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**Long-term U.S. cross-border security flows with developed and emerging market countries
surrounding the global financial crisis**

An Honors Thesis submitted in partial fulfillment of the requirements for Honors in Finance.

By
Caitlin Tongco

Under the mentorship of Axel Grossmann

ABSTRACT

This paper analyzes the impact of the global financial crisis on cross-border long-term security flows from and towards the U.S. We are investigating monthly observations from 72 countries over the period from 2003 to 2013. The findings show that the global financial crisis impacted all cross-border capital flows in our analysis; yet, the timing, the significance, and the nature of the impact varies among the different securities, as well as between a sample of developed and emerging market countries. We find evidence for a flight-to-safety with the start of the global financial crisis, with a significant, but short lived interruption due to the bankruptcy of Lehman Brothers. Further, the bankruptcy of Lehman Brothers has caused an abrupt drop in holdings of U.S. and foreign equity, which have not recovered ever since. This may suggest that the extraordinary event has caused a general increase in international investors' risk aversion. Finally, our results do not provide much evidence for the claim made by developing countries' policymakers that the accommodative monetary policies by the U.S. have caused an overall disruptive capital flow towards their economies.

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2. Introduction

The bankruptcy of Lehman Brothers in September 2008 led to the worst recession in the U.S. in over 80 years and almost brought down the global financial system. While the crisis originated with the default U.S. mortgage-backed securities and the collapse of the U.S. subprime mortgage market, it quickly spread through the U.S. banking system and, almost overnight, tumbled the U.S. economy and caused a global recession. The government of several world economies, especially the U.S., intervened immediately with extraordinary bailout packages of the banking industry, which was followed by unprecedented accommodating monetary policies. Besides the impact on the world economy there is ample evidence the global financial crisis had a significant impact on global capital flows, both in developed and developing countries (e.g., Forbes and Warnock, 2012; Bluedorn et al., 2013; Broner et al., 2013; and Ahmed and Zlate, 2013). As pointed out by Beraut et al. (2009) cross-border capital flows provide important information about foreign investors' optimism towards domestic assets. Moreover, they are essential for countries that are running a current account deficit. However, most studies investigate the gross inflow or net inflow of countries' aggregate annual capital flows¹; nonetheless, certain financial securities may have experience different impacts at different times.

In this paper, we investigate if the trade volume of 72 countries (measured in U.S. dollars) of foreign purchase of U.S. long-term securities, as well as the U.S. purchase of foreign securities over the period from 2003 to 2013. The study differs from others in the following ways: First, we use monthly frequency taken from the web-page of the U.S. Department of the Treasury², which allows for a more precise determination of when and how the events of the financial crisis may have impacted the cross-border capital flows. Second, the employed dataset permits for an investigation of U.S. treasury securities, U.S. government bonds, U.S. corporate bonds, U.S. corporate stocks, foreign bonds and foreign stocks separately, instead of just the aggregate. Third, we investigate the cross-

¹ Gross capital flows are the net sales of domestic securities to foreign residents (inflows) or the net purchase of foreign securities by domestic residents (outflow). Net capital flows are the difference between the gross inflows and outflows.

² The data is available under the following web-page: <http://www.treasury.gov/resource-center/data-chart-center/tic/Pages/country-longterm.aspx>.

border capital flows and their volatility for three periods: 1) the pre-crisis period from 2003 to 2006, 2) the global financial crisis period from 2007 to 2009, and 3) the post-crisis period from 2010 to 2013. Fourth, besides investigating the aggregate cross-border capital flows, we also examine if there have been differences between U.S. cross-border security flows from and towards developed and developing countries by splitting our sample into a sample of 24 developed and 48 developing countries. This is of special interest as several emerging market policymakers have claimed that the accommodative monetary policies by developing countries have triggered disruptive capital inflow to their financial markets causing an asset pricing bubble, currency appreciation, and ultimately a threat to their export-led growth strategy. However, there are other channels through which the financial crisis may have impacted cross-border security flows. That is to say, the safe-haven effect, according to which capital may have flown away from riskier markets towards safer and more liquid ones, or an overall reduction in holdings of foreign securities due to a general increase in investors' risk aversion. This also raises the question if certain long-term securities are impacted differently. We control for possible "financial center bias" by excluding the U.K. and the Cayman Islands from our samples. In most cases this did not change our results.

3. Literature Review

The recent Global Financial Crisis has been declared as the worst financial crisis since the great depression in the 30s to many. Although the crisis itself began in only a portion of the United States' financial market, i.e. the mortgage market, most major financial institutions and banks were ultimately impacted. Institutions and investors heavily invested in the prosperous real estate market, which was filled with subprime mortgages through mortgage-backed-securities. The collapse of the subprime mortgage market caused significant losses to the institutions that heavily traded securities, such as collateralized debt obligations and credit default swaps. Due to the uncertainty who would default next, banks were reluctant to lend money to other financial institutions. This led to a credit crunch (Page, 2013) and a contagion of the financial crisis through the U.S. and ultimately the world economy. The result of the loss of credit was the collapse of large institutions (Martinez and Williams, 2012). The most influential downfall of a

financial institution was the Lehman Brothers bankruptcy in 2008. Holyst et al. (2011) states ...“the Lehman Brothers default event is quantified as having an almost immediate effect in worsening the credit worthiness of all financial institutions in the economic network”. This claim supports how, soon after the collapse of Lehman Brothers, the international banking and finance sectors began to default, and the financial crisis was almost immediately exacerbated (Broner et al., 2013). Due to the large globalization of our financial markets, the bankruptcy of this investment bank sent a shockwave throughout every country and financial institution (Alcorta and Nixon, 2011).

As investors sought out safety for their investments, the international financial markets declined. International capital flows, i.e. money movement among borders through investing, trading, or practicing business, began to slow and decrease to disparaging low numbers. Hence, the beginning of the financial crisis marked a large overall decrease in capital flows. Broner et al. (2013) states that inflows through foreign investors and outflows through domestic investors decreased throughout every country during a crisis; this movement, in turn, creates a decrease in the overall amount of capital flows. They elaborate further and argue that capital inflows and outflows are extremely volatile and procyclical; therefore, they decline during times of crisis and expand in times of prosperity. Forbes and Warnock (2012) agree with Broner et al. (2013) in that the global market is extremely volatile. This volatility in the global market is influenced by a myriad of factors. These factors include global risk, contagion of markets, and the rate of global growth (Forbes and Warnock, 2012). Because of the broad range of factors that determine the changes in the global market, policymakers are not able to completely alter and change the market structure in a short period of time. Consequently, after such a large scale global financial catastrophe, there are very few globally effective options for governments to take in order to reinstate their previously successful markets without affecting a multitude of other markets.

The global financial crisis took such a toll on the developed countries' markets that they were willing to take extreme measures to rebuild the economy. Advanced markets implemented accommodative monetary policies to intervene and to assist the restructuring of their floundering economies. Their solution was to utilize credit easing or quantitative easing (QE) policies. These policies were constructed in countries with large

scale centralized banks, such as England, Japan, and the United States (Powell, 2013). The QE policy established by the United States was implemented after the bankruptcy of the Lehman Brothers in September 2008. By executing quantitative easing during the latter half of the financial crisis, the United States aimed to improve and stimulate their economy through the repair of financial markets by focusing mainly on liquidity operations and, also, the large scale asset purchases (LSAP) of debt, mortgage backed securities, and treasury securities (Fratzcher et al., 2013). Large scale asset purchases were one of the most influential factors of the United States QE because of their influence on long-term interest rates. By integrating LSAP into an economy, the long-term interest rates were lowered, in addition to the already near zero short-term interest rates, resulting in increasing asset prices and in a decline of the value of the U.S. dollar (Powell, 2013; Fratzscher et al., 2013; Chen et al., 2011). Additionally, the literature suggests that the initial effects of the financial crisis was a rise in global risk aversion (Bertraut and Pounder, 2009; Bluedorn et al., 2013), causing an increase in the demand for U.S. Treasury securities (Bertraut and Pounder, 2009). Moreover, Bluedorn et al. (2013) suggest that the risk aversion caused a net inflow towards advanced economies, and, in turn, supports the theory that emerging markets were perceived as more risky. This is an example of the safe haven or flight to safety effect; where, despite the low returns, investors required government backed securities to insure their investments and their returns.

However, as the low yields persisted and risk aversion deteriorated, some investors began to look for higher returns and higher risk investments. The low interest rates in the United States in combination with the unprecedented monetary seem to have caused flows of capital into emerging markets (Ghosh et al., 2012). Thus, the QE policies affected more than just the United States and other developed countries. These quantitative policies that were established to help solely stimulate developed markets began to affect and stimulate the market on a global scale. Powell agrees that the global market was, in fact, supported and boosted due to the QE policies (2013). Following the crisis, Powell's claims seem to be reinforced as the QE policies seemed to have stabilized the global financial market and the monetary easing policies greatly influenced a plethora of assets in all markets (Chen et al., 2011). But, in the long run, the accommodative

monetary policies created a spillover effect that seemed to largely alter and negatively influence developing economies. Because of the small scale of a developing country's market, the large influx of capital seemed to almost stretch their already fragile economies to their breaking point. Many emerging market policymakers claimed that they experienced enormous price inflation, escalating capital inflows, and extreme credit growth (Chen et al., 2011). Reinhart and Reinhart (2008) assert that large capital inflow periods in lower income countries (i.e., emerging markets) go hand in hand with inflation crises in the aforementioned countries. Because of increasing inflation throughout their economies, exchange rates were negatively impacted, and their export growth strategies were severely damaged. Because of the lesser state of a developing country's economy, they are more heavily affected by large changes in the market than a developed country (Fratzscher et al., 2013). Also, most literature seems to infer that capital flows in emerging markets are much more volatile than those in advanced economies, which support the theory that the developing markets were largely affected by accommodative monetary policies whether it be positive or negative (Bluedorn, et al., 2013).

Nonetheless, although the developing markets appear to be influenced negatively solely by the accommodative monetary policies put in place by developed countries, the developed countries may not be the sole perpetrators. Every emerging market seemed to be affected by the unconventional policies in a synchronous manner. However, each emerging economy may have been affected uniquely. There is no uniformity in the negative experiences between each country, which suggests that other factors played roles in the rapid growth and decline of emerging markets (Chen et al., 2011; Ghosh et al., 2012). Research indicates that common risk, liquidity, yield factors, and asset returns played larger roles than quantitative easing in the surge of capital to developing countries (Fratzscher et al., 2013). Rate differentials and growth differentials were also declared as "statistically significant" to the large inflows of capital to emerging markets (Ahmed and Zlate, 2013). In this case, it seems as if risk was the overlying determinant for cross-border capital flows throughout the global financial crisis. Whether it was a "flight to safety" or a tsunami of flows towards emerging markets, risk is the recurring factor that seemed to determine the course of securities.

Although there is a plethora of research and papers about the impact on capital flows throughout the span of the financial crisis, our aim is to elaborate and delve deeper into the previously completed studies. Most scholarly articles, e.g. Bluedorn et al. (2013), Forbes and Warnock (2012), and Chen et al. (2011), finish analyzing capital flows in 2010 or 2011; while we have extended the data collection to include 2013. Also, we analyzed the data monthly rather than annually or quarterly and take a look at specific types of securities instead of aggregate capital flows, which may allow for a more precise understanding of cross-border capital flows. Moreover, we split our sample into countries from developed and developing economies.

4. Data and Methodology

4.1 Data

The data utilized in this study comes from the Treasury International Capital (TIC) reporting system, which is available on the web-page from the U.S. Department of Treasury.³ The dataset provides a comprehensive accumulation of the monthly transactions of different long-term securities from and towards 77 foreign countries, starting in 1977. The data include the gross purchase and the gross sales of U.S. treasury bonds and notes, U.S. government agency bonds, U.S. corporate bonds, U.S. corporate stocks, foreign bonds and foreign stocks. Note the data does not distinguish between foreign government and corporate bonds. We focus in our analysis on the U.S. treasuries, U.S. corporate bonds, as well as foreign stocks and bonds. We consider purchase and sale, as well as the net purchase of U.S. long-term securities by foreigners. The net purchase of U.S. securities by foreigners represents gross purchases by foreigners minus the gross sale by foreigners. Additionally, we consider the purchase and sale⁴, as well as the net purchase of foreign long-term securities by the U.S. The net purchase of foreign

³ The data is available under the following web-page: <http://www.treasury.gov/resource-center/data-chart-center/tic/Pages/country-longterm.aspx>.

⁴ Note, the gross purchase of foreign long-term securities by U.S. residents is equivalent to the gross sales of foreign long-term securities to U.S. residents; while the gross sales of foreign long-term securities by U.S. residents is equivalent to the gross purchase of foreign long-term securities from U.S. residents.

long-term securities by U.S. residents represents the gross sales by foreigners to U.S. residents minus the gross purchase by foreigners from U.S. residents.

