcuru et al. (2010, 2011) investigate active versus passive changes in U.S. investors' international equity portfolio from 1994 to 2008 and find evidence supportive of portfolio rebalancing, but inconsistent with an information disadvantage. My results highlight the impact of the crisis on information asymmetry and demonstrate the importance of looking across the world to understand retrenchment in 2008. Third, I test whether the change in allocation during the crisis was consistent with distinct theories of portfolio choice and home bias.

The rest of this chapter proceeds as follows. Section 1.2 describes the data and methodology I use to measure active allocation. Section 1.3 examines changes in the

foreign portfolio share and home bias in 2008. In section 1.4, I investigate why investors would change their foreign portfolio share. I conclude in section 1.5.

1.2 Data and Methodology

In the first part of the chapter, I describe the data on portfolio holdings. I then turn to the construction of the home bias measure and of active and passive allocation changes.

1.2.1. Equity Holdings Data Sources

To investigate the reallocation of non-domestic equity, I use multilateral surveys conducted by the International Monetary Fund and bilateral surveys conducted by both the U.S. Treasury Department and the U.S. Federal Reserve Board.

For multilateral holdings, I use the International Monetary Fund's *Coordinated Portfolio Investment Survey (CPIS)* data to obtain country specific estimates of non-domestic equity holdings from 2001 to 2009. An advantage of the CPIS data is that it identifies country-level year-end holdings of non-domestic securities for IMF member countries. Limitations of the CPIS data are that some IMF member countries do not report their foreign holdings and the data is at an annual frequency.[2] The reporting frequency makes it unclear when during the year investors traded foreign securities. This contrasts with the more frequent availability of bilateral U.S. holdings data, which I

[2]For most countries the CPIS data is collected annually via the central bank, with a nine month delay between the year-end data being aggregated by the IMF and being made publicly available (http://cpis.imf.org/faq.aspx).

describe next.

For U.S. investors, I also use two main bilateral databases, the Treasury International Capital Reporting System (TIC) annual survey[3] from 2001 to 2009 and the Bertaut-Tryon (2007) monthly database[4] from 1994 to 2009. The TIC annual survey uses security-level identifiers (ISIN or SEDOL) to determine U.S. residents' country-level holdings of foreign securities and non-U.S. residents' country-level holdings of U.S. securities. The survey is strictly enforced and thus provides strong coverage of U.S. investors' international asset allocation and non-U.S. investors' holdings of U.S. securities. In addition to the detailed annual survey, the U.S. Treasury also collects monthly bilateral portfolio flows between the U.S. and foreign counterparties that exceed US$ 50 million.[5] This can introduce a financial center bias in the monthly data (Griever, Lee, and Warnock, 2001); the Bertaut-Tyron database uses the detailed annual survey to adjust the TIC monthly portfolio flows data for financial center bias and valuation changes.[6] The Bertaut-Tyron database allows me to identify U.S. residents' monthly holdings of foreign securities by country and also to identify foreign investors' monthly holdings of U.S. securities by country of origin. All the data are reported in U.S. dollars.

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[3] http://www.treasury.gov/resource-center/data-chart-center/tic/Pages/fpis.aspx#usclaims

[4] http://www.federalreserve.gov/pubs/ifdp/2007/910/ifdp910appendix.pdf

[5] Federal Reserve Bank of New York, *TIC S Historic Reporting Changes* notes that after January 2001 *TIC* S changed the exemption level from US$ 2 million to US$50 million in either gross purchase or gross sales during a month (http://www.newyorkfed.org/banking/regrept/WebpageHistoricReportingChanges_TICS.pdf). U.S. Treasury *TIC* S Form instructions explain that once the exemption level is exceeded, reporting is required for the remainder of the calendar year regardless of the level of either purchase or sales in subsequent months (http://www.treasury.gov/resource-center/data-chart-center/tic/Documents/sinstr-june2011.pdf).

[6] Bertaut and Tryon (2007) provide a detailed explanation of how the sum of the observed, adjusted net transactions, corrected for valuation changes, is in error by a gap assumed to represent the financial center effect, as well as unknown errors and omissions in the monthly transactions.

The final sample includes the countries with the 45 largest equity markets according to the 2000 year-end market capitalization obtained from the S&P Global Fact Book; the IMF *World Economic Outlook 2000, Statistical Appendix, Data and Conventions* identified 24 of the countries in the sample as "advanced economies" and the remainder developing.[7]

1.2.2. Measuring Equity Allocation

I use two measures of equity reallocation: changes in the foreign portfolio share of total equity wealth and changes in investors' home bias. Each provides a different measure of how investors shift equity assets across markets. The foreign portfolio share of total equity wealth measures how much wealth investors allocate abroad. The home bias measures how investors' allocation deviates from a global benchmark.

I use a methodology similar to Kho et al. (2009) to compute investors' domestic holdings, total equity wealth, and home bias. I obtain the year-end market capitalizations from the S&P Global Fact Book[8] and the year-end dollar value of multilateral equity holdings from CPIS Table 8.1.[9] To measure the holdings of investors from country *i* in the equity of their country at date *t* (Domestic Holdings$_{i,t}$), I take the country's dollar value market capitalization and subtract the total dollar value of non-residents' holdings

[7] I exclude Ireland because the foreign portfolio holding of equities registered in Ireland exceeds Ireland's domestic market capitalization. Also, I exclude Taiwan because its macroeconomic data are not available through the World Bank.

[8] S&P Global Fact Book market capitalizations are all float-adjusted, i.e. represents the value of shares not held by insiders; for discussions of float-adjustment and foreign portfolio investment, see Dahlquist et al. (2003), Giannetti and Simonov (2006), Leuz, Lins, and Warnock (2008), and Kho et al. (2009).

[9] From CPIS Table 8.1 *Geographic Breakdown of Portfolio Investment Assets: Equity* (Total equity investment by foreign residents) for each home country and each target country.

of that country's equity. To measure the total equity wealth of investors in country *i*, I add the domestic equity holdings of investors from country *i* and the total dollar value of their equity holdings in each country *j* in the sample (Equity Holdings$_{i,j,t}$).[10] To measure portfolio weights (Portfolio Weight$_{i,j,t}$), I normalize the dollar value of equity holdings (Equity Holdings$_{i,j,t}$) by total equity wealth:

$$PortfolioWeight_{i,j,t} = \frac{EquityHoldings_{i,j,t}}{DomesticHoldings_{i,t} + \sum_{j=1,44} EquityHoldings_{i,j,t}} \quad (1)$$

where Portfolio Weight$_{i,j,t}$ is the relative amount of equity wealth investors in country *i* allocate to country *j* at time *t.* In the following, I define a country in which investors hold assets as a target country. All holdings are in U.S. dollars. In equation (1), the numerator is the dollar value of the amount of equity investors in country *i* hold in target country *j* at time *t* and the denominator, the total equity wealth that investors' in country *i* have at time *t,* equals the dollar value of domestic equity investors in country *i* hold at time *t* plus the dollar value of their equity holdings of all the target countries in the sample at time *t*.

The CPIS does not report non-domestic equity holdings of investors in China, Morocco, and Peru, but it does report foreign investors' holdings of those countries' securities. Therefore the CPIS sample consists of 42 home countries and 45 target countries. The initial sample contains 16,632 multilateral-holdings observations. Some observations are missing due to CPIS reporting rules. First, member countries do not

[10] On average, total equity wealth for the sample covers 93.60% of total equity wealth calculated using total foreign investment to all countries.

report the dollar value of their foreign holdings when they believe it would violate an investor's anonymity.[11] This causes the sample to lose 713 observations. Next, the CPIS does not report the dollar value of holdings when a home country's portfolio holdings of a target country are at or below US$500,000; I code all cases where the dollar value is at or below US$500,000 as being at US$500,000. This affects 2,551 observations. Finally, the CPIS distinguishes between cases where holdings are not reported and where holdings data are simply missing. The cases where multilateral holdings are not reported due to missing information cause the sample to lose 3,226 observations. The final sample contains 372 country-year observations and 12,693 multilateral equity holding observations.

To measure the total foreign portfolio share, I normalize the sum of investors' holdings of foreign equity by total portfolio wealth:

$$TotalForeign\ \ Portfolio\ Share_{i,t} = \frac{\sum_{j=1,44} EquityHoldings_{i,j,t}}{DomesticHoldings_{i,t} + \sum_{j=1,44} EquityHoldings_{i,j,t}} \quad (2)$$

where Total Foreign Portfolio Share$_{i,t}$ is the total dollar value of equity wealth that investors in country *i* allocate to all the target countries in the sample at time *t,* and the denominator is previously defined.

Following Kho et al. (2009), I calculate the home bias of home country *i* towards target country *j* as 1 minus the ratio of the target country's weight in the home country's

[11] The CPIS reporting rules explain that in certain cases an investor would be easy to identify and reporting the holdings would place the investor at a competitive disadvantage. These cases are coded as '(c)' and I set those observations to missing.

equity portfolio and the target's weight in the world market portfolio:

$$HomeBias_{i,j,t} = 1 - \left(\frac{PortfolioWeight_{i,j,t}}{WeightinWorldMarketPortfolio_{j,t}} \right) \quad (3)$$

where Home Bias$_{i,j,t}$ is the home bias of investors from home country *i* towards target country *j* at time *t,* Portfolio Weight$_{i,j,t}$ was previously defined and weight in the World Market Portfolio$_{j,t}$ is the dollar value of target country *j*'s market capitalization at time *t* divided by the dollar value of the world market capitalization at time *t.* A value for the home bias closer to one means that country *i* underweights country *j* relative to what the weight would be if investors in country *i* were to hold the world market portfolio. A value of zero means that investors in country *i* allocate wealth to country *j* proportionately to the share of country *j* in the world market portfolio.

I calculate equal-weighted and value-weighted averages of the home bias within and across countries. To reduce the impact of outliers, I winsorize the level of the home bias towards target countries (Home Bias$_{i,j,t}$) at the 1% and 99% level when I compute equally-weighted averages. For the countries in my sample, the 2008 average home bias was 0.733, ranging from -0.274 for investors in New Zealand[12] to 1.000 for those in Turkey. To value weight within countries, I use the S&P Global Fact Book market capitalization reported for each target country at time *t*-1 as weight. For each home market, I value weight the home bias across target countries in the sampled portfolio. This measure gives the value-weighted home bias of investors in a country; for instance,

[12] For New Zealand, the negative equally-weighted home bias is driven by domestic investors drastically overweighting Australian equities relative to a global benchmark; Bekaert and Wang (2009) attribute negative home bias to a foreign investment bias, in which investors overweight certain countries in their portfolio.

the U.S. value-weighted home bias in 2008 was 0.703. That means in 2008, the value-weighted U.S. allocation to the target countries was 29.7% of what it would have been had U.S. investors held the world market portfolio. I annually rebalance the value weights to sum to one within each home country's sampled portfolio at time *t.*

1.2.3. Measuring Passive Equity Allocation Benchmark

For each home country I estimate a passive benchmark of the total equity wealth and the home bias based on price and exchange rate changes of the target countries. This benchmark measures how the home bias would have changed for investors in a country if they had not made any trades. I use the same methodology described earlier, but with the dollar value of holdings implied by valuation changes. Since the CPIS does not provide security-level information on holdings, I use a measure of market returns. For emerging markets, not all domestic securities may be investable for foreign investors; for developed markets, this is less of a concern. The S&P Broad Market Index (SP BMI) and the S&P Investable Country Index (SP IFCI) measure country-level returns for developed and emerging markets, respectively.[13] I collect MSCI/DataStream foreign exchange rates.[14] To match the year-end dollar value of the annual holdings data, I use the year-end

[13] In most cases the series are available for the full length of my sample. The SP IFCI index for Argentina and Greece transitioned to SP BMI; I merge the Argentina SP IFCI with the SP BMI in October 2009 and the Greece SP IFCI to the Greece SP BMI in October 2002, the last month each IFCI was available, respectively. For Colombia and Pakistan I use each country's SP BMI.

[14] I use MSCI for Argentina, Australia, Austria, Belgium, Chile, Denmark, Egypt, Finland, France, Germany, Greece, Hong Kong, India, Ireland, Italy, Malaysia, Mexico, Morocco, Netherlands, New Zealand, Pakistan, Poland, Spain, the U.K.; I use DataStream for Brazil, Canada, China, Colombia, Czech Republic, Hungary, India, Israel, Japan, Korea, Norway, Peru, the Philippines, Poland, Russia, Singapore, South Africa, Sweden, Switzerland, Thailand, and Turkey.

(i.e. the last day of December) observation to calculate annual changes in price and exchange rates. For all countries, all returns are in U.S. dollars and measured with the Total Return Index.

To measure the passive asset allocation benchmark, I estimate the implied value of home country *i*'s holdings of target country *j*'s equity at time *t* (Implied Holding$_{i,j,t}$) as a function of target country *j*'s price appreciation ($R_{j,t}$) and exchange rate changes ($S_{j,t}$):

$$ImpliedHolding_{i,j,t} = [EquityHoldings_{i,j,t-1}][(1 + R_{j,t})]\left[\left(\frac{1}{S_{j,t}}\right)(S_{j,t-1})\right] \quad (4)$$

where Implied Holding$_{i,j,t}$ is the passive benchmark's dollar value of home country *i*'s holdings of target country *j*'s equity at time *t,* $R_{j,t}$ is the annual return of target country *j* from *t-1* to *t* in U.S. dollars*,* and $S_{j,t}$ is the spot exchange rate between the U.S. dollar and target country *j*'s local currency at time *t.* First, the expression estimates the buy and hold implied level of equity holdings; next, it converts the dollar value of implied holdings into local currency at time *t;* finally, it converts the value of implied holdings from local currency at time *t* into the value of dollars at time *t-1*. This produces implied holdings at time *t* based solely on investors in home country *i* passively holding the equity of target country *j*. I use these implied holdings to obtain a passive benchmark of portfolio weights, total foreign portfolio share and home bias. I describe this in detail next.

To measure passive portfolio weights, I normalize the dollar value of investors' implied holdings of foreign equity by implied total portfolio wealth:

$$Passive\ PortfolioWeight(P,Fx)_{i,j,t} =$$

$$\frac{ImpliedHolding_{i,j,t}}{DomesticHoldings_{i,t} + \sum_{j=1,44} ImpliedHoldings_{i,j,t}} \quad (5)$$

where Passive Portfolio Weight $(P,Fx)_{i,j,t}$ is the relative amount of equity wealth investors in country *i* would have allocated to country *j* at time *t* had they passively held their foreign equity from time *t-1* to time *t*, Implied $Holding_{i,j,t}$ is previously defined and the denominator is the passive benchmark's total equity wealth that investors in country *i* have at time *t.* The difference between the denominator of Equation (1) and Equation (5) is the total foreign holdings term. Here the denominator's second term, the dollar value of country *i*'s implied equity holdings of all target countries in the sample, adjust total portfolio wealth for investors passively holding their non-domestic equity portfolio from time *t-1* to time *t.*[15]

To measure the passive benchmark of the total foreign portfolio share, I normalize the sum of investors' implied holdings of foreign equity by implied total portfolio wealth:

$$Passive\ Total\ Foreign\ Portfolio\ Share(P,Fx)_{i,t} =$$

$$\frac{\sum_{j=1,44} ImpliedHoldings_{i,j,t}}{DomesticHoldings_{i,t} + \sum_{j=1,44} ImpliedHoldings_{i,j,t}} \quad (6)$$

where Passive Total Foreign Portfolio Share $(P,Fx)_{i,t}$ is the total dollar value of equity wealth investors in country *i* would have allocated to all target countries in the sample at time *t* had they passively held their foreign equity from time *t-1* to time *t,* and the

[15] My methodology to calculate passive changes in the foreign portfolio share differs from the approach used in Curcuru et al. (2010), which applies buy and hold returns to the domestic holdings term to measure what they define as U.S. investors' global portfolio.

denominator, the passive benchmark's total equity wealth of investors in country *i* at time *t,* was defined previously.

Finally, I calculate the benchmark value of the home bias of home country *i* towards target country *j* as 1 minus the ratio of the passive portfolio weight of target country *j* in home country *i*'s equity portfolio and target country *j*'s weight in the world market portfolio:

$$Passive\ HomeBias(P,Fx)_{i,j,t} = 1 - \left(\frac{Passive\ PortfolioWeight(P,Fx)_{i,j,t}}{WeightinWorldMarketPortfolio_{j,t}}\right) \quad (7)$$

where Passive Home Bias $(P,Fx)_{i,j,t}$ is the passive benchmark of home country *i*'s home bias towards country *j* at time *t,* Passive Portfolio Weight $(P,Fx)_{i,j,t}$ and Weight in the World Market Portfolio$_{j,t}$ are defined previously. As before, I winsorize the passive level of the home bias at the 1% and 99% level when I compute the equally-weighted average.

1.2.4. Measuring Active Equity Allocation

To determine if investors actively retrenched, I compare changes in the foreign portfolio share to changes implied by the passive benchmark:

$$ActiveForeignPortfolio\ Share_{i,t} = \Delta TotalForeignPortfolio\ Share_{i,t} - \Delta TotalForeignPortfolio\ Share(P,Fx)_{i,t} \quad (8)$$

To assess whether investors actively changed their value-weighted home bias, I contrast the first difference in investors' value-weighted home bias with the first

difference implied by the passive benchmark:

$$ActiveValueWeightedHomeBias_{i,t} =$$

$$\Delta ValueWeightedHomeBias_{i,t} - \Delta ValueWeightedHomeBias(P, Fx)_{i,t} \quad (9)$$

To examine if investors actively changed their home bias towards target countries in the sample, I estimate the change in the home bias that is not the result of changes in prices and exchange rates:

$$ActiveHomeBias_{i,j,t} = \Delta HomeBias_{i,j,t} - \Delta HomeBias(P, Fx)_{i,j,t} \quad (10)$$

1.3 Did investors change their foreign portfolio share in 2008?

In this section, I use the three measures of foreign equity allocation defined in Section 1.2 to document investors' portfolio reallocations in 2008. To account for potential small sample bias, all standard errors are bootstrapped.

1.3.1. Changes in Total Foreign Portfolio Share in 2008

Table 1.1 Panel A presents statistics on changes in the total foreign portfolio share for the home countries in the CPIS sample in 2008. I find that the relative share of equity wealth allocated abroad rose by an average of 3.62% in 2008 (Column 2). For investors in developed and emerging countries, the increase in the foreign portfolio share occurred in distinctly different ways. Column (6) shows investors in developed countries experienced a relatively larger passive increase in their foreign portfolio share (7.54%) than investors in emerging countries (0.77%), a result consistent with investors in

developed countries tending to allocate more wealth abroad (Lane and Milesi-Ferretti, 2008) and experiencing greater losses on foreign assets during the crisis (Gourinchas et. al, 2011). Column (9) reveals that the active change in the foreign portfolio share was significantly negative for investors in developed countries (-2.22%) and positive, but not significant, for investors in emerging countries (0.58%). This indicates that on average investors in developed countries sold foreign equities and investors in emerging markets did not.[16] Yet, the net effect of the active and passive changes was that the total increase in the foreign portfolio share was significantly higher for investors in developed countries (5.32%) than it was for those in emerging countries (1.35%).

The total foreign portfolio share did not rise in all countries; net decreases occurred in nearly one-fifth of the countries in the sample in 2008. Half were developed (Germany, Hong Kong, Japan, Switzerland, and the U.S.) and half emerging (Argentina, Colombia, the Philippines, and Poland). Of the developed countries, the U.S. was the only one to experience a passive increase in the foreign portfolio share. This passive increase in the U.S. foreign portfolio share is puzzling because, from 2007 to 2008, average non-U.S. buy and hold dollar market returns were more negative than U.S. market returns as the flight-to-safety for safe assets (Bernanke et. al, 2011; Caballero and Krishnamurthy, 2009) led to an appreciation of the U.S. dollar against most currencies

[16] Because investors in the U.S. accounted for US$12,577.10 billion or 47.54% of the developed countries total equity wealth in 2008, it is important to determine if the active decrease was solely a U.S. phenomenon. When I remove the U.S. from the sample of developed countries, though total portfolio wealth is lower, the foreign portfolio share of total portfolio wealth actively falls by nearly the same amount, -2.19%. Additionally, the changes in the total foreign portfolio share remain economically and statistically significant when I exclude the U.S. These findings suggest that the active reduction in the foreign portfolio share in 2008 was not exclusive to the U.S. and seems driven by investors in developed markets.

(Fratzscher, 2009). Had U.S. investors' holdings of domestic equity remained fixed, the return and exchange rate effects would have caused the U.S. foreign portfolio share to passively decrease; this indicates that U.S. investors reduced their holdings of domestic equity during the crisis. Since the total foreign portfolio share of the U.S. fell, U.S. investors' active reduction in foreign portfolio share was larger than its passive increase. This indicates that the U.S. investors sold their holdings of both foreign and domestic stocks, but sold their foreign stocks at a higher rate. Using the U.S. market capitalization provided by the S&P Global Fact Book and the total value of non-U.S. residents' holdings of U.S. equity, I find that the percentage of U.S. equity held by non-U.S. investors rose from 11.96% in 2007 to 12.82% in 2008. These results are consistent with U.S. investors reducing their holdings of foreign and domestic equity in 2008.

The U.S. findings raise the question of whether the global changes in the foreign portfolio share during the crisis were driven solely by non-U.S. investors' holdings of U.S. equity. Outside of the U.S., return differences in 2008 across markets and the appreciation of the U.S. dollar against local currencies would cause a passive increase in investors' holdings of U.S. equity. While this is consistent with the global findings, the purchase of U.S. equity by non-U.S. investors is not. Foreign investors buying U.S. equity would actively increase the foreign portfolio share; this contrasts with the significant active decrease in the foreign portfolio share, which occurred on average in 2008. In untabulated results, I examine whether the changes in the foreign portfolio share remain significant when I exclude the U.S. as either a home or target country. Neither specification significantly affects the main findings economic inferences and statistical

significance. These findings suggest that the global changes in the foreign portfolio share were not solely driven by foreign holdings of U.S. equity.

1.3.2 Changes in the Home Bias

Table 1.1 also reports results of the change in the home bias. Panel A presents statistics on the value-weighted home bias and Panel B focuses on the equally-weighted home bias. The results are generally consistent with the previous finding that, in developed markets, the total increase in the foreign portfolio share was larger than in emerging markets. Panel A Column (4) shows that, on average, the value-weighted home bias decreased by -4.18% in 2008. It fell by more in developed countries (-5.89%) than it did in emerging countries (-1.91%). As before, in developed countries the active change was significantly positive (2.70%) and lower than the passive component (-8.59%). For emerging countries, both the active change and passive change are negative, but the active change is not statistically significant. Panel B shows that the equally-weighted home bias fell by -3.19% (Column 2). Again, the total decrease was greater in developed countries (-3.79%) than it was in emerging (-2.38%). Interestingly, I find that investors in both developed and emerging countries actively increased their equally-weighted home bias by an average of 4.87% and 0.49%, respectively, though the active change was only significant for investors in developed countries.[17]

[17] Because investors in some countries hold the equity of relatively few countries in the sample (for example, New Zealand's sampled portfolio is composed of 4 target countries), in untabulated results I check if the findings are sensitive to home countries that hold relatively few target countries. When I

1.3.3 Quarterly Changes in the U.S. Foreign Portfolio Share in 2008

Table 1.2 reports quarterly active changes in the foreign portfolio share of U.S. investors during 2008 and the quarterly change in non-resident holdings of U.S. equity as a percentage of the U.S. market capitalization. For the quarterly sample, the bilateral holdings are obtained from the Bertaut-Tryon database and the U.S. market capitalization is obtained from the S&P BMI. For U.S. investors, the quarterly data indicate that U.S. sales of foreign equity were mostly concentrated in developed markets. For non-U.S. investors holding U.S. equity, there is no quarter when the change in holdings relative to the U.S. market capitalization is negative. In other words, the results indicate that every quarter in 2008 foreign investors increased their share of the U.S. stock market capitalization.

1.4 Why did investors decrease their foreign portfolio share?

In this section, I examine whether the cross-sectional variation in allocation was consistent with portfolio rebalancing, traditional theories of the home bias, or portfolio choice under uncertainty.

1.4.1. Did investors actively rebalance their equity portfolios?

Portfolio rebalancing can cause investors to sell foreign equity, even when their home bias remains unchanged. Because investors exhibit a strong home bias, divergent

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remove home countries that have less than 5 or 10 target countries in their portfolio, all the value-weighted and equal-weighted home bias results hold.

returns across countries can drastically alter their portfolios' composition. All things equal, investors in home countries that experience lower returns relative to foreign countries will experience passive decreases in their home bias. If investors' target foreign shares remain unchanged, we would expect investors to sell foreign equity to rebalance towards their home bias. This may best be illustrated through an example. Suppose an investor has a portfolio of $100 and her decision rule is to invest 80% at home and 20% abroad, i.e. she currently holds $80 at home and $20 abroad. If her home market declines by 50%, her total portfolio will be worth $60 --- one third of which she is holding abroad. To not violate her decision rule, she rebalances her portfolio and sells off nearly half of her foreign equity holdings. Holding the target foreign portfolio shares constant, the rebalancing hypothesis predicts that investors sell foreign stocks to restore their home bias to its previous level. This implies that if there is a passive decrease in the home bias, an investor will trade to reduce that passive decrease.

The portfolio rebalancing hypothesis predicts that investors offset through active changes the impact of passive changes on their portfolio. This hypothesis can be tested by regressing the active portfolio share of foreign stocks on the passive change in that portfolio share. The prediction of the rebalancing hypothesis in that regression is that the coefficient on the passive change should be minus one. If investors do not rebalance completely, the coefficient will be significantly greater than minus one but negative. Finally, if they do not rebalance at all, the coefficient will not be significantly different from zero. In the extreme case where investors chase returns, the coefficient on passive changes would be significantly positive. I estimate this relationship in Regression (1) of

Panel A of Table 1.3. Because of potential small sample bias, all standard errors are bootstrapped. The model includes the lagged passive change in total foreign portfolio share to account for the fact that the rebalancing may take time. The estimated coefficient on passive changes in foreign stock portfolio share is negative and statistically significant, indicating that valuation changes in equity allocation are strongly associated with investors actively reducing their allocation to foreign markets. The coefficient implies that when the foreign portfolio share passively rises by 1 percentage point, investors offset 18% of that increase in the same year.

For the home bias measures, Regressions (2) and (3) report active changes in the value-weighted and the equally-weighted home bias and Regressions (4) through (6) document active changes in the home bias at the target country level. I account for potential small sample bias in Regressions (2) and (3), by bootstrapping standard errors. To account for potential correlation at the country-portfolio level, in Regressions (4) through (6) I cluster standard errors by home country and bootstrap standard errors within each cluster. In Regression (2), the estimated coefficient on the passive change in the value-weighted home bias is negative and significant, a result that is consistent with investors actively rebalancing their portfolios. Regression (3) shows that the significantly negative relation between passive changes and active reductions in the foreign portfolio share grows stronger when I equal weight target countries. Relative to the value-weighted results, the estimated coefficient on passive changes nearly doubles. A stronger test of the rebalancing hypothesis is to investigate whether investors rebalance at the target country level. Regression (4) shows that the negative association between passive changes and

active changes in foreign equity allocations remains economically and statistically significant, so that investors rebalance at the target country level as well as in the aggregate. The coefficient on passive changes in the regression that examines rebalancing at the target country level is larger than in the other regressions. The coefficient implies that if investors in a country see their allocation to a target country passively increase by 1 percentage point, they offset 65% of that increase in the same year.

Given a passive increase in the foreign portfolio share, the extent to which an investor rebalances may depend on the transaction costs and the liquidity of the target countries. In Regression (5), I include the home bias in 2007 towards a country, as a proxy for obstacles in investing in that country, to test the hypothesis that investors rebalanced less actively with respect to countries where these obstacles are high because active changes are more expensive. The specification also includes the interaction between the home bias in 2007 and the passive change in the home bias. The prior year's home bias is demeaned at the country-level. The prediction is that the interaction should be positive, so that there is less rebalancing towards the home bias in countries where obstacles are higher. I find that the interactions are not statistically significant.

In Regression (6), I add a proxy for liquidity in 2008. Given the large numbers of countries in the sample, I restrict my analysis to using turnover for 2008 as a proxy for liquidity and use the turnover measure available from the World Bank. Regression (6) includes passive changes in foreign investment, the level of the home bias towards a target country in 2007, a target country's turnover, and the previously mentioned interactions. Both the level of the prior year's home bias towards a target country and

annual turnover are demeaned at the country-year level. The estimated coefficient on passive changes remains economically large and significantly negative. The interaction between passive changes in equity allocation and a target country's turnover produces a significantly positive estimated coefficient. The result is consistent with a target country's liquidity easing investors' ability to actively rebalance their portfolios, conditional on investors encountering passive changes in equity allocations. Interacting passive changes with the proxy for investment obstacles, the prior year's level of the home bias, does not produce an association statistically different from zero. The proxies suggest that for active reallocation, obstacles abroad played less of a role than liquidity.

The results from the cross-sectional estimations presented in Panel A show a significantly negative association between passive changes and active changes in the foreign portfolio share. Panel B of Table 1.3 explores the relationship between passive and active changes for U.S. investors. A concern with the U.S. results is that the sample size becomes small relative to the multilateral sample as data are available for investment by U.S. investors in 44 countries. The benefit is that it is available more frequently than the CPIS data. If portfolio rebalancing takes time, lagged passive changes would matter. With the higher frequency data, I can better examine whether current active changes are significantly associated with passive changes that occurred earlier in the year. Further, higher frequency data are valuable in terms of focusing on the fourth quarter of 2008, the period in which passive changes were most extreme. Regressions (1) through (3) use the same approach I used in Panel A of Table 1.3 to examine active changes in the U.S. home bias towards target countries in 2008. In Regressions (4) through (7) I take advantage of

the higher frequency of the U.S. data and focus directly on the last quarter of 2008, which is when the dramatic changes in stock values took place. All holdings are measured relative to U.S. investors' total holdings of foreign and domestic equity.[18]

Consistent with the findings presented in Panel A, in Regressions (1) through (3) the estimated coefficient on passive changes in the home bias of U.S. investors towards target markets is significantly negative. In fact, in Regression (1) the coefficient is not distinguishable from minus one --- which suggests that U.S. investors fully offset passive changes in allocation. Regressions (2) and (3) include U.S. home bias towards target countries in 2007 and a target country's turnover. In contrast to the results of Panel A, I do not find that the interaction of a target country's turnover and annual passive changes in the U.S. home bias is statistically significant.

Turning to the fourth quarter of 2008, I estimate a cross-sectional model that includes only contemporaneous passive changes in the U.S. foreign portfolio share and passive changes from the previous quarter (Regression 4). The estimated coefficients on both terms are not statistically significant, indicating that passive changes alone were not significantly associated with U.S. investors' active portfolio adjustments during this period. Next, I use the home bias in 2007 towards a country as a proxy for the obstacles in investing in that country. Regression (5) shows the coefficient on the demeaned 2007 year-end home bias, interacted with current and lagged passive changes, is not distinguishable from zero. The estimated coefficients on current and lagged passive changes remain insignificant. This finding suggests that for U.S. investors, obstacles

[18] U.S. month-end market capitalizations are from the S&P US BMI index.

abroad were not significantly associated with active changes in the foreign portfolio share in the fourth quarter of 2008.

To examine whether liquidity affected U.S. investors' active changes in the fourth quarter of 2008, in Regression (6) I add my proxy for liquidity, a target country's 2008 annual turnover, into the model. Turnover is demeaned across target countries and interacted with current and lagged passive changes in the foreign portfolio share. I find that current and lagged passive changes are significantly associated with active changes in the foreign portfolio share. Consistent with the findings in Panel A, the coefficient on current passive changes is significantly negative and the interaction with turnover is significantly positive. But, in this specification, the sum of the coefficients is not statistically distinguishable from zero. The net effect implies that passive changes and a target market's liquidity cancel out one another. Because developed markets experienced relatively larger passive changes and tend to be relatively more liquid (Lee, 2010), the result is consistent with the finding from Table 1.2 that U.S. investors reduced their foreign portfolio share more in developed markets. The estimated coefficient on lagged passive changes is significantly positive and the interaction with turnover is significantly negative. The sum of the coefficients is negative and statistically significant. This result is consistent with U.S. investors rebalancing their portfolios in response to lagged passive changes in their equity holdings of relatively liquid markets. Lastly, to examine whether investors rebalanced in the last quarter of 2008 in response to passive changes throughout the year, Regression (7) includes passive flows from the first and second quarters of 2008. Similar to the previous results, the coefficient on current passive changes and its

interaction with turnover suggests that the net effect of passive changes and liquidity on active changes is not distinguishable from zero. Surprisingly, I find the same for lagged passive changes interacted with turnover as well. The coefficients on the first and third additional lags are not distinguishable from zero. These findings suggest that U.S. investors were not rebalancing during the fourth quarter of 2008 in response to passive changes that occurred throughout the year.

The specification used in this section assumes that active changes do not affect passive changes in the foreign portfolio share. If an active change in holdings violates that assumption, then we may have reverse causality. For many countries, it seems reasonable to assume that active changes do not cause passive changes since investors from any foreign country would seem to be a small component of the demand for U.S. stocks. Nevertheless, I investigate whether passive changes could have been affected by passive changes due to the price impact of these active changes. I perform unreported robustness checks focused mainly on Panel A Regression (6) to assess this alternative. To examine whether the relatively larger global investors drove the findings, I removed the top five home countries with the largest total equity wealth in 2007, the U.S., the U.K., Japan, Canada, and France. The findings remain relatively unchanged from Regression (6) and indicate that the results are not driven solely by the world's largest investors.

Foreign investors do not have to be globally large to impact a country's stock market, so long as they hold a significant portion of the target country's equity. To identify the largest foreign equity investors in each market, every year I normalize investors' multilateral holdings of each target country's equity by the target's market

capitalization. Using the relative size of investors in home country *i* in target market *j* to proxy for the potential price impact, I divide the sample by the median relative size in 2007. Estimating Regression (6) of Panel A across both groups, the main inferences hold. Repeating the analysis using multilateral holdings normalized by the total dollar value of the total foreign equity investment each target market receives in a given year does not affect the main inferences either. These across-country results are not supportive of the price impact alternative.

Lastly, I test the price impact of active equity trades on passive changes for U.S. investors by estimating a vector auto regressive (VAR) model using monthly active and passive equity flows towards the target countries in the sample from 1995 to 2009. The equity flows are obtained from the Bertaut and Tryon (2007) database. For each country, I test the null that U.S. active flows do not Granger cause U.S. passive flows. In 35 out of 44 countries, I fail to reject the null. I interpret these findings as evidence that does not support the price impact alternative.

Overall, the results from Table 1.3 support two key predictions of the portfolio rebalancing hypothesis. First, active decreases in the foreign portfolio share are negatively associated with passive changes in equity allocation. Second, conditional on passive changes in foreign portfolio shares, a target country's liquidity is positively associated with investors actively reducing their foreign portfolio share. Lastly, I find evidence that U.S. investors rebalanced their equity portfolios in 2008; however, their reallocation of foreign equity holdings during the fourth quarter of 2008 does not seem driven by passive changes that occurred throughout the year.

1.4.2. Did domestic wealth losses cause investors to decrease their foreign portfolio share?

In this section, I investigate the relation between wealth changes during the crisis and foreign equity holdings. Holding the level of risk aversion and the costs associated with maintaining a foreign investment position constant, the benefit of investing abroad will increase in wealth (Lane and Milesi-Ferretti, 2008). Furthermore, losses in non-financial wealth can lead investors to sell stocks to cover various shortfalls in income, i.e. labor income, proprietary income, and real estate (Heaton and Lucas, 2000). All else equal, I expect to observe investors in home countries that suffer more severe wealth losses to decrease their foreign portfolio share more.

To test this wealth shock hypothesis, I estimate a cross-sectional OLS regression using the total decrease in the foreign portfolio share from the CPIS sample in 2008. It is important to note that unlike the dependent variable in Table 1.3, which only included active changes in the foreign portfolio share, here I examine the impact of the wealth shock on the total change in the foreign portfolio share. The wealth theory has predictions for the total share of wealth invested abroad and changes in that share; therefore, I examine the foreign portfolio share's total change. The passive change in the foreign portfolio share would be directly affected if a decrease in wealth causes a decrease in the net benefit from international diversification. The active change directly affects investors' cash holdings in that an increase in the foreign portfolio share brought about by an active change requires the purchase of foreign equities. Hence, investors who need to sell stocks to make up for a decrease in income or non-financial wealth will do so through an active

change. To measure the total decrease in the foreign portfolio share, I use a framework similar to the one used in the previous section; for each home-country, I multiply the total change in the foreign portfolio share by (-1) to examine the degree to which investors *decrease* their allocation to foreign equities relative to their total equity wealth and use changes in the value-weighted and equally-weighted home bias.

The independent variables are proxies for domestic changes in financial and non-financial wealth. I measure domestic changes in financial wealth with a home country's 2007 to 2008 buy and hold stock return. As discussed previously, changes in holdings may affect prices; I address this concern by using returns that end in August, a full quarter before year-end 2008. Annual returns are in U.S. dollars and from the indices discussed in Section 2. To proxy for changes in non-financial income and wealth, I use annual GDP growth and the annual growth in consumption per capita in 2008. GDP growth and consumption growth are both obtained from the World Bank and are in year 2000 constant U.S. dollars. In 2008, investors suffered a large negative wealth shock and a massive economic contraction occurred; but, it is also possible that investors cut foreign investment in anticipation of future income losses. To test whether future changes in non-financial income and wealth are associated with current decreases in foreign portfolio share, I also use domestic GDP growth in 2009. Because the wealth hypothesis predicts that both active and passive change in foreign equity holdings will be affected by changes in wealth, I include the foreign portfolio share's passive changes in the cross-sectional model. Using this specification, the wealth hypothesis predicts that the estimated coefficients on the wealth proxies will be negative and that the estimated coefficient on

passive changes will be positive. To account for potential small sample bias, all standard errors are bootstrapped.

Table 1.4 reports the results of the cross-sectional regressions. In Regressions (1) through (4) I examine the decrease in the total foreign portfolio share. Regression (1) includes both returns and passive changes in the foreign portfolio share in the estimation. The estimated coefficient on returns is significantly negative, indicating that an increase in domestic equity wealth is associated with an increase in the foreign portfolio share. The coefficient implies that if passive changes are held constant, when investors see their home market fall by 1 percentage point, they reduce their total foreign portfolio share by -0.03 percentage points that same year. Repeating specification (1) with current GDP growth and passive changes, Regression (2) shows the estimated coefficient on the non-financial wealth proxy is not statistically distinguishable from zero. I find the same result using lead changes in GDP growth (Regression 3); these results suggests that holding passive changes constant, investors that experienced more severe economic contractions in either 2008 or 2009 were not significantly decreasing their foreign portfolio share more in 2008. Using consumption growth as an alternative proxy for changes in non-financial wealth and income produces similar results (Regression 4). The total foreign portfolio share results suggest that losses in domestic wealth, specifically financial wealth, were significantly associated with reductions in the allocation to foreign markets.

Turning to changes in the home bias, Regressions (5) through (10) show a significantly negative relation between returns and changes in the value-weighted home bias and indicate no such relationship with either proxy for non-financial wealth.

Regression (5) applies specification (1) to the value-weighted home bias; relative to the foreign portfolio share findings in Regression (1), the coefficient on returns increases in economic and statistical significance. Holding passive changes constant, the coefficient implies that when returns fall by 1 percentage point, investors increase their value-weighted home bias by an average of 0.04 percentage points. This result is consistent with changes in wealth affecting how investors change their allocation to foreign equity, but the economic magnitude of the effect is small. For the equally-weighted home bias, the coefficient on returns in Regression (9) is similar to the value-weighted result, but standard errors are nearly two times larger and the association between returns and changes in the equally-weighted home bias is not statistically significant. Using the value-weighted and equally-weighted home bias, I do not find that the non-financial wealth proxies are significant in any specification. This finding is consistent with the total foreign portfolio share results previously documented and suggests that changes in non-financial wealth were not significant drivers of the increase in the equity home bias during the recent crisis.

The results from Table 1.4 support a fundamental prediction of the wealth shock hypothesis. First, returns, my proxy for changes in domestic wealth, are negatively associated with changes in the foreign portfolio share. Second, I do not find a statistically significant association between GDP growth or consumption growth, the non-financial wealth and income proxies, and changes in the foreign portfolio share. This result does not support the non-financial wealth implications of the wealth shock hypothesis.

1.4.3. Did information asymmetries cause investors to reduce their foreign portfolio share?

If information asymmetries are an important cause of the home bias (see, for example, Brenan and Cao, 1997; Van Nieuwerburgh and Veldkamp, 2010; Andrade and Chhaochharia, 2010; Choe, Kho, and Stulz, 2005) [19] and information asymmetries worsen during a crisis (Gelos and Wei, 2005), the information asymmetries hypothesis predicts a worsening of the home bias during the crisis. In this section, I examine whether investors reduce their foreign portfolio share more in countries where these asymmetries are expected to be more prevalent.

I test this hypothesis at the target country level by regressing changes in the home bias towards target countries on proxies for information asymmetries. The cross-section contains year-end changes in the home bias from the CPIS sample in 2008. If information asymmetries increases more where they are already high, the home bias should increase more towards countries where non-resident investors already face high information asymmetries. If the obstacles for investing in a country are related to those asymmetries, this predicts that during a crisis, home bias changes will be positively correlated with their previous levels – in other words, the home bias will increase towards countries where it was already high. This increase in the home bias can occur through passive and active changes in investors' equity holdings. The passive changes in the home bias would

[19]Some authors provide evidence that leads to the opposite conclusion (see, for example, Curcuru et al., 2010 and 2011; Dahlquist and Robertson, 2001). A closely related literature focuses on capital flows positively relating to contemporaneous and past returns as evidence of foreign investors being better informed or trend chasing; the findings there have been mixed (see for example, Jinjarak, Wongsman, and Zheng, 2011; Froot and Ramadorai, 2008; Griffin, Nadari, and Stulz, 2004; Froot, O'Connell, and Seasholes, 2001).

occur when increases in information asymmetries decrease the net present value of holding a target country's equity.[20] The active changes would require investors to sell their holdings of countries for which they have a relatively high home bias. Following this logic, I use the level of the 2007 home bias towards a target country, the passive change in the home bias, and their interaction to proxy for information asymmetries. In this specification, the information asymmetries hypothesis predicts that the coefficient on each term will be positive. As before, the prior year's home bias is demeaned at the country-level; standard errors are clustered by home country and bootstrapped within each cluster.

Table 1.5 Panel A presents the results. Regression (1) includes the level of the previous year's home bias, the current year's passive change, and the interaction term. For passive changes, we can expect from the equally-weighted results of Table 1.4 that the coefficient will be significantly less than 1, but still positive. Indeed, that is the case. The estimated coefficient on passive changes is significantly positive and implies that when the home bias passively increases by 1 percentage point, the total home bias rises by 50% of that increase. While this result is consistent with the information hypothesis, the results for the previous year's level of the home bias and the interaction term are not. Both the estimated coefficients on the lagged home bias and the interaction term are insignificant, indicating that the change in home bias is not positively associated with its

[20]Johnson, Boone, Breach, and Friedman (2000) show that during the Asian financial crisis, measures of corporate governance, specifically minority shareholder protection, explain the degree of exchange rate depreciations and stock market declines among emerging markets better than traditional macroeconomic measures.

level from the previous year. To the extent that the home bias is a function of information asymmetry, these findings suggest that the information asymmetries that matter more during a crisis may differ from those that matter more during good times.

The next tests assess whether proxies for various forms of information asymmetry are associated with changes in the home bias during the crisis. Measures contributing to the information disadvantage investors in home country *i* face when allocating their wealth towards target country *j* include distance, language, and culture. I measure distance in two ways. The first method uses the log of the great circle distance (geographical distance) in kilometers between a home and target country's capital city; longitude and latitudes are obtained from Google Earth. Because the distance between two capital cities may not be the most relevant distance for the marginal investors in either country,[21] I also use a common region dummy variable for countries sharing the same geographic region (Ke et al., 2010). For language and religion, I follow the methodology outlined in Stulz and Williamson (2003) and define a language (religion) dummy variable when the primary language spoken (religion practiced) by the largest fraction of two countries' population is the same. Language and religion are obtained from the CIA World Factbook. The information asymmetries hypothesis predicts that the coefficient on the geographical distance is expected to be positive and the coefficient on the common region, language, and religion dummy variables are expected to be negative. Regression (2) adds the geographical distance and the language and religion dummies

[21] For example, the distance between the capital cities of Canada and the U.S., Ottawa and Washington, D.C., is farther than the distance between their major financial center, Toronto and New York.

into specification (1). The coefficients have the predicted signs and are statistically significant, except for the language dummy. For geographical distance, the estimated coefficient indicates that a 1 percentage point increase in the distance between an investor's capital city and that of a target country is associated with a 2.18 percentage point increase in the home bias. The coefficient on the religion dummy implies that in 2008 investors increased their home bias by -3.74 percentage points less towards target countries with which they shared a common religion. Regression (3) replaces the geographical distance with the common region dummy. The coefficient on the common region dummy is significantly negative, indicating that investors increased their home bias by -4.86 percentage points less towards target countries within their region. The estimated coefficients on the language and religion dummies remain similar to specification (2). The findings show that these information asymmetry proxies are strongly associated with investors reducing their foreign portfolio share.

The previous findings illustrate the role of physical and cultural barriers to information during the crisis. I now turn to institutional aspects of information asymmetries. If information asymmetries increase, relatively strong governance institutions can help to lessen their severity. Specifically, I examine whether investors reallocate their equity holdings towards markets with relatively strong institutional qualities during a period of crisis. To capture a target county's institutional quality, I calculate each target country's Kauffman et al. (2010) governance score. The governance score varies through time and is defined as the average of the following six indices: a country's political stability, government effectiveness, regulatory quality, adherence to

the rule of law, control of corruption, and the degree to which a country's citizens participate in selecting a government. Regression (4) adds a target country's governance score in 2008 to specification (1). The coefficient on the governance variable is not statistically significant. In untabulated results, I include each component of the governance score to specification (1) separately and do not find a statistically significant association between changes in the home bias and each one individually. This finding indicates that these proxies for institutional quality are not significantly associated with changes in foreign allocation and does not support the information asymmetries hypothesis.

The next experiment tests the return implications of information asymmetries. Brenan and Cao (1997) show that when domestic investors possess a cumulative information advantage over foreign investors about their domestic market, investors tend to sell foreign stocks when their return is low. Additionally, the markets where information asymmetries grow more severe may experience lower returns (Johnson, Boone, Breach, and Friedman, 2000). If non-residents reduce more of their holdings in those countries, then holding passive changes constant, their home bias towards countries with lower returns will rise. In Regression (5), I include a target country's return in 2008 into the model used in specification (1). The coefficient on the returns terms is not distinguishable from zero, a finding that does not generally support the information asymmetries hypothesis.

Lastly, I test the joint effect of the various information asymmetry proxies on changes in the home bias. The model adds the region, language and religion dummies,

the governance score, and a target country's annual returns to specification (1). Regression (6) shows that the coefficient on passive changes remains significantly positive and the coefficients on the region and religion dummies remain significantly negative. All three remain largely unchanged from the previous specifications. The level of the home bias is significantly negative and I do not find any other variable to be significantly different from zero.

The results presented in Panel A show a significantly negative association between several proxies for information asymmetries and changes in the home bias. Panel B of Table 1.5 investigates whether this relationship holds for U.S. investors towards target countries in 2008. In Regressions (1) through (5), I follow the same approach used in Panel A of Table 1.5 to explore the total change in the U.S. home bias in 2008. Regressions (6) through (10) examine the changes in the U.S. foreign portfolio share in the fourth quarter of 2008, using methodology defined previously. To account for potential small sample bias, all standard errors are bootstrapped.

Consistent with the results of Panel A, in Regressions (1) through (5) the estimated coefficient on the passive change in the U.S. home bias towards target countries is significantly positive. Regression (1) includes passive changes in the U.S. home bias, the demeaned level of U.S. investors' 2007 home bias towards target countries and their interaction term. In this specification, I do not find a statistically significant association between the level of U.S. investors' demeaned home bias from the previous year and the total change in the U.S. home bias in 2008. The same holds for the interaction term with passive changes, indicating that U.S. investors did not significantly

increase their home bias towards markets where previously it was high. When I include geographic distance, and the common language and religion dummies into specification (1), the coefficients are not significant. This result suggests that during a crisis, distance, language, and culture may play less of role for U.S. investors than they do globally. Regression (3) replaces the distance, language, and culture proxies with a target country's governance score and shows the coefficient on the governance score is not distinguishable from zero. This suggests that U.S. investors did not significantly increase their home bias towards countries with relatively weak governance and does not generally support the information asymmetries hypothesis.[22]

To test the return implications of information asymmetries, Regression (4) adds a target country's return in 2008 into the model used in specification (1). Consistent with the information asymmetries hypothesis, the estimated coefficient on returns is significantly negative. The coefficient implies that holding passive changes constant, when a target country's returns fall by 1 percentage point U.S. investors raise their home bias by 0.15 percentage points in that same year. The coefficient on returns remains statistically significant and grows larger when I add geographic distance, the language and religion dummies, and the governance score to the regression (Regression 5). This result indicates that the relation between target returns and changes in the U.S. home bias is not subsumed by the additional information asymmetry proxies and generally supports the returns implications of the information asymmetries hypothesis.

[22]In untabulated results, when I replace the governance score with each of its six individual components and estimate Regression (3), I do not find that any are significantly associated with changes in the U.S. home bias.

Turning to changes in the U.S. foreign portfolio share in the fourth quarter of 2008, the results from Regressions (6) through (10) are generally similar with the annual U.S. findings. One notable difference is the size of the estimated coefficient on a target country's returns in specifications (9) and (10). The model estimated in specification (9) includes the quarterly passive change in the foreign portfolio share, the demeaned annual home bias in 2007, their interaction, and target countries' fourth quarter return. The coefficient on returns is significantly negative and implies that holding passive changes constant, when returns fall by 1 percentage point U.S. investors reduce their foreign portfolio share by -0.0023 percentage points during the fourth quarter. The size of the coefficient seems largely due to the units of measure. The mean of the dependent variable, changes in the U.S. foreign portfolio share during the fourth quarter, is -0.047% and the average return during this period was -27.42%. When I examine the joint effect of returns and the information asymmetry proxies (Regression 10), the coefficient on returns remains significantly negative and largely unchanged from the previous specification.

Table 1.5 generally supports the information asymmetry hypothesis. First, the results show that investors significantly increased their home bias more towards target countries that were relatively more distant and less towards countries within their same region or that shared their common culture. Second, consistent with the economic downturn implications of information asymmetry, the findings indicate that in 2008 U.S. investors increased their home bias more towards markets that experienced relatively lower returns in 2008. I interpret these findings as supportive of the information

asymmetry hypothesis. Lastly, using the level of the home bias from the previous year and the Kauffman et al. (2010) governance score, I do not find that changes in the home bias were significantly associated with either their previous levels or with a target country's institutional qualities. While the previous level of the home bias and the governance results do not generally support the information asymmetries hypothesis, overall the findings are consistent with a worsening of information asymmetries during the crisis.

1.4.4. Did ambiguity aversion cause investors to reduce their foreign portfolio share?

In this section, I examine whether the cross-sectional change in allocation during the crisis was consistent with ambiguity averse investors responding to uncertainty. The general idea is that investors prefer lotteries in which the probability of each outcome is certain over lotteries in which the probability of each outcome is uncertain (Ellsberg, 1961). For ambiguity averse investors, uncertainty about a foreign country's return process can lead to a home bias (Uppal and Wang, 2003; Epstein, 2001). If ambiguity aversion causes the home bias and if uncertainty increases during financial panics, the ambiguity aversion hypothesis predicts that the home bias increases during crises. Holding the level of ambiguity aversion constant, the ambiguity aversion hypothesis predicts that investors reduce their allocation more in countries where the increase in uncertainty was greater.

I test this hypothesis at the target country level by regressing changes in the home bias towards target countries from the CPIS sample in 2008 and changes in the foreign

portfolio share of U.S. investors in the fourth quarter of 2008 on a proxy for uncertainty. This requires distinguishing between uncertainty and risk. The literature often uses changes in the Chicago Board Options and Exchange (CBOE) VIX index to capture change in market uncertainty (Giannetti and Laeven, 2012; Forbes and Warnock, 2011); VIX is not available for my sample of countries. As a proxy for the increase in uncertainty of a target country's return distribution, I take the ratio of the highest standard deviation of daily market returns for any month in year *t*, divided by the monthly average of the standard deviation of daily market returns in year *t-1*. In untabulated results, I find the sample average of the maximum volatility ratio nearly doubles from 2007 to 2008, and dramatically falls in 2009. For the U.S., the maximum volatility ratio has a correlation of 0.71 with changes in the VIX index over the 2000s. As before, I control for the passive change in the foreign portfolio share. Because ambiguity averse investors may already avoid the markets they perceive as uncertain, I also control for the demeaned 2007 home bias. In this specification, the ambiguity aversion hypothesis predicts that the coefficient on the maximum volatility ratio is to be positive. As before, standard errors are clustered by home country and bootstrapped within each cluster.

Table 1.6 presents the results. Regression (1) includes the maximum volatility ratio, the passive change and the level of the home bias. Contrary to the prediction of the ambiguity aversion hypothesis, the coefficient on the maximum volatility ratio is significantly negative. The coefficient implies that when a target country's maximum volatility ratio grows by 1 percentage point, investors decrease their home bias by 0.99 percentage points that same year. In other words, the result implies that during the crisis

investors increase their home bias less towards markets with relatively higher uncertainty. This result does not support the ambiguity aversion hypothesis.

An alternative explanation for the significantly negative association of the maximum volatility ratio and changes in the home bias is that this proxy for uncertainty actually captures diversification. For example, emerging markets tend to offer greater diversification opportunities even during large market downturns (Christoffersen et al., 2012) and generally tend to be more volatile. To examine whether the significantly negative relation between the maximum volatility ratio and changes in the home bias is driven by this effect, using average monthly market returns over a rolling 3 year (36 month) span, I calculate the correlation between each home and target country. When I include the annual change in correlation between home and target countries into specification (1), Regression (2) shows that the coefficient on the maximum volatility ratio remains significantly negative and similar to the previous specification. This indicates that the maximum volatility ratio does not proxy for changes in correlation. Additionally, I examine whether the negative relation between the maximum volatility ratio and changes in the home bias is subsumed by changes in a target market's volatility. I calculate the standard deviation of a target country's monthly returns over a 3 year (36 month) span and add its year-to-year change to the model (Regression 3). The coefficient on the maximum volatility ratio remains statistically and economically significant. This supports the idea that the maximum volatility ratio measures uncertainty and not variance, but does not support the ambiguity aversion hypothesis. Lastly, I add a target market's global weight to the estimation (Regression 4). The results hold. These findings

indicate that the negative relation between the maximum volatility ratio and changes in the home bias is not driven by the ratio measuring diversification. The proxy for uncertainty suggests that investors increased their home bias significantly less towards markets where uncertainty was higher and does not support the ambiguity aversion hypothesis.

Regression (5) through (8) report changes in the home bias of U.S. investors' in 2008. When I repeat the experiment with U.S. investors, I do not find that the maximum volatility ratio is significantly associated with changes in the home bias. The same holds using the change in the U.S. foreign portfolio share in the fourth quarter of 2008 (Regression 9 through 12). These results contrast with the previous findings and suggest that U.S. investors responded differently to uncertainty than investors did globally.

To assess the sensitivity of the finding that changes in the home bias have a significantly negative relation to a target country's maximum volatility ratio, I perform unreported robustness checks focused mainly on Regression (4). First, I examine whether the significantly negative relation is driven by outliers in the maximum volatility ratio and winsorize the ratio at the 1% and 99% level. The findings remain relatively unchanged from Regression (4) and indicate that the negative relation is not driven by outliers. Next, I test whether the negative relation exists through time and estimate a panel regression using changes in the home bias from the CPIS sample from 2003 to 2009. I add target country fixed effects and year fixed effects into the model, cluster by home country, and bootstrap standard errors within each cluster. The relation between changes in the home bias and the maximum volatility ratio remains significantly negative

and suggests that the association exists through time. Epstein (2001) shows how the ambiguity aversion can lead to home bias even when investors are uncertain about their home return process as well. Adding a home country's maximum volatility ratio to the previously explained specification does not impact the result. These results do not support the ambiguity aversion hypothesis.

Lastly, I examine whether the relation differs across investors in developed and emerging home markets and use panel regressions to estimate a model that includes the maximum volatility ratio of each home and target country, my proxy for return distribution uncertainty, the control variables of specification (4), target fixed effects and year fixed effects. Again, I cluster standard errors by home country and bootstrap within each cluster. For developed countries, the estimated coefficient on a target country's maximum volatility ratio is significantly negative and is consistent with the negative association existing through time. When I further divide the developed portfolio into developed and emerging target countries, the main inference holds across both subgroups. This finding does not support the ambiguity aversion hypothesis for investors in developed countries. I repeat the analysis for investors in emerging home countries. I only find a significant association between the maximum volatility ratio and changes in the home bias when I restrict the portfolio to developed targets. But the relation is significantly negative and thus does not support the ambiguity aversion hypothesis.

The results in Table 1.6 do not support the ambiguity aversion hypothesis. I do not find that the association between the maximum volatility ratios, my proxy for distribution uncertainty, and changes in the home bias is significantly positive for the

global sample or for U.S. investors. First, the results show that across countries investors did not increase their home bias more towards target countries that had higher maximum volatility ratios. Second, the significantly negative association between the uncertainty proxy and changes in the home bias is not subsumed by correlation, variance, or a target market's global weight. I interpret this as supportive evidence that the uncertainty proxy does not proxy for benefits from diversification. Lastly, I do not find that the negative relation holds for U.S. investors, suggesting that U.S. investors responded to uncertainty differently. Collectively, these findings do not support the ambiguity aversion hypothesis.

1.4.4. Did familiarity cause investors to reduce their foreign portfolio share?

Ambiguity averse investors who have a familiarity bias view familiar gambles as less risky than unfamiliar ones, even if they assign identical probability distributions to the two gambles (Tversky and Heath, 1991). This implies that familiarity can lead to a home bias even if investors have equal degrees of uncertainty about foreign and domestic assets. French and Poterba (1991) document that the home bias of investors in the U.S., the U.K., and Japan is consistent with investors expecting returns in their domestic equity market to be several hundred basis points higher than other markets. Li (2004) shows that the home bias of investors in G7 countries is consistent with investors viewing foreign equities, in terms of both expected returns and risk, less favorably than domestic equities. During periods of high uncertainty, ambiguity averse investors who have a familiarity bias may grow more pessimistic about unfamiliar assets than familiar ones (Cao et al., 2011). If investors are ambiguity averse and if familiarity causes the home bias, the

familiarity hypothesis predicts that at high levels of uncertainty, the home bias rises. In this section, I examine one implication of the familiarity hypothesis; namely, I assess whether investors reduce their foreign portfolio share more in target countries with which they are less familiar.

I test this hypothesis at the target country level by regressing changes in the home bias towards target countries from the CPIS sample in 2008 and changes in the foreign portfolio share of U.S. investors in the fourth quarter of 2008 on a proxy for familiarity. I use the growth of a target country in a home country's portfolio from 2001 to 2007 to measure familiarity. The motivation is that after an investor purchases an asset, the asset becomes more familiar (Cao et. al, 2011). Over time, an investor may feel more knowledgeable about the risks associated with that security. This implies an investor would feel relatively more expert in the securities she has held for a longer time. Conversely, an investor may feel somewhat inexperienced with the securities she has recently acquired. To measure portfolio weight growth, I take the log difference of target country *j's* weight in home country *i's* equity portfolio in 2001 and in 2007. The control variables include the passive change in the home bias, and the demeaned level of the 2007 home bias. In this specification, the familiarity hypothesis predicts that the coefficient on portfolio weight growth will be positive. As before, I cluster errors by home country and bootstrap within each cluster.

Table 1.7 reports the cross-sectional regression results. For the CPIS sample, Regressions (1) through (4) show that the estimated coefficient on portfolio weight growth is not distinguishable from zero. This indicates that the proxy for familiarity,

portfolio weight growth, was not significantly associated with changes in the home bias of investors around the world. These results do not support the familiarity hypothesis.

For U.S. investors, Regressions (5) through (8) show a significantly positive relation between portfolio weight growth and changes in the home bias. The results strongly contrast with the global findings for the same period. When I estimate a model containing portfolio weight growth, the passive change in the home bias, and its level from the previous year, the coefficient on portfolio weight growth is significantly positive (Regression 5). The coefficient implies that when passive changes and the previous level of the home bias are held constant, a 1 percentage point increase in portfolio weight growth is associated with a 2 percentage point increase in the home bias. This finding is consistent with U.S. investors increasing their home bias towards markets with which they were less familiar.

If information is costly to acquire, portfolio weight growth may proxy for these costs and not familiarity. I examine whether the previously defined information asymmetry proxies subsume portfolio weight growth. When I add the geographic distance, language, and culture dummies to the model, Regression (6) shows that the coefficient on portfolio weight growth increases in economic and statistical significance. An additional alternative explanation for the strong association between portfolio weight growth and active changes in the home bias of U.S. investors is that the familiarity proxy captures size or liquidity. Regressions (7) and (8) suggest that this is not the case. The relation between portfolio weight growth and changes in the home bias remains significant when I include a target market's global weight (Regression 7) and the

demeaned turnover interacted with passive changes (Regression 8). The U.S. results are consistent with investors increasing their home bias more towards target countries with which they are less familiar during the crisis and generally support the familiarity hypothesis.

Lastly, I examine changes in the U.S. foreign portfolio share in the fourth quarter of 2008 in Regressions (9) through (12). I do not generally find a significant association between portfolio growth and quarterly changes in the U.S. foreign portfolio share. Regression (12) shows only after controlling for all the variables included in specification (4) is the estimated coefficient on portfolio weight growth statistically distinguishable from zero. This suggests that during the intensification of the crisis, holding information asymmetries and liquidity constant, U.S. investors significantly reduced their foreign portfolio share more in countries where portfolio growth was higher.

Table 1.7 shows that across countries, the growth of a target country in a home country's portfolio does not significantly relate to total changes in the home bias in 2008, but for U.S. investors, I find the association to be positive and economically significant. The relation is consistent with investors increasing their home bias more towards countries with which they were relatively less familiar. Lastly, controlling for information asymmetries and liquidity, I find a significant relation between portfolio weight growth and U.S. changes in the home bias during the fourth quarter of 2008. This finding suggests that U.S. investors significantly reduced their allocation more towards countries with which they were less familiar at the peak of the crisis.

1.5 Conclusion

An emerging literature in portfolio choice suggest that in 2008, investors left foreign markets for home (Giannetti and Laeven, 2011; Milesi-Ferretti and Tille, 2011; Forbes and Warnock, 2011; Fratzscher, 2011). In this paper, I document that during 2008, on average the share of equity wealth allocated abroad increased, which is contrary to the retrenchment phenomenon emphasized in the literature. The difference between my results and those of the retrenchment literature is that I develop a methodology to account for both the passive change in allocation due to stock returns and exchange rate changes and the active changes resulting from transactions undertaken by investors, while the literature focuses on investors' trades. On average, across the world, investors came home through trading their foreign equities; but, passive changes in their portfolio shares overwhelmed the retrenchment effect, so that, on average, the home bias fell. However, for the U.S., both changes in domestic and foreign equity holdings go in the same direction, which contrasts with the typical country.

I then investigate the determinants of changes in the share of equity wealth allocated to foreign countries. The crisis dramatically changed market capitalizations, so that portfolios that were optimal for investors before the crisis stopped being so. I therefore investigate whether investors rebalanced their portfolios towards what they were before the crisis. In other words, I ask whether investors rebalance to restore the home bias in their portfolios. I find strong evidence that active portfolio changes were undertaken to offset passive changes as predicted by portfolio rebalancing.

After showing the role of portfolio rebalancing, I examine the extent to which

traditional theories of the home bias and theories of the impact of crises on portfolio allocation can help understand the changes in foreign portfolio shares during the crisis. For the traditional portfolio choice theories, I test the impact of changes in wealth and information asymmetry. In my sample, changes in financial wealth are associated with investors reducing the total share of equity wealth they allocate abroad. I find supportive evidence that investors increased their home bias less towards markets that were relatively close in distance and in culture. The recent literature on uncertainty and familiarity suggests that during a crisis investors will retrench from countries with a greater increase in uncertainty and from countries they are less familiar with. I do not find a relation between my proxy of distribution uncertainty and active changes in the home bias. For familiarity bias, I do find evidence that is consistent with U.S. investors increasing their home bias more towards market with which they were less familiar.

Table 1.1 Active Change in Foreign Portfolio Share of Equity Wealth and Equity Home Bias in 2008.

The table shows descriptive statistics on the total foreign portfolio share of investors in the sample in 2008. The sample contains country-level year-end equity-holding observations from 2001 – 2009 from the CPIS. Using the S&P Global Fact Book, I select the 45 largest equity markets by year-end market capitalization. I exclude countries where the year-end dollar value of foreign holdings exceeds the domestic market capitalization and where macroeconomic data is not available through the World Bank. The final sample contains the multilateral holdings of investors in 42 home countries to 45 target countries. I delete observations when year-end non-domestic holdings are not reported and code all cases where multilateral holdings are at or below US$500,000 as being at US$500,000. *Investors' Allocation to Non-Domestic Assets* labels each home country's year-end allocation to target countries in the sample, as computed from CPIS multilateral holdings. *Passive Benchmark of Non-Domestic Assets* measures the change in allocation to non-domestic assets from year *t-1* to year *t*, given investors' allocation at the end of year *t-1*and assuming investors do not trade foreign stocks. *Active Allocation* measures the change in allocation not due to price and exchange rate changes from year *t-1* to year *t.* Panel A describes each home country's foreign portfolio share of total equity wealth and the value-weighted home bias in 2008. Panel B provides each country's equally-weighted home bias in 2008. To test if the average active change is statistically different from zero, I bootstrap the mean. *, **, *** indicate the statistical significance of average active reallocation from year *t-1* to *t* at the 10%, 5%, and 1% level, respectively.

Table 1.1 Panel A: Active Change in Foreign Portfolio Share of Equity Wealth in the Value-Weighted Home Bias in 2008

	Investors' Allocation to Non-Domestic Assets				Passive Benchmark of Non-Domestic Assets				Active Allocation (%)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Foreign Portfolio Share		Home Bias (Value Weighted)		Foreign Portfolio Share		Home Bias (Value Weighted)		Difference	Difference
	Level	Change (%)	Level	Change (%)	Level	Change (%)	Level	Change (%)	(2) - (6)	(4) - (8)
Developed Markets										
AUSTRALIA	21.861	2.062	0.751	2.697	22.534	6.849	0.740	-3.806	-4.787	6.502
AUSTRIA	42.859	14.135	0.532	-16.095	46.327	17.857	0.482	-21.526	-3.722	5.431
BELGIUM	42.935	4.428	0.526	-3.976	46.367	7.574	0.483	-8.091	-3.145	4.115
CANADA	30.500	5.673	0.681	-1.921	31.431	9.034	0.666	-6.227	-3.361	4.306
DENMARK	45.430	4.730	0.512	-2.892	48.938	10.202	0.466	-9.808	-5.472	6.916
FINLAND	38.617	3.544	0.415	-16.785	47.342	15.838	0.307	-31.551	-12.294	14.766
FRANCE	24.423	1.057	0.719	-0.944	26.130	2.570	0.700	-2.214	-1.513	1.270
GERMANY	27.380	-2.465	0.689	3.560	32.582	-0.320	0.630	1.104	-2.145	2.455
GREECE	10.974	5.624	0.877	-5.735	9.279	5.325	0.895	-5.791	0.300	0.056
HONGKONG	11.686	-11.571	0.848	4.083	10.418	-11.648	0.865	4.592	0.077	-0.509
ISRAEL	10.648	2.685	0.876	-1.411	9.518	3.352	0.889	-2.554	-0.667	1.143
ITALY	20.722	2.959	0.771	-2.826	21.110	1.511	0.767	-1.212	1.449	-1.613
JAPAN	11.018	-1.672	0.876	3.260	10.383	-2.167	0.882	3.827	0.495	-0.567
KOREA	9.759	0.530	0.894	-2.332	10.766	8.211	0.884	-9.108	-7.681	6.776
NETHERLANDS	64.430	14.758	0.323	-9.326	63.678	15.605	0.325	-11.147	-0.848	1.821
NEWZEALAND	44.035	7.933	0.100	-16.440	41.492	6.261	0.136	-12.707	1.672	-3.734
NORWAY	67.948	19.456	0.263	-17.410	60.578	18.738	0.345	-17.021	0.718	-0.389
PORTUGAL	69.551	34.778	0.235	-40.569	70.153	38.214	0.224	-44.261	-3.436	3.692
SINGAPORE	46.616	7.268	0.503	-9.747	40.704	9.791	0.560	-13.785	-2.523	4.037
SPAIN	3.943	0.720	0.933	-3.229	3.532	-0.421	0.949	-0.977	1.141	-2.252
SWEDEN	44.661	9.712	0.506	-9.773	45.036	11.008	0.504	-10.775	-1.297	1.002
SWITZERLAND	23.063	-3.168	0.749	4.993	24.251	-0.973	0.732	2.112	-2.195	2.881
UK	41.578	5.866	0.540	-3.286	43.081	6.958	0.519	-4.154	-1.093	0.869
US	18.637	-1.440	0.703	4.756	20.488	1.612	0.665	-1.030	-3.051	5.786
Total	32.220	5.317	0.618	-5.890	32.755	7.541	0.609	-8.588	-2.224***	2.698***

Continued

Table 1.1 Panel A: Active Change in Foreign Portfolio Share of Equity Wealth in the Value-Weighted Home Bias in 2008

	Investors' Allocation to Non-Domestic Assets				Passive Benchmark of Non-Domestic Assets				Active Allocation (%)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Foreign Portfolio Share		Home Bias (Value Weighted)		Foreign Portfolio Share		Home Bias (Value Weighted)		Difference	Difference
	Level	Change (%)	Level	Change (%)	Level	Change (%)	Level	Change (%)	(2) - (6)	(4) - (8)
Emerging Markets										
ARGENTINA	12.602	-1.566	0.876	2.963	14.116	2.244	0.853	-1.709	-3.810	4.672
BRAZIL	0.530	0.310	0.994	-0.299	0.299	0.126	0.997	-0.118	0.184	-0.181
CHILE	17.685	13.695	0.805	-15.527	4.043	1.296	0.955	-1.750	12.399	-13.776
COLOMBIA	1.309	-0.244	0.966	1.502	1.144	0.165	0.971	0.213	-0.409	1.289
CZECH	14.984	0.412	0.784	-4.172	10.609	-0.034	0.855	-2.039	0.445	-2.133
EGYPT	0.448	0.266	0.980	-1.064	0.179	0.064	0.990	-0.247	0.202	-0.817
HUNGARY	17.915	6.146	0.760	-10.144	14.412	5.148	0.801	-9.582	0.998	-0.561
INDIA	0.071	0.052	0.999	-0.068	0.033	0.023	1.000	-0.018	0.030	-0.050
INDONESIA	0.637	0.138	0.974	-2.231	0.525	0.199	0.987	-0.798	-0.061	-1.432
MALAYSIA	4.854	2.281	0.954	-1.793	2.304	0.925	0.976	-0.884	1.355	-0.910
MEXICO	0.923	0.103	0.978	0.242	0.845	-0.782	0.977	1.997	0.886	-1.755
PAKISTAN	0.021	0.013	0.997	-0.158	0.017	-0.002	0.997	-0.170	0.015	0.012
PHILIPPINES	0.086	-0.054	0.999	0.253	0.161	0.011	0.996	-0.069	-0.065	0.322
POLAND	3.194	-0.504	0.952	-0.573	4.163	2.496	0.928	-5.129	-3.000	4.556
RUSSIA	0.599	0.328	0.993	-0.437	0.590	0.556	0.993	-0.705	-0.229	0.268
SOUTHAFRICA	8.943	2.818	0.890	-2.788	7.022	0.631	0.913	-0.041	2.187	-2.747
THAILAND	1.620	0.124	0.983	-0.053	1.676	0.746	0.983	-0.730	-0.621	0.676
TURKEY	0.048	0.023	0.999	-0.029	0.038	0.009	0.999	-0.011	0.014	-0.018
Total	4.804	1.352	0.938	-1.910	3.454	0.768	0.954	-1.211	0.584	-0.699
Total (Across All Countries)										
Equally Weighted Average	20.470	3.618	0.755	-4.184	20.198	4.638	0.757	-5.426	-1.021*	1.242*

Continued

Table 1.1 Panel B: Active Change in Foreign Portfolio Share of Equity Wealth in the Equal Weighted Home Bias in 2008

	Investors' Allocation to Non-Domestic Assets		Passive Benchmark of Non-Domestic Assets		Active Allocation (%)
	(1)	(2)	(3)	(4)	(5)
	Home Bias (Equal Weighted)		Home Bias (Equal Weighted)		Difference
	Level	Change (%)	Level	Change (%)	(2) - (4)
Developed Markets					
AUSTRALIA	0.752	10.356	0.743	5.352	5.005
AUSTRIA	0.513	-8.747	0.376	-22.969	14.222
BELGIUM	0.573	-4.938	0.523	-8.693	3.755
CANADA	0.807	-2.291	0.785	-7.035	4.744
DENMARK	0.489	-3.125	0.418	-13.235	10.110
FINLAND	0.299	-15.394	0.177	-29.235	13.841
FRANCE	0.663	-1.411	0.645	-7.105	5.694
GERMANY	0.615	0.869	0.554	-7.192	8.061
GREECE	0.927	-2.615	0.942	0.386	-3.001
HONGKONG	0.929	7.690	0.931	6.092	1.598
ISRAEL	0.961	0.352	0.957	-0.977	1.329
ITALY	0.767	-3.999	0.763	-3.220	-0.779
JAPAN	0.922	1.914	0.921	0.708	1.206
KOREA	0.927	2.332	0.906	-7.125	9.458
NETHERLANDS	0.469	-8.914	0.444	-14.642	5.727
NEWZEALAND	-0.274	2.215	-0.382	-6.918	9.133
NORWAY	0.121	-35.722	0.330	-18.928	-16.794
PORTUGAL	0.556	-16.638	0.503	-23.577	6.939
SINGAPORE	0.384	-0.066	0.364	-12.672	12.606
SPAIN	0.799	-8.876	0.717	-19.072	10.197
SWEDEN	0.527	-3.297	0.487	-7.990	4.694
SWITZERLAND	0.794	2.317	0.781	1.164	1.154
UK	0.509	-4.797	0.480	-7.570	2.773
US	0.735	1.722	0.703	-3.591	5.313
Total	0.615	-3.794	0.586	-8.669	4.874***
Emerging Markets					
ARGENTINA	0.975	3.728	0.931	-1.079	4.807
BRAZIL	0.988	-0.488	0.992	-0.393	-0.095
CHILE	0.619	-31.902	0.940	-2.703	-29.199
COLOMBIA	0.986	3.484	0.988	1.940	1.545
CZECH	0.669	8.769	0.626	4.987	3.782
EGYPT	0.973	-1.553	0.989	-0.312	-1.241
HUNGARY	0.525	1.471	0.539	-0.406	1.877
INDIA	0.998	-0.084	0.998	-0.118	0.034
INDONESIA	0.940	-2.364	0.970	0.761	-3.124
MALAYSIA	0.898	-1.654	0.922	-2.359	0.705
MEXICO	0.990	0.382	0.991	1.463	-1.082
PAKISTAN	0.996	-0.249	0.998	-0.125	-0.124
PHILIPPINES	0.987	-0.547	0.991	-0.537	-0.010
POLAND	0.561	-19.754	0.417	-48.889	29.135
RUSSIA	0.989	0.030	0.973	-2.626	2.656
SOUTHAFRICA	0.951	-1.495	0.960	-0.826	-0.669
THAILAND	0.975	-0.651	0.981	-0.404	-0.247
TURKEY	1.000	-0.023	1.000	-0.010	-0.013
Total	0.890	-2.383	0.900	-2.869	0.485
Total (Across All Countries)					
Equal Weighted Average	0.733	-3.190	0.721	-6.183	2.993**

Table 1.2 Descriptive Statistics on Active Change in U.S. Foreign Portfolio Share and Change in Non-U.S. Ownership of U.S. Equity (% US Market Cap), Quarterly Mean and Sum, 2008

The table presents an overview of the active change in U.S. foreign portfolio share and non-U.S. holdings of U.S. equity as a percentage of U.S. market capitalization in 2008. U.S. holdings of foreign equity and non-resident holdings of U.S. equity are obtained from Bertaut-Tryon database. Active change calculates the change in allocation not due to change in prices and exchnage rates from quarter *t-1* to quarter *t.* U.S. foreign portfolio share calculated relative to total U.S. equity wealth. Monthly market capitalization is obtained from the Standard and Poor's United States BMI Index.