After gathering all of the data for each country, we separated our sample into countries from developed and developing markets. Instead of merely looking at gross domestic product or national income, we choose to look at the countries as investors would by utilizing equity indices. By combining two pre-existing, globally renowned equity indices, we formed a set standard of countries. Standard and Poor (S&P) has an equity index with 25 developed countries, 21 emerging markets, and 12 frontier markets. Morgan Stanley Capital International (MSCI) has an equity index with 23 developed markets, 24 emerging economies, and 57 frontier markets. By overlapping these indices with the TIC, we achieved our total of 72 countries. These countries included 48 developing countries and 24 developed countries. The developing country portion also included seven frontier markets. Certain countries were omitted due to the absence of data in certain time periods or the general lack of data in the TIC. Table 1, panel A shows that our sample covers between 96% and 99% of the grand total reported by the TIC. The only exception is U.S corporate stocks, for which our sample only covers between 90% to 96% of the TIC grand total.

One needs to note that the subsample of developed and developing countries may be distorted by a potential transaction bias brought about by intermediary financial centers, as the recorded transactions for each individual country do not necessarily indicate the country from which the foreign securities were ultimately bought. For example, an investor from Spain might purchase a United States Treasury security through an intermediary in the United Kingdom. The Treasury security is then documented as being bought by the United Kingdom although it was purchased by someone in Spain (Bertaut and Pounder, 2009). This may lead to an overstating of transactions for financial centers and an understating for countries that use non-domestic financial centers. According to Bertaut and Judson (2014) the transaction bias may be especially problematic with respect to foreign bonds, but may be less problematic with respect to foreign securities bought by U.S. investors. The countries that exhibit the most influential effects of intermediaries include the United Kingdom and Cayman Islands. However, the Bahamas and Bermuda also constitute a much smaller portion of the large

Caribbean financial center (Bertaut and Pounder, 2009). To control for the impact of the transaction, we analyze the data for our sub-samples of developed and developing countries with and without the Cayman Islands in case of emerging markets and with and without the United Kingdom in the case developed markets. Table 2, panels B to E, shows the percentage of the transaction demand through and from the UK and the Cayman Islands in comparison to the values for our whole sample, as well as the sample of developed or developing countries. The table shows that UK (panel C) represents a higher transaction proportion of the entire sample than the Cayman Islands do (panel D). When we distinguish between developed (panel E), and developing countries (panel F), however, we can see the equal impact of the UK with respect to developed countries and the Cayman Islands with respect to developing countries. Interestingly, the transaction proportion of the UK with respect to developed countries has decreased during the financial crisis for all types of securities, except treasury securities. The transaction proportion for the Cayman Islands, on the other hand, did not change much during the period of the global financial crisis.

We start with our sample in 2003 to exclude the impact of the crises in some of the emerging countries in the late 90s as well as the beginning of the last decade. Moreover, this also excludes the impact of the bursting tech bubble in 2000 as well as the terrorist attack on 9/11. We stop with our sample in 2013 to exclude more recent data that may be incorrect and may change as the TIC revises them and provides more accurate numbers.

4.2 Methodology

To investigate the impact of the financial crisis, we divide our entire period ranging from 2003 to 2013 into three sub-periods: 1) pre-crisis period from 2003 to 2006; 2) crisis period from 2007 to 2009; and 3) the post-crisis period from 2010 to 2013. While the bankruptcy of Lehman Brothers is generally considered as the height of the global financial crisis, there is usually a general consensus that the start of the global financial crisis can be dated back to 2007. We also include 2009 into the time of the crisis period as, according to IMF (2010, 2011) the output of the world decreased by 0.6 percent and the output of advanced economies declined by 3.4%; however, starting in

2010 world output grew again. Moreover, 2010 to 2013 represents a period of unprecedented monetary policies by the Federal Reserve. This includes the quantitative easing two (QE2) and three (QE3); which may have significantly influenced international capital flows.

We examine the impact of the global financial crisis by visually investigating the flow of cross-border long-term securities. This is done by first drawing line charts to depict the change in the purchase and sales of U.S. and foreign long-term securities. We do this for the entire sample of 72 countries, as well as the sample of 24 developed and 48 developing countries. Additionally, we show the bar graphs of the net purchase of U.S. and foreign long-term securities. Further, we present the bar charts of the average total amount of purchased and net purchased U.S. and foreign long-term securities for the overall period from 2003 to 2013, as well as our three sub-periods. This allows us to see if there have been substantial changes during and after the financial crisis. Finally, we calculate the monthly averages and the standard deviations for each sample, period, and type of security. The standard deviations allow for an assessment of a change in volatility for the different securities over the three sub-periods.

Finally, we conduct a two sample t-test with a Levene-Test of equal variance using SPSS to see if there are statistically significant differences between the three sub-periods. The groups tested include: 1) the periods from 2007 to 2009 versus the periods 2010 to 2013, 2) the periods from 2003 to 2006 versus the periods from 2007 to 2009, and 3) the periods from 2003 to 2006 versus 2010 to 2013. Hence, null hypothesis states that various periods have equal population means $H_0: (\mu_1 - \mu_2) = 0$. See also Keller (2014, page 440) for a discussion on the two sample t-test.

The test statistics assuming equal variance becomes:

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{s_p^2 \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

where \bar{x}_1 and \bar{x}_2 are the means of the two periods being tested, and $(\mu_1 - \mu_2)$ is the difference between the population means. The variables n_1 and n_2 are the sizes of the samples and s_p^2 is the pooled variance estimator.

$$s_p^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}$$

The test statistics is a Student t-distribution $n_1 + n_2 - 2$ degrees of freedom, assuming normal distribution of both populations.

The test statistic assuming unequal variance becomes:

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)}}$$

where s_1 and s_2 are the standard deviations of the two samples. Yet, the sampling distribution of the resulting statistics is no longer normal or Student t-distributed. However, the Student t-distribution can be approximated using a more complicated calculation for the degrees of freedom.⁵ We test for equal variance using the Levene-Test in SPSS.

5. Results

5.1 Monthly long-term securities bought and sold as well as net purchases

Figures 1 to 4 show the monthly amount of long-term securities bought and sold by foreigners in U.S. dollar (line-chart) and the net purchases by foreigners (bar-charts). The long-term securities include U.S. treasuries (Figure 1), U.S. government bonds (Figure 2), U.S. corporate bonds (Figure 3), and U.S. corporate stocks (Figure 4). We show the graphs for our entire sample (column 1), as well as our split sample of developed countries (column 2) and emerging countries (column 3). Panel A provides the graphs of all countries, including the Cayman Islands and the UK, and panel B shows the graphs excluding the Cayman Islands and the UK; hence, controlling somewhat for the “financial center bias”, which makes the identification of the foreign counterparties difficult. Figures 5 to 6 show the monthly amount of bought and sold foreign stocks and foreign bonds, respectively, as well as the amount of net purchases. We refer to the overall trade volume of securities when discussing the purchase and sales of securities.

5.1.1 Monthly purchases and net purchases of U.S. long-term securities by foreigners

⁵ See Keller (2014, page 440) for the calculation of the degrees of freedom in the case of unequal variance.

Treasuries and Government Bonds

Figures 1 and 2 (panel A, column 1) show a substantial increase in trade volume of U.S. treasuries and U.S. government bonds for the two years preceding the bankruptcy of Lehman Brothers (indicated by the vertical line). Considering that the active phase of the crisis is commonly dated back to the beginning of 2007, the finding supports the general notion that the early period of the financial crisis has seen a flight-to-safety.⁶ Interestingly, the bankruptcy of Lehman Brothers in September of 2008 caused a significant but rather short-lived drop in the trade volume of U.S. treasuries. This may be related to an overall reduction in holdings of foreign securities due to a general increase in international investors' risk aversion, brought about by the bankruptcy of Lehman Brothers. Notably, the drop in trade volume of U.S. government bonds occurred already in early 2008. The demand for U.S. treasuries, however, resumed again in mid-2009 and reached its peak in mid-2011. The increase in overall trade volume of U.S. treasury securities was accompanied by an increase in net purchases of U.S. treasuries beginning 2009; while the trade volume and the net purchases of U.S. government bond has stayed below crisis levels ever since. Hence, the flight to safety seemed to be interrupted by the extraordinary event of Lehman Brothers' bankruptcy, but continued and even intensified after investors absorbed the initial shock. The patterns for developed countries (column 2) are very similar to those based on the overall sample and do not change much when we exclude the UK (panel B). With respect to our sample of emerging countries (column 3), we find slightly different patterns, especially if we exclude the Cayman Islands. It appears that it took investors from emerging countries, in comparison to those from developed countries, much longer to regain trust in U.S. treasury securities. Moreover, the rebound in the trade volume of U.S. treasury securities is less pronounced for emerging countries once we exclude the Cayman Islands. Finally, there seems to be a general increase in the demand for U.S. treasuries and U.S. government bonds with the start of 2013.

Corporate Bonds

⁶ Bertaut and Pounder (2009) show that the beginning of the financial crisis in 2007 coincides with a flight-to-safety, as foreign investors increased their demand for U.S. treasury securities, while moving out of other more risky securities.

Looking at the graphs for U.S. corporate bonds (Figure 3), we find that they experienced high demand up to the start of the financial crisis in 2007, which in part may be related to the increase in new issued corporate asset-backed securities, as well as the international demand for such securities. Yet, we see a significant drop in trade volume and net purchases with the beginning of 2008. Thus, while the demand for U.S. treasuries decreased substantially with the bankruptcy of Lehman Brothers, the decline in demand for U.S. corporate bonds happened much earlier. Interestingly, the first half of 2009 saw again an increase in trade volume for U.S. corporate bonds, followed by continuing decrease in the demand for U.S. corporate bonds to levels below the ones preceding the global financial crisis. Two factors may have caused the decrease in demand for U.S. corporate debt during and after the global financial crisis. First, as stated by Bertaut and Pounder (2009), U.S. corporate issuance decreased in 2008, while the sales of U.S. debt was still high due to the redemption of maturing securities, which led to the negative net purchases. Second, the flight-to-safety as investors moved out of the more risky U.S. corporate bonds and bought U.S. treasury securities. The latter argument is supported by the fact that the low levels of trade volume of U.S. corporate bonds, as well their net purchases, have not recuperated after the global financial crisis, while the demand for U.S. treasuries has increased during the same time frame. Further, the pattern remains fairly robust if we distinguish between developed (column 2) and emerging countries (column 3) and/or exclude the UK or the Cayman Islands (panel B).

Corporate Stocks

Similar to U.S. corporate bonds, we find for U.S. equity securities (Figure 4) a considerable increase in trade volume before the financial crisis. However, while the trade volume for corporate bonds decreased with the start of the financial crisis in 2007, the trade volume for U.S. equity securities remained at high levels until Lehman Brothers' bankruptcy in September 2008. With the bankruptcy of Lehman Brothers, however, the trade volume dropped substantially and has not recovered ever since. This is especially interesting given that the Dow Jones index more than doubled its value from

2009 to 2013.⁷ The finding holds for developed countries (column 2) and emerging countries (column 3) alike. Moreover, the finding does not change if we exclude the UK and the Cayman Islands. With respect to the net purchases of U.S. equity securities, we find similar patterns; yet, the reduction seemed to have started already during the financial crisis. Moreover, the financial crisis, as well as the period starting mid-2011, has seen large swings between positive and negative net purchases, especially when we are excluding the UK and the Cayman Islands. In general, the findings suggest that the financial crisis has caused a general reduction of foreign investors' appetite for U.S. corporate bonds and stocks, plausibly brought about by a general higher level of risk aversion.

5.1.2 Monthly purchases and net purchases of foreign long-term securities by the U.S.

Foreign Stocks

Figure 6 shows the graphs for the purchases of foreign stocks by the U.S. The patterns are very much comparable to those found for U.S. equity securities. That is to say, an increase in trade volume before the bankruptcy of Lehman Brothers and an immediate drop in the last quarter of 2008, which was followed by a general lower demand. Again, the finding is mainly robust with respect to our sample of developed countries (column 2) and emerging countries (column 3), and does not change if we exclude the Cayman Islands and the UK. It suggests that the global financial crisis has caused a general reduction in cross-border equity positions, which has impacted U.S. equity and foreign equity alike. Moreover, with respect to foreign equity bought by U.S. investors, we do not find evidence that the accommodative monetary policies of the U.S. have caused a considerable increase in capital inflow towards emerging countries.

Foreign Bonds

Looking at foreign bonds, Figure 5 reveals for the period prior to the bankruptcy of Lehman Brothers, as well as its immediate aftermath, similar shapes as discussed for U.S. corporate bonds. The patterns are again very much the same for our whole sample (column 1), as well as the sample of developed countries (column 2) and emerging countries (column 3). All samples show a substantial decrease in trade volume and net

⁷ The value increased from around 8,000 to over 16,500, a return of over 106%.

purchases during 2008. That finding does not change much when we exclude the UK and Cayman Islands. Interestingly, our sample of developed countries including the UK (panel A, column 2) shows a significant spike in trade volume in the first half of 2010; which disappears if we exclude the UK. During the period following the financial crisis, however, the patterns for foreign bonds follow more those of the U.S. treasuries than U.S. corporate bonds. The graphs show that trade volume of foreign bonds resumed from 2009 to 2013. The finding is especially striking for emerging countries (column 3) for which we find a continuous increase in trade volume since the mid-2009, reaching levels of more than five times the levels seen before the crisis. Notably, the finding does not change if we exclude the Cayman Islands. The general increase in foreign bonds may suggest that U.S. investors are using foreign bonds as a substitute for the more risky perceived foreign equity. Further, the findings may also be related to the accommodative monetary policies of the U.S., which has caused unprecedented low short-term and long-term interest rates. This in turn seems to support the claims made by some policymakers from emerging countries that monetary policies of developed countries, particularly the U.S., have triggered disruptive capital flows into their economies. However, this amplified capital flows seem to be exclusively related to foreign bonds and not equity flows and maybe more related to U.S. investors seeking higher fixed income returns, rather than the increase in liquidity due to quantitative easing in the U.S.