		Quarter 2008							
		(1)		(2)		(3)		(4)	
		Mean	Sum	Mean	Sum	Mean	Sum	Mean	Sum
US Active Change Foreign Equity (% Total Portfolio Wealth)									
Developed Markets	23	0.042	0.973	-0.039	-0.893	-0.044	-1.011	0.022	0.505
Emerging Markets	21	0.001	0.016	0.003	0.053	-0.012	-0.255	-0.001	-0.030
Total	44	0.022	0.989	-0.019	-0.840	-0.029	-1.266	0.011	0.475
Change Foreign Holdings US Equity (%US Market Cap)									
Developed Markets	23	0.018	0.412	0.006	0.146	0.001	0.034	0.027	0.617
Emerging Markets	21	0.008	0.173	0.007	0.140	0.001	0.031	0.002	0.042
Total	44	0.013	0.584	0.007	0.286	0.001	0.065	0.015	0.658
Home Bias (Equal-Weighted)									
Developed Markets	919	0.611	-6.727	0.591	-11.036	0.611	-6.727	0.591	-11.036
Emerging Markets	402	0.726	-10.429	0.803	-8.298	0.726	-10.429	0.803	-8.298
Total	1321	0.647	-7.853	0.655	-10.203	0.647	-7.853	0.655	-10.203

Table 1.3 Portfolio Rebalancing and Active Allocation

This table presents results from OLS estimates of the effect of portfolio rebalancing on active allocation. Panel A presents cross-sectional regressions of the active decrease in the total foreign portfolio share, active changes in the value-weighted and equally-weighted home bias in Column (1) through (3) and active changes in the home bias of home country *i* towards target country *j* in Columns (4) though (6). The cross-sections contain country-level year-end multilateral holdings from the CPIS sample for 2008. Active changes from year *t-1* to year *t* are changes in allocation not due to passive changes in asset prices and exchange rates. Passive changes in allocation are calculated using holdings from year *t-1* and the change in prices and exchanges rates from year *t-1* to year *t*. *Home Bias i,j t-1* is the level of the home bias of investors in home country *i* towards target country *j* for year-end 2007. *Turnover* is a target country's 2008 annual turnover, provided by the World Bank. *Home Bias i,j t-1* and *Turnover* are demeaned at the country-year level. F-tests examine if the estimated coefficient on current or lagged passive changes in the foreign portfolio share are equal to (-1). Panel B presents cross-sectional regression results of U.S. investors' active changes in the home bias in 2008 and quarterly active changes in the foreign portfolio share in the fourth quarter of 2008. All standard errors are bootstrapped and presented in parantheses. For home bias at the country-portfolio level, standard errors are clustered by home country and bootstrapped within each cluster. ***,**,* report cases where the estimated coefficient is different from zero at 10%, 5%, 1% significance level, respectively.

Panel A Passive and Active Changes in Foreign Portfolio Share in 2008

	(1) Active Decrease Foriegn Port. Share	(2) Active Change VW Home Bias	(3) Active Change EW Home Bias	(4)	(5)	(6)
				Active Change Home Bias *i,j*		
Passive Δ FPS	-0.18*					
	(0.102)					
Passive Δ FPS *t-1*	-0.34					
	(0.221)					
Passive Δ VW Home Bias		-0.20**				
		(0.094)				
Passive Δ VW Home Bias *t-1*		-0.01				
		(0.169)				
Passive Δ EW Home Bias			-0.45***			
			(0.129)			
Passive Δ EW Home Bias *t-1*			0.16			
			(0.329)			
Passive Δ Home Bias *i,j*				-0.65***	-0.60***	-0.73***
				(0.087)	(0.105)	(0.107)
Passive Δ Home Bias *i,j t-1*				0.09	0.18	0.14
				(0.142)	(0.174)	(0.179)
Home Bias *i,j t-1*					-1.03	-1.05
					(3.264)	(3.442)
Target Turnover						1.71
						(1.553)
Passive Δ HB *i,j* * HB i,j t-1					0.09	-0.03
					(0.170)	(0.087)
Passive Δ HB *i,j* * Target Turnover						0.41***
						(0.087)
Passive Δ HB *i,j t-1* * HB i,j t-1					0.03	0.12
					(0.101)	(0.150)
Passive Δ HB *i,j t-1* * Target Turnover						-0.42
						(0.377)
Constant	0.07	0.19	0.35	-1.65	-1.36	-1.64
	(0.550)	(0.674)	(1.029)	(1.319)	(1.305)	(1.321)
Observations	42	42	42	1,234	1,234	1,234
No of Countries	42	42	42	42	42	42
Cluster	.	.	.	Home	Home	Home
Passive t = (-1)	0.000	0.000	0.000	0.000	0.000	0.011
Passive t_1 = (-1)	0.003	0.000	0.000	0.000	0.000	0.000
Adjusted R-squared	0.187	0.160	0.281	0.328	0.330	0.367

Continued

Table 1.3, Continued

Panel B US Passive and Active Changes in Foreign Portfolio Share in 2008

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Active Change US Home Bias in 2008			Active Change US Foreign Portfolio Share in Q4 2008			
Passive Δ US Home Bias	-0.80***	-0.67***	-0.58**				
	(0.141)	(0.187)	(0.230)				
Passive Δ US Home Bias *t-1*	-0.30*	-0.32	-0.25				
	(0.162)	(0.287)	(0.325)				
Passive Δ US FPS				0.07	-0.34	-0.99**	-0.78**
				(0.392)	(0.323)	(0.451)	(0.376)
Passive Δ US FPS *t-1*				-0.30	-0.30	0.83*	0.84*
				(0.461)	(0.382)	(0.483)	(0.454)
US Home Bias *t-1*		-1.61	-8.05		-0.09	-0.08	-0.06
		(11.122)	(15.037)		(0.074)	(0.055)	(0.049)
Target Turnover			-2.10			-0.01	0.00
			(2.865)			(0.017)	(0.018)
Passive Δ US HB*US HB t-1		0.75	0.66				
		(1.048)	(1.639)				
Passive Δ US HB*Target Turnover			-0.26				
			(0.516)				
Passive Δ US HB *t-1**US HB *t-1*		-0.94	-1.57				
		(1.219)	(1.913)				
Passive Δ US HB *t-1**Target Turnover			0.06				
			(0.581)				
Passive Δ US FPS*US HB *t-1*					-2.31	1.17	-0.00
					(3.071)	(3.048)	(3.389)
Passive Δ US FPS*Target Turnover						1.74*	1.24
						(1.012)	(0.984)
Passive Δ US FPS *t-1* *US HB *t-1*					-1.11	-4.41	-1.46
					(3.215)	(3.088)	(3.525)
Passive Δ US FPS *t-1* *Target Turnover						-2.67**	-1.62
						(1.180)	(1.212)
Passive Δ US FPS *t-2*							0.47
							(0.451)
Passive Δ US FPS *t-3*							-0.30
							(0.440)
Constant	1.45*	2.02	2.81	0.00	-0.00	-0.00	0.01
	(0.758)	(1.953)	(2.255)	(0.007)	(0.010)	(0.009)	(0.009)
Observations	44	44	44	44	44	44	44
No of Countries	44	44	44	44	44	44	44
F-test (Passive t= -1)	0.146	0.082	0.067	0.006	0.042	0.989	0.556
F-test (Passive t_1 = -1)	0.000	0.018	0.021	0.131	0.065	0.000	0.000
Adjusted R-squared	0.545	0.531	0.504	0.074	0.247	0.593	0.664

Table 1.4 Domestic Changes in Financial and Non-Financial Wealth and Changes in the Foreign Portfolio Share

This table presents results from OLS estimates of the effect of changes in domestic wealth on investors' total foreign portfolio share in 2008. The changes in the foreign portfolio share are measured with the decrease in the total foreign portfolio share relative to total portfolio wealth, changes in the value-weighted and equally-weighted home bias in 2008. The cross-section contains country-level year-end multilateral holdings from the CPIS sample for 2008. Changes in financial and non-financial wealth are measured with annual buy and hold market returns, annual GDP Growth, and consumption per capita growth; buy and hold market returns are in U.S. dollars. GDP Growth and consumption growth are in year 2000 constant U.S. dollars and obtained from the World Bank. All standard errors are bootstrapped and presented in parantheses. ***,**,* report cases where the estimated coefficient is different from zero at 10%, 5%, 1% significance level, respectively.

Domestic Change in Wealth and Total Changes in Foreign Portfolio Share in 2008

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Decrease in Foreign Portfolio Share				Δ Value Weighted Home Bias				Δ Equal Weighted Home Bias			
Home Return *t*	-0.03*				-0.04**				-0.04			
	(0.018)				(0.019)				(0.048)			
Home GDP Growth *t*		-0.02				0.03				-0.09		
		(0.172)				(0.236)				(0.411)		
Home GDP Growth *t+1*			-0.05				-0.05				-0.04	
			(0.121)				(0.129)				(0.170)	
Home Consumption Growth *t*				-0.06				-0.02				-0.23
				(0.148)				(0.183)				(0.359)
Passive Δ FPS	0.85***	0.83***	0.84***	0.84***								
	(0.090)	(0.091)	(0.086)	(0.092)								
Passive Δ VW Home Bias					0.82***	0.80***	0.81***	0.80***				
					(0.095)	(0.096)	(0.091)	(0.097)				
Passive Δ EW Home Bias									0.56***	0.56***	0.56***	0.55***
									(0.137)	(0.145)	(0.143)	(0.147)
Constant	-0.11	0.29	0.17	0.36	-0.24	0.09	0.09	0.19	-0.15	0.45	0.18	0.51
	(0.548)	(0.570)	(0.562)	(0.547)	(0.655)	(0.810)	(0.700)	(0.705)	(1.283)	(1.296)	(1.175)	(1.140)
Observations	42	42	42	41	42	42	42	41	42	42	42	41
No of Countries	42	42	42	41	42	42	42	41	42	42	42	41
Adjusted R-squared	0.811	0.803	0.804	0.801	0.799	0.791	0.792	0.787	0.388	0.383	0.383	0.383

Table 1.5 Information Asymmetry and Changes in the Foreign Portfolio Share in 2008

This table presents cross sectional OLS regressions of reductions in the foreign portfolio share on proxies for information asymmetry in 2008. Panel A reports the changes in the foreign portfolio share are measured with changes in the home bias of home country *i* towards target country *j*. The cross section contains country-level year-end multilateral holdings from the CPIS sample for 2008. Passive change is the change in the home bias due to the change in prices and exchange rates from year *t-1* to year *t*. Home bias *i,j t-1* is the level of the home bias investors in home country *i* have towards target country *j* year-end 2007. Geographic distance is the log of the great circle distance between a home and target country's capital cities. Share region, language, and religion are dummy variables for home and target countries that share a common geographic region, predominantly spoken language, or predominantly practiced religion, respectively. Language and religion are obtained from the CIA World Factbook. Governance is the annual Kauffman et al. (2010) country-level governance score for each target in 2008. Annual buy and hold market returns are in U.S. dollars. Panel B presents cross-sectional regression results of U.S. investors' total change in the home bias in 2008 and quarterly total change in the U.S. foreign portfolio share in the fourth quarter of 2008. Target Return (Q4) is a country's buy and hold market return for the fourth quarter of 2008 and is measured in U.S. dollars. All standard errors are clustered by home country, bootstrapped within each cluster and presented in parentheses. *, **, *** indicate the statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A Information Asymmetry and Total Change in the Home Bias in 2008

	(1)	(2)	(3)	(4)	(5)	(6)
	Total Change in Home Bias *i,j*					
Passive Δ Home Bias *i,j*	0.50***	0.47***	0.47***	0.50***	0.50***	0.47***
	(0.139)	(0.150)	(0.150)	(0.144)	(0.144)	(0.149)
Home Bias *i,j t-1*	-1.29	-5.37**	-5.03*	-1.57	-1.25	-5.06*
	(3.231)	(2.512)	(2.607)	(3.365)	(3.263)	(2.623)
Passive Δ HB *i,j* * HB i,j t-1	0.07	0.05	0.05	0.07	0.07	0.05
	(0.117)	(0.122)	(0.122)	(0.121)	(0.123)	(0.122)
Geographic Distance		2.18*				
		(1.188)				
Share Language		-14.12	-13.69			-13.61
		(9.498)	(9.793)			(10.155)
Share Religion		-3.74*	-3.72*			-3.66*
		(1.975)	(1.921)			(2.068)
Share Region			-4.86**			-4.88**
			(2.385)			(2.435)
Target Governance *t*				-0.72		-0.17
				(1.346)		(1.347)
Target Return *t*					-0.02	-0.02
					(0.036)	(0.031)
Constant	-1.04	-18.08*	1.93**	-0.51	-2.20	1.24
	(1.481)	(10.830)	(0.751)	(2.175)	(2.160)	(1.956)
Observations	1,267	1,267	1,267	1,267	1,267	1,267
No of Countries	42	42	42	42	42	42
Cluster	Home	Home	Home	Home	Home	Home
Adjusted R-squared	0.192	0.217	0.218	0.192	0.192	0.217

Continued

Table 1.5, Continued

Panel B Information Asymmetry and Total Change in the US Home Biasin 2008 and US Foreign Portfolio Share in Q4 2008

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Total Change US Home Bias in 2008					Total Change US Foreign Portfolio Share in Q4 2008				
VARIABLES										
Passive Δ US Home Bias	0.39**	0.43**	0.39**	0.46***	0.58***					
	(0.182)	(0.204)	(0.193)	(0.172)	(0.226)					
Passive Δ US HB*US HB t-1	0.77	0.75	0.83	1.01	0.96					
	(0.891)	(1.106)	(0.969)	(0.819)	(0.967)					
Passive Δ US FPS						0.42	0.44*	0.42	0.42*	0.43**
						(0.276)	(0.230)	(0.274)	(0.217)	(0.194)
Passive Δ US FPS*US HB *t-1*						-3.15	-1.81	-3.15	-3.57*	-2.40
						(2.042)	(1.954)	(2.042)	(1.938)	(1.915)
US Home Bias *t-1*	-3.45	-2.73	-5.44	-3.57	-6.36	0.08	0.05	0.08	0.11	0.06
	(5.967)	(6.292)	(6.713)	(5.490)	(6.006)	(0.065)	(0.063)	(0.071)	(0.072)	(0.065)
Geographic Distance		0.92			-0.75		-0.03			-0.02
		(2.539)			(2.765)		(0.020)			(0.019)
Share Language		0.56			1.52		0.07			0.06
		(4.518)			(4.143)		(0.063)			(0.060)
Share Religion		2.54			4.46		0.00			0.01
		(4.098)			(3.610)		(0.020)			(0.023)
Target Governance *t*			-0.78		-1.89			-0.00		-0.01
			(1.147)		(1.222)			(0.008)		(0.008)
Target Return (2008) *t*				-0.15**	-0.16**					
				(0.070)	(0.080)					
Target Return (Q4) *t*									-0.00***	-0.00**
									(0.001)	(0.001)
Constant	2.83***	-5.90	3.32***	-4.67	2.13	0.00	0.25	0.00	-0.06**	0.14
	(0.973)	(22.788)	(1.157)	(3.514)	(23.063)	(0.009)	(0.178)	(0.010)	(0.029)	(0.172)
Observations	44	44	44	44	44	44	44	44	44	44
No of Countries	44	44	44	44	44	44	44	44	44	44
Adjusted R-squared	0.103	0.090	0.092	0.200	0.223	0.683	0.735	0.675	0.748	0.788

Table 1.6 Distribution Uncertainty and Changes in the Foreign Portfolio Share in 2008

This table presents cross sectional OLS regressions of reductions in the foreign portfolio share on proxies for information asymmetry in 2008. Changes in the foreign portfolio share are measured with changes in the home bias of home country *i* towards target country *j,* U.S. investors' total change in the home bias in 2008 and quarterly total change in the U.S. foreign portfolio share in the fourth quarter of 2008.The cross section contains country-level year-end multilateral holdings from the CPIS sample for 2008 and the Bertaut and Tryon (2007) sample for U.S. investors in the fourth quarter of 2008. *Target Max Volatility* is the ratio of the highest standard deviation of daily returns for any month in year *t*, divided by the average standard deviation in year *t-1*. Passive change is the change in the home bias due to the change in prices and exchange rates from year *t-1* to year *t*. Home bias *i,j t-1* is the level of the home bias investors in home country *i* have towards target country *j* year-end 2007. Correlation and standard deviation are estimated using 3-year (36 month) rolling windows of monthly returns of home and target countries. Returns are in U.S. dollars. Global weight is the weight of a country in the world market portfolio. All standard errors are bootstrapped and presented in parantheses. For home bias at the country-portfolio level, standard errors are clustered by home country and bootstrapped within each cluster. *, **, *** indicate the statistical significance at the 10%, 5%, and 1% level, respectively.

Uncertainty and Changes in the Home Bias and Foreign Portfolio Share in 2008

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Total Change in Home Bias i,j				Total Change in US Home Bias				Total Change in US FPS Q4			
VARIABLES												
Target Max Volatility *t*	-0.99**	-1.01*	-0.94*	-0.95*	-0.18	-0.37	-0.54	-0.57	0.00	-0.00	-0.00	-0.00
	(0.499)	(0.521)	(0.518)	(0.526)	(0.783)	(0.916)	(0.928)	(0.895)	(0.004)	(0.004)	(0.004)	(0.004)
Δ Corretlation *t* (36 Month)		1.32	0.83	0.85		4.29	5.16	5.24		0.05	0.03	-0.00
		(2.917)	(2.921)	(2.982)		(5.822)	(5.821)	(6.017)		(0.055)	(0.069)	(0.094)
Δ Target Volatility *t* (36 Month)			-0.04	-0.03			0.06	0.06			0.00	0.00
			(0.033)	(0.033)			(0.071)	(0.078)			(0.001)	(0.001)
Target Market Global Weight *t*				0.01				0.07				-0.01
				(0.063)				(0.447)				(0.013)
Home Bias *t-1*	-2.27	-2.30	-2.38	-2.39	-6.35	-6.53	-6.82	-6.72	-0.02	-0.02	-0.01	0.01
	(3.363)	(3.322)	(3.343)	(3.311)	(6.407)	(6.479)	(6.924)	(6.699)	(0.054)	(0.054)	(0.055)	(0.053)
Passive Δ Home Bias i,j	0.43***	0.43***	0.43***	0.43***	0.29**	0.28*	0.28*	0.28*				
	(0.067)	(0.068)	(0.068)	(0.067)	(0.143)	(0.164)	(0.165)	(0.159)				
Passive Δ US FPS									0.84***	0.85***	0.87***	1.03***
									(0.282)	(0.291)	(0.288)	(0.309)
Constant	3.15	2.96	3.74	3.72	3.59	3.31	2.34	2.24	-0.00	-0.01	-0.01	0.00
	(3.067)	(3.003)	(2.929)	(3.056)	(3.821)	(3.717)	(4.464)	(4.476)	(0.016)	(0.017)	(0.020)	(0.019)
Observations	1,267	1,267	1,267	1,267	44	44	44	44	44	44	44	44
No of Countries	42	42	42	42	44	44	44	44	44	44	44	44
Cluster	Home	Home	Home	Home	-	-	-	-	-	-	-	-
Adjusted R-squared	0.190	0.190	0.189	0.189	0.081	0.072	0.063	0.039	0.573	0.564	0.557	0.571

Table 1.7 Familiarity and Changes in the Foreign Portfolio Share in 2008

This table presents cross sectional OLS regressions of reductions in the foreign portfolio share on proxies for information asymmetry in 2008. Changes in the foreign portfolio share are measured with changes in the home bias of home country *i* towards target country *j,* U.S. investors total change in the home bias in 2008 and quarterly total change in the U.S. foreign portfolio share in the fourth quarter of 2008.The cross section contains country-level year-end multilateral holdings from the CPIS sample for 2008 and the Bertaut and Tryon (2007) sample for U.S. investors in the fourth quarter of 2008. *Portfolio Weight Growth* is the log difference of the weight of a target country in a home country's equity portfolio in 2001 and 2007. All other variables are previously defined. All standard errors are bootstrapped and presented in paranthesis. For home bias at the country-portfolio level, standard errors are clustered by home country and bootstrapped within each cluster. *, **, *** indicate the statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Total Change in Home Bias *i,j*				Total Change in US Home Bias				Total Change in US FPS Q4			
Portfolio Weight Growth (2001-07)	0.56	0.44	0.44	0.22	2.00*	2.62**	2.73**	2.67**	0.00	0.01	0.01	0.02*
	(0.621)	(0.589)	(0.567)	(0.518)	(1.029)	(1.295)	(1.256)	(1.294)	(0.008)	(0.008)	(0.009)	(0.011)
Passive Δ Home Bias *i,j*	0.44***	0.43***	0.43***	0.40***	0.31**	0.42**	0.43**	0.45*				
	(0.073)	(0.069)	(0.069)	(0.082)	(0.146)	(0.194)	(0.207)	(0.230)				
Passive Δ US FPS									0.84***	0.63***	0.75***	0.49
									(0.264)	(0.213)	(0.210)	(0.310)
Home Bias *i , j t-1*	-2.18	-5.88**	-5.88**	-5.37*	-10.46*	-9.81	-10.53	-11.90*	-0.02	-0.03	-0.02	-0.03
	(3.390)	(2.901)	(2.837)	(2.842)	(6.070)	(6.393)	(6.868)	(7.197)	(0.059)	(0.054)	(0.053)	(0.054)
Geographic Distance						-0.08	-0.12	0.12		-0.04**	-0.04*	-0.04**
						(2.446)	(2.458)	(2.975)		(0.021)	(0.021)	(0.020)
Share Region		-5.34**	-5.33**	-4.63**								
		(2.359)	(2.380)	(2.350)								
Share Language		-14.14	-14.15	-13.94		1.33	1.68	1.06		0.09	0.09	0.10
		(10.099)	(10.154)	(10.254)		(3.976)	(4.100)	(5.542)		(0.063)	(0.063)	(0.068)
Share Religion		-3.94*	-3.94**	-3.59*		3.95	3.94	4.40		0.00	0.00	-0.02
		(2.014)	(1.987)	(1.876)		(3.815)	(3.808)	(4.454)		(0.020)	(0.019)	(0.029)
Target Market Global Weight *t*			0.00	-0.03			-0.23	-0.02			-0.01	-0.01
			(0.078)	(0.058)			(0.459)	(0.674)			(0.009)	(0.008)
Target Turnover				2.03				-1.97				0.01
				(1.745)				(2.921)				(0.018)
Passive Δ HB *i,j* * Target Turnover				0.28***				-0.13				
				(0.057)				(0.472)				
Passive Δ US FPS*Target Turnover												0.44
												(0.547)
Constant	-1.76	1.73**	1.72**	1.74**	0.40	-0.24	0.31	-2.14	-0.00	0.36*	0.31*	0.35**
	(1.383)	(0.787)	(0.848)	(0.883)	(1.512)	(21.172)	(21.238)	(26.380)	(0.011)	(0.182)	(0.182)	(0.174)
Observations	1,166	1,166	1,166	1,166	44	44	44	44	44	44	44	44
No of Countries	39	39	39	39	44	44	44	44	44	44	44	44
Cluster	Home	Home	Home	Home	.	.	.	.	.	.	.	.
Adjusted R-squared	0.192	0.220	0.219	0.239	0.141	0.169	0.154	0.118	0.574	0.712	0.715	0.758

CHAPTER 2

IS SENSITIVITY TO INTERNATIONAL STOCK FLOWS PRICED IN THE CROSS-SECTION OF U.S. STOCK RETURNS?

2.1 Introduction

Although U.S. investors continue to display a significant home bias, from 1977 to 2011, capital flows caused by the international stock transactions of U.S. investors and the U.S. stock transactions of foreign investors grew substantially.[23] At their core, flows represent demand shifts for stocks. A well-established literature details that within a global setting, these demand changes can be rapid and extreme. The impact of the resulting "surges" (Reinhart and Reinhart, 2009) and "sudden stops" (Calvo, 1998; Calvo, Izquierdo, and Mejia, 2004) on local economies has been the subject of extensive research.[24] At the firm level, stocks bought or sold because of international stock flows are subject to shifts in demand that other stocks are not. Therefore, sensitivity to

[23]The annual sum of the dollar value of U.S. net purchase of foreign equity climbed from USD 1,525.58 million in 1977 to USD 71,702 million in 2011. During this period, the annual sum of foreign net purchase of U.S. equity increased from USD 9,925.53 million in 1977 to USD 25,075 in 2011. All dollars are measured in USD 2011, using the U.S. Bureau of Labor Statistics consumer price index (BLS CPI) inflation adjuster.

[24]The market-level impact of these flows on the U.S. economy has been the subject of a growing literature; see, for example, Forbes and Warnock, 2011; Forbes, 2012; Bertaut and Pounder, 2009; Bernanke et al., 2011.

international stock flows might make these stocks risky. This paper examines whether this risk is priced. That is, I investigate whether cross-sectional differences in expected stock returns are related to the sensitivity of firm-level stock returns to changes in aggregate international stock flows.

Separating U.S. monthly net flows into outflows (U.S. investors' net purchases of foreign equity) and inflows (foreign investors' net purchases of U.S. equity), I evaluate the sensitivity of firm-level returns to innovations in international stock flows. Using flows-mimicking portfolios that take long (short) positions in firms with high (low) sensitivity to flows, I find that stocks with higher sensitivity to outflows earn significantly lower risk-adjusted returns. From July 1982 to December 2011, the outflows-mimicking portfolio earns an excess monthly return of –0.637% relative to the Carhart four-factor model augmented by the Pastor-Stambaugh traded liquidity factor. I find that the significantly negative risk-adjusted returns hold in both halves of the 30-year sample period. With respect to only the Fama-French (1993) three-factor model, the outflows-mimicking portfolio earns an excess monthly return of –0.760%. Relative to the Fama-French three-factor model, the excess risk-adjusted returns to the momentum factor (0.839%) and the traded liquidity factor (0.560%) are comparable over the sample period. I do not find a significant relation for either inflows or net flows factor mimicking portfolios.

Traditional asset pricing theory predicts that returns comove because of stocks' exposure to priced risk factors. Yet, relative to various factor models, the outflows-

mimicking portfolio earns significantly negative risk-adjusted returns. High outflows-beta firms tend to be smaller and have higher book-to-market ratios. One possible explanation for the outflows mimicking portfolio's risk-adjusted performance may be that outflows-beta is not independent of either size or book-to-market. Furthermore, friction-based and sentiment-based theories of comovement (Barberis and Shleifer, 2003; Barberis, Shleifer, and Wurgler, 2005) contend that limits to arbitrage may cause categories of stocks to comove as investors respond to liquidity needs or uninformed demand shocks. Both characteristics are challenging for standard asset pricing models (Daniel and Titman, 1997) and serve as common categorical groupings for investors (Barberis and Shleifer, 2003). However, using the portfolio-based approach, I find that the significantly negative premiums seem independent of both size and book-to-market.

To disentangle the pricing impacts of sensitivity to flows, exposure to standard risk-factors, and misvaluation or limits to arbitrage jointly, I exploit the full cross-section of firm-level stock returns. The main empirical specification follows Brennan, Chordia, and Subrahmanyman (1998). I use risk-adjusted firm-level stock returns within a Fama-MacBeth (1973) regression specification. Relative to the Carhart (1997) four-factor model, I find a significantly negative risk premium associated with sensitivity to outflows. I show that firms with higher outflows sensitivity tend to be smaller, younger, more volatile, and less likely to be globally diversified. The premium remains significantly negative after controlling for characteristics associated with international diversification, size, book-to-market, momentum, volatility, sales growth, asset growth,

and earnings. The results are consistent across the board using various factor models to risk-adjust returns. I do not find evidence consistent with stable premiums for sensitivity to either inflows or net flows. The results suggest that at the security-level, firms with higher sensitivity to outflows earn significantly lower risk-adjusted returns.

I examine whether the return to the flows-mimicking portfolios are predictable. The main assumption is that the flows portfolios' returns should vary across periods when the demand for foreign stocks changes. Flows betas are sensitivities to shocks in international stock purchases. By construction, when the demand for foreign stocks is lower than expected the return to flows-mimicking portfolios should be lower. To identify these periods, I follow the international portfolio choice literature. First, traditional theories of international portfolio choice argue that maintaining a foreign investment position can be costly (Black, 1974; Stulz, 1981; Lewis, 2011). Holding all else equal, the wealth theory predicts that following declines in wealth (Lane and Milesi-Ferretti, 2008), the returns to the flows portfolios will be negative. Second, theories of choice under uncertainty (Ellsberg, 1961) ascertain that if investors are ambiguity averse, aggregate uncertainty may reduce foreign investment (Epstein, 2001; Uppal and Wang, 2003). Holding ambiguity aversion fixed, this predicts that lagged changes in uncertainty will be negatively associated with the return on flows portfolios. Third, behavioral work suggests that domestic investors' sentiment affects capital flows (Baker, Wurgler, and Yuan, 2012; Hwang, 2011). Holding the limits to arbitrage constant, this implies that the flows portfolios' performance will be positively associated with changes in investor

sentiment.

Empirically, I find the flows portfolios' returns predictable. The main empirical specification is similar to Baker and Wurgler (2006). I look for patterns in the average monthly return of the flows-mimicking portfolios, conditional on lagged changes in aggregate wealth. To measure changes in wealth, I use lagged U.S. stock market returns. Following negative U.S. stock market returns, firms with a low outflows beta earn significantly higher returns than firms with a high outflows beta. However, following positive U.S. stock market returns, the outflows-mimicking portfolios' return spreads are not significant. Supportive of the wealth theory, the asymmetric pattern holds when I factor in non-U.S. stock market declines. Additionally, I find that the inflows-mimicking portfolio displays some predictability conditional upon lagged changes in the non-U.S. stock market. The wealth predictability results hold when I use flows betas that are orthogonal to contemporaneous and lagged U.S. market returns. Likewise, the wealth predictability results generally hold within regression frameworks that control for various risk factors.

The findings are not as supportive of the uncertainty theory. I condition the time series on lagged changes in the Chicago Board of Exchange VXO index (Giannetti and Laeven, 2012; Forbes and Warnock, 2011), my proxy for changes in aggregate uncertainty. I find that following increases in the VXO, the outflows-mimicking portfolio earns significantly negative returns; after decreases in the VXO, the portfolio's return differential is not significant. I find no significant pattern for the return to either the

inflows or the net-flows-mimicking portfolio, conditional on lagged changes in my proxy for uncertainty.

The sentiment predictability findings for the flows-mimicking portfolios are mixed. I condition the time-series on lagged changes to the Baker-Wurgler measure orthogonal to U.S. macroeconomic conditions, the University of Michigan consumer confidence survey (Lemmon and Portniaguina, 2006), and the closed-end fund discount. Using these three proxies, I find that following declines in sentiment, the outflows portfolio earns significantly negative risk-adjusted returns. Following declines in sentiment, low outflows beta stocks earn significantly higher risk-adjusted returns. While these findings are consistent with the limits to arbitrage hypothesis, I also find some evidence that following increases in the Baker-Wurgler sentiment measure and the consumer confidence survey, the outflows portfolio earns significantly negative risk-adjusted returns. The outflows portfolio's performance seems to be the result of high outflows beta stocks significantly underperforming relative to standard asset-pricing models following increases in sentiment.

This paper is connected to an extensive literature that examines the relation between international stock flows and conditions in the U.S. financial market (e.g., Bohn and Tesar 1996; Froot, O'Connell, and Seasholes, 2001). Much of this literature focuses on net flows, and I show that the portfolio protection created with the outflows portfolio is not readily achievable with an inflows- or net-flows-mimicking portfolio. I contribute to a growing literature that emphasizes the role of outflows and inflows into the U.S.

market (Forbes and Warnock, 2011; Forbes, 2012; Bertaut and Pounder, 2009; Bernanke et al., 2011). The main difference between my results and those from both areas of the previous literature is that I relate international stock purchases to the cross-section of U.S. firm-level returns. Baker, Wurgler, and Yuan (2012) and Hwang (2011) examine the role of sentiment and international capital flows; Bartram, Griffin, and Ng (2011) examine the impact of foreign ownership linkages on domestic stock returns. Our points of emphasis are different. I focus on the pricing impact of aggregate international flows in the cross-section of U.S. firm-level returns.

The rest of the chapter proceeds as follows. Section 2.2 describes the data and methodology I use to measure flows and create flow portfolios. Section 2.3 examines the relation between sensitivity to flows and the cross-section of risk-adjusted returns. Section 2.4 tests the time-series predictability of flow portfolios. I conclude in section 2.5.

2.2 Data and Methodology

In the first part of the chapter, I describe the data on equity flows. All equity flows measures are reported in Table 2.1. I then turn to the construction of flows portfolios and report summary characteristics for each portfolio in Table 2.2.

2.2.1. Equity Holdings Data Sources

To investigate aggregate non-domestic equity flows, I use two bilateral surveys conducted by the U.S. Department of Treasury and the U.S. Federal Reserve Board. I measure bilateral equity flows from the Treasury International Capital Reporting System (TIC) monthly survey from January 1977 to December 2011. In the database, transactions are calendar-month flow measures. Respondents report total purchases and sales of non-domestic equities that occurred during the month. The TIC survey collects monthly bilateral portfolio flows between the U.S. and foreign counterparties that exceed USD 50 million.[25] The survey is legally required and strictly enforced; therefore, its coverage of U.S. international equity transactions is comprehensive. All transactions are presented in U.S. dollars.

[25]Federal Reserve Bank of New York, *TIC S Historic Reporting Changes* notes that after January 2001 *TIC* S changed the exemption level from USD 2 million to USD 50 million in either gross purchase or gross sales during a month (http://www.newyorkfed.org/banking/regrept/WebpageHistoricReportingChanges_TICS.pdf).U.S. Treasury *TIC* S form instructions explain that once the exemption level is exceeded, reporting is required for the remainder of the calendar year regardless of the level of either purchase or sales in subsequent months (http://www.treasury.gov/resource-center/data-chart-center/tic/Documents/sinstr-june2011.pdf).

I obtain non-domestic stock holdings from the U.S. Federal Reserve Board's *Flow of Funds Federal Statistical Release Z.1* data. The *Flow of Funds* data provide quarterly measures of U.S. holdings of foreign equity and foreign investors' holdings of U.S. equity. All holdings are reported in U.S. dollars. Total holdings of non-domestic equity are stock-variables measured at the end of each quarter. Both the TIC data and *Flow of Funds* data are consistent.[26]

2.2.2. Measuring Portfolio Flows

I use three measures of non-domestic equity flows: outflows, inflows, and net flows. Outflows measure U.S. investors' net purchases of foreign equity. Inflows measure the net amount of U.S. equity purchased by non-U.S. investors. Net flows measures the netted portfolio flow between U.S. and foreign investors by subtracting inflows from outflows.

I use a methodology similar to Vagias and van Dijk (2010) and Forbes and Warnock (2011) to measure non-domestic equity transactions. To compute outflows ($Outflow_t$), I take the difference between U.S. investors' total purchases of non-U.S. equity (US Purchases Foreign $Equity_t$) and U.S. investors' total sales of non-U.S. equity (US Sales Foreign $Equity_t$):

[26]An alternative source for U.S. equity holdings data is the Bertaut and Tryon (2007) database, which reports holdings at a monthly frequency. That database starts in 1994; therefore, its time-series is limited relative to the *Flow of Funds* data. The correlation between the *Flow of Funds* data and the Bertaut and Tryon database is 0.98 over their overlapping period (1994–2011).

$$Outflow_t = US\ Purchases\ Foreign\ Equity_t - \ US\ Sales\ Foreign\ Equity_t \quad (1)$$

I calculate inflows (Inflow$_t$) as non-U.S. investors' total purchases of U.S. equity (Foreign Purchases US Equity$_t$) less non-U.S. investors' total sales of U.S. equity (Foreign Sales US Equity$_t$):

$$Inflow_t = Foreign\ Purchases\ US\ Equity_t - \ Foreign\ Sales\ US\ Equity_t \quad (2)$$

I measure net flows (Net flow$_t$) as U.S. investors' net purchases of non-U.S. equity (Outflow$_t$) minus non-U.S. investors' net purchases of U.S. equity (Inflow$_t$):

$$Netflow_t = Outflow_t - \ Inflow_t \quad (3)$$

2.2.3. Portfolio Flows Relative to Equity Holdings

Suppose an investor in the United States wants to reduce her allocation to foreign markets at time *t.* I want to know, given her equity holdings at time *t-1,* how much foreign equity she sells at time *t.* I use a methodology similar to Kho et al. (2009) to compute investors' domestic holdings, foreign holdings, and total equity wealth. I obtain month-end U.S. market capitalizations from *CRSP* and the quarter-end dollar-value of bilateral equity holdings from *Flow of Funds* data. To measure U.S. investors' holdings of domestic equity at date *t* (US Domestic Holdings$_t$), I take the capitalization of the U.S. market and subtract the dollar value of U.S. equity held by non-U.S. investors. To measure U.S. investors' total equity wealth, I add U.S. domestic equity holdings and the total dollar value of U.S. holdings of non-U.S. equity (US Foreign Holdings$_t$). To

measure scaled outflows (Scaled Outflow$_t$), I normalize the dollar value of outflows (Outflow$_t$) by lagged total equity wealth:

$$Scaled\ Outflow_t = \frac{(Outflow_t)}{(US\ Domestic\ Holdings_{t-1} + US\ Foreign\ Holdings_{t-1})} \quad (4)$$

To examine inflows relative to non-U.S. investors' total holdings of U.S. equity (Scaled Inflow$_t$), I divide inflows (Inflow$_t$) by the lagged dollar value of non-U.S. investors' total holdings of U.S. equity (Foreign Holdings US Equity$_t$):

$$Scaled\ Inflow_t = \frac{(Inflow_t)}{(Foreign\ Holdings\ US\ Equity_{t-1})} \quad (5)$$

To calculate net flows relative to total international holdings (Scaled Netflow$_t$), I divide net flows (Netflow$_t$) by the lagged sum of U.S. investors' total holdings of non-U.S. equity (US Foreign Holdings$_t$) and non-U.S. investors' total holdings of U.S. equity (Foreign Holdings US Equity$_t$):

$$Scaled\ Netflow_t = \frac{(Netflow_t)}{(US\ Foreign\ Holdings_{t-1} + Foreign\ US\ Holdings_{t-1})} \quad (6)$$

Table 2.1 Panel A presents statistics for scaled flows from 1977 to 2011. I find that U.S. investors' monthly net purchases of foreign equity relative to their total portfolio holdings have increased by an average 0.028% per month (Column 1). Foreign investors' net purchases of U.S. equity relative to total foreign holdings of U.S. equity have grown by an average of 0.364% per month (Column 1). Average monthly net flows have been slightly negative (–0.039), signifying that relative to U.S. investors, foreign

investors have made cross-border purchases at a higher rate.

In 1977, many markets were closed to U.S. investors, and foreign investors from many markets could not invest in the United States. That's not an issue now. To inspect how international stock flows have changed through time, Panel B examines scaled flows across sub samples. Column (1) reports the monthly average of scaled flows from 1977 to 1989, inclusive. I find that prior to 1990, inflows were high (0.400) and comparatively larger than outflows (0.009). This resulted in average net flows relative to gross cross-border holdings being negative (–0.208). However, Column (2) shows that this pattern reversed in the 1990s and resulted in average net flows of 0.211% per month. During this period, inflows displays its lowest sample average (0.255) and outflows its highest (0.050). Column (3) shows that from 2000 to 2011, net flows were slightly negative (–0.064). In the more recent period, inflows have reached its highest average for the sample (0.415) and outflows have slightly decreased (0.030).

Panel C examines the persistence of scaled flows for the full sample. Column (1) reports the correlation between current and lagged scaled flows. All the flows display significantly positive auto correlation ranging from 0.602 for outflows to 0.474 for inflow. To examine the persistence of flows, I estimate the following regression:

$$Scaled\ Flow_t = a + b_1 Scaled\ Flow_{t-1} + e_t \quad (7)$$

Columns (3) and (4) report the estimated coefficient and R-squared from time-series regressions of current flows on lagged flows. For each equation, the estimated coefficients on lagged flows are positive and significant. Lagged outflows (inflows) can

explain over 30% (20%) of the variation in current outflows (inflow).

Taken together, Table 2.1 indicates that flows display considerable time-series variation and persistence. In untabulated results, I examine whether scaled flows are stationary. I follow Vagias and van Dijk (2010) and perform an augmented Dickey-Fuller test on scaled flows standardized to have zero mean and unit variance. The alternative hypothesis allows for both an intercept and time trend. I find scaled flows to be non-stationary. Using the Hannan-Quinn information criterion, I find the optimal lag for scaled flows to be one month. To address both aspects of the flows data, I use a Hodrick Presscott Filter with λ =129,600 (Ravn and Uhlig, 2002) on scaled flows and run an AR1 model on the filtered series. The innovations in scaled flows serve as the factors that I use to estimate firm-level sensitivity to international stocks purchases. I detail this below.

2.2.4. International Equity Flow Factor Mimicking Portfolios

I obtain stock price data for all publicly traded firms on NYSE/AMEX/Nasdaq with share codes 10 or 11 from the *CRSP* monthly file from January 1977 to December 2011. The return series includes delisted returns and is matched against accounting data from COMPUSTAT. I follow Fama and French (1992) and match *CRSP* monthly returns between July of year *t* and June of year *t+1* with accounting data from fiscal year ending in year *t-1*. I calculate book equity (BE) as the stockholders' equity (CEQ) plus the deferred tax and investment credit (TXDITC) on the balance sheet minus the book value of preferred stock. I require firms to have positive book equity and assets (AT). The

market capitalization of firms that have multiple PERMNOs are added by their unique PERMCO and treated as a one-firm observation.

Using the innovations in the filtered scaled flows from the previous section, I compute each firm's sensitivity to international stock purchases, i.e., flow betas. The approach is similar to Chen, Roll, and Ross (1986). I estimate the following equation:

$$Ret_{i,t} - Rf_t = a + b_1 Innovation\ Flow_t + e_t \quad (8)$$

The estimated coefficient, the flows beta, measures a firm's sensitivity to aggregate shocks in scaled international stock flows. To avoid a look-ahead bias, I estimate Equation (8) by regressing firm-level returns on contemporaneous flow-shocks using a five-year (60-month) rolling window. I require firms to have at least 24 months of non-missing observation within the five-year window. I form portfolio breakpoints by sorting NYSE firms into deciles by their flows betas and assign AMEX/Nasdaq firms to each portfolio based on their flows beta. Portfolio returns are measured from July of year *t* through June of year *t+1*. The risk-free rate is the three-month U.S. Treasury Bill downloaded via Ken French's website. Each portfolio's monthly returns are from July 1982 to December 2011 (354-months). Monthly excess returns and firm-level characteristics for each portfolio are detailed in the next section.

2.2.5. Average Portfolio Return and Firm Characteristics

Table 2.2 Panel A presents return and firm characteristics for the outflows deciles and an outflows-mimicking portfolio that takes a long position in stocks in the tenth decile (high-outflows-beta) and short position in stocks in the first decile (low-outflows-beta). Column (1) reports the value-weighted outflows-beta for each decile. Value weights are defined using each firm's market capitalization (Size) in June of year *t,* the month before the return series being measured. I find that firms in the low decile have a negative outflows beta, meaning their returns tend to be higher during periods when outflows tends to be low. By contrasts, firms in the high decile have an outflows beta close to 2. Column (2) presents the value-weighted excess return for each decile and Column (3) focuses on the equal-weighted excess return. The average excess return is not monotonic and the return differential on the factor-mimicking portfolio is negative but not significant. By construction, the innovations in scaled flows have zero mean; thus, the outflow-mimicking portfolio's insignificant return spread is not surprising. The equal-weighted portfolios generally have higher returns, with the largest increase being for the high outflows decile. The average return for the high outflows portfolio nearly doubles from 0.481% (Column 2) to 0.920% (Column 3).

Size, book-to-market, volatility, and age are reported in Columns (4)–(7). I follow Baker and Wurgler (2006) and use their variable definitions when possible. Characteristics are value-weighted and winsorized at the 1% and 99% level. Size is presented as each outflows beta decile's percentage of the sample's total market

capitalization. Firms in the low outflows beta decile account for 10.60% of the sample's market capitalization (Column 4). High outflows beta decile firms account for 3.90% of the sample. The size difference between the extreme deciles –6.70% (t = –36.096) indicates that stocks that are most sensitive to outflows tend to be roughly half the size of the stocks that are least sensitive. To calculate the book-to-market ratio, I scale book equity by each firm's market capitalization in December of year *t-1*. Column (5) indicates that the book-to-market ratio of high outflows beta decile is 2.80% (t = 2.415) higher than that of low outflows beta decile stocks. Volatility is the annual standard deviation of monthly stock-returns for each firm from the one year (12 months) prior to June of year *t.* Column (6) shows that, on average, high outflows beta decile stocks have a volatility 9.90% (t = 29.72) higher than low outflows beta decile stocks. Age is the number of years between the firm's first appearance in CRSP and June of year *t*. High outflows beta decile firms are the youngest decile of firms in the sample and –16.567 years (t = –35.054) younger than low outflows beta decile firms (Column 7). Relative to low outflows beta decile firms, I find that high outflows beta decile firms are smaller, with higher book-to-market ratios, more volatile stock returns, and younger.

Multinational characteristics are reported in Columns (8)–(9). The pre-tax foreign ratio is the ratio of foreign pre-tax income (PIFO) to total assets (AT). If firms do not report foreign pre-tax income, the ratio takes a value of zero. Column (8) indicates that the reported pre-tax foreign ratios of firms in the high outflows beta decile (1.20%) were the lowest for the sample. The difference between pre-tax foreign ratios of high and low

outflows beta firms (–0.80%) indicates that high outflows beta firms engage in significantly less multinational activity (t = –12.322). The foreign income tax ratio is the ratio of foreign income tax (TXFO) to total assets (AT). If firms do not report foreign income tax, the foreign income tax ratio takes a value of zero. Column (10) shows a similar pattern to pre-tax foreign ratios, with high outflows beta decile firms reporting lower foreign income tax ratios (0.40%) than low outflows beta decile firms (0.60%). The difference between the foreign income tax ratios (0.20%) is statistically significant (t = –12.010). Each multinational proxy suggests that firms in the high outflows beta decile engage in less multinational activity than firms in the low outflows beta decile do.

Column (10) reports the average number of firms per decile. On average, the high outflows beta decile has the highest concentration of firms (630.33), but the smallest size in the sample (Column 3). The results are consistent with previous findings that smaller firms tend to have higher sensitivity to outflow.

Panel B presents inflows deciles and Panel C focuses on net flows deciles. Neither the inflows portfolios nor the net-flows portfolios display monotonic returns or significant returns for the factor-mimicking portfolios. I do not find a strong cross-sectional relationship between inflows beta or net flows beta and volatility, or age. For inflows, I find that firms in the sample are concentrated in the extreme deciles. Firms in the high (low) inflows decile account for 66.90% (17.70%) of the sample size (Panel B, Column 4). In addition, high inflows beta stocks tend to have lower book-to-market ratios than low inflows beta stocks (Panel B, Column 5). Interestingly, the inflows and net-

flows portfolios exhibit contrasting cross-sectional relationships with multinational activity. For the sample, the cross-sectional relation between inflows beta (net-flows beta) and multinational activity appears positive (negative). Columns (8) and (9) show that relative to low inflows beta firms, high inflows beta firms have significantly higher pre-tax foreign ratios (0.50%) and foreign income tax ratios (0.30%). For net flows beta, high net flows beta firms display relatively lower pre-tax foreign ratios (–0.60%) and foreign income tax ratios (–0.20%).

2.3 Are international stock flows priced in the cross-section of stock-returns?

In this section, I examine the relation between sensitivity to international equity flows and monthly risk-adjusted returns. I investigate whether the relation is independent of size and book-to-market at the portfolio-level. I conclude by testing the relation between sensitivity to flows and risk-adjusted returns at the firm level.

2.3.1 Do International stock flows portfolios earn significant risk-adjusted returns?

To test whether sensitivity to international stock flows are priced in the cross-section of stock returns, I regress the return of each flow-mimicking portfolio on the Carhart four-factor model. I examine the following specification:

$$Ret_{H,t} - Ret_{L,t} = a + b * MKT_t - Rf_t + s * SMB_t + h * HML_t + m * UMD_t + e_t \quad (9)$$

Where H (L) identifies portfolio returns from the high (low) flows beta portfolio. The estimated intercept, *a*, represents the portfolio's average excess risk-adjusted return. Under an exact asset-pricing model, the portfolio's return should be a function of its exposure to risk factors and each risk factor's premium. Within this specification, this predicts that the estimated intercept, *a*, should not be distinguishable from zero. If after controlling for risk, stocks with higher sensitivity to flows outperform stocks with lower sensitivity to flows, the estimated coefficient should be positive. If the opposite is true and stocks with higher sensitivity to flows underperform relative to the stocks with lower sensitivity to flows, the estimated intercept should be negative. To account for potential autocorrelation, all standard errors use the Newey-West adjustment for three lags.

Table 2.3 Panel A reports the results for estimating Equation (9) using the outflows portfolios. Columns (1) through (5) present the estimated intercepts and coefficients for value-weighted outflows portfolios; Columns (6) through (10) report equal-weighted results. I find that stocks with lower sensitivity to outflows earn higher risk-adjusted returns. A portfolio that takes a long position in stocks with the lowest sensitivity to outflows earns 0.437% excess monthly return relative to the Carhart four-factor model (Column 1). The estimated intercept for firms in the high outflows decile is negative, but not significant. An outflows-mimicking portfolio that takes long positions in stocks with high outflows beta and short positions in stocks with low outflows beta earns –0.627% excess monthly return relative to the four-factor model. The outflow-mimicking portfolio positively loads on the market factor (Column 2), the size factor

(Column 3) and negatively loads on the momentum factor (Column 5). For the equal-weighted portfolios, eight out of the ten outflows beta deciles earn risk-adjusted returns in excess of the four-factor model (Column 6). The return differential on the equally weighted, outflow-mimicking portfolio remains significantly negative (–0.275%), yet with a reduced economic magnitude. The smaller return spread seems driven by the performance of the high outflows-beta decile. For the equal-weighted portfolio, the low decile's excess monthly risk-adjusted return remains significantly positive (0.485%). The excess risk-adjusted return for the high decile is positive (0.210), but insignificant. The results suggest that controlling for risk, stocks with high outflows beta earn significantly lower returns than stocks with low outflows beta.

Panel B of Table 2.3 reports the estimated coefficients from regressing the inflows deciles on the four-factor model. I do not find evidence of a strong cross-sectional relationship between sensitivity to inflows and risk-adjusted returns. Column (1) shows that two of the ten value-weighted inflows beta deciles have intercepts that are significantly different from zero and the excess risk-adjusted return on the value-weighted, factor-mimicking portfolio is not significantly different from zero. The findings do not support the hypothesis that sensitivity to inflows is priced in the cross-section of stock returns. For the equal-weighted inflows portfolios, I find that eight of the ten inflows beta deciles earn excess risk-adjusted returns (Column 6). Yet, the risk-adjusted return on a portfolio that takes a long position in firms with high inflow-beta and a short position in firms with low inflow-beta is not significantly different from zero. The

equal-weighted results are not consistent with a strong cross-sectional relation between sensitivity to inflows and excess risk-adjusted returns.

Panel C of Table 2.3 examines the performance of net-flows portfolios relative to the four-factor model. Using value-weighted portfolios (Column 1) and equal-weighted portfolios (Column 6), I do not find consistent evidence that sensitivity to net flows is related to the cross-section of risk-adjusted returns. Across both approaches, the net-flows, factor-mimicking portfolio's estimated coefficient is not distinguishable from zero. The results are not consistent with the hypothesis that sensitivity to net flows is priced in the cross-section of stock returns.

The findings indicate that relative to the Carhart (1997) four-factor model, the outflows-mimicking portfolio earns significant excess risk-adjusted returns; neither the inflows nor the net-flows-mimicking portfolio display such behavior. One possible concern is that the results are specific to the choice of asset pricing model. However, using various asset-pricing models, I do not find this to be case. Appendix Table A.1 reports the performance of each flow-mimicking portfolio relative to the CAPM, the Fama and French (1993) three-factor factor model, and the Carhart (1997) four-factor model augmented by the Pastor and Stambaugh (2003) traded-liquidity factor. The negative cross-sectional relation between sensitivity to outflows and risk-adjusted returns remains robust to each of the factor models. In addition, the equal-weighted, outflow-mimicking portfolio's return remains significantly negative. Furthermore, the insignificant relation between sensitivity to either inflows or net flows and risk-adjusted

returns holds across each factor model. These findings do not support the hypothesis that the significantly negative relation between sensitivity to outflows and risk-adjusted returns are due to the choice of the four-factor model.

Additionally, Appendix Table A.2 examines the risk-adjusted return to the flows mimicking portfolios across sub periods. I divide the sample into July 1982 to December 1997 (186 months) and January 1997 to December 2011 (180 months). Using value-weighted portfolios, I find that the results generally hold across the subsamples.

Lastly, given the non-monotonic relation between flows beta and raw returns documented in Section 2.2, the results may be driven by using deciles to form flow-mimicking portfolios. Appendix Table A.3 examines the risk-adjusted returns of value-weighted and equal-weighted flows mimicking portfolios formed using quintiles. Each flows-mimicking portfolio takes a long position in stocks in the high quintile (high-flow-beta) and a short position in stocks in the low quintile (low-flow-beta). The findings discussed in this section hold. The relation between sensitivity to outflows and excess risk-adjusted returns remains significantly negative. I do not find evidence consistent with such a relation for either inflows or net flow. The findings do not support the hypothesis that pricing of sensitivity to outflows in the cross-section of returns is a result of using deciles.

Taken together, the results from Table 2.3 support one prediction of the hypothesis that sensitivity to international stock purchases is priced in the cross-section of stock returns. The evidence is consistent with stocks' having higher sensitivity to

outflows earning significantly lower risk-adjusted returns than stocks with lower sensitivity to outflows. However, the findings are not supportive of the hypothesis that sensitivity to either inflows or net flows is priced in the cross-section of stock returns.

2.3.2 Are international stock flows portfolios independent of size or book-to-market?

Using asset pricing models typically used in the empirical literature, the risk-adjusted return on the flows-mimicking portfolios should not be distinguishable from zero. However, relative to various models of risk, the intercept for an outflows mimicking portfolio remains significantly negative. The characteristics examined in Section (2.2) indicate an inverse relation between firm-size and sensitivity to outflows. Additionally, firms with high outflows-beta tend to have higher book-to-market ratios. One possible explanation for the outflows mimicking portfolio's risk-adjusted performance may be the influence of size and book-to-market characteristics within the portfolios. In other words, outflows-beta may not be independent of size and book-to-market. Moreover, friction-based and sentiment-based theories of comovement (Barberis and Shleifer, 2003; Barberis, Shleifer, and Wurgler, 2005) contend that limits to arbitrage may cause categories of stocks to comove as investors respond to liquidity needs or uninformed demand shocks. Both characteristics are strongly associated with the cross-section of stock returns (Fama and French, 1992), which is challenging for standard asset pricing models (Daniel and Titman, 1997), and serve as common categorical groupings for investors (Barberis and Shleifer, 2003). This section examines whether the relation

between sensitivity to flows and risk-adjusted returns is independent of the size and book-to-market characteristics.

To investigate the relation while holding size constant, I construct 25 portfolios from the intersection of two independent sorts of all stocks into five size- and five flows-beta portfolios. Break points for each quintile are from NYSE-listed firms in June of year *t,* the month prior to portfolio formation. Similar to Fama and French (1993), I form flow-mimicking portfolios that take long (short) positions in firms that belong to the high (low) flows beta quintile and belong to the same size quintile. I do the same for size, controlling for flow beta. I estimate the following equation:

$$Ret_{H,Size_j,t} - Ret_{L,Size_j,t}$$

$$= a + b * MKT_t - Rf_t + s * SMB_t + h * HML_t + m * UMD_t + l * LIQ\ e_t \quad (10)$$

The difference between dependent variables for Equation (9) and Equation (10) comes from the $Size_j$ term, denoting that flows-mimicking portfolios belong to the same size quintile. To account for the role of liquidity in friction-based theories of comoving, I augment the four-factor model by the Pastor and Stambaugh (2003) traded-liquidity factor. The test assets are value-weighted by firm-size in June of year *t.* I regress the excess return of the 25 portfolios and the raw returns of the 10 long-short portfolios on the five-factor model. Within this specification, if the risk-adjusted return for the flows-mimicking portfolios is not independent of size, then the estimated intercept should not

be significantly different from zero. To account for potential autocorrelation, all standard errors use the Newey-West adjustment for three lags.

Table 2.4 Panel A reports the results for the outflows portfolios; panel B and C report the results for inflows and net flow, respectively. Across all size categories, the outflows results hold. Portfolios with the lowest sensitivity to outflows earn significantly positive risk-adjusted returns (Column Low); those with the highest sensitivity to outflows do not (Column High). Each of the five outflow-mimicking portfolios earns significantly negative risk-adjusted returns (Column H–L). For both sensitivity to inflows and net flows, I find that the factor mimicking portfolios are negative but insignificant.

The evidence presented in Table 2.4 does not support the hypothesis that sensitivity to outflows proxies for size. Rather, the findings suggest that independent of size, firms with lower sensitivity to outflows significantly outperform firms with higher sensitivity to outflows. This supports the hypothesis that sensitivity to outflows is priced in the cross-section of returns. However, the results do not support the hypothesis that sensitivities to either inflows or net flows are independently priced in the cross-section of returns.

Table 2.5 repeats the exercise with 25 value-weighted portfolios independently sorted by flows beta and book-to-market ratios. As before, flow-mimicking portfolios control for the book-to-market ratio, intercepts are estimated relative to the five-factor model, and all standard errors follow the Newey-West adjustment for three lags. Panel A presents the findings for outflow; panels B and C report the results for inflows and net

flows, respectively. Controlling for book-to-market, I find that the significantly negative relation between sensitivity to outflows and risk-adjusted returns generally holds. Across four of the five book-to-market categories, portfolios with the lowest sensitivity to outflows earn significantly positive risk-adjusted returns (Column Low). None of the intercepts for portfolios with high sensitivity to outflows are distinguishable from zero (Column High). Three of the five outflow-mimicking portfolios earn significantly negative risk-adjusted returns (Column H–L). For both sensitivity to inflows and net flows, I find that none of the intercepts of the flows-mimicking portfolios are distinguishable from zero.

The findings presented in Table 2.5 do not support the hypothesis that sensitivity to outflows proxies for book-to-market. The evidence suggests that holding book-to-market constant, firms with lower sensitivity to outflows generally outperform firms with higher sensitivity to outflows. While the outflows results support the hypothesis that sensitivity to international stock flows is priced in the cross-section of returns, the inflows and net flows results do not.

2.3.3 What is the price of international stock flows risk?

In this section, I extend the analysis of the previous section by performing cross-sectional regressions. This allows me to control for various firm characteristics that may impact the relation between sensitivity to international stock purchases and risk-adjusted returns. More specifically, I control for the fundamentals related to international

corporate diversification and misvaluation or limits to arbitrage. Characteristics related to misvaluation or limits to arbitrage are from Baker and Wurgler (2006) and follow their variable definitions when possible. To account for the exposure of stock returns to risk factors that have been shown to affect the cross-section of returns, I use risk-adjusted excess returns as the dependent variables. The risk- adjustment is based on the four-factor model following Brennan, Chordia, and Subrahmanyam (1998).[27]

As before, the factor loadings with respect to the risk model are estimated using 60-months rolling windows and assigned to each security in July of year *t* through June of year *t+1*. Using monthly risk-adjusted returns, I estimate the following Fama-MacBeth equation:

$$Ret_{i,t} - f_{i,j,t} * \lambda_{j,t} - Rf_t = \gamma_0 + \gamma_{Flow} FlowBeta_{i,t} + u_t \qquad (11)$$

where $f_{i,j,t} * \lambda_{j,t}$ is the factor loading of stock$_i$ on factor$_j$ at time *t* multiplied by the risk-premium of factor$_j$ at time *t.* The left-hand side term measures excess risk-adjusted returns. The estimated coefficient on the independent variable, γ_{Flow}, measures the risk-premium associated with sensitivity to flows. If the asset-pricing model used to measure risk-adjusted returns holds, the risk-premium associated with sensitivity to international stock purchases would not be distinguishable from zero. If firms with higher sensitivity to flows earn relatively higher risk-adjusted returns, the estimated coefficient would be

[27]All the results presented here are similar to those of the CAPM, Fama-French three-factor model, and the Carhart four-factor model augmented by the traded liquidity factor.

positive. In the event that the opposite holds and sensitivity to flows is associated with lower risk-adjusted returns, the estimated coefficient would be negative.

Panel A of Table 2.6 presents the regression results for the outflows beta. Regression (1) estimates the price of flow risk. The estimated coefficient on the outflows beta (–0.528) is significantly negative. The result implies that firms with higher sensitivity to outflows earn significantly lower risk-adjusted returns. Regressions (2) through (4) examine whether the significantly negative relation is subsumed by a measure of international corporate diversification. Regression (2) includes the pre-tax foreign ratio and a dummy variable that takes a value of 1 for firms that report pre-tax foreign income. The estimated coefficient on outflows beta remains relatively unchanged. Regression (3) repeats the specification using an alternative proxy for international corporate diversification, the foreign tax ratio and a dummy variable that takes a value of one for firms that report foreign tax. The estimated premium for outflows beta remains significantly negative. The specification estimated in Regression (4) includes both measures of international diversification; the estimated premium remains significantly negative. The findings suggest that firms with higher sensitivity to outflows earn significantly lower risk-adjusted returns. I do not find support for the hypothesis that this negative relation is a result of outflows beta capturing my proxies for international corporate diversification.

Regressions (5) through (7) examine the impact of characteristics associated with misvaluation or limits to arbitrage. Regression (5) adds size, the book-to-market ratio,

and momentum to the base specification. Momentum (Mom) measures each firm's cumulative return for the 11-month period through 12 and 2 months prior to June of year *t*. I take the natural logs of both size and book-to-market; I winsorize momentum at the 1% and 99% levels. I find that the estimated premium for outflows beta (–0.497) remains significantly negative. The specification estimated in Regression (6) adds additional characteristics associated with misvaluation or limits to arbitrage. They include: volatility (Volatility), net sales from fiscal year *t* scaled by the value of assets from the fiscal year *t-1* (Sales Growth), the value of assets from fiscal year *t* scaled by the value assets from fiscal year *t-1* (Asset Growth), earnings relative to book-equity (E/BE), and a dummy variable for firms that have negative earnings. Earnings are defined as income before extraordinary items (IB) in addition to deferred taxes from the income statement (TXDI) minus preferred dividends. The additional characteristics are winsorized at the 1% and 99% level. The estimated coefficient on outflows beta (–0.431) remains significantly negative. Lastly, I estimate an equation that controls for the joint impact of the multinational, misvaluation or limits to arbitrage characteristics in Regression (7). Within this specification, I find that the estimated coefficient on the outflows beta remains significantly negative. The evidence does not support the hypothesis that the negative relation between sensitivity to outflows and risk-adjusted returns is subsumed by proxies for international corporate diversification, measures of misvaluation or limits to arbitrage.

Panel B of Table 2.6 reports regression results for the inflows beta; panel C focuses on the net-flows beta. Across both measures, I do not find evidence supportive of

a strong cross-sectional relation between sensitivity to international equity flows and risk-adjusted returns. For both inflows beta and net-flows beta, the estimated price of flows risk is indistinguishable from zero. Taken together, the inflows and net-flows findings do not support the hypothesis that the flows beta is priced in the cross-section of stock returns.

The outflows findings presented in Table 2.6 support the hypothesis that sensitivity to international equity flows is priced in the cross-section of stock returns. Using firm-level, risk-adjusted returns, I find evidence consistent with the outflows beta having a significantly negative risk premium. For my sample, the price of outflows risk is not subsumed by measures of international corporate diversification or characteristics commonly associated with misvaluation or limits to arbitrage. The results are consistent with sensitivity to international stock flows being priced but only for outflows.

2.4 Are the returns to the international stock flows-mimicking portfolios predictable?

In this section, I examine the return predictability for reach flows-factor mimicking portfolio. I investigate whether the returns for each flows-factor mimicking portfolio is consistent with traditional portfolio choice theories, portfolio choice under uncertainty, or theories of speculative investment. To account for potential autocorrelation, all standard errors use the Newey-West adjustment for three lags.

2.4.1 Do aggregate changes in wealth predict the return to international stock flows-mimicking portfolios?

In this section, I investigate the relation between the return on flows-mimicking portfolios and changes in aggregate wealth. Traditional portfolio choice theories predict that if foreign investment is costly (Lewis, 2011), holding those costs and the level of risk aversion fixed, the gains from investing abroad will increase in investors' wealth (Lane and Milesi-Ferretti, 2008). For the time-series, the wealth theory predicts that flows will be positively associated with changes in wealth.[28] By construction, the flows-mimicking portfolios should have lower returns when the demand for foreign stocks is lower than expected. All else equal, I assume that investors observe changes in their total wealth, and then decide whether they can 'afford' to stay abroad.[29] I expect to observe the stock returns for firms that are less (more) sensitive to flows to be higher (lower) following declines in wealth. In other words, during a period when the demand for foreign stocks falls unexpectedly, stocks that negatively comove with flows should perform better than stocks that positively comove with flows. Following increases in wealth, the opposite

[28]The positive relation between flows and past market performance has been interpreted as return chasing or momentum investing (Brennan and Cao, 1997; Griffin, Nadari, and Stulz, 2004). Under the return-chasing hypothesis, market returns are a signal to foreign investors who face an information asymmetry (Brennan and Cao, 1997; Dahlquist and Robertson, 2004) or a difference of opinion (Dumas, Lewis, and Osambela, 2011). Trend chasing predicts that outflow will be positively related to lagged foreign returns and inflow positively associated with lagged U.S. returns. Alternatively, the relation between portfolio flows and contemporaneous returns has been interpreted as evidence that foreign investors are better informed (see, for example, Curcuru et al., 2010, 2011; Froot and Ramadorai, 2008) or impact target markets through price pressures.

[29]This approach assumes that investors' display constant relative risk aversion and the specification assumes that flows-betas are do not proxy for sensitivity to changes in aggregate wealth. Later in this section, I show that the findings hold when I orthogonalize flows-betas to current and lagged U.S. market returns.

should hold.

To test this wealth-shock hypothesis, I estimate the raw return and excess risk-adjusted return to the flows-mimicking portfolios using lagged changes in the U.S. market-level returns. The main specification follows Baker and Wurgler (2006); I proxy for unexpected changes in wealth, using lagged U.S. stock market returns. Unlike the dependent variable in Table 2.3, which included each portfolio's returns for the full time-series, here I examine the flows-mimicking portfolio's return in the months following positive and negative U.S. stock market returns separately. Stated differently, I condition the time-series on lagged U.S. stock market returns. To the extent that investors are not perfectly globally diversified, but hold a (sufficient) portion of their equity wealth abroad, negative returns at home or abroad would constitute a loss of wealth. To proxy for changes in financial wealth abroad, I use lagged changes in the non-U.S. stock market. Non-U.S. market returns are from the MSCI World Index and downloaded via DataStream. Lastly, to proxy for relative wealth changes, I use the lagged return differential between the U.S. and foreign stock market returns. The independent variables for the risk-adjusted returns are the risk factors used for the CAPM, the Fama and French (1993) three-factor factor model, the Carhart (1997) four-factor model, and the Carhart (1997) four-factor model augmented by the Pastor and Stambaugh (2003) traded-liquidity factor. To account for autocorrelation in the error term, all standard errors are adjusted using the Newey-West correction for 3 lags.

Table 2.7 Panel A reports the results for value-weighted portfolios. Columns (1)

through (5) examine raw returns and excess risk-adjusted returns, i.e., the intercept relative to the factor models. Following negative U.S. market-level returns, the return on the outflow-portfolio is significantly negative (Column 1), indicating that a decline in aggregate wealth is associated with low outflows-beta stocks out performing high outflows-beta stocks. The raw returns imply that, on average, the outflows-portfolio earns –1.167% following negative U.S. market returns. Relative to each model of risk, the return spread remains statistically and economically large; the estimated intercepts range from –1.065% relative to the CAPM (Column 2) to –0.951% relative to the five-factor model (Column 5). Interestingly, following increases in U.S. market-level returns, the outflow-portfolio's return is not statistically significant. Conditioning on lagged U.S. stock market returns, I find that the return on the inflows and net flows portfolios are generally not distinguishable from zero. The results suggest that after declines in U.S. stock market wealth, firms with low outflows-beta outperform firms with high outflows-beta, and for both inflows-beta and net-flows-beta the time-series relation with lagged U.S. market-level returns does not hold.

Repeating the exercise with lagged changes in foreign stock-market wealth, I find that the significantly negative excess return to the outflows-portfolio following stock market declines holds. In the months following declines in the non-U.S. stock market, the outflows portfolio earns an average raw return of –1.047% (Column 1) and –1.138% relative to the five-factor model (Column 5). Following an increase in the non-U.S. stock market, the return on the outflows portfolio is not significant. In contrast to the previous

results, the inflows portfolio displays significant time-series variations conditional on lagged changes in foreign stock market wealth. Column (1) indicates that following a non-U.S. stock market decline, the inflows portfolio earns an average monthly return of –0.748%, and after a non-U.S. stock market increase, the portfolio's average monthly return is 0.687%. The results generally hold within regression specifications that control for various factors. The inflows portfolio results suggest that firms that are more sensitive to the international stock purchases of foreign investors earn higher returns following periods of increased foreign wealth and lower returns following periods of reduced foreign wealth. Although the outflows and inflows portfolios display significant time-series predictability conditional on lagged changes in non-U.S. stock market wealth, I do not find evidence of such a relationship for the net flows portfolios. The return on the net flows portfolio remains insignificant conditioning on foreign stock market changes.

Turning to the performance of the U.S. stock market relative to the non-U.S. stock market, I find that the outflows-portfolio exhibits significantly negative risk-adjusted returns across all sample periods. The results suggest that whether or not the U.S. stock market underperforms or outperforms the foreign stock market, stocks with higher outflows-beta earn significantly lower returns than stocks with lower outflows-beta. Conditional on the relative performance of the U.S. stock market to the non-U.S. stock market, I find that neither the inflows nor the net-flows portfolios exhibit returns distinguishable from zero.

In results not tabulated, I find that the high and low outflows deciles exhibit

asymmetric performance conditional on the relative performance of the U.S. stock market. After the U.S. stock market underperforms relative to the non-U.S. stock market, firms in the low (high) outflows decile earn significantly positive (insignificantly negative) risk-adjusted returns. When the U.S. stock market outperforms the non-U.S. stock market, firms in the low (high) outflows decile earn insignificantly positive (significantly negative) risk-adjusted returns. This results in an outflows-mimicking portfolio that exhibits significantly negative performance across both sample periods.