With respect to the net purchases of foreign bonds we find for the whole sample (column 1) and the sample of developed countries (column 2) mainly positive capital flows for the period immediately prior to the financial crisis as well as during the first half of the financial crisis. The bankruptcy of Lehman Brother triggered again substantial negative net purchases of foreign bonds. In the aftermath of the financial crisis, however, we see an increase in monthly negative net purchases of foreign bonds. With respect to the net purchases of foreign bonds from emerging countries (column 3), we find for the entire period from 2003 to 2013 monthly swings of positive and negative values; however, those swings have become larger after the financial crisis.

Thus, while the global financial crisis has reduced the demand for foreign bonds in its immediate aftermath, the trade volume and the volatility of the net purchases has increased, especially for emerging countries.

5.2 Pre-crisis, crisis, and post-crisis average monthly purchases and net purchases

Figures 7 to 10 show the average monthly purchases and net purchases of U.S. treasuries (Figure 7), U.S. government bonds (Figure 8), U.S. corporate bonds (Figure 9), and U.S. corporate stocks (Figure 10) for the entire period from 2003 to 2013, the pre-crisis period from 2003 to 2006, the crisis period from 2007 to 2009, and the post-crisis period from 2010 to 2013. Again, we show the graphs for our entire sample (column 1), as well as our split sample of developed countries (column 2) and emerging countries (column 3). Panels A and B provide the graphs for the average monthly purchases and net purchases of all countries, including the Cayman Islands and the UK. To control for the “financial center bias” panels C and panel D, show the graphs excluding the Cayman Islands and the UK. Figures 11 to 12 show the graphs of foreign stocks and foreign bonds bought by U.S. investors, respectively.

Tables 2 to 7 provide the actual dollar amounts of the average monthly purchases and net purchases of the cross-border transactions with the U.S. for the entire period, as well as the three sub-periods. Additionally, the tables provide the standard deviations for the different periods, as well as the two-sample t-test, indicating if the change in the purchases of long-term securities from one period to the next is statistically significant.

5.2.1 Pre-crisis, crisis, and post-crisis average monthly purchases and net purchases of U.S. long-term securities by foreigners

U.S. Treasuries

Figure 7 demonstrates that, compared to the pre-crisis period, the average monthly purchases (panel A, column 1) as well as the average monthly net purchases (panel B, column 1) of U.S. treasury securities increased during the financial crisis and continued to increase during the post-crisis period. The pattern does not change if focus on developed countries (column 2). Further, Table 2 shows that the increase is statistically significant for each period. While the pattern is also similar with respect to the net purchases for U.S. treasuries, they are not all statistically significant.

Excluding the UK from our sample of developed countries (panel D, column 2), we find a decrease in the net purchases during the crisis period. The decrease, however, is statistically insignificant (see Table 2).

In line with our findings for the overall sample and the sample of developed countries, panel A (column 3) shows that the purchases of treasury securities increases for emerging countries over all three periods; and the increase is statistically significant (Table 2, panel A). However, the net purchases (panel B) decreases for the post-crisis period. Excluding the Cayman Islands from the sample of emerging market countries (panels C and D) shows an increase in the demand for U.S. treasury securities during the crisis period, but a decrease in the post-crisis period. Yet, none of the changes are statistically significant (Table 2, panel B). Finally, Table 2 shows a substantially higher volatility during the crisis-period and the post-crisis period. The finding holds with respect to the treasury securities bought and the net purchases, as well as our sample of developed and emerging countries. Splitting our sample into three sub-periods provides additional evidence for a flight-to-safety; however, the evidence seems to be especially striking for developed countries during the post-crisis period.

U.S. Government Bonds

Figure 8 (panel A, column 1) shows an increase in the overall purchases of U.S. government bonds during the crisis period and a drop in the post-crisis period to levels seen in the pre-crisis period. Both changes are statistically significant (see Table 3). The pattern is very similar if we split the sample in countries from developed markets (column 2) and emerging markets (column 3). Moreover, excluding the UK (panel C, column 2) does not change our results. However, excluding the Cayman Islands shows that there is an increase in the post-crisis period for emerging countries. Yet, the increase during the crisis period and the post-crisis period is insignificant (Table 3, panel B).

Looking at the net purchases of U.S. government bonds (panel B) indicates a statistically significant decrease (Table 3, panel A) for all three samples during the crisis period. The net purchases, however, picked up during the post crisis period, especially if we exclude the UK and the Cayman Islands (panel D), though the increase is not statistically significant (Table 2, panel B). Interestingly, while the U.S. treasuries showed elevated volatility levels for the crisis period and post-crisis period in comparison to the

pre-crisis period, we find that for U.S. government bonds the volatility has increased only during the crisis period.

Thus, in contrast to U.S. treasuries, we find that investors from developed countries have not increased their holdings of U.S. government bonds after the financial crisis, while there seems to be a tendency of increased demand for U.S. government bonds by emerging markets.

U.S. Corporate bonds

Figure 9 (panel A) shows, similar to the findings with respect to U.S. government bonds, that the overall purchases of corporate bonds increased for the crisis period, but decreased during the post-crisis period. The patterns hold for the overall sample (column 1), as well as our sample of developed countries (column 2) and emerging market countries (column 3).

Focusing on the net purchases of corporate bonds (panel B), we find a significant reduction for the crisis period versus the pre-crisis period. This may be due to the substantial decline in corporate bonds bought by foreigners surrounding the bankruptcy of Lehman Brothers, as well as the reduction in corporate bond issues, while at the same time the amount of maturing corporate bonds sold by foreigners was comparatively high. Panel B shows for all three samples that the net purchases of U.S. corporate bonds declined even further during the post-crisis period.

The findings do not change when we exclude the UK and the Cayman Islands (panels C and D). Moreover, Table 4 shows that the changes are all statistically significant, with the only exception being the increase in U.S. corporate bonds bought by developed countries (excluding the UK). The findings provide additional evidence that foreign investors have reduced their overall holdings of U.S. corporate bonds during the post-crisis period. Moreover, the levels in the post-crisis period are statistically significantly lower than those found in the pre-crisis period. Table 4 further demonstrates a substantial increase in volatility during the crisis period in comparison to the pre-crisis period; while the volatility in the post-crisis period has been lower in comparison to the pre-crisis period.

Corporate stocks

Figure 10 (panels A and C) shows that the demand for U.S. corporate stocks bought by foreigners is similar to the pattern found for U.S. government bonds and corporate bonds. That is to say, a statistically significant increase during the crisis period and a statistically significant drop during the post-crisis period (see Table 5). The pattern stays the same for our sample of developed and emerging countries (columns 2 and 3) and does not change if we exclude the UK and Cayman Islands. In comparison to the findings for corporate bonds, however, the pattern does not change when we consider the net purchase of U.S. stocks by foreigners. This suggests that the demand for U.S. stocks was relatively strong during the whole crisis period from 2007 to 2009 and dropped only after the bankruptcy of Lehman Brothers. While we find that the changes of the net purchases for the crisis period and the post-crisis period are statistically significant with respect to developed countries, they are not statistically significant with respect to the emerging countries (see Table 5). Nevertheless, the findings provide evidence that the bankruptcy of Lehman Brothers has caused an overall reduction in the holdings of U.S. corporate stocks, though the evidence is not statistically significant for emerging markets. In line with the findings for government bonds and corporate bonds, we also find that the volatility increased during the crisis period.

5.2.2 Pre-crisis, crisis, and post-crisis average monthly purchases and net purchases of foreign long-term securities by U.S.

Foreign Bonds

In line with the findings for U.S. long-term securities, Figure 11 shows that the overall purchases of foreign bonds (panel A, column 1) increases during the financial crisis period. The finding holds for our whole sample, as well as the sample of developed and emerging countries and does not change if we exclude the UK or the Cayman Islands (panel C). For the post-crisis period, we find that the overall purchases of foreign bond continued to increase. Excluding the UK from our sample of developed countries (panel C, column 2), however, reduces the dollar amount of foreign bonds purchased by U.S. investors for the post-crisis period, though the amount is higher in comparison to the pre-crisis period.

Focusing on the net purchases of foreign bonds by the U.S. (panel B) shows an increase during the crisis period and a decrease in the post-crisis period (to levels close to the pre-crisis period) for the overall sample (column 1) as well as our sample of developed countries (column 3). For the emerging market countries, we find increasing negative amounts (panel B, column 3). Excluding the Cayman Islands (panel D, column 3) provides a substantial negative amount of net purchased foreign bonds for the crisis period and a smaller negative amount for the post-crisis period. Table 6 indicates that most of the changes with respect to foreign bonds bought by U.S. investors are statistically significant. On the other hand, the changes are not statistically significant with respect to the net purchases of foreign bonds. Finally, Table 6 shows that the volatility of foreign bonds purchased by U.S. increased with the financial crisis and remained at high levels during the post-crisis levels.

In summary, the findings show a statistically significant increase in the dollar amount of foreign bonds bought by U.S. investors from developed and emerging countries during and after the financial crisis. While the increase in the demand of bonds from emerging markets seems to support the claim made by developing countries' policymakers that the accommodative monetary policies of the U.S. have caused a considerable increase in capital inflow towards emerging countries, the net purchases of foreign bonds does not support their claim.

Foreign Stocks

Figure 12 shows the results with respect to foreign stocks bought by U.S. investors and illustrates that they are almost identical to the patterns found for U.S. corporate stocks bought by foreign investors. Panel A shows an increase in the purchases of foreign stocks during the financial crisis, but a decrease in the post-crisis period. Yet, the levels in the post-crisis period are higher than the levels in the pre-crisis period. The changes over the different sub-periods are all statistically significant (see Table 7). Furthermore, the results hold for our whole sample (column 1), the sample of developed countries (column 2), as well as our sample of emerging market countries (column 3) and do not change if we exclude the UK and the Cayman Islands (panel C).

Looking at the net purchases of foreign stocks by U.S. investors provides again a different picture. For developed countries (panels B and D, column 2), we find for the

crisis period a statistically significant decrease for the net demand of corporate stocks, with a statistically significant rebound during the post-crisis period (see Table 7). Panel D, column 3, provides similar results for our sample of emerging market countries (excluding the Cayman Islands), though the findings are not statistically significant (see Table 7, panel B). Again, our findings with respect to foreign equity do not seem to support the claim that the monetary policies of the U.S. have caused disruptive capital flows towards developing countries. While the dollar amount of foreign stocks bought by U.S. investors is statistically significantly higher during the post-crisis period in comparison to the pre-crisis period, the amount is statistically significantly lower than during the crisis-period. Hence, the amount of foreign equity purchased has rather decreased with the start of the U.S. quantitative easing. Moreover, while the net purchases of foreign equity has increased in the pre-crisis period, the increase is not statistically significant and only slightly higher than in the pre-crisis period, especially in the case where we exclude the Cayman Islands (panel D, column 3).

6. Conclusion

In this paper we analyze the impact of the global financial crisis on the amount of cross-border security flows (measured in U.S. dollars) from and towards the U.S. The securities investigated are the U.S. treasury securities, U.S. government bonds, U.S. corporate bonds, U.S. corporate stocks, foreign bonds and foreign stocks.

Plotting line-charts, we investigate the direct impact of the financial crisis on the cross-border security flows. Moreover, we divide our sample into three sub-periods: a pre-crisis period from 2003 to 2006, a crisis period from 2007 to 2009, and a post-crisis period from 2010 to 2013. This allows us to detect if there are statistically significant differences in the average monthly amounts between the different sub-periods. Moreover, it allows us to analyze the impact of the unprecedented monetary policies by the U.S. that follow the bankruptcy of Lehman Brothers on the cross-border capital flows. This may be of special interest as some of the policymakers in developed countries have claimed that the accommodative monetary policies by the U.S. have caused disruptive capital flows towards their countries.

While we find that the global financial crisis has impacted all cross-border capital flows in our analysis, the timing, the significance, and the nature of the impact differs among the different securities, as well as our sample of developed and emerging market countries. We find a significant increase in the demand for U.S. treasuries with the start of the global financial crisis in early 2007. The increase holds for the developed and emerging markets alike; we interpret the increase as evidence for the commonly stated flight-to-safety. Interestingly, the flight-to-safety experienced a significant, but short lived interruption due to the bankruptcy of Lehman Brothers. Yet, the demand for U.S. treasury securities resumed with the beginning of 2009, especially with respect to developed countries; while developing countries took much longer to regain trust in U.S. treasury securities. Notably, U.S. government bonds, U.S. corporate bonds as well foreign bonds experienced a decline in their demand much earlier than U.S. treasuries. In line with U.S. treasuries, we find for U.S. stocks and foreign stocks also a significant drop in demand with the bankruptcy of Lehman Brothers. However, while the demand for U.S. treasuries increased after the financial crisis, we find that the demand has not recovered for U.S. corporate bonds, U.S. stocks as well as foreign stocks. The finding is similar for developed and emerging countries. It may be seen as evidence that financial crisis has caused a general reduction of international cross-border capital flows, especially with respect to equity and U.S. corporate bonds, plausibly brought about by a general increase in risk aversion. One of the main exceptions to our findings is the demand for foreign bonds by U.S. investors, which has substantially increased during the period following the financial crisis. This increase is especially significant for the demand of foreign bonds from emerging markets. Further, our findings suggest that the impact of the global financial crisis on the cross border capital flows was less severe with respect to our sample of emerging markets.

Notably, our results do not indicate much evidence that the accommodative monetary policies by the U.S. have caused overall disruptive capital flows towards emerging market countries. In fact, we see lower equity flows towards emerging markets in the post-crisis; yet, the demand by U.S. investors for bonds from emerging markets increased significantly. The latter finding, however, may be more related to the higher interest rates in emerging markets in the post-crisis period, rather than higher liquidity

brought about by the quantitative easing. The finding points in the direction that U.S. investors use foreign bonds as a substitute for more risky (perceived) foreign equity investments, possibly due to a general increase in risk-aversion after the bankruptcy of Lehman Brothers.

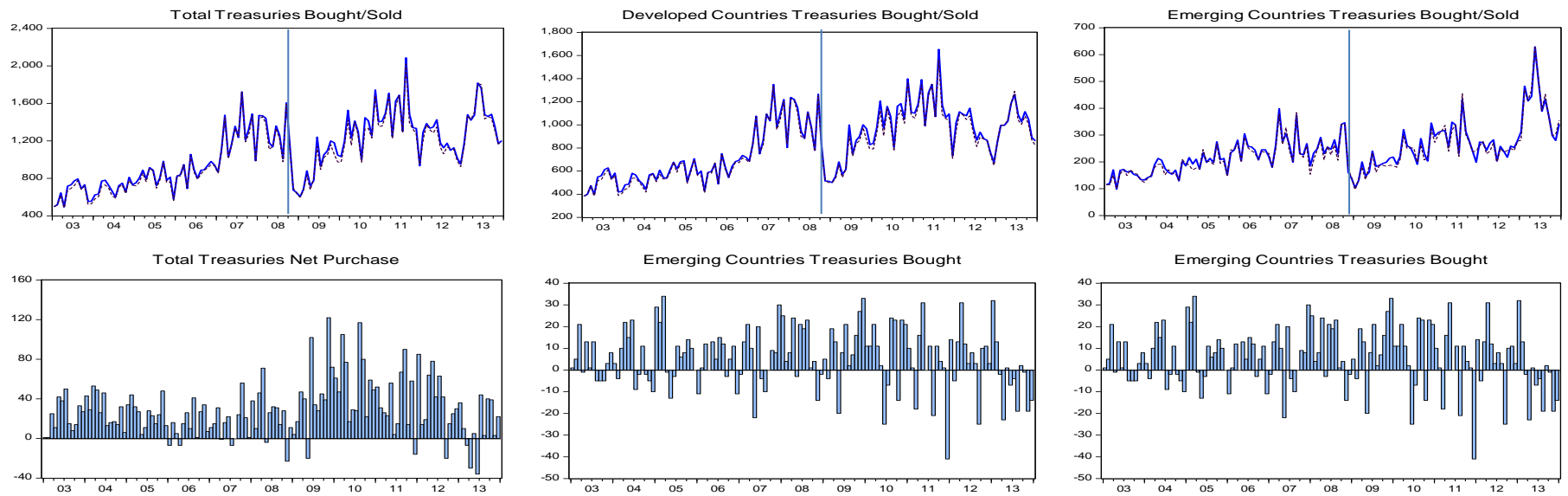
Finally, we find higher volatility during the crisis period with respect to the demand of all long-term securities investigated in this paper. The higher volatility subsided for most long-term securities during the post-crisis period.

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Panel A: U.S. Treasury securities including the Cayman Island and the UK



Panel B: U.S. Treasury securities excluding the Cayman Island and the UK

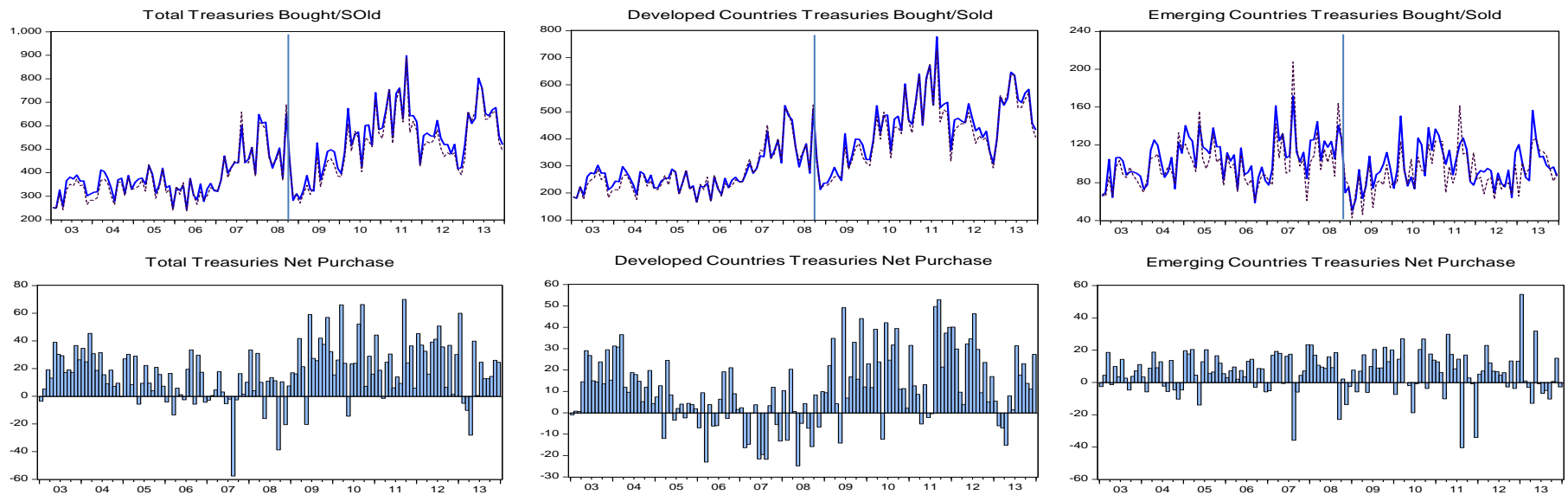
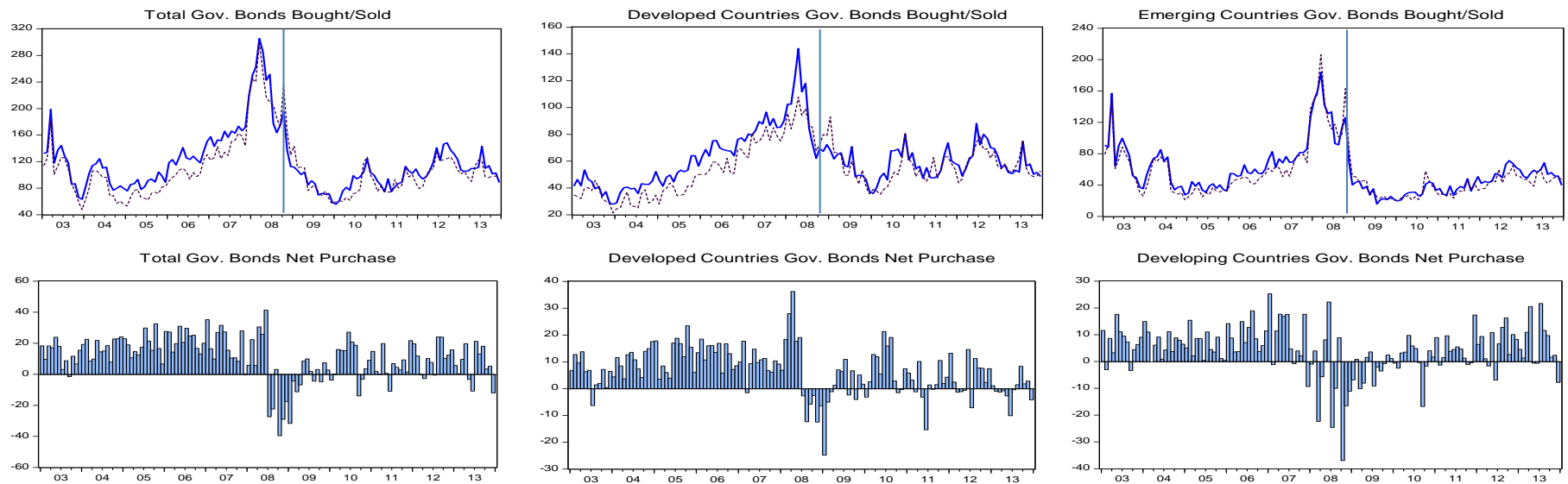


Figure 1: Purchase and net purchase of U.S. Treasuries by developed and developing countries

Panel A: U.S. government bonds including the Cayman Island and the UK



Panel B: U.S. government bonds excluding the Cayman Island and the UK

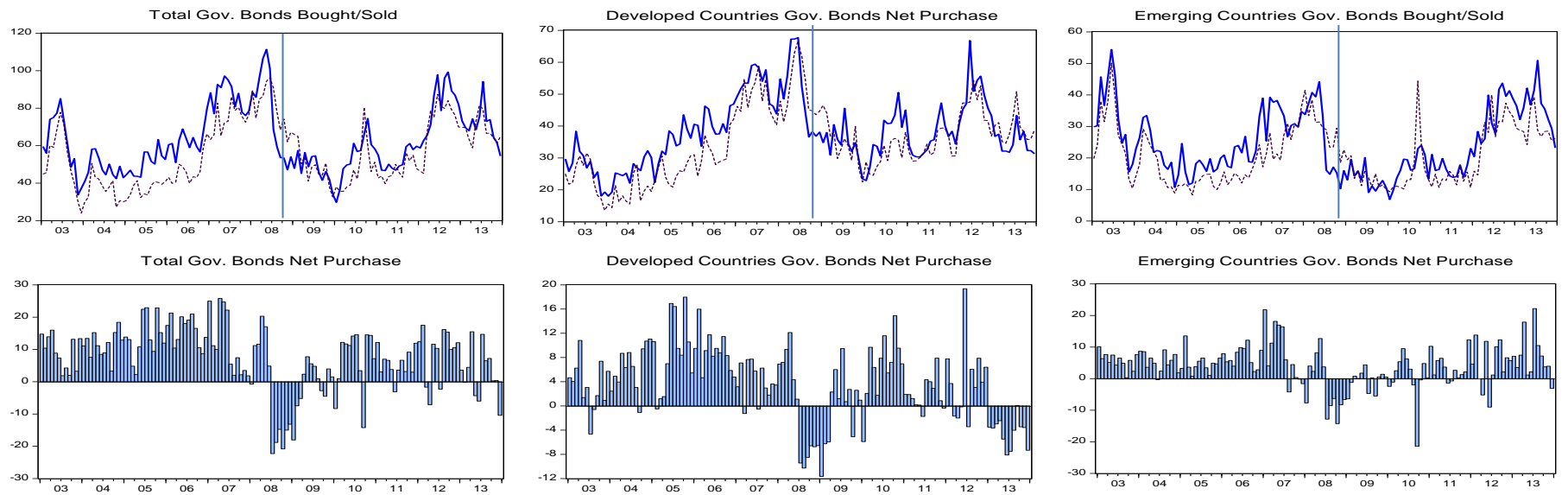
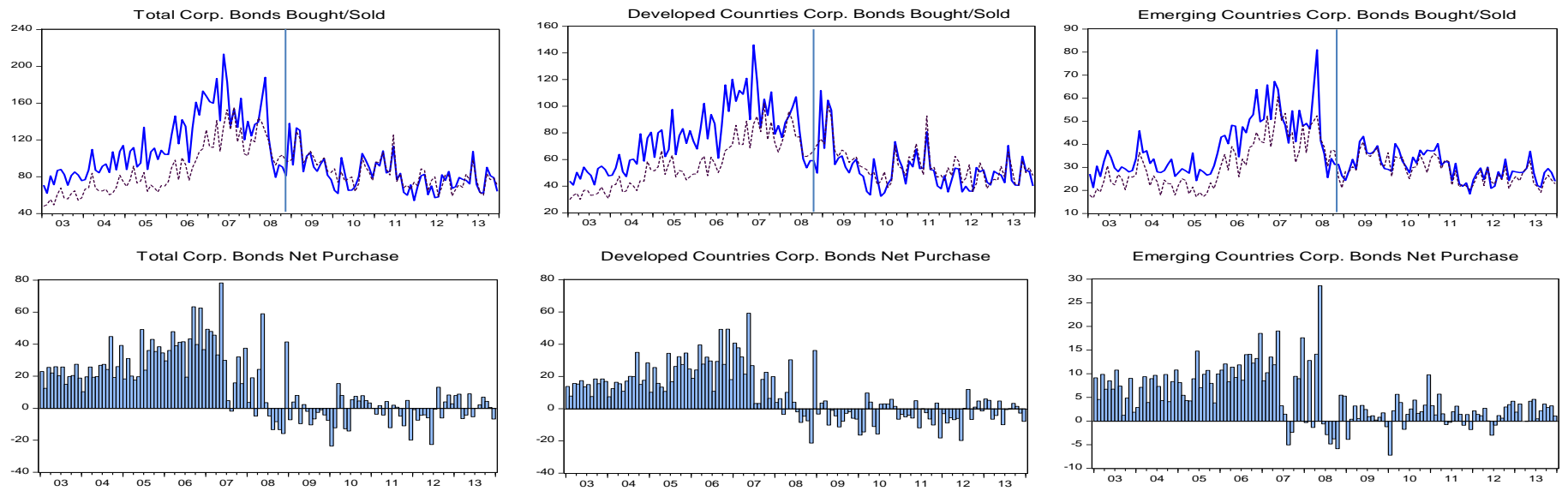