Table 2.7 Panel B reports the results for equal-weighted portfolios. The equal-weighted results for the outflows-portfolio are generally consistent with the value-weighted findings. The outflows-portfolio continues to have significantly negative returns conditional upon lagged declines in the U.S. stock market and declines in the non-U.S. stock market. Column (5) shows that after declines in the U.S. or non-U.S. stock market, the outflows-portfolio earns an average excess monthly return of –0.538% and –0.556% relative to the five-factor model, respectively. Interestingly, the inflows portfolio exhibits asymmetric performance conditional on lagged declines in both the U.S. stock market and the non-U.S. stock market. Following aggregate declines in stock market wealth, the inflow-portfolio earns significantly negative average returns. After positive stock market returns, the portfolio's return differential is insignificant. Lastly, the net flows portfolios continue to exhibit little predictability conditional on lagged aggregate changes in wealth.

The results from Table 2.7 generally support the wealth predictability implications of sensitivity to international stock flows being priced in the cross-section of

stock returns. One possibility is that the flow-betas proxy for sensitivity to systematic risk. If flows-beta is an indirect measure of U.S. market-beta, then the flows-mimicking portfolio's predictability may be the result of the empirically flat relationship between U.S. market-beta and realized returns. After all, stocks that perform better during periods when aggregate wealth falls are low-beta stocks by definition. The U.S. market-beta hypothesis predicts that once flows-factor loadings are estimated orthogonal to U.S. market-beta, the flow-portfolios should not continue to exhibit time-series predictability.

To test this hypothesis, I orthogonalize flows-betas to current and lagged U.S. market returns. To do this, I follow Baele et al. (2013) and estimate the following equations using individual stock returns:

$$Ret_{i,t} - Rf_t = a + b_1 Innovation\ Flow_t + b_2(Mkt_t - Rf_t) + b_3(Mkt_{t-1} - Rf_{t-1}) + e_t \quad (12)$$

Equation (12) augments the first-pass regression used in Equation (8) with contemporaneous and lagged excess U.S. market returns.

Alternatively, to the extent that equity flows can increase the global influence on asset prices (Karolyi and Stulz, 2003), flows-beta may proxy for a combination of U.S. market-beta and non-U.S. market-beta. To address this non-U.S. beta hypothesis, I estimate the following equation:

$$Ret_{i,t} - Rf_t = a + b_1 Innovation\ Flow_t + b_2(Mkt_t - Rf_t) + b_3(Mkt_{t-1} - Rf_{t-1}) + b_4(Glb_t - Rf_t) + b_5(Glb_{t-1} - Rf_{t-1}) + e_t \quad (13)$$

Equation (13) adds contemporaneous and lagged excess non-U.S. market returns to the first-pass regression used in Equation (12). Using orthogonalized flows-betas, I repeat the portfolio formation steps outlined previously and condition the time series on lagged aggregate changes in wealth.

Appendix Table A.3 Panel A reports the value-weighted results for portfolios orthogonal to U.S. market-beta; panel B focuses on value-weighted flow-mimicking portfolios orthogonal to U.S. and non-U.S. beta. For portfolios orthogonal to U.S. market-beta, I find that the return predictability findings generally hold. Following negative U.S. market returns, the average return to the outflow-mimicking portfolio remains significantly negative. The outflows result holds following negative non-U.S. market returns and following periods when the U.S. market underperforms relative to the rest of the world. The inflows-mimicking portfolios generally earn higher returns following positive foreign market returns and following periods when foreign markets outperform the United States. For portfolios orthogonal to both U.S. and foreign beta, the outflow-mimicking portfolio's significantly negative performance after declines in aggregate wealth continues to hold. The inflows-portfolio generally earns significantly positive returns following positive non-U.S. returns. The findings are not consistent with the alternative hypothesis that the predictability of flow-mimicking portfolios is due to flow-beta serving as a proxy for systematic risks.

The results from this section generally support the wealth predictability implications of international stock purchases being priced in the cross-section of stock

returns. First, lagged negative U.S. stock market returns, my proxy for unexpected declines in wealth predict the return to an outflows-mimicking portfolio. Additionally, the outflows-mimicking portfolio displays similar predictability conditional upon lagged negative foreign stock market returns. I take this as evidence consistent with non-domestic changes in wealth predicting the portfolios' return. Third, the inflows-portfolio's returns are predictable given lagged declines in foreign returns. Finally, I do not find the returns to the net-flows-mimicking portfolio to be predictable given lagged changes in my proxies for wealth. This result does not support the aggregate wealth predictability implications of sensitivity to international stock purchases being priced.

2.4.2 Do aggregate changes in uncertainty predict the return to international stock flows-mimicking portfolios?

In this section, I explore whether the return to flows-mimicking portfolios are consistent with ambiguity-averse investors responding to changes in aggregate uncertainty. The general idea is that if investors are ambiguity-averse, i.e., they prefer certainty over uncertainty (Ellsberg, 1961), then holding the level of ambiguity aversion fixed, the gains to investing abroad will be decreasing in uncertainty (Epstein, 2001; Uppal and Wang, 2003). For international stock flows, the ambiguity aversion theory predicts that the demand for foreign equity will be decreasing in uncertainty. For the flows-mimicking portfolios, the ambiguity aversion theory predicts that stocks with high (low) flows-beta will earn lower (higher) returns when uncertainty rises and the demand

for foreign stocks falls. All else being equal, I expect to observe changes in uncertainty being negatively associated with the return to the flows-mimicking portfolios.[30]

I test this hypothesis by conditioning each flows-mimicking portfolio's raw and risk-adjusted return on aggregate changes in uncertainty. To proxy for changes in uncertainty, I use lagged monthly changes in the Chicago Board Options and Exchange (CBOE) VXO index (Forbes and Warnock, 2011; Giannetti and Laeven, 2012). The VXO is the square root of the risk neutral expectations of the variance for the next 30 days for the S&P 100. I also use lagged changes in the VIX, which is similarly defined for the S&P 500.[31] In this specification, the ambiguity aversion hypothesis predicts that the return on flow-mimicking portfolios should be significantly negative following increases in the VXO and VIX. As before, standard errors are estimated with the Newey-West adjustment for three lags.

Table 2.8 Panel A presents the value-weighted results; panel B reports the equal-weighted results. Consistent with the ambiguity aversion prediction, I find that the value-weighted, outflows-mimicking portfolio earns significantly negative returns following an increase in the VXO. Column (1) shows that during those periods the outflows-mimicking portfolio earns an average monthly return of –0.881%. Columns (2) through

[30]Furthermore, investors may have a bias toward holding securities with which they are most familiar (Kang and Stulz, 1997; Tversky and Heath, 1991). If investors are more familiar with domestic stocks than they are familiar with foreign stocks (French and Poterba, 1991; Li 2004), then all else being equal, changes in uncertainty will be negatively associated with flows.

[31]For the purposes of this paper, the major difference between the measures is power in the time-series. The VXO data are available starting in 1986; the VIX data are available from 1990.

(6) report the excess risk-adjusted return. Relative to each factor model, the portfolio's excess return remains significantly negative. Similar to the predictability results for wealth, the portfolio's performance is asymmetric. Following declines in the VXO, the return to the value-weighted outflows-mimicking portfolio is not distinguishable from zero. While this suggests that after uncertainty increases, firms with higher sensitivity to outflows significantly underperform firms with lower sensitivity to outflows, the findings do not hold when condition on lagged changes in VIX. Furthermore, I find no evidence that the return to either the inflows- or net-flows-mimicking portfolios are predictable given lagged changes in either proxy for uncertainty. Lastly, equal-weighted, flow-mimicking portfolios display no significant relation with lagged changes in either the VXO or the VIX.

Given the negative correlation between market returns and aggregate volatility (Ang et al., 2006; Campbell and Hentschel, 1992; French, Schwert, and Stambgaugh 1987), one possibility is that the flows-mimicking portfolios performance may be attributed to systematic risk. To address this possibility, I use the previously discussed flows portfolios that are orthogonal to U.S. market-beta. The results are presented in Appendix Table A.4. Using flows-mimicking portfolios orthogonal to U.S. market-beta, I find that the results generally hold. The outflows-mimicking portfolio earns significantly negative returns following decreases in the VXO and VIX. In addition, the inflows-mimicking portfolio generally earns significantly positive returns following decreases in the VIX. The results are not consistent with the hypothesis that the returns to the flows-

mimicking portfolios following changes in aggregate uncertainty are the result of systematic risk.

The value-weighted results in Table 2.8 support one fundamental prediction of the ambiguity aversion hypothesis; the outflows-mimicking portfolio earns significantly negative returns following increases in aggregate uncertainty. However, the evidence for the inflows- and net-flows-mimicking portfolios do not strongly support the ambiguity aversion hypothesis.

2.4.3 Do aggregate changes in investor sentiment predict the return to international stock flows-mimicking portfolios?

Noise traders may view foreign securities as a speculative investment class (Baker, Wurgler, and Yuan, 2012). To the extent that the sentiment of noise traders may be correlated (Barberis and Shleifer, 2003; Barberis, Shleifer, and Wurgler 2005; Delong et al., 1990), the speculative investment theory predicts that changes in sentiment will positively correspond with capital flows. Furthermore, Baker, Wurgler, and Yuan (2012) and Hwang (2011) show that private capital flows can serve as a transmission mechanism for the sentiment of foreign investors. Holding the limits to arbitrage fixed, the speculative investment theory predicts that periods of reduced sentiment will correspond with noise traders retrenching from foreign markets. Following periods of reduced sentiment, stocks with lower sensitivity to international stock flows should have relatively higher returns as noise traders reduce their allocation to speculative

investments. Alternatively, the assets held by noise traders are likely to experience negative returns following periods of increased sentiment as mispricing is corrected. This market correction theory predicts a negative relation between lagged changes in sentiment and the return to stocks with higher sensitivity to international stock purchases. Therefore, the theoretical relation between lagged changes in investor sentiment and the return to a flows-mimicking portfolio is less clear than the directional predictions of wealth and uncertainty.

I examine the relation between sensitivity to international stock flows and sentiment by conditioning the flow-mimicking portfolios' monthly returns on lagged proxies of sentiment. First, I use the Baker-Wurgler measure of investor sentiment. The measure is orthogonalized to U.S. macroeconomic conditions. Second, I use the U.S. consumer sentiment index produced by the University of Michigan. To the extent that changes in consumer sentiment correspond with investor optimism (Lemmon and Portniaguina, 2006), increases in consumer sentiment would be positively associated with increases in sentiment. Lastly, I use changes in the closed-end fund discount (CEFD), to proxy for changes in sentiment. Fluctuations in the CEFD have commonly been associated with changes in investor sentiment (Lee, Shleifer, and Thaler, 1991). Within this specification, increases in the CEFD correspond with reductions in sentiment. The consumer sentiment index is downloaded via the University of Michigan; both the Baker-Wurgler measure and the CEFD are downloaded from Jeffrey Wurgler's website. As before, I regress flows-mimicking portfolios on factor models to calculate excess risk-

adjusted returns and use lagged changes in each measure of sentiment to proxy for changes in the beginning period of sentiment. In addition, I estimate standard errors with the Newey-West adjustment for three lags.

Table 2.9 Panel A presents the value-weighted results for raw and excess risk-adjusted returns. Across all three proxies of sentiment, I find that the outflows-mimicking portfolio earns significantly negative risk-adjusted returns following decreases in aggregate sentiment. Following declines in the Baker-Wurgler measure of investor sentiment, the outflow-mimicking portfolio earns an average excess risk-adjusted return of –0.667% relative to the five-factor model (Column 5). The significantly negative relation holds following reductions in consumer confidence and increases in the CEFD. These findings are supportive of the speculative investment predictions of international stock purchases being priced in the cross-section of stock returns. I do not find that either the inflows- or net-flows-mimicking portfolios earn significant risk-adjusted returns conditional on lagged changes of my proxies for sentiment. The inflows and net flows findings do not support the hypothesis that return to flow-mimicking portfolios varies with aggregate changes in sentiment.

In addition, I find some evidence that the outflow-mimicking portfolio earns significantly negative risk-adjusted returns following increases in the Baker-Wurgler measure of sentiment and consumer confidence. At first glance, the significantly negative risk-adjusted returns to the outflow-mimicking portfolio following increases in aggregate sentiment may seem counterintuitive. However, firms with higher sensitivity to outflows

tend to be the kinds of firms subject to speculative investment, i.e., smaller, younger, and more volatile. Baker and Wurgler (2006) show that following increases in sentiment these stocks tend to have lower returns. This predicts that the outflows-mimicking portfolio may be driven by the relative underperformance of the high outflows-beta decile. In results not reported, I find that following increases in aggregate sentiment the high outflows-beta decile significantly underperforms standard asset pricing models. The results are consistent with the Baker and Wurgler (2006) findings.

Turning to equal weighted results in panel B of Table 2.9, I find mixed results regarding the relation between sentiment and the return to flows-mimicking portfolios. First, the equal-weighted portfolios place more weight on small stocks, which are likely to have lower returns following periods of increased sentiment (Baker and Wurgler, 2006). Consistent with the predictions of market correction, I find that the return on the outflows-mimicking portfolio is significantly negative following increases in the Baker-Wurgler measure of sentiment. The inflows-mimicking portfolio displays similar behavior following increases in consumer confidence. Second, the outflows-mimicking portfolio earns significantly negative risk-adjusted returns following increases in the CEFD. The result is consistent with the prediction that stocks with lower sensitivity to international stock purchases perform better during periods of reduced sentiment. While these findings are consistent with the speculative investment hypothesis, the differential return spreads on the equal-weighted, flows-mimicking portfolios are smaller. In addition, the net-flows-mimicking portfolio does not display consistent predictability

related to changes in the sentiment proxies.

The outflows results presented in Table 2.9 generally support the hypothesis that the return to the flows-mimicking portfolios relate to aggregate changes in sentiment. The findings for inflows are not as supportive of the sentiment hypothesis and the net flows results are generally not supportive of the sentiment hypothesis.

2.4 Conclusion

This essay examines the pricing impact of U.S. international stock flows on the cross-section of U.S. stock returns. Measuring the sensitivity of U.S. firm-level returns to innovations in flows, I test whether a flows-factor mimicking portfolio offers significant risk-adjusted returns. I document that an outflows portfolio that takes long positions in stocks with high outflows beta and short positions in stocks with low outflows beta earns significant risk-adjusted returns relative to various factor models. I find that neither inflows- nor net-flows-mimicking portfolios earn significant risk-adjusted returns.

I use firm-level risk-adjusted returns to fully investigate the price of flow risk. Consistent with the portfolio results, I find that outflows risk earns a significantly negative risk premium. The risk premium is not subsumed by characteristics associated with international corporate diversification or commonly associated with misvaluation or limits to arbitrage. I do not find evidence consistent with such a relation for inflows beta or net-flows beta.

I test whether the flows-factor mimicking portfolios' returns are predictable given periods when the unexpected demand for foreign stocks is likely to change. Employing intuition from international portfolio choice, these states are likely to correspond with periods of reduced wealth, increased uncertainty, and reduced sentiment. I show that the outflows-portfolio's returns are predictable. Specifically, I show that stocks with high outflows beta earn lower returns than stocks with low outflows beta following U.S. or foreign stock market declines, increases in VXO, decreases in investor sentiment, or decreases in consumer confidence. Some of the results conditional on foreign market returns extend to the inflows mimicking portfolio as well. The findings are consistent with theories that identify wealth, uncertainty, and sentiment as important factors for international stock flows.

The paper contributes to a growing literature that examines the distinct role of outflows and inflows into the U.S. market (Bernanke et al., 2011; Bertaut and Pounder, 2009; Forbes and Warnock, 2011; Forbes, 2012) and relates international flows to the cross-section of returns.

Table 2.1 Summary Statistics of U.S. Aggregate International Stock Flows

The table reports summary statistics of the aggregate international stock flows scaled by lagged values of equity holdings. Monthly outflows of U.S. investors' net purchase of foreign equity and inflows of foreign investors' net purchase of U.S. equity are from January 1977 to December 2011. Panel A reports statistics for the full sample; panel B reports the mean of scaled flows across subsamples; in panel C Corr reports the correlation between current and lagged flows, the estimated parameter from $Flow_t = a + b_1 Flow_{t-1} + e_t$ and the regressions' R-squared. Flows are collected from the U.S. Department of Treasury's International Capital System (TIC). Outflows are scaled by lagged values of U.S. investors' total equity wealth, i.e. U.S. investors' total holdings of domestic and foreign equity. U.S. holdings of domestic equity are measured as the U.S. market capitalization less total foreign holdings of U.S. equity. Inflows are scaled by the lagged value of foreign investors' total holdings of U.S. equity. Net flows are U.S. outflows less foreign inflows and are scaled by the lagged sum of U.S. holdings of foreign equity and foreign holdings of U.S. equity. The U.S. market is measured using *CRSP;* U.S. holdings of foreign equity and foreign investors' holdings of U.S. equity are from the U.S. Federal Reserve Flow of Funds data.

	(1)	(2)	(3)	(4)
Panel A: Full Sample	Mean	Median	Std Dev	N
$Outflow_{USt}$ (%)	0.028	0.021	0.044	419
$Inflow_{FORt}$ (%)	0.364	0.368	0.623	419
Net $flow_{US\text{-}FOR}$ (%)	-0.039	-0.038	0.441	419

Panel B: Subsample Means	1977-1989	1990-1999	2000-2011
$Outflow_{USt}$ (%)	0.009	0.050	0.030
$Inflow_{FORt}$ (%)	0.400	0.255	0.415
Net $Flow_{US\text{-}FOR}$ (%)	-0.208	0.211	-0.064

Panel C: Correlation	Corr ($Flow_t$, $Flow_{t-1}$)	a	$b_1 Flow_{t-1}$	R-sq
$Outflow_{USt}$ (%)	0.602***	0.011***	0.604***	0.362
$Inflow_{FORt}$ (%)	0.474***	0.190***	0.475***	0.225
Net $Flow_{US\text{-}FOR}$ (%)	0.563***	-0.017	0.563***	0.317

Table 2.2 Characteristics of International Stock Flows Factor Loading Portfolios, 1982-2011

The reports average value-weighted characteristics of flow deciles. Panel A reports aggregate portfolios sorted into deciles by each stock's sensitivity to innovations in outflow (U.S. investors' monthly purchase of foreign equity); Panels B and C repeat the exercise for portfolios sorted on innovation in inflow (foreign investors' monthly net purchase of U.S. equity) and net flow (outflow less inflow). Flow factor loading (Flow Loading), monthly excess returns (Return), the value of foreign pretax income relative to total assets (Pre-Tax Foreign/Total Assets), the value of foreign income tax relative to total assets (Foreign Income Tax/Total Assets), market capitalization (Size), book equity to market equity ratio (B/M), the standard deviation of monthly returns from June of year *t-1* to *t* (Volatility), the years between the firm first listing on CRSP and June of year *t* (Age), the average number of firms in each portfolio (Firms) and t-statistics for Portfolio returns are from July 1982 to December 2011: 354 months. Value weights are defined using each firm's market capitalization in June of year *t.* Accounting data are from year *t-1*. Portfolios are formed in July of year *t* through June of year *t+1*. Firms are required to have at least 24 non-missing observations, positive assets and non-negative book equity in the fiscal year prior to portfolio formation. Deciles are formed by NYSE-break points. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: Outflow Factor Loading Portfolios

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Outflow	US Outflow Loading	Value Weighted Return	Equal Weighted Return	Size (% of Sample)	BE/ ME_{t-1}	Volatility	Age	(Pre-Tax Foreign/ Total Assets)	(Foreign Inc-Tax/ Total Assets)	Firms
Low	-0.271	0.766	0.987	0.106	0.528	0.283	35.437	0.020	0.006	483.472
2	0.048	0.664	0.946	0.119	0.533	0.252	38.217	0.023	0.007	291.633
3	0.230	0.673	0.826	0.129	0.520	0.244	41.136	0.021	0.011	279.331
4	0.385	0.666	0.918	0.128	0.519	0.265	39.462	0.025	0.009	283.542
5	0.517	0.651	0.897	0.109	0.532	0.279	37.066	0.024	0.008	280.910
6	0.652	0.649	0.868	0.095	0.534	0.293	36.714	0.023	0.008	292.590
7	0.793	0.719	0.947	0.080	0.543	0.302	33.063	0.022	0.008	290.726
8	0.961	0.773	0.960	0.072	0.570	0.331	30.078	0.023	0.008	316.195
9	1.200	0.745	0.891	0.057	0.556	0.366	28.156	0.020	0.007	363.045
High	1.812	0.481	0.920	0.039	0.556	0.477	18.869	0.012	0.004	630.333
H - L	2.083***	-0.285	-0.068	-0.067***	0.028**	0.195***	-16.567***	-0.008***	-0.002***	
t-stat	37.49	-1.091	-0.439	-36.096	2.415	30.326	-35.054	-12.322	-12.010	

Continued

Table 2.2, Continued

Panel B: Inflow Factor Loading Portfolios

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Inflow	US Inflow Loading	Value Weighted Return	Equal Weighted Return	Size (% of Sample)	BE/ ME_{t-1}	Volatility	Age	(Pre-Tax Foreign/ Total Assets)	(Foreign Inc-Tax/ Total Assets)	Firms
Low	-1.240	0.594	0.834	0.177	0.547	0.282	33.661	0.018	0.006	799.621
2	-0.031	0.259	0.965	0.011	0.522	0.264	34.450	0.016	0.006	29.376
3	0.015	0.584	0.958	0.008	0.595	0.262	34.050	0.013	0.005	24.133
4	0.083	0.936	0.803	0.006	0.542	0.273	34.196	0.011	0.005	18.754
5	0.161	0.709	0.841	0.008	0.581	0.259	35.734	0.014	0.006	22.387
6	0.184	0.684	0.861	0.011	0.550	0.247	36.812	0.015	0.008	22.554
7	0.260	0.365	0.623	0.010	0.545	0.270	36.435	0.022	0.008	24.189
8	0.357	0.662	0.955	0.015	0.554	0.266	40.234	0.021	0.007	35.415
9	0.491	0.699	1.085	0.020	0.539	0.252	36.065	0.018	0.007	54.384
High	3.176	0.710	0.929	0.669	0.527	0.294	36.145	0.024	0.009	2482.223
H - L	4.416***	0.116	0.094	0.492***	-0.020***	0.012***	2.484***	0.005***	0.003***	
t-stat	46.413	0.975	1.068	54.162	-4.827	5.078	6.772	9.086	16.386	

Continued

Table 2.2, Continued

Panel C: Net Flow Factor Loading Portfolios

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Net Flow	US Net Flow Loading	Value Weighted Return	Equal Weighted Return	Size (% of Sample)	BE/ ME_{t-1}	Volatility	Age	(Pre-Tax Foreign/ Total Assets)	(Foreign Inc-Tax/ Total Assets)	Firms
Low	-0.100	0.726	0.868	0.075	0.529	0.390	24.475	0.021	0.007	617.316
2	-0.056	0.785	0.960	0.111	0.545	0.302	36.105	0.023	0.009	326.008
3	-0.039	0.710	0.989	0.119	0.518	0.281	38.350	0.026	0.009	285.924
4	-0.026	0.678	0.993	0.111	0.506	0.267	37.824	0.022	0.008	268.924
5	-0.015	0.779	0.896	0.109	0.532	0.259	39.668	0.022	0.008	267.181
6	-0.005	0.580	0.831	0.103	0.531	0.260	38.679	0.021	0.008	274.150
7	0.005	0.761	0.901	0.103	0.545	0.268	37.853	0.021	0.008	284.192
8	0.016	0.508	0.929	0.084	0.561	0.286	35.406	0.022	0.008	299.472
9	0.032	0.621	0.836	0.071	0.562	0.304	31.858	0.018	0.006	346.681
High	0.070	0.744	0.886	0.050	0.538	0.380	22.720	0.014	0.005	543.189
H - L	0.170***	0.018	0.018	-0.026***	0.009	-0.010	-1.755***	-0.006***	-0.002***	
t-stat	44.828	0.080	0.128	-12.336	1.236	-1.242	-3.621	-7.780	-10.002	

Table 2.3 International Stock Flows Portfolios, Risk-Adjusted Returns, 1982-2011

Table reports three-factor and four-factor regression for flows factor sorted portfolios: $R=a + b$*MKT $+s*SMB + h*HML + m*UMD + e$, $t(a)$ is the t-stat of a. Columns labeled MKT, SMB, HML, and UMD, report the slope on each factor. Deciles are formed by NYSE-break points. Factor loadings are estimated using rolling 5-year (60 month) windows. Firms are required to have at least 24 non-missing observations, positive assets and non-negative book equity in fiscal year *t-1*. Outflows are U.S. investors' monthly net purchases of foreign equity, scaled by the lagged value of U.S. investors' total equity wealth, i.e. investors' total holdings of domestic and foreign equity. U.S. holdings of domestic equity are measured as the U.S. market capitalization less total foreign holdings of U.S. equity. Inflows are foreign investors' net purchases of U.S. equity, scaled by the lagged value of foreign total holdings of U.S. equity. Net flow are the U.S. net purchases of foreign equity less foreign net purchases of U.S. equity, scaled by the lagged sum of U.S. holdings of foreign equity and foreign holdings of U.S. equity. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: Outflow Portfolio, Value Weighted						Equal Weighted				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	a	MKT	SMB	HML	UMD	a	MKT	SMB	HML	UMD
1	0.437***	0.804***	-0.188***	-0.266**	-0.131*	0.485***	0.801***	0.835***	0.020	-0.182**
2	0.177*	0.886***	-0.296***	0.008	-0.070**	0.398***	0.788***	0.533***	0.251***	-0.149***
3	0.134*	0.935***	-0.251***	0.099**	-0.089***	0.225***	0.842***	0.503***	0.305***	-0.138***
4	0.132*	1.005***	-0.211***	0.011	-0.138***	0.282***	0.867***	0.543***	0.337***	-0.133***
5	-0.006	1.081***	-0.029	0.112*	-0.094***	0.236***	0.904***	0.540***	0.373***	-0.145***
6	-0.020	1.090***	-0.077	0.135***	-0.091***	0.172**	0.936***	0.560***	0.397***	-0.136***
7	0.027	1.080***	-0.002	0.196***	-0.089**	0.215***	0.962***	0.631***	0.438***	-0.137***
8	0.094	1.073***	0.039	0.083	-0.042	0.213**	0.998***	0.709***	0.404***	-0.149***
9	-0.030	1.188***	0.137*	0.158*	-0.070	0.150	1.011***	0.811***	0.382***	-0.182***
10	-0.190	1.299***	0.463***	-0.116	-0.289***	0.210	1.083***	1.133***	0.135	-0.249***
10-1	-0.627***	0.495***	0.650***	0.150	-0.158**	-0.275*	0.282***	0.298***	0.115	-0.067

Continued

Table 2.3, Continued

Panel B: Inflow Portfolio, Value Weighted						Equal Weighted				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	a	MKT	SMB	HML	UMD	a	MKT	SMB	HML	UMD
L	-0.057	0.953***	0.099*	0.094	-0.170***	0.273**	0.830***	0.809***	0.215***	-0.140**
2	-0.055	0.887***	-0.147***	0.136**	-0.162***	0.145	0.838***	0.515***	0.390***	-0.097***
3	-0.055	0.918***	-0.170***	0.059	-0.099***	0.200**	0.820***	0.491***	0.345***	-0.094***
4	-0.010	0.935***	-0.183***	0.323***	-0.067	0.227**	0.830***	0.532***	0.352***	-0.115***
5	0.169*	0.963***	-0.226***	0.052	-0.009	0.329***	0.878***	0.564***	0.334***	-0.126***
6	0.080	1.020***	-0.089	-0.017	-0.080**	0.272***	0.934***	0.606***	0.341***	-0.154***
7	0.216**	0.985***	-0.127**	-0.016	-0.050	0.325***	0.943***	0.623***	0.319***	-0.163***
8	-0.004	1.104***	-0.143**	0.000	-0.148***	0.244**	1.007***	0.678***	0.335***	-0.167***
9	0.006	1.108***	0.039	-0.062	-0.175***	0.300**	1.011***	0.845***	0.182***	-0.236***
H	-0.176	1.317***	0.258**	-0.234***	-0.258***	0.287	1.071***	1.142***	-0.015	-0.310***
H-L	-0.119	0.365***	0.159	-0.328**	-0.088	0.014	0.241***	0.333***	-0.230***	-0.170***

Continued

Table 2.3, Continued

Panel C: Net Flow Portfolio, Value Weighted						Equal Weighted				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	a	MKT	SMB	HML	UMD	a	MKT	SMB	HML	UMD
L	0.305	1.164***	0.080	-0.482***	-0.301***	0.312*	0.995***	1.050***	-0.052	-0.302***
2	0.287**	1.007***	-0.125**	-0.051	-0.182***	0.363***	0.942***	0.724***	0.199***	-0.241***
3	0.229***	1.004***	-0.173***	-0.121***	-0.166***	0.365***	0.920***	0.662***	0.246***	-0.187***
4	0.115	0.964***	-0.212***	0.039	-0.060**	0.356***	0.925***	0.561***	0.280***	-0.166***
5	0.186**	0.952***	-0.237***	0.127**	-0.033	0.241***	0.882***	0.529***	0.339***	-0.111***
6	-0.024	0.961***	-0.199***	0.239***	-0.089**	0.181**	0.882***	0.493***	0.376***	-0.129***
7	0.120	0.969***	-0.058	0.120**	-0.005	0.218**	0.889***	0.520***	0.386***	-0.102***
8	-0.152*	1.087***	-0.013	0.144***	-0.118***	0.251**	0.877***	0.607***	0.393***	-0.107***
9	-0.028	1.045***	-0.002	0.291***	-0.170***	0.145	0.913***	0.651***	0.397***	-0.138***
H	0.112	1.079***	0.300***	0.010	-0.149***	0.188	0.947***	0.956***	0.253***	-0.148**
H-L	-0.193	-0.084	0.220**	0.493***	0.152*	-0.124	-0.048	-0.094**	0.305***	0.154**

Table 2.4 International Stock Flows and Firm-Size Portfolios, 1982-2011

Panel A reports alpha of five-factor of value-weighted portfolios independently sorted by flow-factor and size. Excess risk-adjusted returns are estimated as: $R_{H,t} - R_{L,t} = a + b$*MKT $+s$*$SMB + h$*$HML + m$*$UMD + l$*$LIQ + e$, where H (L) identifies a portfolio that takes a long (short) position in stocks with high (low) flow-beta. Columns labeled Low, 2, 3, 4, High report flow-factor quintiles. Rows labelled Small, 2, 3, 4, Big report size quintiles. Returns come from the difference between high and low quintiles, holding size quintiles constant. Quintiles are formed by NYSE-break prior to portfolio formation in June of year *t*. Panel A reports outflow beta sorted portfolios; panels b and c reports inflow and net flow sorted portfolios, respectively. Factor loadings are estimated using rolling 5-year (60 month) windows. Firms are required to have at least 24 non-missing observations, positive assets and non-negative book equity in fiscal year *t-1*. Newey-West standard errors are adjusted for 3 lags. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A	Outflow						
		Low	2	3	4	High	H-L
	Small	0.248*	0.240**	0.195*	0.134	-0.019	-0.267*
Size	2	0.319***	0.226**	0.080	0.191*	-0.077	-0.396***
	3	0.352***	0.193*	0.191*	0.117	0.054	-0.299*
	4	0.389***	0.086	0.119	0.061	-0.070	-0.459**
	Big	0.321***	0.172**	-0.020	0.026	-0.098	-0.419*
	SMB	-0.073	0.068	0.215*	0.108	0.079	

Panel B	Inflow						
		Low	2	3	4	High	H-L
	Small	0.122	0.183*	0.170*	0.148	0.098	-0.024
Size	2	0.068	0.240**	0.321***	0.162	-0.035	-0.102
	3	0.210*	0.185*	0.264**	0.232**	0.044	-0.166
	4	0.200*	0.106	0.216**	0.112	-0.007	-0.207
	Big	0.198	0.073	0.155**	0.177	0.064	-0.134
	SMB	-0.077	0.110	0.014	-0.029	0.033	

Panel C	Net Flow						
		Low	2	3	4	High	H-L
	Small	0.130	0.345***	0.045	0.139	0.054	-0.076
Size	2	0.033	0.270***	0.249**	0.156	0.000	-0.033
	3	0.179	0.179**	0.271***	0.164	0.125	-0.054
	4	0.206	0.178*	0.209**	0.051	-0.008	-0.214
	Big	0.278**	0.160**	0.079	-0.003	0.157	-0.120
	SMB	-0.148	0.185	-0.035	0.141	-0.103	

Table 2.5 International Stock Flows and Firm-Book-to-Market Portfolios, 1982-2011

Panel A reports alpha of five-factor of value-weighted portfolios independently sorted by flow-factor and size. Excess risk-adjusted returns are estimated as: $R_{H,t} - R_{L,t} = a + b$*MKT $+s$*$SMB + h$*$HML + m$*$UMD + l$*$LIQ + e$, where H (L) identifies a portfolio that takes a long (short) position in stocks with high (low) flow-beta. Columns labeled Low, 2, 3, 4, High report flow-factor quintiles. Rows labeled Low, 2, 3, 4, High report book-to-market-quintiles. Returns come from the difference between high and low quintiles, holding book-to-market quintiles constant. Quintiles are formed by NYSE-break prior to portfolio formation in June of year *t*. Panel A reports outflow beta sorted portfolios; panels b and c reports inflow and net flow sorted portfolios, respectively. Factor loadings are estimated using rolling 5-year (60 month) windows. Firms are required to have at least 24 non-missing observations, positive assets and non-negative book equity in fiscal year *t-1*. Newey-West standard errors are adjusted for 3 lags. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A Outflow

		Low	2	3	4	High	H-L
	Low	0.387***	0.233**	0.193*	0.209	0.063	-0.324
B/M	2	0.289**	0.248*	0.029	0.163	-0.247	-0.535**
	3	0.299**	0.153	-0.144	-0.023	-0.092	-0.391*
	4	0.232	-0.112	-0.026	0.017	-0.059	-0.291
	High	0.471***	0.183	0.195	-0.233	-0.205	-0.676**
	L-H	-0.084	0.049	-0.002	0.442**	0.268	

Panel B Inflow

		Low	2	3	4	High	H-L
	Low	0.239	0.153	0.318***	0.337***	0.066	-0.173
B/M	2	0.172	0.098	0.161	0.081	0.022	-0.150
	3	0.216	0.016	0.019	-0.032	0.035	-0.181
	4	-0.072	0.093	-0.133	0.140	-0.006	0.066
	High	0.136	0.046	0.121	0.084	0.139	0.003
	L-H	0.103	0.107	0.197	0.254	-0.073	

Panel C Net Flow

		Low	2	3	4	High	H-L
	Low	0.324**	0.256***	0.182	0.127	0.201	-0.123
B/M	2	0.099	0.286**	0.166	-0.006	-0.146	-0.245
	3	0.255	-0.099	0.078	0.014	0.113	-0.142
	4	0.111	0.076	-0.182	-0.021	0.023	-0.088
	High	0.388**	-0.008	0.245	-0.205	0.051	-0.337
	L-H	-0.063	0.263	-0.063	0.332	0.150	

Table 2.6 International Stock Flows and Carhart Four-Factor Model Risk-Adjusted Firm-Level Returns, 1982-2011

The table reports Fama MacBeth regressions of stock's sensitivity to innovations in fund flows on risk adjusted returns, $R_{i,t} - f^{*}\lambda - R_{f,t} = a + b_{Flow} + c^{*}X_{t-1} + e_t$. Returns are adjusted to the Carhart (1997) four factor model. Panel a reports the findings for outflow beta; panel b reports inflow beta; panel c reports net flow beta. Factor loadings are estimated using rolling 5-year (60 month) windows. Firms are required to have at least 24 non-missing observations, positive assets and non-negative book equity in fiscal year *t-1*. Returns are adjusted for delisted returns and measured from July of year *t* through June of year *t+1*. Monthly outflow, inflow, and netflow are from January 1977 to December 2011. Outflows are scaled by lagged values of U.S. investors' total equity wealth, i.e. investors' total holdings of domestic and foreign equity. Inflows are scaled by the lagged value of foreign investors' total holdings of U.S. equity. Net flows are scaled by the lagged values of U.S. investors' total holdings of foreign equity and foreign investors' total holdings of U.S. equity. Scaled flows are detrended using a Hodrick-Prescott filter, with λ=129,600 (see Ravn and Uhlig, 2002). Innovations in the detrended scaled flows are measured using an AR1 model. *Size* is price times shares outstanding in the June prior to July of year *t*. *B/M* is the ratio of book equity in fiscal year *t-1* relative to market capitalization in December of year *t-1*. *Momentum* is the cumulative return for the 11-month period between 12 and 2 months prior to July of year *t*. *Volatility* is the annualized standard deviation of monthly returns over the 12 months ending in June prior to July of year *t*. *Sales growth* is the percentage change in net sales. *Asset growth* is the percentage change in assets. *Earnings to book equity* (E/B) is earnings relative to book equity for firms with positive earnings. *Negative Earnings (Neg Earn)* is an indicator variable taking a value of one for firms with negative earnings during fiscal year *t-1*. Standard errors are reported in parentheses. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