Figure 2: Purchase and net purchase of U.S. government bonds by developed and developing countries

Panel A: U.S. corporate bonds including the Cayman Island and the UK



Panel B: U.S. corporate bonds excluding the Cayman Island and the UK

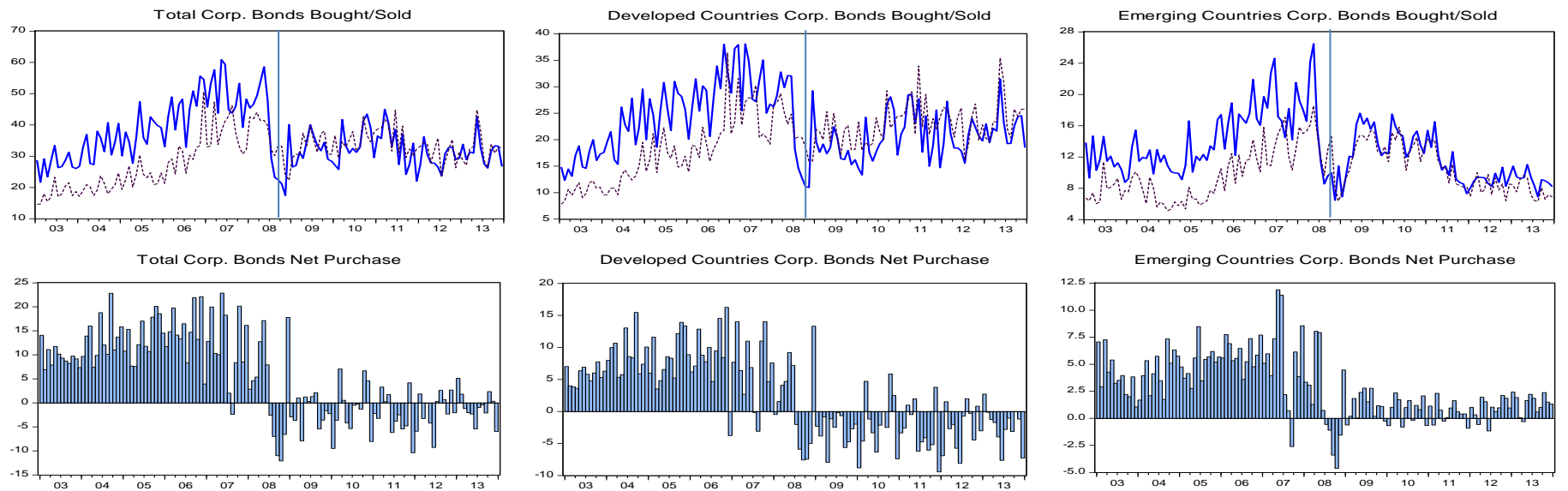
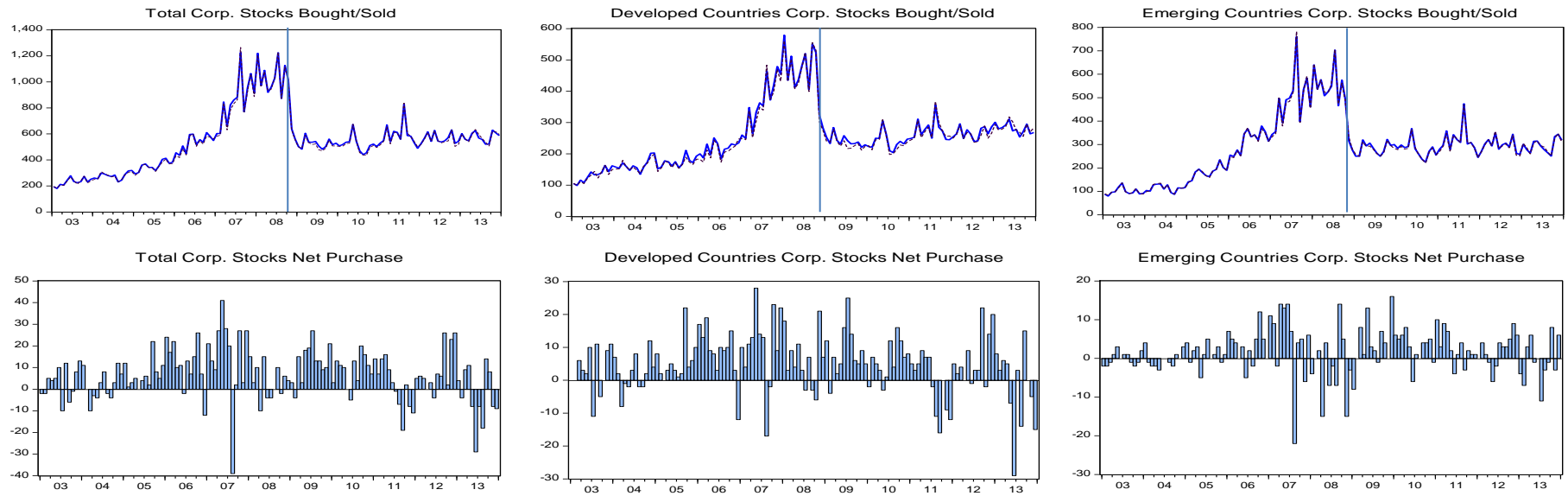


Figure 3: Purchase and net purchase of U.S. corporate bonds by developed and developing countries

Panel A: U.S. corporate stocks including the Cayman Island and the UK



Panel B: U.S. corporate stocks excluding the Cayman Island and the UK

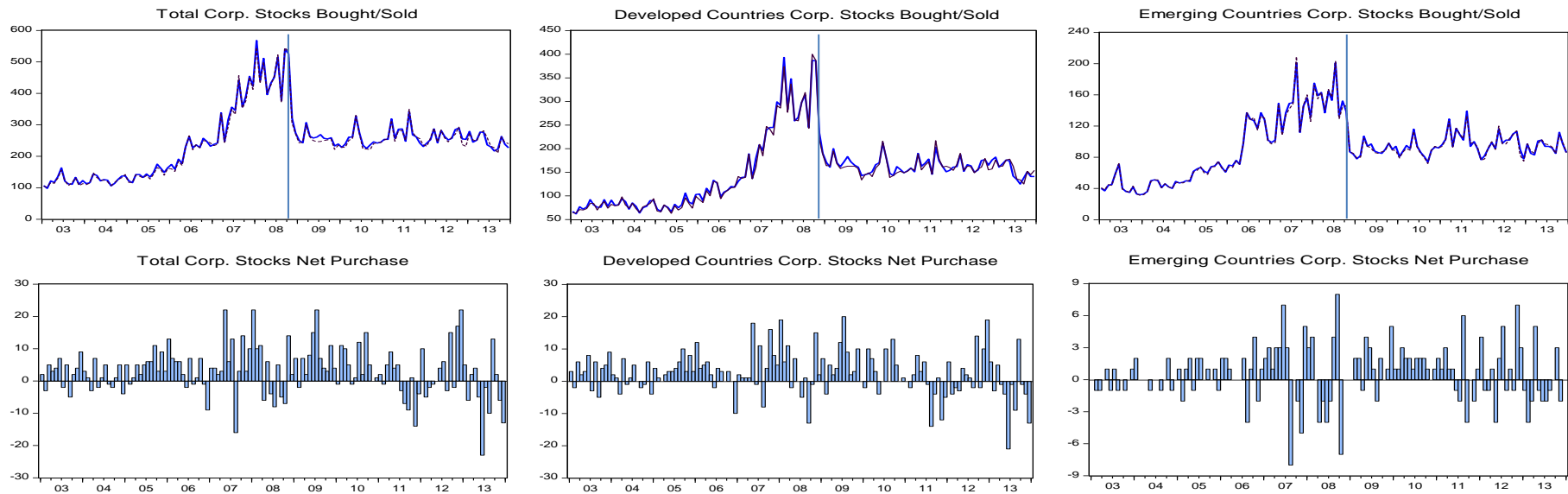
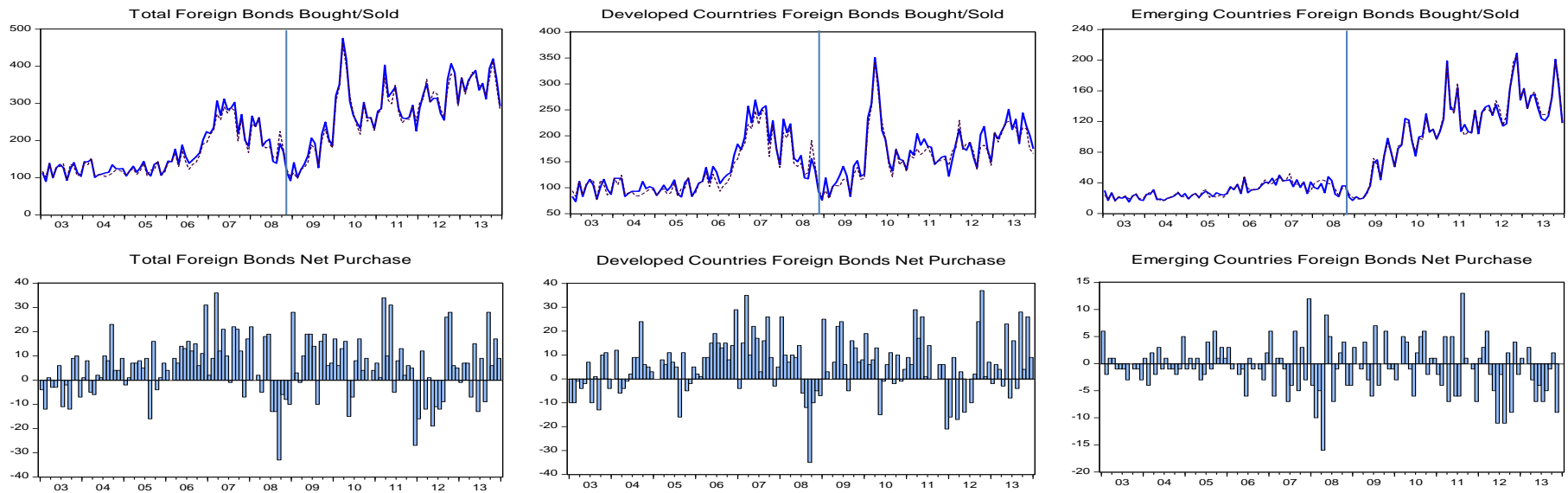


Figure 4: Purchase and net purchase of U.S. corporate stocks by developed and developing countries

Panel A: Foreign bonds including the Cayman Island and the UK



Panel B: Foreign bonds excluding the Cayman Island and the UK

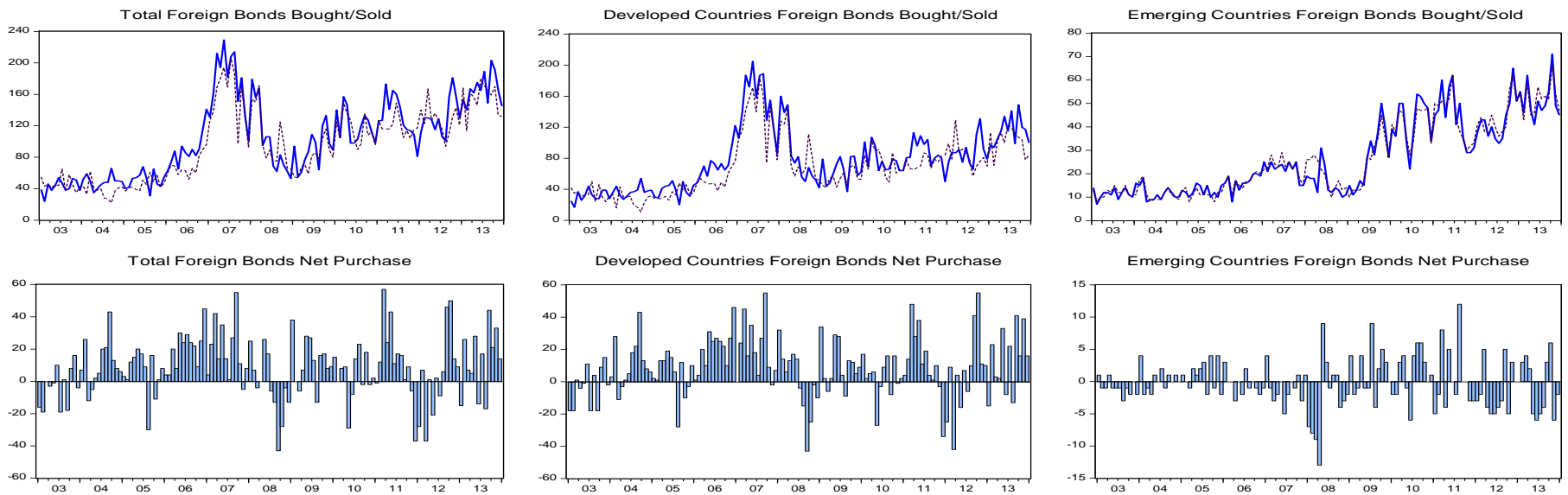
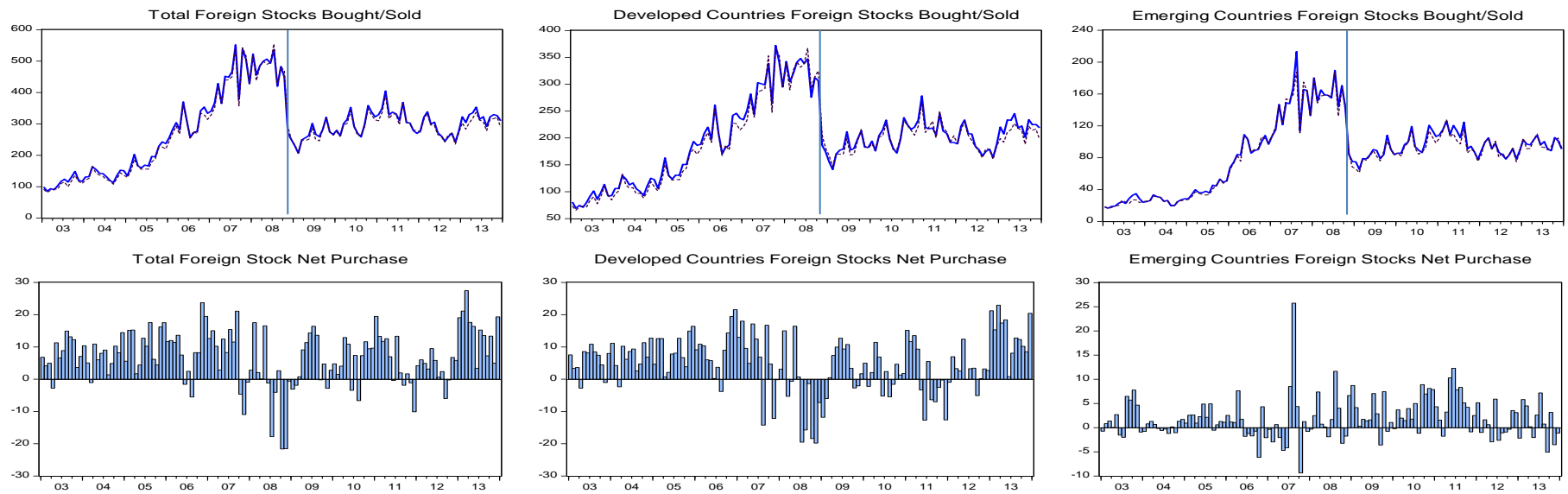


Figure 5: Purchase and net purchase of foreign bonds of developed and developing countries by U.S.

Panel A: Foreign stocks including the Cayman Island and the UK



Panel B: Foreign stocks excluding the Cayman Island and the UK

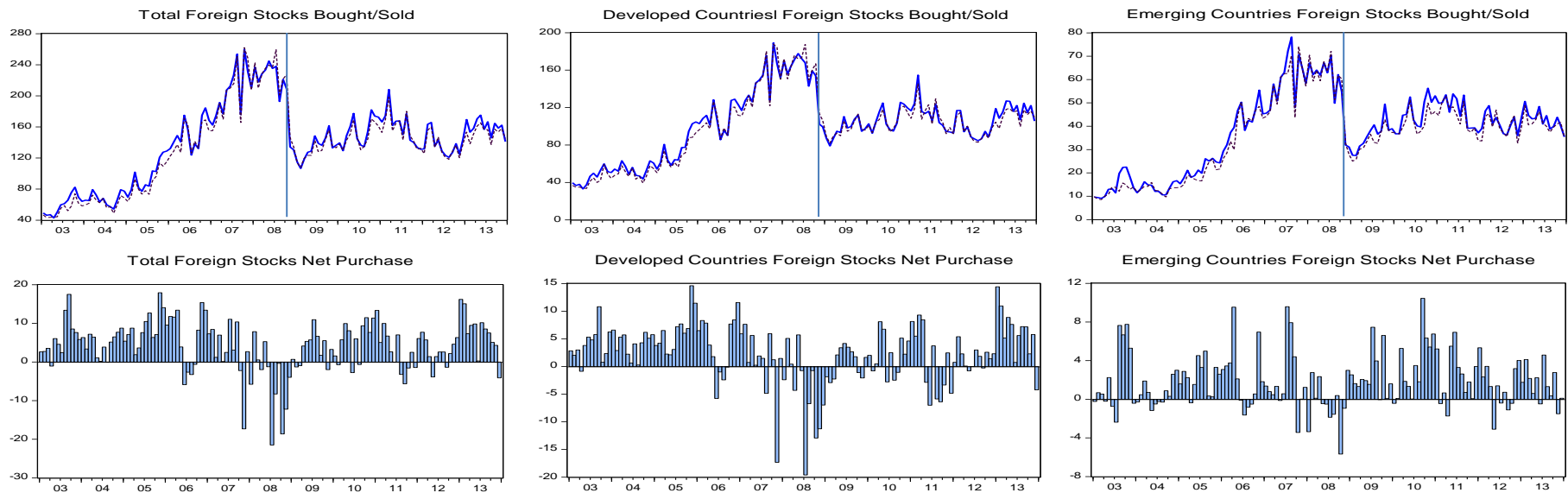
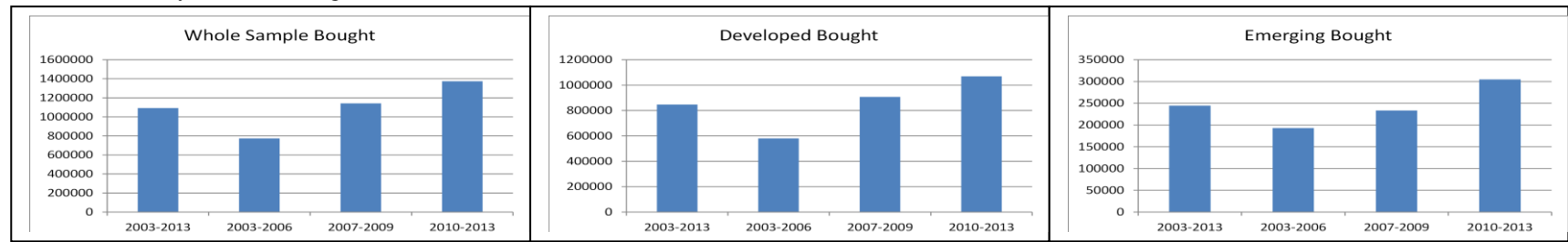
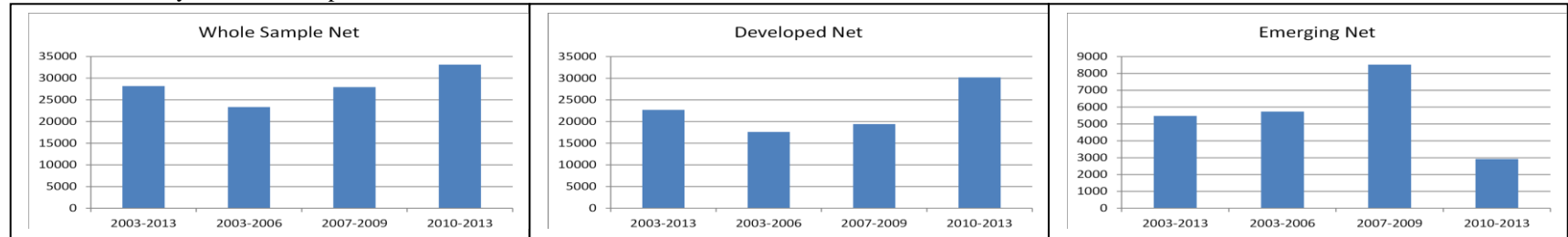


Figure 6: Purchase and net purchase of foreign stocks of developed and developing countries by U.S.

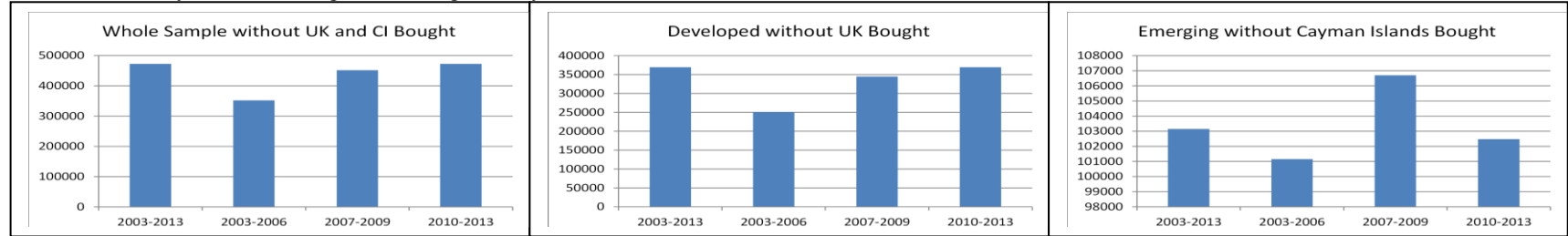
Panel A: Treasury securities bought



Panel B: Treasury securities net purchase



Panel C: Treasury securities bought excluding the Cayman Island and the UK



Panel D: Treasury securities net purchase excluding the Cayman Island and the UK

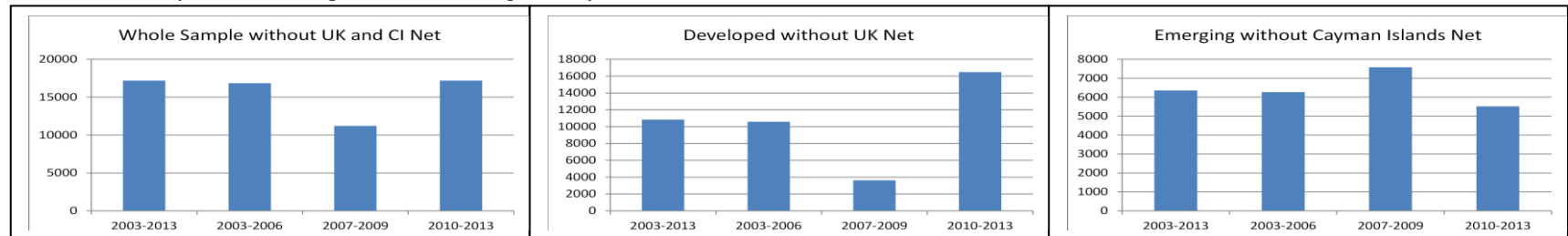
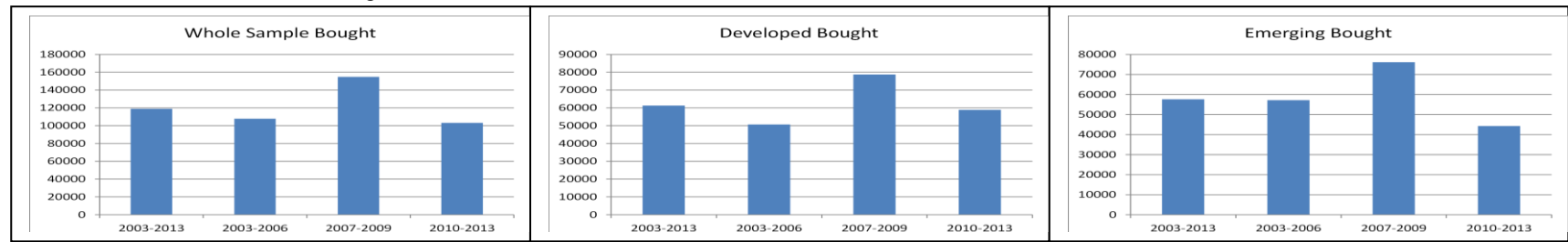
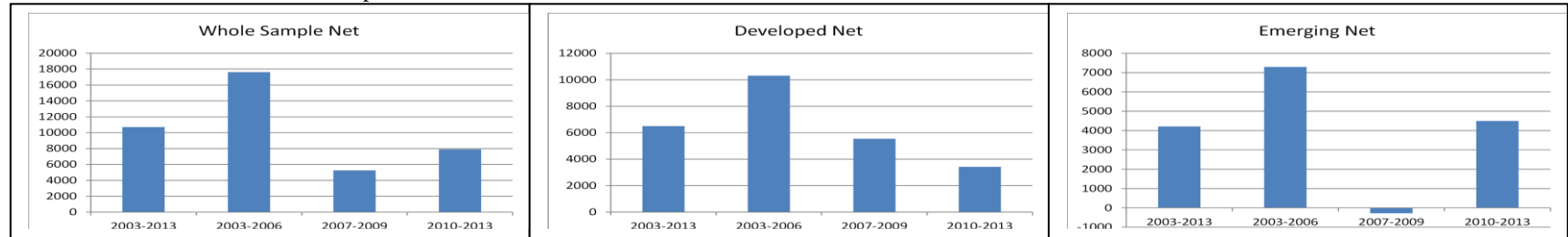