Table 2.6 Panel A: Outflow Beta

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Outflow Beta	-0.528***	-0.537***	-0.533***	-0.537***	-0.497***	-0.431***	-0.433***
	(-3.318)	(-3.390)	(-3.434)	(-3.466)	(-3.286)	(-3.068)	(-3.074)
Ln(Size)					0.023	-0.105***	-0.122***
					(0.485)	(-3.129)	(-3.544)
Ln(B/M)					0.555***	0.336***	0.347***
					(5.467)	(4.448)	(4.530)
Momentum (12,2)					0.238	0.097	0.104
					(1.295)	(0.575)	(0.621)
Volatility						-1.304***	-1.301***
						(-3.565)	(-3.579)
Sales Growth						-0.199	-0.191
						(-1.599)	(-1.530)
Asset Growth						-1.041***	-1.012***
						(-6.111)	(-5.911)
E/BE						0.247	0.238
						(1.645)	(1.564)
Neg Earnings (0,1)						-0.498***	-0.495***
						(-4.376)	(-4.387)
Pre-Tax Ratio		-29.794		-33.739			-41.983
		(-1.142)		(-1.302)			(-1.524)
Pre-Tax Ratio (0,1)		0.050		0.018			0.012
		(0.359)		(0.134)			(0.097)
Foreign Tax Ratio			19.317***	22.768***			26.612***
			(3.169)	(4.782)			(5.703)
Foreign Tax Ratio (0,1)			-0.167	-0.176			-0.010
			(-1.164)	(-1.241)			(-0.125)
Constant	0.054	0.009	0.138	0.138	0.129	2.600***	2.602***
	(0.229)	(0.039)	(0.737)	(0.735)	(0.376)	(8.861)	(8.728)
Observations	1,241,596	1,241,596	1,241,596	1,241,596	1,239,479	1,052,723	1,052,723
R-squared	0.001	0.000	0.001	0.000	0.001	0.002	0.001
Number of Months	354	354	354	354	354	354	354

Continued

Table 2.6 Continued, Panel B: Inflow Beta

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Inflow Beta	-0.018	-0.020	-0.019	-0.019	-0.008	0.014	0.013
	(-0.522)	(-0.557)	(-0.528)	(-0.535)	(-0.241)	(0.368)	(0.359)
Ln(Size)					0.030	-0.101***	-0.123***
					(0.606)	(-3.015)	(-3.612)
Ln(B/M)					0.563***	0.343***	0.350***
					(5.550)	(4.731)	(4.798)
Momentum (12,2)					0.179	0.083	0.094
					(0.996)	(0.499)	(0.566)
Volatility						-1.436***	-1.433***
						(-3.651)	(-3.665)
Sales Growth						-0.206*	-0.192*
						(-1.796)	(-1.680)
Asset Growth						-1.078***	-1.044***
						(-6.420)	(-6.208)
E/BE						0.238*	0.227
						(1.679)	(1.594)
Neg Earnings (0,1)						-0.466***	-0.465***
						(-4.161)	(-4.172)
Pre-Tax Ratio		-29.530		-34.046			-42.631
		(-1.159)		(-1.344)			(-1.559)
Pre-Tax Ratio (0,1)		0.132		0.095			0.079
		(0.943)		(0.685)			(0.629)
Foreign Tax Ratio			22.708***	25.141***			27.506***
			(3.364)	(5.078)			(5.919)
Foreign Tax Ratio (0,1)			-0.146	-0.172			-0.040
			(-1.040)	(-1.207)			(-0.487)
Constant	-0.152	-0.220	-0.089	-0.095	-0.076	2.464***	2.494***
	(-0.569)	(-0.809)	(-0.420)	(-0.443)	(-0.196)	(8.456)	(8.584)
Observations	1,241,596	1,241,596	1,241,596	1,241,596	1,239,479	1,052,723	1,052,723
R-squared	0.000	0.000	0.000	0.000	0.001	0.001	0.000
Number of Months	354	354	354	354	354	354	354

Continued

Table 2.6 Continued, Panel C: Net Flow Beta

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Net Flow Beta	-0.023	-0.022	-0.023	-0.023	-0.027	-0.035	-0.034
	(-1.119)	(-1.098)	(-1.156)	(-1.148)	(-1.346)	(-1.612)	(-1.599)
Ln(Size)					0.046	-0.092***	-0.113***
					(0.920)	(-2.703)	(-3.268)
Ln(B/M)					0.590***	0.355***	0.362***
					(5.640)	(4.730)	(4.795)
Momentum (12,2)					0.230	0.116	0.125
					(1.219)	(0.670)	(0.730)
Volatility						-1.513***	-1.509***
						(-3.892)	(-3.906)
Sales Growth						-0.213*	-0.202*
						(-1.802)	(-1.704)
Asset Growth						-1.072***	-1.040***
						(-6.323)	(-6.120)
E/BE						0.228	0.218
						(1.608)	(1.525)
Neg Earnings (0,1)						-0.508***	-0.503***
						(-4.386)	(-4.384)
Pre-Tax Ratio		-26.501		-30.992			-41.528
		(-1.067)		(-1.251)			(-1.525)
Pre-Tax Ratio (0,1)		0.090		0.078			0.056
		(0.642)		(0.574)			(0.448)
Foreign Tax Ratio			24.347***	24.700***			26.056***
			(3.690)	(5.180)			(5.754)
Foreign Tax Ratio (0,1)			-0.240	-0.265*			-0.062
			(-1.603)	(-1.759)			(-0.762)
Constant	-0.267	-0.335	-0.141	-0.147	-0.229	2.409***	2.458***
	(-0.995)	(-1.239)	(-0.679)	(-0.704)	(-0.596)	(8.076)	(8.195)
Observations	1,241,596	1,241,596	1,241,596	1,241,596	1,239,479	1,052,723	1,052,723
R-squared	0.000	0.000	0.000	0.000	0.001	0.001	0.001
Number of Months	354	354	354	354	354	354	354

Table 2.7 International Stock Flows Factor Mimicking Portfolio, and Aggregate Changes in Wealth, 1982-2011

Table reports raw returns and excess risk-adjusted returns relative to the CAPM, three-factor, four-factor, and five-factor regression for value-weighted flow factor-mimicking portfolios. Excess risk-adjusted returns are estimated as: $R_{H,t} - R_{L,t} = a + b$*MKT $+s$*$SMB + h$*$HML + m$*$UMD + l$*$LIQ + e$, where H (L) identifies a portfolio that takes a long (short) position in stocks with high (low) flow-beta. Columns labeled CAPM, FF3F, FF3F+ Mom, FF3F + Mom + Liq, report the excess risk-adjusted return, i.e. the intercept relative to each facto model. Returns come from the difference between high and low deciles for each flow factor loading. Deciles are formed by NYSE-break points. Panel A reports value-weighted portfolios; panel b reports equal-weighted. *Globe* is non-U.S. market returns. Factor loadings are estimated using rolling 5-year (60 month) windows. Firms are required to have at least 24 non-missing observations, positive assets and non-negative book equity in fiscal year *t-1*. Newey West standard errors are adjusted for 3 lags. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: Value-Weighted

		(1)	(2)	(3)	(4)	(5)	(6)
Portfolio	Aggregate Wealth Proxy	Raw	CAPM	FF3F	FF3F + Mom	FF3F + Mom + Liq	N
Outflow H-L	$MKT_{t-1}<0$	-1.167***	-1.065***	-1.065***	-0.937***	-0.951***	138
Outflow H-L	$MKT_{t-1}>0$	0.318	-0.405	-0.405	-0.276	-0.242	215
Inflow H-L	$MKT_{t-1}<0$	-0.565	-0.619	-0.619	-0.723	-0.865*	138
Inflow H-L	$MKT_{t-1}>0$	0.470	0.247	0.247	0.342	0.183	215
Net Flow H-L	$MKT_{t-1}<0$	0.196	0.327	0.327	0.250	0.338	138
Net Flow H-L	$MKT_{t-1}>0$	-0.093	-0.251	-0.251	-0.367	-0.311	215
Outflow H-L	$Globe_{t-1}<0$	-1.047**	-1.175***	-1.175***	-1.140***	-1.138***	153
Outflow H-L	$Globe_{t-1}>0$	0.337	-0.290	-0.290	-0.149	-0.079	200
Inflow H-L	$Globe_{t-1}<0$	-0.748*	-0.926**	-0.926**	-0.896	-0.887*	153
Inflow H-L	$Globe_{t-1}>0$	0.687**	0.604*	0.604*	0.671*	0.411	200
Net Flow H-L	$Globe_{t-1}<0$	0.265	0.406	0.406	0.185	0.180	153
Net Flow H-L	$Globe_{t-1}>0$	-0.167	-0.385	-0.385	-0.467	-0.315	200

Continued

Table 2.7 Continued, Panel A Value-Weighted

Outflow H-L	$(MKT\text{-}Globe)_{t-1} < 0$	-0.597	-0.720**	-0.720**	-0.676**	-0.677**	158
Outflow H-L	$(MKT\text{-}Globe)_{t-1} > 0$	0.008	-0.747***	-0.747***	-0.517*	-0.526**	195
Inflow H-L	$(MKT\text{-}Globe)_{t-1} < 0$	0.322	0.308	0.308	0.363	0.128	158
Inflow H-L	$(MKT\text{-}Globe)_{t-1} > 0$	-0.143	-0.471	-0.471	-0.421	-0.499	195
Net Flow H-L	$(MKT\text{-}Globe)_{t-1} < 0$	-0.314	-0.373	-0.373	-0.469	-0.337	158
Net Flow H-L	$(MKT\text{-}Globe)_{t-1} > 0$	0.291	0.168	0.168	0.038	0.070	195

Continued

Table 2.7 Continued, Panel B: Equal-Weighted

		(1)	(2)	(3)	(4)	(5)	(6)
Portfolio	Aggregate Wealth Proxy	Raw	CAPM	FF3F	FF3F + Mom	FF3F + Mom + Liq	N
Outflow H-L	$MKT_{t-1}<0$	-0.528**	-0.541***	-0.541***	-0.541***	-0.538**	138
Outflow H-L	$MKT_{t-1}>0$	0.238	-0.212	-0.212	-0.150	-0.122	215
Inflow H-L	$MKT_{t-1}<0$	-0.556**	-0.481**	-0.481**	-0.449	-0.501*	138
Inflow H-L	$MKT_{t-1}>0$	0.422*	0.032	0.032	0.176	0.143	215
Net Flow H-L	$MKT_{t-1}<0$	0.340*	0.290	0.290	0.209	0.246	138
Net Flow H-L	$MKT_{t-1}>0$	-0.193	-0.143	-0.143	-0.260	-0.224	215
Outflow H-L	$Globe_{t-1}<0$	-0.387	-0.503***	-0.503***	-0.556***	-0.556***	153
Outflow H-L	$Globe_{t-1}>0$	0.187	-0.182	-0.182	-0.109	-0.038	200
Inflow H-L	$Globe_{t-1}<0$	-0.557**	-0.621***	-0.621***	-0.513*	-0.509*	153
Inflow H-L	$Globe_{t-1}>0$	0.496*	0.196	0.196	0.318	0.314*	200
Net Flow H-L	$Globe_{t-1}<0$	0.346*	0.352*	0.352*	0.169	0.166	153
Net Flow H-L	$Globe_{t-1}>0$	-0.237	-0.213	-0.213	-0.302*	-0.266	200
Outflow H-L	$(MKT\text{-}Globe)_{t-1}<0$	-0.261	-0.337*	-0.337*	-0.333	-0.301	158
Outflow H-L	$(MKT\text{-}Globe)_{t-1}>0$	0.100	-0.323*	-0.323*	-0.196	-0.200	195
Inflow H-L	$(MKT\text{-}Globe)_{t-1}<0$	0.184	0.194	0.194	0.288	0.255	158
Inflow H-L	$(MKT\text{-}Globe)_{t-1}>0$	-0.077	-0.401**	-0.401**	-0.243	-0.273	195
Net Flow H-L	$(MKT\text{-}Globe)_{t-1}<0$	-0.177	-0.244	-0.244	-0.316	-0.277	158
Net Flow H-L	$(MKT\text{-}Globe)_{t-1}>0$	0.172	0.211	0.211	0.035	0.057	195

Table 2.8 International Stock Flows Factor Mimicking Portfolio, and Aggregate Changes in Uncertainty, 1982-2011

Table reports raw returns and excess risk-adjusted returns relative to the CAPM, three-factor, four-factor, and five-factor regression for value-weighted flow factor-mimicking portfolios. Excess risk-adjusted returns are estimated as: $R_{H,t} - R_{L,t} = a + b$*MKT $+s$*$SMB + h$*$HML + m$*$UMD + l$*$LIQ + e$, where H (L) identifies a portfolio that takes a long (short) position in stocks with high (low) flow-beta. Columns labeled CAPM, FF3F, FF3F+ Mom, FF3F + Mom + Liq, report the excess risk-adjusted return, i.e. the intercept relative to each facto model. Returns come from the difference between high and low deciles for each flow factor loading. Deciles are formed by NYSE-break points. Panel A reports value-weighted portfolios; panel b reports equal-weighted. *VXO* is the square-root of the risk-neutral expectation of the variance for the next 30 calendar days for the S&P 100; ΔVXO is the change in VXO from time *t-2* to *t-1;* ΔVIX is equivalently defined for the S&P 500; implied volatilities are calculated by the Chicago Board Options Exchange.. Factor loadings are estimated using rolling 5-year (60 month) windows. Firms are required to have at least 24 non-missing observations, positive assets and non-negative book equity in fiscal year *t-1*. Newey West standard errors are adjusted for 3 lags. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: Value-Weighted

		(1)	(2)	(3)	(4)	(5)	(6)
Portfolio	Aggregate Uncertainty Proxy	Raw	CAPM	FF3F	FF3F + Mom	FF3F + Mom + Liq	N
Outflow H-L	$\Delta VXO_{t-1}<0$	0.535	-0.322	-0.322	-0.215	-0.315	167
Outflow H-L	$\Delta VXO_{t-1}>0$	-0.881**	-0.544*	-0.544*	-0.512*	-0.513*	141
Inflow H-L	$\Delta VXO_{t-1}<0$	0.436	0.185	0.185	0.290	0.014	167
Inflow H-L	$\Delta VXO_{t-1}>0$	-0.202	-0.071	-0.071	-0.140	-0.134	141
Net Flow H-L	$\Delta VXO_{t-1}<0$	0.049	-0.163	-0.163	-0.322	-0.270	167
Net Flow H-L	$\Delta VXO_{t-1}>0$	0.057	0.096	0.096	0.013	0.009	141
Outflow H-L	$\Delta VIX_{t-1}<0$	0.406	-0.343	-0.343	-0.207	-0.413	140
Outflow H-L	$\Delta VIX_{t-1}>0$	-0.431	-0.479	-0.479	-0.400	-0.404	120
Inflow H-L	$\Delta VIX_{t-1}<0$	0.221	0.040	0.040	0.123	-0.389	140
Inflow H-L	$\Delta VIX_{t-1}>0$	0.165	-0.034	-0.034	-0.128	-0.214	120
Net Flow H-L	$\Delta VIX_{t-1}<0$	0.037	-0.177	-0.177	-0.340	-0.101	140
Net Flow H-L	$\Delta VIX_{t-1}>0$	0.276	0.450	0.450	0.344	0.389	120

Continued

Table 2.8 Continued, Panel B: Equal-Weighted

Portfolio	Aggregate Uncertainty Proxy	(1) Raw	(2) CAPM	(3) FF3F	(4) FF3F + Mom	(5) FF3F + Mom + Liq	(6) N
Outflow H-L	$\Delta VXO_{t-1}<0$	0.311	-0.153	-0.153	-0.125	-0.195	167
Outflow H-L	$\Delta VXO_{t-1}>0$	-0.237	-0.115	-0.115	-0.094	-0.095	141
Inflow H-L	$\Delta VXO_{t-1}<0$	0.495*	0.067	0.067	0.220	0.123	167
Inflow H-L	$\Delta VXO_{t-1}>0$	-0.257	-0.144	-0.144	-0.084	-0.082	141
Net Flow H-L	$\Delta VXO_{t-1}<0$	-0.080	0.014	0.014	-0.147	-0.110	167
Net Flow H-L	$\Delta VXO_{t-1}>0$	0.043	0.003	0.003	-0.054	-0.056	141
Outflow H-L	$\Delta VIX_{t-1}<0$	0.307	-0.098	-0.098	-0.051	-0.090	140
Outflow H-L	$\Delta VIX_{t-1}>0$	0.045	0.008	0.008	0.030	0.026	120
Inflow H-L	$\Delta VIX_{t-1}<0$	0.387	0.052	0.052	0.231	0.096	140
Inflow H-L	$\Delta VIX_{t-1}>0$	-0.017	-0.137	-0.137	-0.119	-0.146	120
Net Flow H-L	$\Delta VIX_{t-1}<0$	-0.081	-0.040	-0.040	-0.221	-0.099	140
Net Flow H-L	$\Delta VIX_{t-1}>0$	0.085	0.170	0.170	0.128	0.142	120

CHAPTER 3

WHY HAS THE U.S. FOREIGN PORTFOLIO SHARE INCREASED?

3.1 Introduction

For decades, the share of equity wealth that U.S. investors allocated abroad remained relatively flat; however, in recent years, it has grown substantially. In 1994, the U.S. foreign portfolio share was 10.52%, by 2010, it rose to 21.74%. Traditional portfolio choice theories predict that investors limit their foreign holdings when the costs of international diversification outweigh the benefits. Theories of ambiguity aversion (Ellsberg, 1961) and behavioral finance suggest that uncertainty and speculation play important roles in foreign investment as well. While these theories offer different perspectives on why U.S. investors continue to allocate the majority of their equity wealth to domestic stocks (Lewis, 2011), the increased foreign portfolio share would suggest that through time, this tendency has waned.

To examine why the allocation to foreign stocks has increased, I distinguish between active trades by investors and passive valuation changes using a sample of monthly bilateral equity holdings between the United States and 45 countries from 1994 to 2010. Theoretically, both passive and active changes in the foreign portfolio share can increase the allocation of investors to foreign stocks but the cause of the change in the allocation is very different if the allocation increases due to passive changes rather than active changes. With passive changes, investors did not make an active decision to acquire foreign stocks and their allocation changed as a result of valuation changes and of their holdings of domestic stocks. Empirically, I find that most of the increase in the foreign portfolio share has been due to passive changes. For my sample, the share of the U.S. stock market capitalization held by foreign investors rose from 5.90% in 1994 to 13.29% in 2010. The increased foreign share of the U.S. stock market indicates that U.S. investors sold sizeable portions of their domestic equity holdings to foreign investors. My results show that the U.S. foreign portfolio share has increased as U.S. investors have passively allowed their foreign holdings to appreciate and actively sold their domestic equity holdings to foreign investors. Consistent with this implication, using monthly bilateral equity flows collected by the U.S. Department of the Treasury International Capital System (TIC), I find that over this period the sum of U.S. net equity flows relative to the U.S. stock market capitalization has been negative.

To understand why the U.S. foreign portfolio share has increased through time, I test whether the cross-country variation in the monthly changes of U.S. investors' foreign equity holdings was consistent with traditional portfolio choice theories, theories of

uncertainty aversion, or speculative investment. Each portfolio choice theory has pricing implications for returns and exchange rates; therefore, I control for the passive change in U.S. investors' foreign equity holdings. First, holding risk aversion constant, traditional portfolio choice theories predict that if maintaining a foreign investment position is costly, the gains to holding foreign equity are increasing in wealth. Second, holding the level of ambiguity-aversion constant, theories of portfolio choice under uncertainty predict that the gains to investing abroad are decreasing in aggregate uncertainty (Epstein, 2001; Uppal and Wang, 2003). Third, behavioral research on international investment suggests that sentiment can influence international capital flows (Baker, Foley, Wurgler, 2009; Baker, Wurgler, Yuan, 2012; Hwang, 2011). Holding the limits to arbitrage constant, speculative investment predicts a positive relation between market misvaluation and investors allocation to foreign markets.

Empirically, I find that the change in U.S. stock portfolios across countries supports predictions of the role of wealth and ambiguity. I measure changes in financial wealth with market returns. Additionally, I use growth in industrial production to proxy for monthly changes in non-financial wealth. Holding passive changes constant, I find that U.S. portfolio reallocations are positively associated with current and future changes in foreign wealth and not significantly associated with domestic changes in wealth. The total change in the U.S. foreign portfolio share displays a significantly positive relation with current foreign returns and a negative relation with lagged foreign returns. In my sample, the relation holds at the target country level and extends to lead growth in a target country's industrial production. Both findings are consistent with Curcuru,

Thomas, Warnock, and Wongsman (2010) who find that U.S. investors partially rebalance and tend to sell past winners.[32] Finally, I find that the association between my proxy for increased uncertainty, the ratio of the highest standard deviation of daily market returns for any month in *t-3* to *t*, divided by the monthly minimum of the standard deviation of daily market returns for any month in *t-3* to *t*, and changes in the portfolio weights of U.S. investors is negative and economically significant. The relation is consistent with U.S. investors increasing their foreign portfolio share less toward markets where uncertainty grew higher.

The results are not as supportive of the predictions of speculative investment causing U.S. investors to increase their foreign portfolio share. To test whether U.S. investors have increased their holdings more towards target markets that experience more severe mispricing, I use the misvaluation component of each target country's market-to-book ratio (Baker, Foley, Wurgler, 2009; Hwang 2011). Holding passive changes constant, I find a significantly negative association between a target market's misvaluation and U.S. investors' portfolio reallocations. U.S. investors reduced their mispriced holdings in equity markets that were in more liquid at a higher rate, a result consistent with liquidity easing arbitrage. Lastly, across home countries, I examine the change in foreign investors' relative share of the U.S. equity market. In my sample, a home country's misvaluation component is negatively associated with changes in the

[32]An extensive literature examines whether net flows predict or chase market-level returns (see for example, Bohn and Tesar, 1996; Froot, O'Connell, and Seasholes, 2001). For a detailed discussion of how market-returns relate to non-domestic equity flows and portfolio reallocations, see Curcuru, Thomas, Warnock, and Wongsman (2010).

relative share of the U.S. stock market, suggesting that foreign investors in markets that experienced higher levels of misvaluation increased their share of the U.S. stock market at relatively lower rates.

This paper is connected to an extensive literature that examines why investors are less than perfectly diversified globally[33] and a growing literature on the impact of valuations on international portfolio reallocations (Curcuru et al., 2010, 2011). As such, my contribution is threefold. First, identifying equity holdings across target countries allows me to document where U.S. investors went and to disentangle how they got there, i.e., through trades or valuation changes. I show that the economic impact of the passive changes is large and controlling for them is empirically important. Second, monthly data increases the power to distinguish why investors go abroad. My experiments test competing theories of portfolio choice by exploiting cross-country variations in factors that change dynamically. Third, exploiting foreign investors' holdings of U.S. equity across home countries, I categorize which foreign investors changed their share of the U.S. equity market. I show that foreign purchases of U.S. equity were considerable; pinpointing which specific countries changed their share of the U.S. equity market permits me to ask who came into the United States.

The rest of the chapter proceeds as follows. Section 3.2 describes the data and methodology I use to measure flows. Section 3.3 examines growth in the U.S. foreign portfolio share and foreign holdings of U.S. equity from 1994 to 2010. In section 3.4, I investigate the relation between changes in stock portfolios and wealth, uncertainty, and

[33]For detailed reviews of the home bias literature, see Lewis (2011) and Karolyi and Stulz (2003).

misvaluation. I conclude in section 3.5.

3.2 Data and Methodology

In the first part of the paper, I describe the data on international portfolio holdings and equity flows. I then turn to the construction of the foreign holdings measures, active and passive changes in foreign holdings, and non-domestic equity flows scaled by holdings.

3.2.1 Equity Holdings Data Sources

To investigate the U.S. reallocation of non-domestic equity holdings, I use two main bilateral databases, the Bertaut and Tryon (2007) monthly database[34] from March 1994 to December 2010 and the Treasury International Capital Reporting System (TIC*)* monthly survey[35] from January 1994 to December 2010. The Bertaut and Tryon database allows me to identify U.S. residents' monthly holdings of foreign equity by country and foreign residents' monthly holdings of U.S. equity by country of origin. The database is maintained by the U.S. Federal Reserve Board.[36] The TIC monthly survey collects bilateral portfolio flows between U.S. residents and foreign counterparties that exceed

[34] http://www.federalreserve.gov/pubs/ifdp/2007/910/ifdp910appendix.pdf
[35] http://www.treasury.gov/resource-center/data-chart-center/tic/Pages/fpis.aspx#usclaims
[36] An alternative data source for U.S. holding of non-domestic equity is the U.S. Federal Reserve Board *Flow of Funds Statistical Release Z.1* database. The *Flow of Funds* data provides quarterly measures of aggregate bilateral equity holdings between the U.S. and foreign markets. The correlation between the between aggregate holdings reported using the Bertaut and Tryon (2007) database and the *Flow of Funds* data is 0.98 over their overlapping period (1994 – 2010), indicating that the data are consistent.

US$ 50 million.[37] The TIC survey is legally required and strictly enforced; therefore, its coverage is comprehensive. All data are reported in U.S. dollars.

The final sample includes U.S. bilateral holdings of 45 equity markets; the International Monetary Fund *World Economic Outlook 2000, Statistical Appendix, Data and Conventions* identifies 23 of the countries in the sample as "advanced economies" (Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Israel, Italy, Japan, Korea, the Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, and the United Kingdom) and the remainder developing (Argentina, Brazil, Chile, China, Colombia, the Czech Republic, Egypt, Hungary, India, Indonesia, Malaysia, Mexico, Morocco, Pakistan, Peru, the Philippines, Poland, Russia, South Africa, Taiwan, Thailand, and Turkey).

3.2.2 Measuring Equity Reallocation

I use three measures of equity reallocation: changes in the foreign portfolio share of U.S. investors total equity wealth, changes in the share of the U.S. stock market capitalization held by foreign investors, and non-domestic equity flows scaled by equity holdings. The foreign portfolio share measures the proportion of total equity wealth

[37]Federal Reserve Bank of New York, TIC S Historic Reporting Changes notes that after January 2001 TIC S changed the exemption level from USD2 million to USD50 million in either gross purchase or gross sales during a month (http://www.newyorkfed.org/banking/regrept/WebpageHistoricReportingChanges_TICS.pdf).U.S. Treasury TIC S Form instructions explain that once the exemption level is exceeded, reporting is required for the remainder of the calendar year regardless of the level of either purchase or sales in subsequent months (http://www.treasury.gov/resource-center/data-chart-center/tic/Documents/sinstr-june2011.pdf).

investors allocate abroad. The foreign share of the U.S. stock market capitalization measures the portion of total U.S. equity held by foreign residents. The equity flows measure investors' net purchases of non-domestic equity.

To calculate U.S. investors' domestic holdings and total equity wealth, I use a methodology similar to Kho et al. (2009). I obtain the month-end U.S. market capitalization from *CRSP* and the month-end dollar value of foreign holdings of U.S. equity from the Bertaut and Tryon database. To measure U.S. investors' holdings of domestic equity at time *t* (US Domestic Holdings$_t$), I take the capitalization of the U.S. market minus the dollar value of foreign holdings of U.S. equity. I define a country in which U.S. investors hold equity as a target country and a country in which foreign investors hold U.S. equity as a home country. To measure U.S. investors' total equity wealth, I add U.S. domestic equity holdings and the total dollar value of their equity holdings for each target country in the sample (US Foreign Holdings$_{j,t}$). To measure portfolio weights (US Portfolio Weight$_{j,t}$), I scale the dollar value of U.S. foreign equity holdings of each target country by U.S. investors' total equity wealth:

$$US\ PortfolioWeight_{j,t} = \frac{US\ Foreign\ Holdings_{j,t}}{US\ Domestic\ Holdings_t + \sum_{j=1,45} US\ Foreign\ Holdings_{j,t}} \quad (1)$$

where US Portfolio Weight$_{j,t}$ is the relative portion of equity wealth U.S. investors allocate to country *j* at time *t.* In equation (1), the numerator is the dollar value that U.S. investors hold in target country *j* at time *t* and the denominator, the total equity wealth that U.S. investors have at time *t*, equals the dollar value of domestic equity that U.S.

investors hold at time *t* plus the dollar value of their holdings of all the target countries in the sample at time *t.* The holdings data for Belgium and New Zealand are available starting in January 2000. The final sample contains 8883 country-month observations. To reduce the potential impact of outliers, I winsorize the portfolio weights at the 1% and 99% level.

I measure the total foreign portfolio share by dividing U.S. investors' holding of foreign equity by U.S. total portfolio wealth:

$$US\ Foreign\ Portfolio\ Share_t = \frac{\sum_{j=1,45} US\ Foreign\ Holdings_{j,t}}{US\ Domestic\ Holdings_t + \sum_{j=1,45} US\ Foreign\ Holdings_{j,t}} \quad (2)$$

where US Foreign Portfolio Share$_t$ is the total dollar value of equity wealth that U.S. investors allocate to all the target countries in the sample at time *t,* the denominator is previously defined.

3.2.3 Measuring Passive Benchmark Reallocation

For each month, I estimate a passive benchmark of the total equity wealth and portfolio weights based on the monthly price and exchange rate changes for the target countries. The benchmark measures how the foreign portfolio share would have changed had U.S. investors not made any trades. I use the same methodology described earlier, but substitute holdings with their dollar values implied by valuation changes. From the perspective of a U.S. resident, not all securities within an emerging market may be

investable; for developed markets, investability is less of an issue. The S&P Broad Market Index (SP BMI) and the S&P Investable Country Index (SP IFCI) measure country-level returns for developed and emerging markets, respectively.[38] I supplement missing returns data with returns from DataStream.[39] I collect MSCI/DataStream foreign exchange rates.[40] To match the month-end dollar value of the monthly holdings data, I use the month-end (i.e., the last day of the month) observation to calculate monthly changes in price and exchange rates. For all countries, all returns are in U.S. dollars and measured with the Total Return Index.

To measure the passive asset allocation benchmark, I estimate the implied value of U.S. equity holdings of target country *j*'s equity at time *t* (Implied Holding$_{j,t}$) as a function of target country *j*'s price appreciation ($R_{j,t}$) and exchange rate changes ($S_{j,t}$):

$$ImpliedHolding_{j,t} = \left[US\ Foreign\ Holdings_{j,t-1}\right]\left[\left(1 + R_{j,t}\right)\right]\left[\left(\frac{1}{S_{j,t}}\right)\left(S_{j,t-1}\right)\right] \qquad (3)$$

where Implied Holding$_{j,t}$ is the passive benchmark's dollar value of U.S. investors' holdings of target country *j*'s equity at time *t,* $R_{j,t}$ is the monthly return of target country *j* from *t-1* to *t* in U.S. dollars*,* and $S_{j,t}$ is the spot exchange rate between the U.S. dollar and

[38] The SP IFCI index for Argentina and Greece transitioned to SP BMI; I merge the Argentina SP IFCI with the SP BMI in October 2009 and the Greece SP IFCI to the Greece SP BMI in October 2002, the last month each IFCI was available, respectively. For Colombia and Pakistan I use each country's SP BMI.
[39] In most cases, the return series are available for the duration of my sample. For Brazil, China, Egypt, and Russia, the return series are available later in the sample.
[40] I use MSCI for Argentina, Australia, Austria, Belgium, Chile, Denmark, Egypt, Finland, France, Germany, Greece, Hong Kong, India, Ireland, Italy, Malaysia, Mexico, Morocco, Netherlands, New Zealand, Pakistan, Poland, Spain, the U.K; I use DataStream for Brazil, Canada, China, Colombia, Czech Republic, Hungary, India, Israel, Japan, Korea, Norway, Peru, the Philippines, Poland, Russia, Singapore, South Africa, Sweden, Switzerland, Thailand, and Turkey.

target country *j*'s local currency at time *t.* The expression produces implied holdings at time *t* based solely on investors in the United States passively holding the equity of target country *j.* I use these implied holdings to obtain a passive benchmark of portfolio weights and the U.S. foreign portfolio share. I describe this in detail next.

To measure passive portfolio weights, I normalize the dollar value of U.S. investors' implied holdings of foreign equity by implied total portfolio wealth:

$$US\ Passive\ PortfolioWeight(P,Fx)_{j,t} = \frac{ImpliedHolding_{j,t}}{US\ Domestic\ Holdings_t + \sum_{j=1,45} ImpliedHoldings_{j,t}} \quad (4)$$

where US Passive Portfolio Weight $(P,Fx)_{j,t}$ is the relative amount of equity wealth U.S. investors would have allocated to country *j* at time *t* had they passively held their foreign equity from time *t-1* to time *t*, Implied $Holding_{j,t}$ is previously defined and the denominator is the passive benchmark's total equity wealth that U.S. investors have at time *t.* The difference between the denominator of Equation (1) and Equation (4) is the denominator's second term, the dollar value of U.S. investors' implied equity holdings of all target countries in the sample. The implied holdings terms adjusts total portfolio wealth for investors passively holding their non-domestic equity portfolio from time *t-1* to time *t.*[41] As before, I winsorize the passive level of the portfolio weights at the 1% and 99% level.

To measure the passive benchmark of the total foreign portfolio share, I normalize

[41]My methodology to calculate passive changes in the foreign portfolio share differs from the approach used in Curcuru et al. (2011), which applies buy and hold returns to the domestic holdings term to measure what they define as U.S. investors' global portfolio.

the sum of investors' implied holdings of foreign equity by implied total portfolio wealth:

$$US\ Passive\ Foreign\ Portfolio\ Share(P,Fx)_{i,t} = \frac{\sum_{j=1,45} ImpliedHoldings_{j,t}}{US\ Domestic\ Holdings_t + \sum_{j=1,45} ImpliedHoldings_{j,t}} \quad (5)$$

where US Passive Foreign Portfolio Share $(P,Fx)_{i,t}$ is the total dollar value of equity wealth U.S. investors would have allocated to all target countries in the sample at time *t* had they passively held their foreign equity from time *t-1* to time *t,* and the denominator, U.S. investors' passive level of total equity wealth at time *t,* was defined previously.

3.2.4 Measuring Active Equity Allocation

To determine if U.S. investors actively reallocate their holdings, I estimate the changes in the U.S. portfolio weights that is not due to price changes and exchange rates:

$$Active\ Change\ USPortfolioWeight_{j,t} = \Delta US\ Portfolio\ Weight_{j,t} - \Delta US\ Portfolio\ Weight(P,Fx)_{j,t} \quad (6)$$

To assess whether U.S. investors actively reallocate their total foreign portfolio share, I contrast the first difference in U.S. investors' total foreign portfolio share with the first difference implied by the passive benchmark:

$$Active\ Change\ USForeignPortfolio\ Share_t = \Delta US\ ForeignPortfolio\ Share_t - \Delta USForeignPortfolio\ Share(P,Fx)_t \quad (7)$$

3.2.5 Measuring Foreign Investors' Share of U.S. Equity

To examine the share of the U.S. stock market held by foreign investors, I normalize the dollar value of U.S. equity held by residents in home country *j* at time *t* by the U.S. stock market capitalization:

$$Foreign\ Share\ of\ US\ Stock\ Market_{j,t} = \frac{\left(Foreign\ Holdings\ US\ Equity_{j,t}\right)}{\left(US\ Stock\ Market\ Captialization_{t}\right)} \quad (8)$$

As before, I winsorize the foreign share of the U.S. stock market weights at the 1% and 99% level. To measure the extent to which investors in home country *j* change their relative share of the U.S. stock market at time *t*, I take the change in home country *j*'s foreign share of the U.S. stock market from time *t-1* to time *t.*

3.2.6 Measuring Portfolio Flows

I use three measures of bilateral equity flows: outflows, inflows, and net flows. Outflows measure the net amount of foreign equity purchased by US residents. Inflows measure foreign residents' net purchases of U.S. equity. Net flows measure the netted portfolio flow between U.S. and foreign investors by taking the difference between outflows and inflows. To keep the economic interpretation of the equity flows comparable to the U.S. foreign portfolio share and the foreign share of the U.S. stock market, I scale outflows by U.S. investors' lagged holdings of total equity and normalize inflows and net flows by the U.S. stock market capitalization. I detail this below.

To measure non-domestic equity transactions for each country, I follow a

methodology similar to Vagias and van Dijk (2010) and Forbes and Warnock (2011). I calculate outflows ($Outflow_{j,t}$) as U.S. investors' total purchases of target country *j*'s equity at time *t* (US Purchases Foreign $Equity_{j,t}$) minus U.S. investors' total sales of target country *j*'s equity at time *t* (US Sales Foreign $Equity_{j,t}$), scaled by the lagged dollar value of U.S. investors' total portfolio wealth:

$$Scaled\ Outflow_{j,t} = \frac{(US\ Purchases\ Foreign\ Equity_{j,t} - US\ Sales\ Foreign\ Equity_{j,t})}{(US\ Domestic\ Holdings_{t-1} + US\ Foreign\ Holdings_{t-1})} \quad (9)$$

To measure inflows ($Inflow_{j,t}$) relative to the U.S. stock market capitalization, I take the difference between investors' in home country *j*'s total purchases of U.S. equity at time *t* (Foreign Purchases US $Equity_{j,t,}$) and their total sales of U.S. equity at time *t* (Foreign Sales US $Equity_{j,t}$), scaled by the U.S. stock market capitalization:

$$Scaled\ Inflow_{j,t} = \frac{(Foreign\ Purchases\ US\ Equity_{j,t} - Foreign\ Sales\ US\ Equity_{j,t})}{(US\ Stock\ Market\ Captialization_t)} \quad (10)$$

I compute net flows (Net $flow_{j,t}$) relative to the U.S. stock market capitalization, as U.S. investors' outflow to target country *j* at time *t* ($Outflow_{j,t}$) minus U.S. inflow from investors' in home country *j* at time *t* ($Inflow_{j,t}$), scaled by the U.S. stock market capitalization:

$$Scaled\ Netflow_t = \frac{(Outflow_{j,t} - Inflow_{j,t})}{(US\ Stock\ Market\ Captialization_t)} \quad (11)$$

3.3 How did the U.S. foreign portfolio share grow?

In this section, I use the three measures of foreign equity allocation defined in Section 3.2 to document the growth in U.S. investors' portfolio share from 1994 to 2010. To account for potential small sample bias, all standard errors are bootstrapped.

3.3.1 Changes in U.S. Portfolio Weights and the Foreign Share of U.S. Equity

Table 3.1 presents statistics on the level and summed monthly change in U.S. bilateral equity holdings over the sample period. For the target countries in the sample, I find that the relative share of U.S. equity wealth allocated abroad has increased by an average of 0.238 percentage points (Column 3). The average growth in portfolio weights has been significantly positive for both developed (0.339) and emerging markets (0.133). When I sum the monthly portfolio weight changes over the sample period, I find that the accumulated impact is large. The U.S. foreign portfolio share more than doubled over the sample period, growing by 10.721 percentage points. U.S. holdings in developed markets accounted for roughly four fifths of that increase. Column (4) reveals that had investors made no monthly trades, the average change in the U.S. foreign portfolio share would have been roughly the same. Column (5) shows that for the sample, the average active growth in U.S. investors' foreign portfolio weights has not been distinguishable from zero. This indicates that the growth in the U.S. foreign portfolio share has occurred because of U.S. investors passively allowing their foreign holdings to appreciate. The findings are consistent with U.S. investors' partially rebalancing their foreign holdings by selling past winners, as documented in Curcuru et al. (2011).

When I examine foreign holdings of U.S. equity, I find that across countries, the average change in the percentage of the U.S. stock market capitalization held by foreign investors has been significantly positive (Column 8). The summed monthly changes in the foreign share of the U.S. stock market capitalization indicate that over the sample period, investors in developed home countries acquired a larger share of U.S. equity (6.03%) than investors in emerging home countries (1.18%). The results are consistent with investors in developed countries tending to allocate more wealth abroad (Lane and Milesi-Ferretti, 2008). The overall increase in the percentage of the U.S. stock market held by foreign investors suggests that over the sample period, U.S. investors sold a substantial portion of their domestic equity holdings to foreign investors.

The share of U.S. equity wealth invested abroad did not rise in all target countries; U.S. portfolio weights decreased in Italy, the Netherlands, Argentina, Malaysia, and Mexico over the sample period. Interestingly, had U.S. investors not made monthly trades, U.S. investors' total allocation to those target countries still would have decreased. The results reiterate the previous findings that changes in the U.S. foreign portfolio share were largely driven by passive changes. Also of note, not all foreign investors increased their relative share of the U.S. equity market; the percentage of the U.S. stock market held abroad decreased in roughly one-fifth of the countries in the sample. Three were developed (Austria, Belgium, and Italy) and seven were emerging (Brazil, Egypt, Indonesia, Morocco, Pakistan, Philippines, and Turkey). The findings highlight the extent to which investors in developed countries acquired shares of the U.S. stock market at higher rates than investors in emerging home countries.

3.3.2 U.S. Cross-Border Equity Flows

Table 3.2 reports the mean and sum of monthly bilateral equity flows between investors in the U.S. and investors in the countries in the sample. The results are generally consistent with the previous finding that U.S. investors' allocation to developed markets grew at a larger rate than U.S. allocation to emerging markets. Column (2) shows that, in total, U.S. investors' net purchases of foreign equity relative to their total equity wealth increased by 6.335% over the sample period. As a percentage of their total equity wealth, U.S. investors' outflows increased by more in developed target countries (4.990%) than it did in emerging target countries (1.344%). Column (4) reports inflows scaled by the U.S. stock market capitalization. As before, in developed home countries investors acquired U.S. equity at relatively higher rate (7.950%) than investors in emerging home countries (0.206%). Column (6) shows that relative to the U.S. stock market capitalization, total net flows over the sample period were –1.659%. This indicates that U.S. investors went abroad at a lower rate than non-U.S. investors entered into the U.S. stock market. Relative to the U.S. stock market capitalization, the total net flows between the U.S. and developed markets was negative (–2.832%) and positive between the U.S. and emerging markets (1.173%). In other words, the results indicate that the sales of domestic equity to foreign investors were largely driven by U.S. investors selling their domestic holdings to investors in developed countries.

3.4 Why did U.S. investors increase their foreign portfolio share?

In this section, I examine whether the cross-country variation in allocation was consistent with traditional theories of portfolio choice, portfolio choice under uncertainty, or theories of speculative investment.

3.4.1 Did changes in wealth cause investors to increase their foreign portfolio share?

In this section, I investigate the relation between changes in wealth and changes in foreign equity holdings. Holding the level of risk aversion and the costs associated with investing abroad fixed, the gains from holding foreign equity will be an increasing function of wealth (Lane and Milesi-Ferretti, 2008). Additionally, gains and losses in non-financial wealth can lead investors to reallocate their stocks portfolios (Heaton and Lucas, 2000). All else being equal, the wealth theory predicts a positive relation between changes in wealth and foreign investment.

To test the wealth hypothesis, I estimate a time-series OLS regression using the monthly total change in the U.S. foreign portfolio share over the sample period. The passive changes in the foreign portfolio share would be directly impacted if changes in wealth change the net benefit of holding foreign equity. Active increases in the foreign portfolio share require investors to purchase foreign equity; therefore, active change directly affects investors' total wealth. Consequently, an investor who needs to sell foreign equity to cover a loss of income or to diversify following an increase in non-financial wealth will reallocate through an active change.

The independent variables are proxies for changes in financial and non-financial

wealth. I measure aggregate changes in financial wealth with current and lagged monthly U.S. stock market returns. Although investors are not perfectly globally diversified, they hold wealth abroad; hence, negative domestic or foreign returns would constitute a loss of wealth. To proxy for foreign changes in financial wealth, I use current and lagged monthly non-U.S. stock market returns from the MSCI World Index, downloaded via DataStream. To account for the correlation between U.S. and foreign returns, I follow Bekaert et al. (2011) and orthogonalize current non-U.S. returns to contemporaneous and past U.S. returns.[42] The ideal proxy for changes in non-financial wealth would be monthly changes in real GDP growth; however, GDP growth is not available at a monthly frequency. Therefore, I use monthly growth in U.S. industrial production.[43] Industrial production is provided by the U.S. Federal Reserve Board and downloaded from Jeffrey Wurgler's website. Because investors may slowly respond to change in non-financial wealth, I measure the change in industrial production from time *t-3* to time *t.* Alternatively, investors may reallocate their portfolio holdings in anticipation of changes of non-financial wealth. To test whether future changes in non-financial income are associated with current changes in foreign investments, I also use the changes in industrial production from time *t* to time *t+3.* Because the wealth hypothesis predicts that both the passive and active changes in the foreign portfolio share will be impacted by changes in wealth, I include current and lagged passive changes in the foreign portfolio

[42] The main findings in this section are not sensitive the use of orthogonal returns.

[43]Hobijn and Steindel (2009) show that from 1948 to 2009, the correlation between quarterly U.S. real GDP growth and U.S. industrial production is 0.8. For a detailed discussion on the high frequency relation between U.S. real GDP growth and industrial production see their paper and the citations there in. http://www.newyorkfed.org/research/current_issues/ci15-7.pdf

share. Within this specification, the wealth hypothesis predicts that the estimated coefficient on the wealth measures and the passive changes will be positive. To account for potential small sample bias and seasonality, all standard errors are clustered by month and bootstrapped within each cluster.

Table 3.3 Panel A reports the results for the time-series regressions. Regressions (1) through (4) examine the total change in the U.S. foreign portfolio share. Regression (1) includes both U.S. market returns and passive changes in the foreign portfolio share in the estimation. The estimated coefficients on U.S. market returns are not significantly different from zero. The estimated coefficients on the current and lagged passive changes in the foreign portfolio share are significantly positive, indicating that a passive increase in foreign equity wealth is associated with an increase in the foreign portfolio share. The coefficients on the passive changes imply that when the foreign portfolio share increases by one percentage point this month, U.S. investors increase their foreign portfolio share by 0.6045 percentage points that same month and by 0.1290 percentage points the following month. Repeating specification (1) with foreign returns and passive changes, Regression (2) shows the estimated coefficient on contemporaneous foreign returns is significantly positive and the estimated coefficient on lagged foreign returns is significantly negative. The results suggest that U.S. investors positively respond to current changes in foreign financial wealth and negatively respond to past foreign market returns. Regression (3) replaces foreign returns with lag and lead changes in industrial production. I do not find the estimated coefficients on the industrial production terms to

be distinguishable from zero.[44] Regression (4) includes all three proxies for changes in wealth and passive changes. Both the estimated coefficients on the foreign returns and passive terms remain statistically and economically significant. I do not find that the estimated coefficients on either the U.S. return or industrial production terms are significantly different from zero.[45] The total foreign portfolio share results suggest that changes in wealth, specifically financial wealth abroad, are significantly associated with changes in U.S. investors' allocation to foreign markets.

The findings documented in Section (3.3) highlighted the economic importance of U.S. investors' sales of domestic equity to foreign investors. To understand whether these sales of domestic equity were related to changes in wealth, I turn to the changes in the aggregate share of the U.S. stock market held by foreign investors. The predictions of the wealth theory and changes in the level of foreign holdings of U.S. equity are not quite clear. If it is more costly to maintain a foreign investment position abroad than at home (Black, 1976; Lane and Milessi-Ferritti, 2008; Stulz, 1984), then when wealth falls, investors can reallocate away from foreign markets by buying domestic stocks. This predicts that when U.S. investors lose wealth, the share of the U.S. stock market held by foreign investors also falls. Alternatively, U.S. investors may sell domestic equity to foreign investors to cover income loses. If U.S. investors sell domestic holdings to

[44]In unreported results, I repeat specification (3) with lagged and lead industrial production growth measured over six-month windows. I find that the association between lead growth in U.S. industrial production and current changes in the U.S. foreign portfolio share becomes significantly negative and the estimated coefficient on lagged industrial production is not distinguishable from zero.

[45]In an unreported F-test, I find that the estimated coefficients on current and lagged foreign returns are significantly different from one another, suggesting that the results presented in Regression (4) are not because of the test lacking power to distinguish between the marginal impact of current and lagged foreign returns.

accommodate for wealth losses, then when wealth falls, the foreign share of the U.S. stock market should rise. To examine the relation empirically, I regress monthly changes in the total foreign share of the U.S. stock market on the wealth proxies described previously. To account for the possibility that U.S. investors may slowly unwind their domestic holdings for reasons unrelated to wealth, I augment the specifications estimated in models (1) through (4) with the lagged changes the foreign share of the U.S. market.

Regressions (5) through (8) document changes in the total foreign share of the U.S. stock market capitalization. I find evidence of a consistently negative relation between market returns and changes in aggregate foreign holdings of U.S. equity; I find no such relation with my proxy for changes in non-financial wealth. Regression (5) shows that the estimated coefficient on current and lagged U.S. returns is significantly negative, but economically small. The coefficients imply that when U.S. market returns fall by one percentage point, foreign investors increase their share of the U.S. market by 0.0051 percentage points that same month and by 0.0071 percentage points the next month. Regression (6) shows a similar relation between changes in the foreign holdings of U.S. equity and contemporaneous foreign market returns. Lastly, when I control for foreign returns, I find that passive change display a significantly positive association with change in aggregate foreign holdings of U.S. equity (Regressions 6 and 8).

The results presented in Table 3.3, panel A show a significantly positive (negative) association between current (lagged) foreign returns and current changes in the total foreign portfolio share of U.S. investors. The results also suggest that passive changes in the U.S. foreign portfolio share are positively related to changes in the total

share of the U.S. market held by foreign investors. Panel B of Table 3.3 explores these relationships at the country level. Specifically, I estimate panel regressions of the monthly changes of U.S. investor's portfolio weights at the target-country level and foreign investors' shares of the U.S. stock market at the home-country level. A concern with country-level data is that the changes in the portfolio weights may be noisy. The benefit is that it allows a way to exploit the cross-country variation for the sample of 45 countries. Furthermore, the panel data is helpful in terms of focusing on the portfolio-level mechanisms that impact foreign reallocation. I follow the same approach I used in panel A of Table 3.3; however, here I estimate OLS panel regressions. I include current and lagged passive changes in U.S. foreign portfolio weights in all specifications. To focus on the dynamic impact of changes in wealth and account for seasonality, all specifications include country-fixed effects and monthly-fixed effects. To account for potential correlation at the country-portfolio level, I cluster standard errors by country and bootstrap standard errors within each cluster.

At the target-country level, Regressions (1) through (4) report the total changes in U.S. investors' portfolio weights and Regressions (5) through (8) document changes in foreign investors' share of the U.S. market capitalization at the home-country level. I test the relation between foreign returns and investors' equity reallocations at the target-country level. The equation estimated in Regression (1) includes foreign returns and passive changes. As before, I follow Bekaert et al. (2011) and orthogonalize each country's return to current and lagged U.S. returns. I find that the previous findings for the positive relation with current returns and the negative relation with lagged returns

hold at the target-country level. The estimated coefficients on both terms remain economically and statistically significant. The estimated coefficients on the current and lagged passive changes are positive and significant, a result consistent with investors passively increasing their allocations to target markets given changes in wealth. Regression (2) replaces returns with growth in monthly seasonally adjusted industrial production, obtained from the IMF. As before, I measure lagged (lead) industrial growth from *t-3* (*t+3*) to *t*. The estimated coefficient on lead industrial production growth is significantly positive, a result consistent with U.S. investors reallocating wealth abroad in anticipation of future changes in non-financial wealth. The relation between changes in U.S. portfolio weights and lagged industrial production is not statistically significant; suggesting that for my sample, U.S. monthly reallocations abroad may not be significantly associated with past changes in foreign non-financial wealth.

Given news related to future economic states, investors may change their allocation to foreign markets in anticipation of losing wealth. Both lagged target market returns and lagged industrial production growth display a non-positive relation with current changes in U.S. foreign holdings. The relation does not seem consistent with U.S. investors extrapolating past changes in foreign wealth into their current equity reallocations (Brennan and Cao 1997; Dahlquist and Robertson 2004; Griffin, Nadari, and Stulz 2004). I test whether the negative relation holds for an alternative economic signal about future changes in wealth, using changes in a target country's dividend yield to proxy for economic news. Under the assumption that higher dividend yields correspond with periods of lower future market prices (Campbell and Shiller, 1988),

increases in the dividend yields may be interpreted as signal for lower expected returns. The wealth theory predicts a negative relation between contemporaneous changes in foreign dividend yields and reallocations to foreign markets. Monthly dividend yields are obtained from DataStream and changes are measured from *t-3* to *t.*[46] Regression (3) shows a significantly negative relation between changes in a target country's dividend yields and U.S. investors reallocations to foreign markets. The results are consistent with U.S. investors reducing their allocation to markets in anticipation of future wealth losses.

Foreign investors may slowly react to a wealth loss abroad if illiquidity makes portfolio reallocations costly. To test whether the negative association between lagged foreign returns and current portfolio changes is affected by a target country's liquidity, I augment the model estimated in specification (1) of panel B in Table 3.3 with a proxy for liquidity. I measure liquidity with a target country's monthly market turnover, the dollar value of stocks traded divided by the target country's market capitalization. Both variables are in U.S. dollars and downloaded via DataStream. At the target-country level, I demean turnover by its twelve-month moving average. I do not find that either the inclusion of turnover or its interaction with monthly returns affects the findings.[47] This does not support the hypothesis that, for my sample, the negative association between lagged foreign market returns and U.S. investors' current portfolio reallocation is driven by target-market level liquidity.

[46]For discussions of the predicative power of changes in the dividend yield to forecast returns over horizons much longer than the ones I analyze here, see Cochrane (2007) and Ang and Bekaert (2007).
[47]The findings are robust to the use of monthly market volume as an alternative proxy for liquidity.

Turning to changes in foreign investors' share of the U.S. stock market, I augment the models estimated in specifications (1) through (4) with the lagged changes in each country's share of the U.S. stock market. The results presented in Regressions (5) through (8) indicate that the positive relation between passive changes in U.S. portfolio weights and changes in foreign investors' share of the U.S. market holds at the home-country level. Regression (7) shows a significantly positive relation between changes in the home-country dividend yields and changes in foreign investors' share of the U.S. equity market. Lastly, I do not find a significant relation for either returns or industrial production and changes in the foreign investors' shares of U.S. equity.

The findings presented indicate that, for my sample, the relation between current (lagged) market returns and U.S. investor's current portfolio reallocations is significantly positive (negative). In unreported tests, I examine why this relation holds for my sample. The positive relation between portfolio flows and contemporaneous returns has been interpreted as evidence that foreign investors are better informed (Curcuru et al., 2010 and 2011; Froot and Ramadorai, 2008) or affect target markets through price pressures. In unreported robustness checks, I use a VAR to examine the possibility that U.S. investors exhibit price-pressures on foreign markets. The VAR contains monthly changes in the U.S. foreign portfolio share and non-U.S. market returns. I fail to reject the null that changes in the U.S. foreign portfolio share do not Granger cause foreign returns. This does not support the hypothesis that the relation I find in my sample is driven by price pressures.

A significantly positive relation between lagged foreign returns and current reallocation has been interpreted as evidence of signals of future return performance (Brennan and Cao, 1997; Dahlquist and Robertson, 2004), performance extrapolation (Griffin, Nadari, and Stulz, 2004), or evidence of a difference of opinion (Dumas, Lewis, and Osambela, 2011). To this extent, orthogonal returns may not be representative of the actual signal that investors observe when deciding whether to reallocate their wealth abroad. In unreported robustness checks, I repeat all the models estimated in Table 3.3 with foreign returns that are not orthogonal to current and lagged U.S. returns. I find that the results remain statistically and economically significant.

The results from Table 3.3 support three key predictions of the wealth hypothesis. First, the change in the U.S. foreign portfolio share is positively associated with contemporaneous foreign returns. Second, changes in U.S. portfolio weights display a positive relation with a target country's current return and future industrial production growth. Finally, I find that changes in U.S. portfolio weights are negatively associated with changes in a target country's dividend yields. I take this result as behavior consistent with U.S. investors reducing their allocation to foreign markets in due to lower expected returns. However, changes in U.S. investors' portfolio weights display a negative association with past foreign market returns.

3.4.2 Did changes in uncertainty cause investors to increase their foreign portfolio share?

In this section, I examine whether the growth in the U.S. foreign portfolio share was consistent with ambiguity-averse investors increasing their allocation to foreign markets. Ambiguity-averse investors prefer lotteries with outcomes that are certain to lotteries with outcomes that are uncertain (Ellsberg, 1961). Within the context of global investment, if investors are ambiguity-averse, the uncertainty of a foreign country's return process can affect the portion of wealth investors choose to allocate abroad (Epstein, 2001; Uppal and Wang, 2003). Holding the level of ambiguity aversion constant, the ambiguity aversion hypothesis predicts that investors increase their allocation less so toward target countries where uncertainty is higher.

I test the uncertainty hypothesis at the target country level by regressing changes in the portfolio weights of U.S. investors on proxies for uncertainty. While a common measure for the change in uncertainty is the Chicago Board Options and Exchange (CBOE) VIX index (Forbes and Warnock, 2011; Giannetti and Laeven, 2012); the VIX is not available for my sample of countries. To proxy for the uncertainty of a target country's return distribution, I take the ratio of the highest standard deviation of daily market returns for any month *t-3* to month *t*, divided by the monthly minimum of the standard deviation of daily market returns for any month *t-3* to month *t.* In results not tabulated, I find the sample average of the maximum volatility ratio nearly doubles from Q3 2008 to Q4 2008 and dramatically falls in 2009. As before, I control for the current and lagged passive change in U.S. portfolio weights. If investors are ambiguity-averse,

the passive changes should reflect the impact of changes in uncertainty on market returns and exchange rates. In this specification, the ambiguity aversion hypothesis predicts that the coefficient on the maximum volatility ratio is to be negative. As before, all specifications include country and monthly fixed effects; standard errors are clustered by target country and bootstrapped within each cluster.

Table 3.4 presents the results. Regression (1) includes the maximum volatility ratio and the current and lagged passive change in U.S. portfolio weights. Consistent with the predictions of the ambiguity aversion hypothesis, the coefficient on the maximum volatility ratio is significantly negative. The coefficient implies that, all else being equal, when a target country's maximum volatility ratio increases by one percentage point, U.S. investors reduce their portfolio weights by 0.0015 percentage points that same month. The estimated coefficient on the uncertainty proxy implies that a one standard deviation increases in the maximum volatility ratio is associated with a -0.040 standard deviation decrease in the U.S. investors' foreign portfolio share. While the economic magnitude of the implied relation is relatively small, the results imply that over the sample period, U.S. investors increase their allocation less towards markets with relatively higher uncertainty. This result supports the ambiguity aversion hypothesis.

Alternatively, the significantly negative relation between the maximum volatility ratio and changes in U.S. portfolio weights may be due to the maximum volatility ratio capturing risk and not uncertainty. To investigate whether the significantly negative association is driven by risk, I use the monthly average of the standard deviation of daily market returns over a rolling three-month span. When I include the average standard

deviation into specification (1), Regression (2) shows the estimated coefficient on the volatility ratio remains significantly negative and relatively unchanged from the previous specification. An alternative measure of risk is the range (Garman and Klass, 1980; Alizadeh, Brandt, and Diebold, 2002). Regression (3) replaces the standard deviation with range of monthly market returns over a rolling three-month span. The coefficient on the maximum volatility ratio remains significant and relatively unchanged. The finding suggests that the negative relation between the proxy for uncertainty and U.S. investors' reallocations is not driven by the ratio measuring risk.

One concern may be the sensitivity of the association between uncertainty and changes in the U.S. portfolio weights to the specification of the volatility ratio. Regression (4) switches the volatility ratio's denominator, the monthly minimum volatility of daily market returns, with the monthly average volatility of daily market returns over a rolling three-month span. I find that the relation between uncertainty and changes in the U.S. portfolio weights remains significantly negative. The proxy for uncertainty suggests that U.S. investors increased their allocations less so toward markets where uncertainty was relatively higher and supports the ambiguity aversion hypothesis.

Regressions (5) through (8) examine monthly changes in each home country's share of the U.S. stock market. As before, I augment the previous specifications with the lagged change in each country's share of the U.S. stock market. When I repeat the experiment across home countries, I do not find that the maximum volatility ratio is significantly associated with changes in foreign investors' holdings of U.S. equity. These results contrast with the negative association between uncertainty and U.S. investors'

reallocations towards target countries and suggest that across home countries, changes in foreign investors' share of the U.S. stock market are not associated with uncertainty in their local market.

To examine the sensitivity of the findings that changes in the U.S. portfolio weights have a significantly negative association with a target country's maximum volatility ratio, I perform unreported robustness checks based on Regression (4). The maximum volatility ratio results may be driven by my choice to restrict the window over which returns are observed to three months. However, when I expand the window from three months to six months, the relation between the maximum volatility ratio and U.S. investors' portfolio weight changes remains significantly negative and economically comparable. Overall, these findings support the ambiguity aversion hypothesis.

The results presented in Table 3.4 generally support the ambiguity aversion hypothesis. I find that the association between the maximum volatility ratio, my proxy for uncertainty, and changes in U.S. investors' portfolio allocations is significantly negative. First, the results show that across target countries, U.S. investors reduced their allocation to markets with relatively higher levels of uncertainty. Second, the significantly negative association is not subsumed by a target country's volatility or return range. I take this as evidence of the volatility ratio measuring uncertainty and not risk. Lastly, I do not find that the negative relation holds for changes in foreign investors' shares of the U.S. market. This suggests that at the home-country level, changes in foreign investors' share of the U.S. stock market are not associated local market uncertainty.

3.4.3 Did speculative investment cause investors to increase their foreign portfolio share?

International behavioral research suggests that sentiment may influence international capital flows (Baker, Foley, Wurgler, 2009; Baker, Wurgler, Yuan, 2012; Hwang, 2011). Speculative investment predicts that noise traders may speculate on foreign markets. If local misvaluation attracts foreign speculation, then holding the limits to arbitrage constant, the speculative investment theory predicts a positive relation between market misvaluation and investors allocation to foreign markets.

I test the speculation hypothesis at the target-country level by regressing changes in the portfolio weights of U.S. investors on a proxy for market misvaluation. To proxy for mispricing, I use the Baker, Foley, and Wurgler (2009) methodology to calculate the misvaluation component of the market-to-book ratio. The misvaluation component is the fitted value from a first stage regression of future six-month-market returns on country-level, market-to-book ratios.[48] As before, foreign market returns are orthogonal to current and lagged U.S. market returns. Monthly market-to-book ratios are obtained from DataStream. Because mispricing can cause "overvalued" assets to appreciate prior to returning to their fundamental values, an increase in the share of equity wealth allocated to a mispriced market does not necessarily imply speculative investment.[49] In other words, passive changes can make it seem as if investors speculate even when they do not.

[48]Baker, Foley, and Wurgler (2009) show that two main assumptions are that the market-to-book ratio contains a fundamental and misvaluation component and that the misvaluation component is associated with lower future returns.

[49]The same logic applies to markets where mispricing leads to 'undervalued' assets.

Therefore, I control for current and lagged passive changes. Higher (lower) values of the misvaluation component correspond with higher (lower) levels of mispricing. Within this specification, the speculation theory predicts that the estimated coefficients on the misvaluation proxy will be positive if investors increase their allocations to relatively overvalued markets beyond what can be attributed to passive changes. If equity reallocations are not significantly associated with misvaluation, the estimated coefficient should not be distinguishable from zero. Lastly, if investors reduce their allocation to markets when overvaluation is more severe, the estimated coefficient should be significantly negative. As before, I include monthly fixed effects and target-country fixed effects. Standard errors are clustered by target country and bootstrapped within each cluster.

Table 3.5 reports the panel regression results. For U.S. investors, Regressions (1) through (4) show a significantly negative relation between the misvaluation component of a target country's market-to-book ratio and changes in portfolio weights. When I estimate a model containing the misvaluation component and the current and lagged passive changes in portfolio weights, the coefficient on the misvaluation component is significantly negative (Regression 1). The coefficient implies that when passive changes are held constant, a one standard deviation increase in misvaluation is associated with a –0.0145 standard deviation decrease in U.S. portfolio weights. This finding is consistent with U.S. investors increasing their equity allocations less toward markets in which mispricing is more severe.

The significantly negative association between the misvaluation component and

portfolio weight changes may be due the misvaluation component capturing the differences in returns. I examine whether lagged target market returns subsume the misvaluation component. When I add lagged target market returns, Regression (2) shows that the coefficient on the misvaluation component remains significantly negative. An additional alternative explanation for the negative association between the mispricing component and changes in U.S. portfolio weights is that the misvaluation proxy captures bad news about future investment opportunities. Regression (3) adds the previously defined changes in the dividend yield to the estimation. The relation between the misvaluation component and changes in U.S. investors' portfolio weights remains significantly negative. The results are consistent with U.S. investors increasing their allocation less so toward markets that exhibit higher levels of mispricing.

If illiquidity makes arbitrage costly, then a target markets' liquidity may affect the extent to which investors are able to react to mispricing. I test the relation between the proxy for mispricing and a target country's liquidity by adding foreign turnover and its interaction with the misvaluation component (Regression 4). As before, turnover is demeaned at the target-country level using a rolling 12-month window. The estimated coefficient on the misvaluation component remains economically large and significantly negative. The interaction between the misvaluation component and a target country's turnover produces a significantly negative estimated coefficient. The result is consistent with a target country's liquidity easing investors' ability to actively rebalance their portfolios away from market with higher mispricing, conditional on investors encountering misvaluation in their equity allocations. These results do not generally

support the hypothesis that over the sample period U.S. investors actively reallocated their equity wealth towards markets where misvaluation was more severe.

At the home-country level, I examine changes in foreign investors' shares of the U.S. stock market in Regressions (5) through (8). I find a significantly negative relation between the misvaluation component and changes in foreign investors' shares of the U.S. stock market. Regression (5) includes current and lagged passive changes in U.S. portfolio weights, the lagged change in each home country's share of the U.S. stock market, and the misvaluation component. For foreign investors, the estimated coefficient on the misvaluation component implies that, all else equal, a one percentage point increase in local misvaluation reduces their share of the U.S. stock market by –0.0539 percentage points of that increase. Regressions (6) through (8) show that the significantly negative association is not subsumed by lagged local returns, changes in the dividend yield, or demeaned home-market turnover interacted with misvaluation. The results suggest that investors in markets that experience higher levels of misvaluation increase their share of the U.S. equity market at a relatively lower rate.

Table 3.5 shows that the misvaluation component of the market-to-book ratio has a significantly negative relation with U.S. investors' reallocations to foreign markets. The relation appears consistent with U.S. investors increasing their portfolio weights at lower rates to markets where misvaluation is more severe. Using the monthly turnover, I find evidence consistent with a target market's liquidity easing U.S. investors' reallocations away from markets with higher degrees of misvaluation. Lastly, across home countries, I find a significantly negative relation between the misvaluation component of the market-

to-book ratio and foreign changes in the share of the U.S. the stock market. This finding suggests that foreign investors in markets that experience higher levels of misvaluation increased their holdings of U.S. equity at relatively lower rates.

3.5 Conclusion

In this chapter, I document that from 1994 to 2010, on average, the share of equity wealth that U.S. investors allocated to foreign equity increased. The accumulated change resulted in the U.S. foreign portfolio share nearly doubling over this time span. Separating the monthly change in the U.S. foreign portfolio share into the change due to trades and the change caused by valuation changes, I find that most of this increase has been because of passive changes in foreign portfolio shares. On average, across a sample of 45 target countries, the monthly active changes are not distinguishable from zero. Over this period, U.S. investors significantly reduced their share of the U.S. equity market. For my sample, I find that the passive appreciation of the foreign portfolio share and reduced share of domestic holdings have combined to increase the relative share of equity wealth that U.S. investors allocated to foreign markets.

After showing the impact of passive changes on the U.S. foreign portfolio share, I examine whether theories of traditional portfolio choice, uncertainty, or speculation can help explain U.S. portfolio reallocations through time. For the traditional portfolio choice theory, I test whether the portfolio reallocations were significantly associated with changes in wealth. In my sample, current and future changes in foreign wealth are associated with U.S. portfolio reallocations. I find evidence that U.S. portfolio

reallocations were negatively associated with past changes in foreign wealth. A growing literature in uncertainty aversion predicts that uncertainty can limit foreign investment. I find supportive evidence that U.S. investors increased their foreign portfolio share less so in markets where uncertainty increased. Behavioral portfolio choice literature suggests that foreign investment can be speculative. Using a proxy for market misvaluation, I find the relation between foreign misvaluation and U.S. portfolio reallocations is significantly negative. I also find a significantly negative relation between foreign misvaluation and changes in foreign investors' shares of the U.S. equity market.

Table 3.1 Descriptive Statistics of Changes in U.S. Foreign Portfolio Share of Equity Wealth and Foreign Holdings of U.S. Equity, 1994 – 2010.

The table shows descriptive statistics on the total foreign portfolio share of U.S. investors in the sample from 1994 to 2010. The sample contains country-level month-end equity-holding observations from the Bertaut and Tryon database, across 45 home countries and 45 target countries. *U.S. Foreign Portfolio Share Weight* labels U.S. investors' relative allocation to target countries in the sample, as computed from Bertaut and Tryon bilateral holdings. *Total Growth* sums the monthly change in portfolio weights to target countries over the entire sample period. *Passive Growth* sums the change in allocation to non-domestic assets from month *t-1* to month *t*, given investors' allocation at the end of month *t-1* and assuming investors do not trade foreign stocks. *Active Allocation* sums the change in allocation not due to price and exchange rate changes from month *t-1* to month *t. Foreign Holdings* labels foreign investors' holdings of the U.S. equity as a share of the U.S. stock market capitalization. The U.S. monthly stock market capitalization is obtained from CRSP. The equity holdings data for Belgium and New Zealand are available from January of 2000. All standard errors are bootstrapped and presented in parenthesis. ***,**,* report cases where the estimated coefficient is different from zero at 10%, 5%, 1% significant level, respectively.

		U.S. Foreign Portfolio Share Weight 1994 -2010 (% US Total Equity Wealth)					Foreign Holdings (% US Market Cap)		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Developed Markets	N	March 1994 Level	Dec 2010 Level	Total Growth	Passive Growth	Active (4) - (3)	March 1994 Level	Dec 2010 Level	Total Growth
AUSTRALIA	200	0.337	0.833	0.483	0.538	-0.055	0.130	0.548	0.418
AUSTRIA	200	0.024	0.068	0.043	0.042	0.001	0.041	0.036	-0.006
BELGIUM*	107	0.000	0.160	0.100	0.096	0.004	0.000	0.137	-0.016
CANADA	200	0.790	2.273	1.502	1.570	-0.068	0.956	1.839	0.883
DENMARK	200	0.036	0.213	0.175	0.170	0.005	0.032	0.176	0.144
FINLAND	200	0.059	0.152	0.086	0.087	-0.000	0.002	0.065	0.063
FRANCE	200	0.511	1.359	0.819	0.809	0.009	0.216	0.872	0.656
GERMANY	200	0.510	1.150	0.603	0.599	0.004	0.286	0.409	0.123
GREECE	200	0.011	0.034	0.023	0.024	-0.001	0.008	0.008	0.000
HONG KONG	200	0.349	0.737	0.386	0.384	0.002	0.112	0.236	0.124
ISRAEL	200	0.051	0.249	0.197	0.190	0.006	0.022	0.102	0.080
ITALY	200	0.275	0.285	-0.022	-0.018	-0.004	0.090	0.088	-0.003
JAPAN	200	1.981	2.504	0.427	0.398	0.029	0.624	1.616	0.993
KOREA	200	0.087	0.681	0.573	0.569	0.005	0.002	0.098	0.095
NETHERLANDS	200	0.758	0.670	-0.130	-0.138	0.008	0.377	0.971	0.594
NEW ZEALAND*	107	0.000	0.017	0.002	0.001	0.000	0.000	0.041	0.031
NORWAY	200	0.078	0.128	0.048	0.046	0.002	0.008	0.640	0.632
PORTUGAL	200	0.022	0.030	0.008	0.008	0.000	0.004	0.019	0.015
SINGAPORE	200	0.136	0.314	0.155	0.147	0.008	0.176	0.591	0.416
SPAIN	200	0.274	0.364	0.088	0.083	0.004	0.022	0.050	0.029
SWEDEN	200	0.235	0.352	0.098	0.093	0.005	0.064	0.355	0.291
SWITZERLAND	200	0.419	1.778	1.370	1.278	0.091	0.783	1.212	0.429
UK	200	1.988	2.780	0.773	0.773	-0.001	1.797	1.839	0.042
Country (Average)	23	0.425	0.745	0.339***	0.337***	0.002	0.250	0.519	0.261***
Total (Sum)	4414	8.933	17.132	7.807	7.752	0.054	5.754	11.949	6.032

Continued

Table 3.1, Continued

		U.S. Foreign Portfolio Share Growth 1994 -2010 (% US Total Equity Wealth)					Foreign Holdings (% US Market Cap)		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		March 1994	Dec 2010	Total	Passive	Active	March 1994	Dec 2010	Total
Emerging Markets	N	Level	Level	Growth	Growth	(4) - (3)	Level	Level	Growth
ARGENTINA	200	0.152	0.014	-0.139	-0.136	-0.003	0.023	0.026	0.003
BRAZIL	196	0.168	1.079	0.854	0.852	0.002	0.017	0.013	-0.003
CHILE	200	0.050	0.071	0.018	0.016	0.002	0.008	0.094	0.086
CHINA	195	0.018	0.560	0.538	0.533	0.005	0.003	0.872	0.869
COLOMBIA	200	0.006	0.020	0.015	0.014	0.000	0.010	0.032	0.022
CZECH	200	0.006	0.025	0.019	0.020	-0.001	0.000	0.006	0.006
EGYPT	170	0.001	0.028	0.025	0.024	0.001	0.002	0.001	-0.001
HUNGARY	200	0.003	0.019	0.016	0.016	-0.000	0.000	0.006	0.006
INDIA	200	0.023	0.481	0.458	0.450	0.008	0.005	0.006	0.001
INDONESIA	200	0.039	0.140	0.104	0.100	0.004	0.003	0.002	-0.001
MALAYSIA	200	0.182	0.113	-0.084	-0.091	0.007	0.002	0.017	0.015
MEXICO	200	0.691	0.426	-0.236	-0.255	0.019	0.035	0.123	0.088
MOROCCO	200	0.001	0.002	0.002	0.001	0.001	0.000	0.000	-0.000
PAKISTAN	200	0.005	0.005	0.001	0.001	0.000	0.002	0.000	-0.001
PERU	200	0.009	0.019	0.011	0.011	-0.000	0.003	0.013	0.010
PHILIPPINES	200	0.038	0.050	0.009	0.010	-0.001	0.007	0.006	-0.001
POLAND	200	0.001	0.049	0.047	0.044	0.004	0.002	0.002	0.000
RUSSIA	165	0.001	0.309	0.272	0.266	0.006	0.001	0.001	0.001
SOUTH AFRICA	200	0.088	0.391	0.286	0.265	0.021	0.000	0.015	0.015
TAIWAN	200	0.009	0.524	0.513	0.495	0.018	0.021	0.087	0.066
THAILAND	200	0.082	0.117	0.028	0.029	-0.002	0.003	0.009	0.006
TURKEY	200	0.013	0.170	0.159	0.160	-0.001	0.002	0.001	-0.000
Country (Average)	22	0.072	0.210	0.133**	0.128**	0.004***	0.007	0.061	0.054
Total (Sum)	4326	1.583	4.614	2.914	2.826	0.088	0.151	1.334	1.183
All Countries									
Country (Average)	45	0.245	0.483	0.238***	0.235***	0.003	0.137	0.295	0.160***
Total (Sum)	8740	10.516	21.746	10.721	10.578	0.143	5.905	13.283	7.215

Table 3.2 U.S. International Equity Flows, 1994 – 2010

The table presents an overview of the monthly equity flows between the U.S. and the countries in the sample. U.S. net purcahse of foreign equity (outflow) is measured as a percentage of lagged U.S. total equity wealth; forein investors' net purchase of U.S. equity (inflow) is measured as a percentage of the U.S. market captilaztion, the netted difference of outflow less inflow (netflow) is measured as a percentage fo the U.S. market captilization. U.S. holdigns of foreign equity and non-resident holdings of U.S. equity are obtained from Bertaut-Tryon database. Monthly equity flows are obtained from the U.S. Treasury Department *TIC* database; the U.S. monthly stock market capitalization market capitalzation is obstained from CRSP.