Figure 7: Treasury Securities, Average Monthly Demand, 2003 to 2013, 2003 to 2006, 2007 to 2009, 2010 to 2013

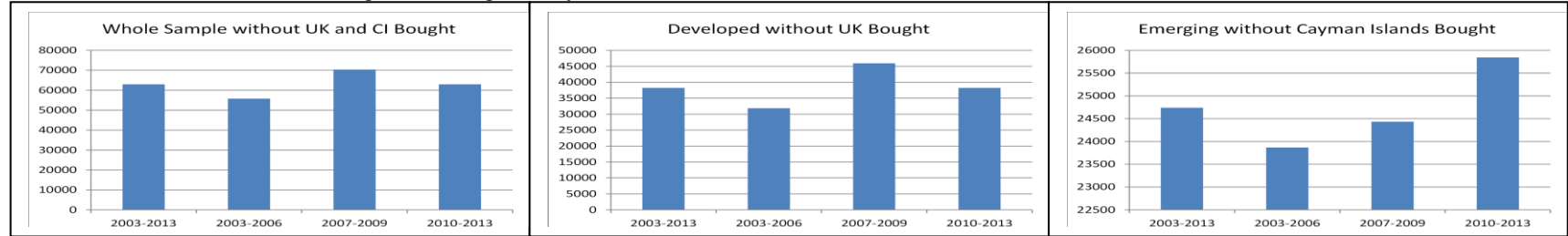
Panel A: Government securities bought



Panel B: Government securities net purchase



Panel C: Government securities bought excluding the Cayman Island and the UK



Panel D: Government securities net purchase excluding the Cayman Island and the UK

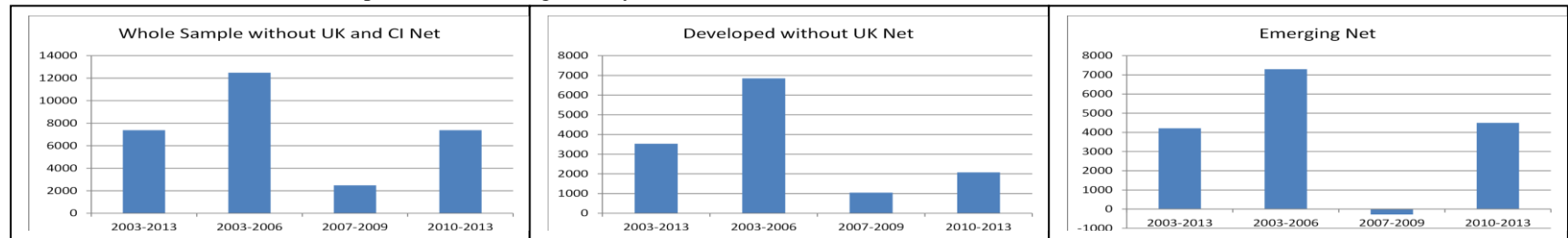
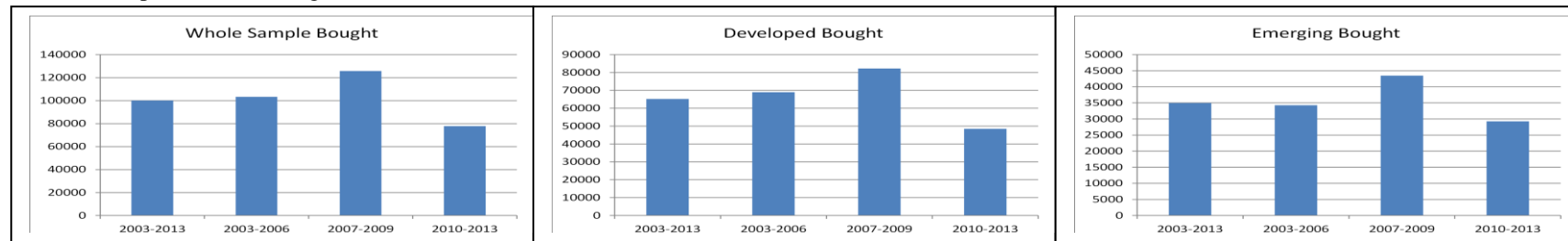
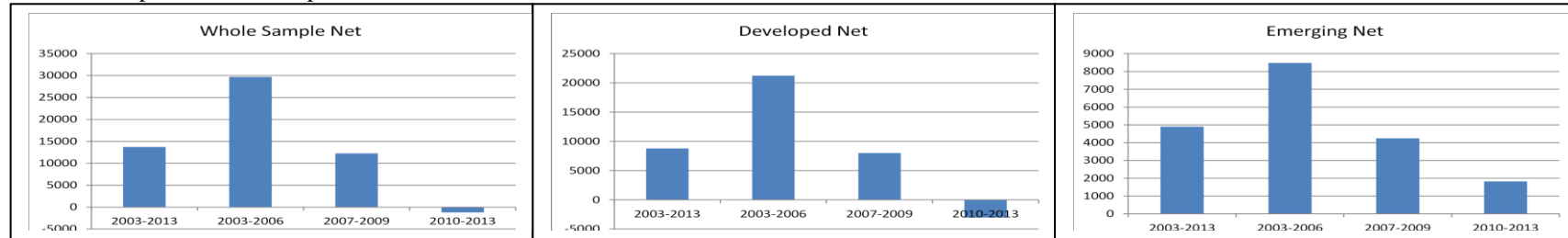


Figure 8: Government Securities, Average Monthly Demand, 2003 to 2013, 2003 to 2006, 2007 to 2009, 2010 to 2013

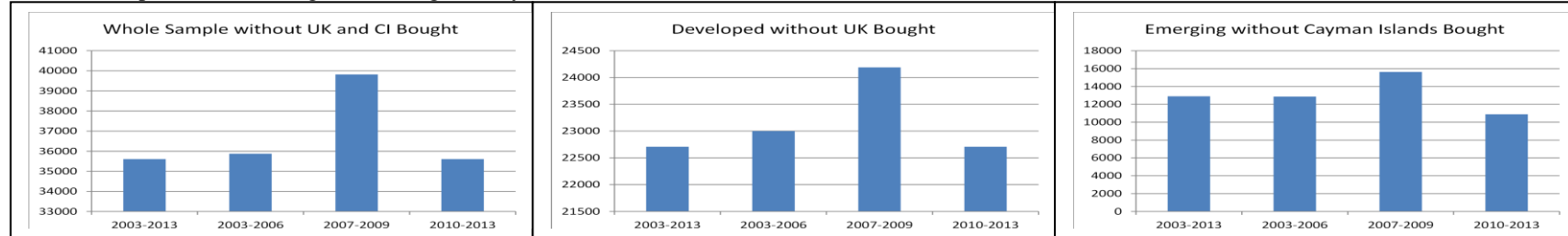
Panel A: Corporate bonds bought



Panel B: Corporate bonds net purchase



Panel C: Corporate bonds bought excluding the Cayman Island and the UK



Panel D: Corporate bonds net purchase excluding the Cayman Island and the UK

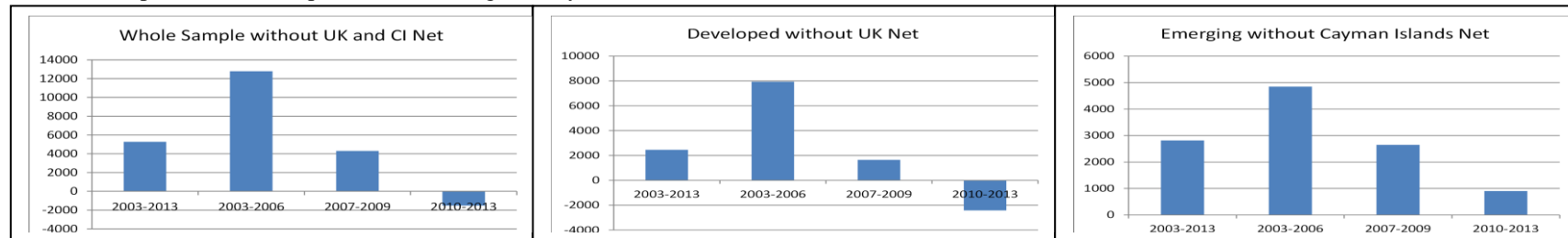
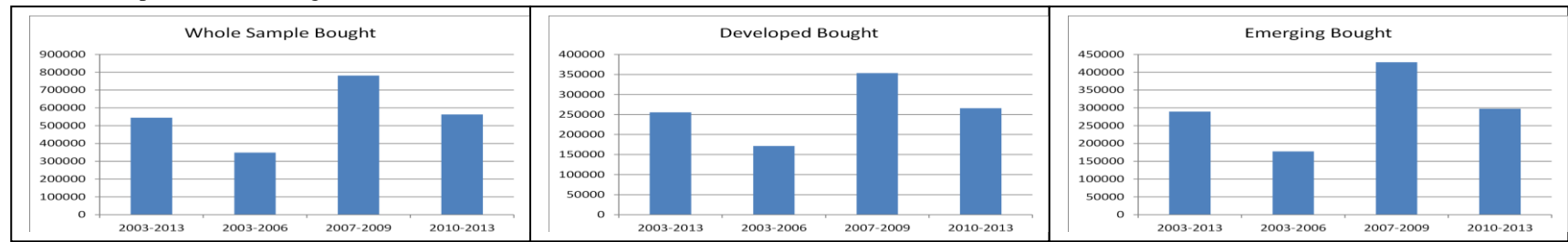
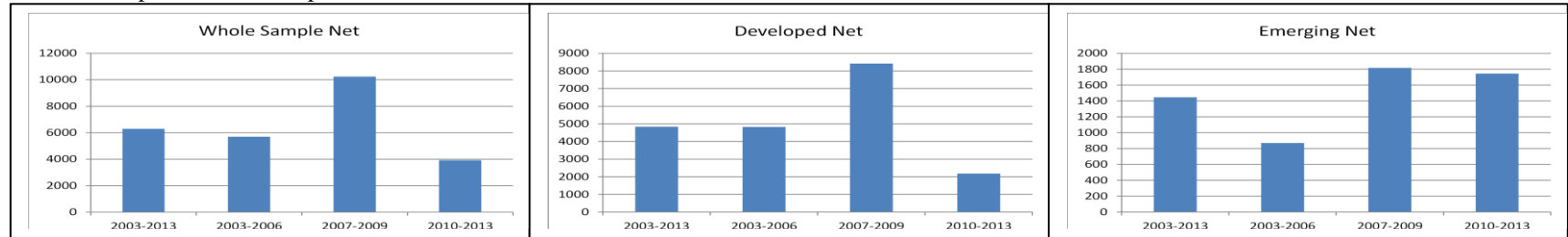


Figure 9: Corporate Bonds, Average Monthly Demand, 2003 to 2013, 2003 to 2006, 2007 to 2009, 2010 to 2013