		US Net Purchase$_t$ (% US Total Equity Wealth$_{t-1}$)		For Net Purchase$_t$ (% US Stock Market Capitalization$_t$)		Net Flow$_t$ (% US Stock Market Capitalization$_t$)	
		(1)	(2)	(3)	(4)	(5)	(6)
Developed Markets	N	Mean	Sum	Mean	Sum	Mean	Sum
AUSTRALIA	201	0.001	0.231	0.001	0.105	0.001	0.133
AUSTRIA	201	0.000	0.004	0.000	0.027	-0.000	-0.022
BELGIUM	120	-0.000	-0.014	0.001	0.075	-0.001	-0.089
CANADA	201	0.001	0.257	0.002	0.479	-0.001	-0.212
DENMARK	201	0.000	0.040	0.000	0.088	-0.000	-0.046
FINLAND	201	0.000	0.027	0.000	0.029	-0.000	-0.001
FRANCE	201	0.001	0.165	0.003	0.577	-0.002	-0.404
GERMANY	201	-0.000	-0.008	0.001	0.289	-0.001	-0.295
GREECE	201	0.000	0.010	0.000	0.003	0.000	0.008
HONG KONG	201	0.003	0.510	0.002	0.438	0.000	0.084
ISRAEL	201	-0.000	-0.000	0.001	0.184	-0.001	-0.184
ITALY	201	0.000	0.035	0.001	0.112	-0.000	-0.076
JAPAN	201	0.009	1.812	0.003	0.510	0.007	1.325
KOREA	201	0.001	0.246	0.000	0.028	0.001	0.223
NETHERLANDS	201	-0.001	-0.151	0.002	0.408	-0.003	-0.563
NEW ZEALAND	120	0.000	0.001	0.000	0.017	-0.000	-0.016
NORWAY	201	-0.000	-0.032	0.001	0.290	-0.002	-0.322
PORTUGAL	201	0.000	0.026	0.000	0.001	0.000	0.025
SINGAPORE	201	-0.000	-0.009	0.002	0.378	-0.002	-0.386
SPAIN	201	0.000	0.002	0.000	0.069	-0.000	-0.067
SWEDEN	201	0.000	0.040	0.001	0.189	-0.001	-0.149
SWITZERLAND	201	0.000	0.022	0.002	0.387	-0.002	-0.365
UK	201	0.009	1.776	0.016	3.266	-0.007	-1.433
Total	4461	0.001	4.990	0.002	7.950	-0.001	-2.832

Continued

Table 3.2, Continued.

		(1)	(2)	(3)	(4)	(5)	(6)
Emerging Markets	N	Mean	Sum	Mean	Sum	Mean	Sum
ARGENTINA	201	0.000	0.032	0.000	0.034	-0.000	-0.001
BRAZIL	201	0.003	0.545	-0.000	-0.007	0.003	0.572
CHILE	201	0.000	0.020	0.000	0.028	-0.000	-0.007
CHINA	201	0.000	0.058	0.000	0.062	-0.000	-0.003
COLOMBIA	201	0.000	0.009	0.000	0.013	-0.000	-0.003
CZECH	201	-0.000	-0.006	0.000	0.004	-0.000	-0.010
EGYPT	201	0.000	0.006	-0.000	-0.002	0.000	0.008
HUNGARY	201	0.000	0.001	0.000	0.007	-0.000	-0.005
INDIA	201	0.000	0.097	-0.000	-0.019	0.001	0.117
INDONESIA	201	0.000	0.047	0.000	0.001	0.000	0.047
MALAYSIA	201	0.000	0.042	-0.000	-0.001	0.000	0.045
MEXICO	201	-0.000	-0.029	0.000	0.049	-0.000	-0.078
MOROCCO	201	0.000	0.001	0.000	0.001	-0.000	-0.000
PAKISTAN	201	0.000	0.006	-0.000	-0.000	0.000	0.006
PERU	201	0.000	0.019	0.000	0.002	0.000	0.017
PHILIPPINES	201	0.000	0.024	0.000	0.001	0.000	0.024
POLAND	201	0.000	0.010	-0.000	-0.003	0.000	0.014
RUSSIA	201	0.000	0.005	0.000	0.004	0.000	0.002
SOUTH AFRICA	201	0.000	0.060	0.000	0.017	0.000	0.045
TAIWAN	201	0.002	0.333	0.000	0.014	0.002	0.321
THAILAND	201	0.000	0.022	-0.000	-0.000	0.000	0.023
TURKEY	201	0.000	0.040	0.000	0.001	0.000	0.038
Total	4422	0.000	1.344	0.000	0.206	0.000	1.173
Full Sample							
Total	8883	0.001	6.335	0.001	8.156	-0.000	-1.659

Table 3.3 Changes in Financial and Non-Financial Wealth and Changes in the U.S. Foreign Portfolio Share

This table presents results OLS estimates of the effect of changes in wealth on U.S. investors' total foreign portfolio share and non-U.S. investors share of the U.S. stock market capitalization. Panel A presents time-series regressions of the total change in U.S. foreign portfolio share in Column (1) through (4) and the total change in the share of the U.S. stock market capitalization held by foreign investors in Column (5) through (8). The time-series contain aggregate month-end bilateral equity holdings from the Bertaut and Tryon database from 1994 to 2010. *Passive changes* are calculated using holdings from month *t-1* to month *t* and the change in prices and exchanges rates from month *t-1* to month *t*. *US Market Return* is the excess monthly return to the U.S. market and obtained from the S&P BMI index. *Foreign Market Return* is the world market return, excluding the U.S. market and obtained from MSCI. Following Bekaert et al (2011), foreign returns are orthogonal to current and lagged U.S. market returns. *US Industrial Production* measures the change in U.S. industrial production from month *t-3* to month *t*. *Foreign Share t-1* measures the change in the share of U.S. equity held by foreign investors from month *t-1* to *t*. Panel B presents country-level monthly panel-regression results of the total change in U.S. investors' portfolio weights at time *t* to country *j* and changes in the share of the U.S. market capitalization held by foreign investors' from country *j* at time *t*. *Return* is the excess monthly return for country *j* at time *t* in U.S. dollars and obtained from S&P and DataStream and are orthogonal to current and lagged U.S. market returns. *Industrial Production* measures the change in country j's seasonally adjusted industrial production from month *t-3* to month *t*, provided by IMF. *Dividend Yield* measures the change the dividend yield from month *t-3* to month *t* and is obtained from DataStream. *Turnover* the monthly value of stocks traded in country *j* divided country *j's* monthly market, all values are obtained from DataStream. *Turnover* is demeaned by the country *j's* rolling 12-month average. In Panel A, standard errors are clustred by month; Panel B clusters standard errors by country. All standard errors are bootstrapped within each cluster and presented in paranthesis. ***,**,* report cases where the estimated coefficient is different from zero at 10%, 5%, 1% significant level, respectively.

Table 3.3 Panel A

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total Change in US FPS				Total Change For. Share US Market			
VARIABLES								
Passive Δ US FPS *t*	0.6045***	0.3158***	0.6053***	0.3205***	0.0464	0.0934***	0.0489	0.1103***
	(0.062)	(0.036)	(0.054)	(0.035)	(0.031)	(0.032)	(0.032)	(0.032)
Passive Δ US FPS *t-1*	0.1290**	0.1360***	0.1493***	0.1487***	0.0129	0.0398	0.0376	0.0542*
	(0.052)	(0.031)	(0.050)	(0.029)	(0.024)	(0.033)	(0.027)	(0.031)
US Market Return *t*	0.0030			0.0008	-0.0051***			-0.0035*
	(0.004)			(0.003)	(0.002)			(0.002)
US Market Return *t-1*	-0.0024			0.0017	-0.0071***			-0.0066***
	(0.004)			(0.002)	(0.002)			(0.002)
Foreign Market Return *t*		0.0850***		0.0829***		-0.0115***		-0.0127***
		(0.004)		(0.004)		(0.004)		(0.004)
Foreign Market Return *t-1*		-0.0182***		-0.0187***		-0.0033		-0.0042
		(0.005)		(0.005)		(0.004)		(0.004)
ΔUS Ind. Pro *t+3*			-0.0063	0.0009			-0.0216	-0.0079
			(0.025)	(0.013)			(0.015)	(0.014)
ΔUS Ind. Pro *t-3*			0.0098	-0.0053			-0.0102	-0.0091
			(0.026)	(0.011)			(0.012)	(0.010)
ΔFor Share US *t-1*					-0.0525	0.0064	-0.0582	-0.0728
					(0.129)	(0.139)	(0.142)	(0.150)
Constant	0.0149	0.0322***	0.0146	0.0330***	0.0725***	0.0544***	0.0742***	0.0719***
	(0.031)	(0.008)	(0.033)	(0.011)	(0.012)	(0.012)	(0.015)	(0.014)
Observations	199	199	196	196	199	199	196	196
No.of Clusters	12	12	12	12	12	12	12	12
Cluster	Month	Month	Month	Month	Month	Month	Month	Month
Adjusted R-squared	0.409	0.816	0.43	0.818	0.0768	0.0201	0.0506	0.120

Continued

Table 3.3. Continued, Panel B

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change US Portfolio Weight *j,t*				Change For. Share US Market *j,t*			
VARIABLES								
Passive Δ US FPS *j,t*	0.4266***	0.4748***	0.4682***	0.4185***	0.0231	0.0218	0.0228*	0.0228*
	(0.057)	(0.061)	(0.053)	(0.052)	(0.014)	(0.016)	(0.014)	(0.014)
Passive Δ US FPS *j,t-1*	0.0893***	0.0874***	0.0865***	0.0886***	0.0104**	0.0100*	0.0106**	0.0110**
	(0.017)	(0.018)	(0.017)	(0.015)	(0.005)	(0.006)	(0.005)	(0.005)
Return *j,t*	0.0759***			0.0760***	-0.0012			-0.0010
	(0.017)			(0.017)	(0.001)			(0.001)
Return *j,t-1*	-0.0170***			-0.0169***	-0.0001			-0.0001
	(0.005)			(0.005)	(0.001)			(0.001)
Δ Ind. Pro *j,t-3*		0.0036				-0.0040		
		(0.006)				(0.008)		
Δ Ind. Pro *j,t+3*		0.0326**				-0.0060		
		(0.015)				(0.007)		
Δ DivYield *j,t-3*			-0.1210***				0.0242*	
			(0.038)				(0.013)	
Turnover *j,t*				-0.0000				0.0901
				(0.000)				(0.085)
Return *j,t**Turnover *j,t*				0.0001				-0.0000
				(0.000)				(0.000)
Return *j,t-1**Turnover *j,t*				0.0001				0.0000*
				(0.000)				(0.000)
ΔFor Share US *j,t-1*					0.0889	0.0223	0.0883	-0.0000
					(0.087)	(0.078)	(0.082)	(0.000)
Constant	-0.0039***	-0.0071***	-0.0043***	-0.0042***	0.0013***	0.0018***	0.0013***	0.0014***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Monthly FE	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	8,695	4,747	8,684	8,278	8,695	4,747	8,684	8,278
No of Clusters	45	25	45	45	45	25	45	45
Cluster	Home	Home	Home	Home	Target	Target	Target	Target
Adjusted R-squared	0.372	0.321	0.320	0.366	0.0502	0.0431	0.0507	0.0504

Table 3.4 Distribution Uncertainty and Changes in the Foreign Portfolio Share

This table presents OLS panel regressions of changes in U.S. investors' portfolio weights and foreign investors share of the U.S. stock market capitalization on proxies for uncertainty from 1994 to 2010. The panel contains monthly, country-level, bilateral holdings obtained from the Bertaut and Tryon (2007) database. *Max/Min Volatility* is the ratio of the highest standard deviation of daily returns for any month from *t-3* to *t*, divided by the minimum standard deviation of daily returns from any month *t-3* to *t. Max/Avg Volatility* is the ratio of the highest standard deviation of daily returns for any month from *t* to *t-3*, divided by the monthly average standard deviation of daily returns from month *t-3* to *t. Avg Volatility* is the monthly average standard deviation of daily returns from month *t-3* to *t. Return Max – Min* is the range of the monthly returns for from *t-3* to *t. For Share* and *Passive changes* are previously defined. All standard errors are clustered by home country and bootstrapped within each cluster. *, **, *** indicate the statistical significance at the 10%, 5%, and 1% level, respectively.

Uncertainty								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change US Portfolio Weight *j,t*				Change For. Share US Market *j,t*			
VARIABLES								
(*Max/Min Volatility*) *j,t*	-0.0015***	-0.0015***	-0.0015***		0.0001	0.0000	0.0001	
	(0.000)	(0.001)	(0.000)		(0.000)	(0.000)	(0.000)	
(*Max/Avg Volatility*) *j,t*				-0.0043***				0.0005
				(0.001)				(0.000)
Avg Volatility		0.0204				0.0348**		
		(0.019)				(0.014)		
Return Max – Min, *j,t*			-0.0000	-0.0009			0.0008	0.0008
			(0.001)	(0.002)			(0.001)	(0.001)
ΔFor Share US *j,t-1*					0.0887	0.0871	0.0885	0.0885
					(0.086)	(0.084)	(0.087)	(0.085)
Passive Δ US FPS *j,t*	0.4693***	0.4696***	0.4693***	0.4694***	0.0224*	0.0228*	0.0225*	0.0225*
	(0.052)	(0.053)	(0.052)	(0.053)	(0.013)	(0.014)	(0.013)	(0.014)
Passive Δ US FPS *j,t-1*	0.0881***	0.0884***	0.0881***	0.0883***	0.0103**	0.0109**	0.0103**	0.0103**
	(0.017)	(0.017)	(0.017)	(0.017)	(0.005)	(0.005)	(0.004)	(0.005)
Constant	-0.0016	-0.0018	-0.0016	0.0014	0.0010***	0.0007**	0.0009***	0.0005
	(0.001)	(0.001)	(0.001)	(0.002)	(0.000)	(0.000)	(0.000)	(0.001)
Monthly FE	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	8,677	8,677	8,677	8,681	8,677	8,677	8,677	8,681
No of Countries	45	45	45	45	45	45	45	45
Cluster	Home	Home	Home	Home	Target	Target	Target	Target
Adjusted R-squared	0.321	0.321	0.321	0.320	0.0504	0.0514	0.0503	0.0504

Table 3. 5 Misvaluation and Changes in the US Foreign Portfolio Share

This table presents OLS panel regressions of changes in U.S. investors' portfolio weights and foreign investors share of the U.S. stock market capitalization on proxies for market misvaluation from 1994 to 2010. The panel contains monthly, country-level, bilateral holdings obtained from the Bertaut and Tryon (2007) database. *MarketToBookFitted* is the misvaluation component of the country-level market-to-book ratio. The misvaluation component is the fitted value from a first stage regression of future six-month-market returns on country-level market-to-book ratio (Baker, Foley, Wurgler, 2009). Monthly market-to-book ratios are obtained from DataStream. *Return, DivYield, Turnover, For Share* and *Passive changes* are previously defined. All standard errors are clustered by home country and bootstrapped within each cluster. *, **, *** indicate the statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change US Portfolio Weight *j,t*				Change For. Share US MKT *j,t*			
VARIABLES								
MarketToBookFitted	-0.0605***	-0.0733***	-0.0650***	-0.0652***	-0.0539*	-0.0555*	-0.0555*	-0.0562*
	(0.019)	(0.019)	(0.018)	(0.021)	(0.033)	(0.033)	(0.033)	(0.034)
Return j,t-1		-0.0130***	-0.0160***	-0.0147***	-0.0003	0.0002	0.0002	0.0001
		(0.005)	(0.005)	(0.005)	(0.001)	(0.001)	(0.001)	(0.001)
Δ DivYield j,t-3			-0.1431***	-0.1373***		0.0266*	0.0266*	0.0267*
			(0.040)	(0.037)		(0.014)	(0.015)	(0.014)
Turnover j,t				-0.0000				0.0000
				(0.000)				(0.000)
MTBFitted* Turnover j,t				-0.0018*				-0.0000
				(0.001)				(0.001)
ΔFor Share US j,t-1					0.0876	0.0870	0.0870	0.0882
					(0.085)	(0.086)	(0.084)	(0.085)
Passive Δ US FPS j,t	0.4644***	0.4674***	0.4656***	0.4566***	0.0228	0.0232*	0.0232*	0.0229*
	(0.054)	(0.057)	(0.055)	(0.054)	(0.014)	(0.014)	(0.014)	(0.014)
Passive Δ US FPS j,t-1	0.0869***	0.0952***	0.0947***	0.0932***	0.0107**	0.0108**	0.0108**	0.0113**
	(0.018)	(0.019)	(0.019)	(0.018)	(0.005)	(0.005)	(0.005)	(0.005)
Constant	-0.0042***	-0.0040***	-0.0041***	-0.0041***	0.0013***	0.0013***	0.0013***	0.0014***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
Monthly FE	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	8,446	8,446	8,443	8,123	8,446	8,443	8,443	8,123
No of Countries	44	44	44	44	44	44	44	44
Cluster	Home	Home	Home	Home	Target	Target	Target	Target
Adjusted R-squared	0.316	0.318	0.319	0.315	0.0514	0.0518	0.0518	0.0521

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Appendix A: CHAPTER 2: International Stock Flows-Factor Mimicking Portfolios

Appendix, Table A.1 International Stock Flows Portfolio Risk-Adjusted Returns, 1982-2011

Table reports CAPM, three-factor, four-factor, and five-factor regression for value weighted fund flow factor mimicking portfolios: $R=a + b$*MKT $+s$*$SMB + h$*$HML + m$*$UMD+ l$*$LIQ + e$, *se(a)* is the standard error of a. Columns labeled MKT, SMB, HML, UMD, and LIQ report the slope on each factor. Returns come from the difference between high and low deciles for each flow factor. Deciles are formed by NYSE-break points. Factor loadings are estimated using rolling 5-year (60 month) windows. Firms are required to have at least 24 non-missing observations, positive assets and non-negative book equity in fiscal year *t-1*. Outflows are U.S. investors' monthly net purchases of foreign equity, scaled by the lagged value of U.S. investors' total equity wealth, i.e. investors' total holdings of domestic and foreign equity. U.S. holdings of domestic equity are measured as the U.S. market capitalization less total foreign holdings of U.S. equity. Inflows are foreign investors' net purchases of U.S. equity, scaled by the lagged value of foreign total holdings of U.S. equity. Net flow are the U.S. net purchases of foreign equity less foreign net purchases of U.S. equity, scaled by the lagged sum of U.S. holdings of foreign equity and foreign holdings of U.S. equity. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

Portfolio	a	se(a)	MKT	SMB	HML	UMD	LIQ	N
Outflow H-L	-0.665***	(0.233)	0.598***					354
Outflow H-L	-0.760***	(0.225)	0.535***	0.639***	0.199			354
Outflow H-L	-0.627***	(0.227)	0.495***	0.650***	0.150	-0.158**		354
Outflow H-L	-0.637***	(0.219)	0.495***	0.651***	0.150	-0.158**	0.017	354
Inflow H-L	-0.246	(0.235)	0.473***					354
Inflow H-L	-0.119	(0.243)	0.387***	0.153	-0.300**			354
Inflow H-L	-0.045	(0.260)	0.365***	0.159	-0.328**	-0.088		354
Inflow H-L	-0.216	(0.246)	0.368***	0.180	-0.318***	-0.097	0.306***	354
Net flow H-L	0.129	(0.228)	-0.177*					354
Net flow H-L	-0.066	(0.225)	-0.123	0.231**	0.445***			354
Net flow H-L	-0.193	(0.249)	-0.084	0.220**	0.493***	0.152*		354
Net flow H-L	-0.109	(0.249)	-0.086	0.210**	0.488***	0.156*	-0.150**	354

Continued

Appendix Table A.1, Continued, Panel B: Equal Weighted

Portfolio	a	se(a)	MKT	SMB	HML	UMD	LIQ	N
Outflow H-L	-0.269*	(0.147)	0.319***					354
Outflow H-L	-0.332**	(0.137)	0.299***	0.293***	0.136			354
Outflow H-L	-0.275*	(0.147)	0.282***	0.298***	0.115	-0.067		354
Outflow H-L	-0.267*	(0.147)	0.282***	0.297***	0.115	-0.067	-0.015	354
Inflow H-L	-0.200	(0.168)	0.372***					354
Inflow H-L	-0.128	(0.155)	0.284***	0.321***	-0.177***			354
Inflow H-L	0.014	(0.164)	0.241***	0.333***	-0.230***	-0.170***		354
Inflow H-L	-0.037	(0.160)	0.242***	0.340***	-0.227***	-0.172***	0.092**	354
Net flow H-L	0.115	(0.150)	-0.153***					354
Net flow H-L	0.005	(0.142)	-0.087	-0.083*	0.257***			354
Net flow H-L	-0.124	(0.158)	-0.048	-0.094**	0.305***	0.154**		354
Net flow H-L	-0.083	(0.154)	-0.049	-0.098**	0.303***	0.156**	-0.072**	354

Appendix, Table A.2 International Stock Flows Portfolio Risk-Adjusted Returns, Quintiles, 1982-2011

Table reports CAPM, three-factor, four-factor, and five-factor regression for value weighted fund flow factor mimicking portfolios: $R=a + b$*MKT $+s$*$SMB + h$*$HML + m$*$UMD+ l$*$LIQ + e$, $se(a)$ is the standard error of a. Columns labeled MKT, SMB, HML, UMD, and LIQ report the slope on each factor. Returns come from the difference between high and low quintiles for each flow factor. Deciles are formed by NYSE-break points. Factor loadings are estimated using rolling 5-year (60 month) windows. Firms are required to have at least 24 non-missing observations, positive assets and non-negative book equity in fiscal year *t-1*. Outflows are U.S. investors' monthly net purchases of foreign equity, scaled by the lagged value of U.S. investors' total equity wealth, i.e. investors' total holdings of domestic and foreign equity. U.S. holdings of domestic equity are measured as the U.S. market capitalization less total foreign holdings of U.S. equity. Inflows are foreign investors' net purchases of U.S. equity, scaled by the lagged value of foreign total holdings of U.S. equity. Net flow are the U.S. net purchases of foreign equity less foreign net purchases of U.S. equity, scaled by the lagged sum of U.S. holdings of foreign equity and foreign holdings of U.S. equity. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: Value Weighted

Portfolio	a	se(a)	MKT	SMB	HML	UMD	LIQ	N
Outflow H-L	-0.359*	(0.193)	0.437***					354
Outflow H-L	-0.455**	(0.181)	0.401***	0.491***	0.208*			354
Outflow H-L	-0.404**	(0.186)	0.385***	0.495***	0.189	-0.061		354
Outflow H-L	-0.446**	(0.184)	0.386***	0.500***	0.191	-0.063	0.075	354
Inflow H-L	-0.089	(0.192)	0.354***					354
Inflow H-L	0.042	(0.194)	0.272***	0.136	-0.282**			354
Inflow H-L	0.093	(0.206)	0.257***	0.140*	-0.301**	-0.059		354
Inflow H-L	-0.047	(0.190)	0.265***	0.159**	-0.289***	-0.064	0.226***	354
Net flow H-L	-0.039	(0.184)	-0.097					354
Net flow H-L	-0.203	(0.175)	-0.047	0.142*	0.333***			354
Net flow H-L	-0.244	(0.202)	-0.035	0.139*	0.348***	0.046		354
Net flow H-L	-0.104	(0.194)	-0.043	0.120	0.337***	0.051	-0.225***	354

Continued

Appendix Table A.2. Continued, Panel B Equal Weighted

Portfolio	a	se(a)	MKT	SMB	HML	UMD	LIQ	N
Outflow H-L	-0.251**	(0.127)	0.285***					354
Outflow H-L	-0.314***	(0.116)	0.269***	0.273***	0.137*			354
Outflow H-L	-0.268**	(0.123)	0.255***	0.277***	0.120	-0.055		354
Outflow H-L	-0.262**	(0.122)	0.255***	0.277***	0.120	-0.055	-0.011	354
Inflow H-L	-0.096	(0.158)	0.338***					354
Inflow H-L	-0.017	(0.142)	0.249***	0.323***	-0.184***			354
Inflow H-L	0.126	(0.146)	0.206***	0.333***	-0.237***	-0.164***		354
Inflow H-L	0.074	(0.142)	0.209***	0.340***	-0.233***	-0.166***	0.084**	354
Net flow H-L	0.063	(0.138)	-0.148***					354
Net flow H-L	-0.039	(0.132)	-0.087*	-0.096**	0.217***			354
Net flow H-L	-0.156	(0.145)	-0.051	-0.104**	0.261***	0.134**		354
Net flow H-L	-0.109	(0.142)	-0.054	-0.110***	0.257***	0.136**	-0.075**	354

Appendix, Table A.3 International Stock Flows Portfolio Risk-Adjusted Returns, Sub-Samples, 1982-1997, 1997-2011

Table reports CAPM, three-factor, four-factor, and five-factor regression for value weighted fund flow factor mimicking portfolios: $R=a + b$*MKT $+s$*$SMB + h$*$HML + m$*$UMD+ l$*$LIQ + e$, $se(a)$ is the standard error of a. Columns labeled MKT, SMB, HML, UMD, and LIQ report the slope on each factor. Returns come from the difference between high and low quintiles for each flow factor. Deciles are formed by NYSE-break points. Factor loadings are estimated using rolling 5-year (60 month) windows. Firms are required to have at least 24 non-missing observations, positive assets and non-negative book equity in fiscal year *t-1*. Outflows are U.S. investors' monthly net purchases of foreign equity, scaled by the lagged value of U.S. investors' total equity wealth, i.e. investors' total holdings of domestic and foreign equity. U.S. holdings of domestic equity are measured as the U.S. market capitalization less total foreign holdings of U.S. equity. Inflows are foreign investors' net purchases of U.S. equity, scaled by the lagged value of foreign total holdings of U.S. equity. Net flow are the U.S. net purchases of foreign equity less foreign net purchases of U.S. equity, scaled by the lagged sum of U.S. holdings of foreign equity and foreign holdings of U.S. equity. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: 1982 -1997

Portfolio	a	se(a)	MKT	SMB	HML	UMD	LIQ	N
Outflow H-L	-1.024***	(-3.370)	0.543***					186
Outflow H-L	-0.813***	(-3.094)	0.438***	0.918***	-0.093			186
Outflow H-L	-0.589**	(-2.242)	0.452***	0.864***	-0.138	-0.305**		186
Outflow H-L	-0.508**	(-2.003)	0.409***	0.769***	-0.133	-0.294**	-0.276***	186
Inflow H-L	-0.312	(-1.437)	0.239***					186
Inflow H-L	-0.144	(-0.638)	0.161**	0.358***	-0.172			186
Inflow H-L	-0.059	(-0.256)	0.166**	0.337***	-0.189	-0.116		186
Inflow H-L	0.013	(0.061)	0.128*	0.252***	-0.184	-0.106	-0.245***	186
Net flow H-L	-0.188	(-0.867)	0.087					186
Net flow H-L	-0.267	(-1.220)	0.118	0.292***	0.201*			186
Net flow H-L	-0.160	(-0.672)	0.125	0.266***	0.180*	-0.146*		186
Net flow H-L	-0.217	(-0.949)	0.156*	0.334***	0.176*	-0.154*	0.197***	186

Continued

Appendix Table A.3. Continued, Panel B: 1997-2011

Portfolio	a	se(a)	MKT	SMB	HML	UMD	LIQ	N
Outflow H-L	-0.289	(-0.878)	0.620***					180
Outflow H-L	-0.498	(-1.501)	0.565***	0.508***	0.308*			180
Outflow H-L	-0.433	(-1.308)	0.521***	0.529***	0.276	-0.101		180
Outflow H-L	-0.636**	(-2.161)	0.492***	0.533***	0.296**	-0.114	0.232**	180
Inflow H-L	-0.014	(-0.040)	0.640***					180
Inflow H-L	0.116	(0.330)	0.574***	0.003	-0.401**			180
Inflow H-L	0.127	(0.339)	0.567***	0.007	-0.406**	-0.017		180
Inflow H-L	-0.376	(-1.103)	0.495***	0.017	-0.358**	-0.051	0.577***	180
Net flow H-L	0.259	(0.745)	-0.347***					180
Net flow H-L	0.015	(0.046)	-0.305***	0.252*	0.581***			180
Net flow H-L	-0.106	(-0.312)	-0.223**	0.214	0.640***	0.188**		180
Net flow H-L	0.107	(0.312)	-0.193*	0.210*	0.620***	0.202**	-0.244**	180

Appendix, Table A.4 Market Beta Orthogonal, International Stock Flows Mimicking Portfolio, and Aggregate Changes in Wealth, 1982-2011

Table reports raw returns and excess risk-adjusted returns relative to the CAPM, three-factor, four-factor, and five-factor regression for value-weighted flow factor-mimicking portfolios. Excess risk-adjusted returns are estimated as: $R_{H,t} - R_{L,t} = a + b$*MKT $+s*SMB + h*HML + m*UMD + l*LIQ + e,$ where H (L) identifies a portfolio that takes a long (short) position in stocks with high (low) flow-beta. Columns labeled CAPM, FF3F, FF3F+ Mom, FF3F + Mom + Liq, report the excess risk-adjusted return, i.e. the intercept relative to each facto model. Returns come from the difference between high and low deciles for each flow factor loading. Deciles are formed by NYSE-break points. Panel A reports value-weighted portfolios; panel b reports equal-weighted. *Globe* is non-U.S. market returns. Factor loadings are estimated using rolling 5-year (60 month) windows. Firms are required to have at least 24 non-missing observations, positive assets and non-negative book equity in fiscal year *t-1*. Newey West standard errors are adjusted for 3 lags. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

Appendix Table A.4, Panel A: Market Orthog, Value-Weighted							
		(1)	(2)	(3)	(4)	(5)	(6)
Portfolio	Aggregate Wealth Proxy	Raw	CAPM	FF3F	FF3F + Mom	FF3F + Mom + Liq	N
Outflow H-L	$MKT_{t-1}<0$	-0.774***	-0.621**	-0.621**	-0.540**	-0.561**	138
Outflow H-L	$MKT_{t-1}>0$	0.259	-0.048	-0.048	-0.025	-0.086	215
Inflow H-L	$MKT_{t-1}<0$	-0.240	-0.370	-0.370	-0.417	-0.513	138
Inflow H-L	$MKT_{t-1}>0$	0.298	0.376	0.376	0.392	0.210	215
Net Flow H-L	$MKT_{t-1}<0$	0.260	0.503	0.503	0.606	0.667*	138
Net Flow H-L	$MKT_{t-1}>0$	0.111	-0.034	-0.034	-0.063	-0.034	215
Outflow H-L	$Globe_{t-1}<0$	-0.845***	-0.817***	-0.817***	-0.797***	-0.793***	153
Outflow H-L	$Globe_{t-1}>0$	0.391*	0.100	0.100	0.127	0.129	200
Inflow H-L	$Globe_{t-1}<0$	-0.485	-0.584	-0.584	-0.591	-0.583	153
Inflow H-L	$Globe_{t-1}>0$	0.526*	0.618**	0.618**	0.626**	0.392	200
Net Flow H-L	$Globe_{t-1}<0$	0.308	0.478	0.478	0.442	0.441	153
Net Flow H-L	$Globe_{t-1}>0$	0.064	-0.106	-0.106	-0.106	0.027	200
Outflow H-L	$(MKT\text{-}Globe)_{t-1}<0$	-0.453*	-0.520**	-0.520**	-0.532*	-0.563**	158
Outflow H-L	$(MKT\text{-}Globe)_{t-1}>0$	0.105	-0.188	-0.188	-0.081	-0.114	195
Inflow H-L	$(MKT\text{-}Globe)_{t-1}<0$	0.573**	0.483*	0.483*	0.490*	0.268	158
Inflow H-L	$(MKT\text{-}Globe)_{t-1}>0$	-0.305	-0.210	-0.210	-0.161	-0.223	195
Net Flow H-L	$(MKT\text{-}Globe)_{t-1}<0$	-0.285	-0.245	-0.245	-0.285	-0.188	158
Net Flow H-L	$(MKT\text{-}Globe)_{t-1}>0$	0.538**	0.379	0.379	0.399	0.417	195

Continued

Appendix Table A.4 Continued, Panel B: Non-U.S. Orthog, Value Weighted.

		(1)	(2)	(3)	(4)	(5)	(6)
Portfolio	Aggregate Wealth Proxy	Raw	CAPM	FF3F	FF3F + Mom	FF3F + Mom + Liq	N
Outflow H-L	$MKT_{t-1}<0$	-0.595**	-0.488*	-0.488*	-0.482*	-0.470*	138
Outflow H-L	$MKT_{t-1}>0$	0.264	-0.003	-0.003	0.018	0.031	215
Inflow H-L	$MKT_{t-1}<0$	-0.282	-0.480	-0.480	-0.599	-0.715	138
Inflow H-L	$MKT_{t-1}>0$	0.346	0.404	0.404	0.402	0.175	215
Net Flow H-L	$MKT_{t-1}<0$	0.099	0.287	0.287	0.461	0.538	138
Net Flow H-L	$MKT_{t-1}>0$	-0.016	-0.119	-0.119	-0.120	-0.028	215
Outflow H-L	$Globe_{t-1}<0$	-0.604**	-0.589**	-0.589**	-0.638**	-0.636**	153
Outflow H-L	$Globe_{t-1}>0$	0.336	0.116	0.116	0.148	0.277	200
Inflow H-L	$Globe_{t-1}<0$	-0.436	-0.606	-0.606	-0.670	-0.661	153
Inflow H-L	$Globe_{t-1}>0$	0.510*	0.564*	0.564*	0.548*	0.233	200
Net Flow H-L	$Globe_{t-1}<0$	0.166	0.344	0.344	0.369	0.367	153
Net Flow H-L	$Globe_{t-1}>0$	-0.076	-0.197	-0.197	-0.165	0.067	200
Outflow H-L	$(MKT\text{-}Globe)_{t-1}<0$	-0.463*	-0.543**	-0.543**	-0.588**	-0.519**	158
Outflow H-L	$(MKT\text{-}Globe)_{t-1}>0$	0.245	-0.017	-0.017	0.120	0.101	195
Inflow H-L	$(MKT\text{-}Globe)_{t-1}<0$	0.309	0.176	0.176	0.163	-0.107	158
Inflow H-L	$(MKT\text{-}Globe)_{t-1}>0$	-0.068	0.023	0.023	0.044	-0.037	195
Net Flow H-L	$(MKT\text{-}Globe)_{t-1}<0$	-0.285	-0.213	-0.213	-0.226	-0.056	158
Net Flow H-L	$(MKT\text{-}Globe)_{t-1}>0$	0.284	0.113	0.113	0.175	0.205	195