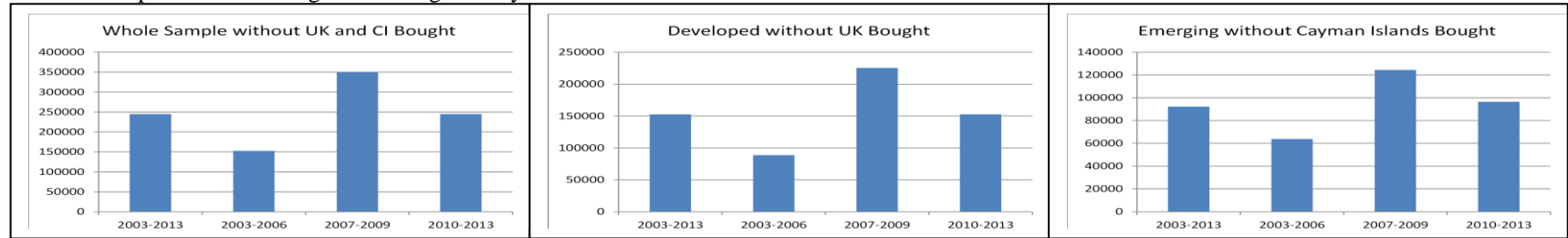
Panel A: Corporate stocks bought



Panel B: Corporate stocks net purchase



Panel C: Corporate stocks bought excluding the Cayman Island and the UK



Panel D: Corporate stocks net purchase excluding the Cayman Island and the UK

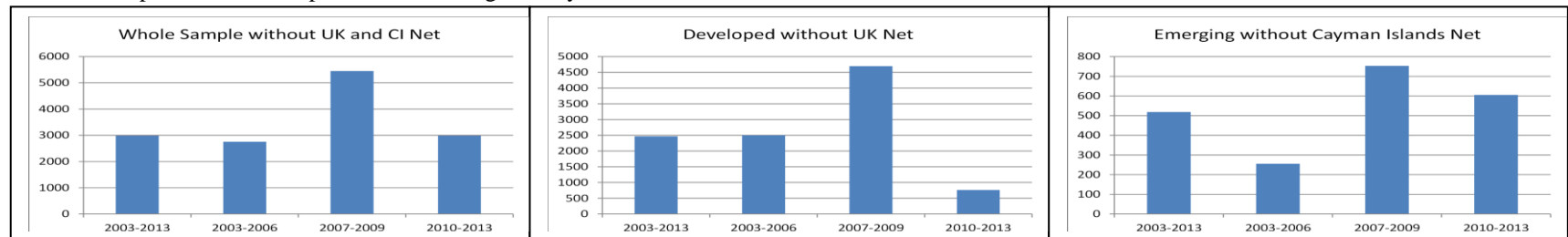
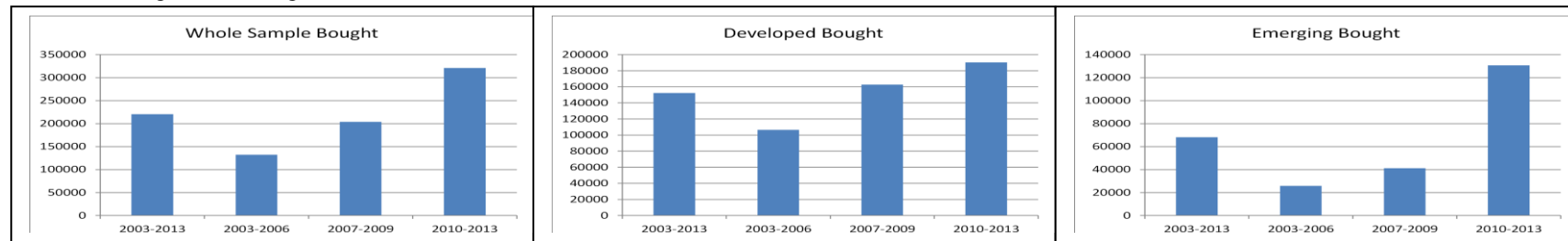
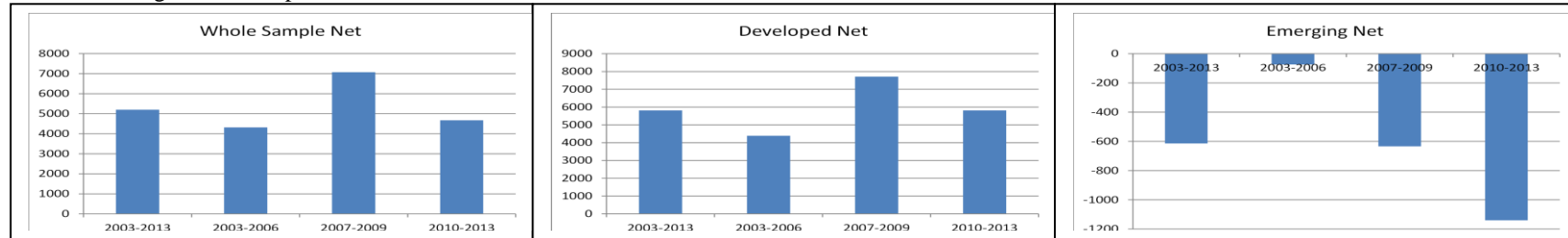


Figure 10: Corporate stocks, Average Monthly Demand, 2003 to 2013, 2003 to 2006, 2007 to 2009, 2010 to 2013

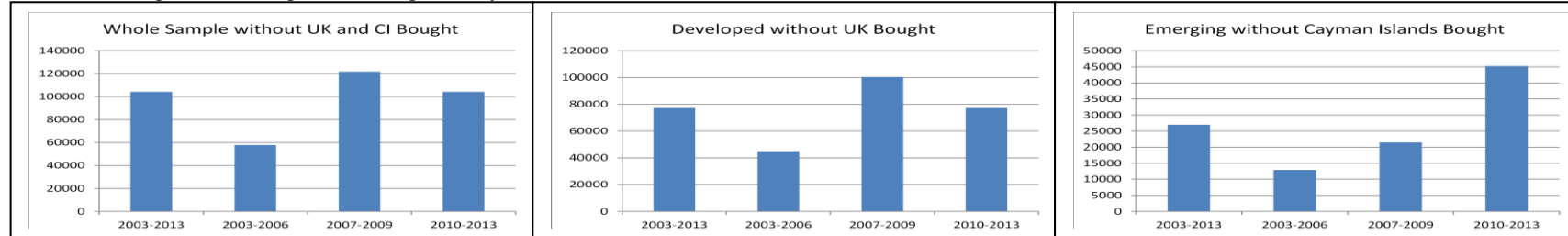
Panel A: Foreign bonds bought



Panel B: Foreign bonds net purchase



Panel C: Foreign bonds bought excluding the Cayman Island and the UK



Panel D: Foreign bonds net purchase excluding the Cayman Island and the UK

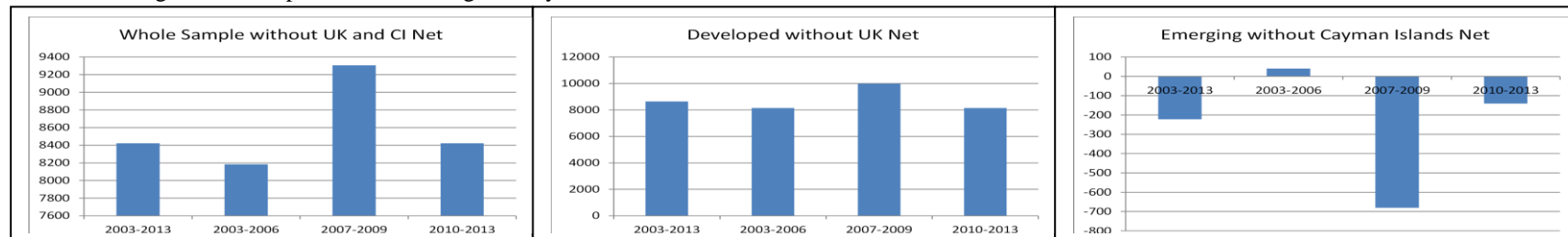
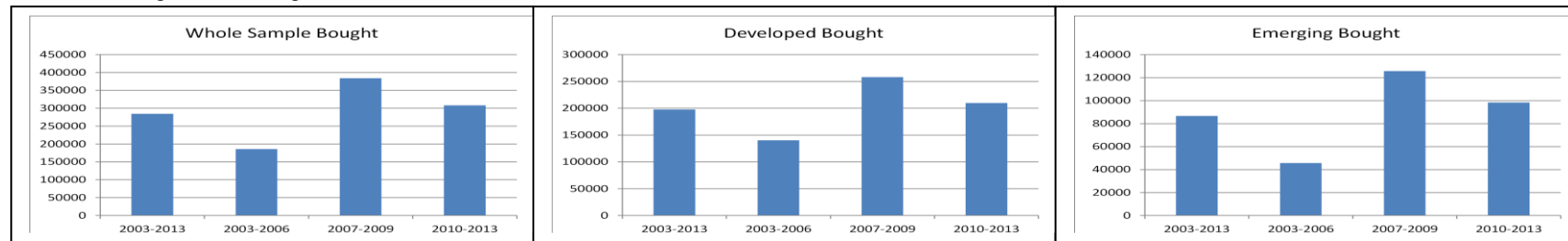
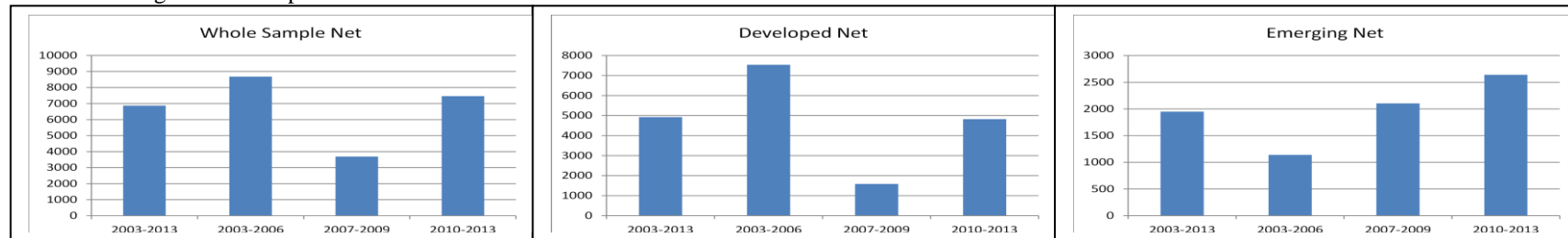


Figure 11: Foreign Bonds, Average Monthly Demand, 2003 to 2013, 2003 to 2006, 2007 to 2009, 2010 to 2013

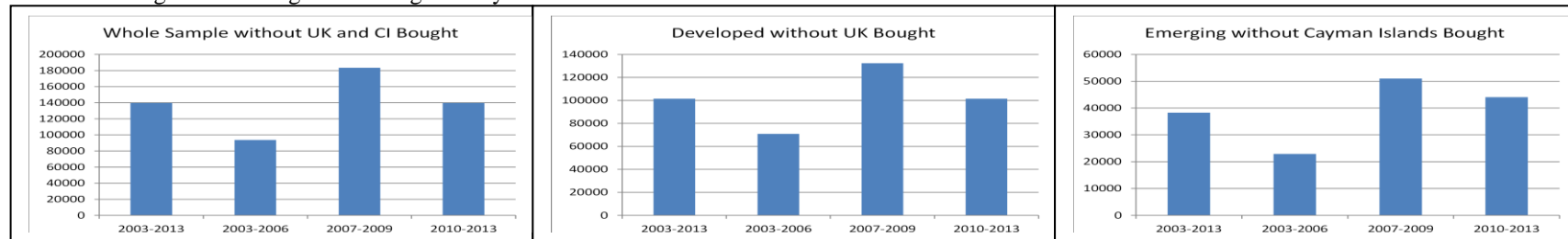
Panel A: Foreign stocks bought



Panel B: Foreign stocks net purchase



Panel C: Foreign stocks bought excluding the Cayman Island and the UK



Panel D: Foreign stocks net purchase excluding the Cayman Island and the UK

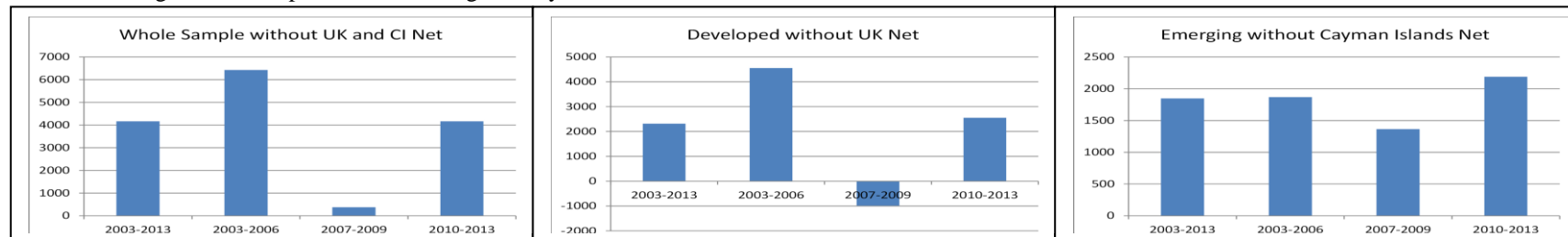


Figure 12: Foreign stocks, Average Monthly Demand, 2003 to 2013, 2003 to 2006, 2007 to 2009, 2010 to 2013

Table 1: Sample Percentages

Panel A: Comparison of securities bought between whole sample and grand total				
	2003 - 2013	2003 - 2006	2007 - 2009	2010 - 2013
Treasuries	99%	98%	99%	99%
Government Bonds	97%	97%	98%	96%
Corporate Bonds	98%	97%	99%	99%
Corporate Stocks	93%	90%	96%	91%
Foreign Bonds	99%	98%	99%	99%
Foreign Stocks	98%	96%	99%	97%
Panel B: Percent of securities of the whole sample bought by UK and Cayman Islands				
	2003 - 2013	2003 - 2006	2007 - 2009	2010 - 2013
Treasuries	57%	55%	60%	56%
Government Bonds	47%	48%	55%	37%
Corporate Bonds	64%	65%	68%	59%
Corporate Stocks	55%	56%	55%	54%
Foreign Bonds	53%	56%	40%	57%
Foreign Stocks	51%	49%	52%	50%
Panel C: Percent of securities of the whole sample bought by UK				
	2003 - 2013	2003 - 2006	2007 - 2009	2010 - 2013
Treasuries	44%	43%	49%	41%
Government Bonds	19%	17%	21%	19%
Corporate Bonds	42%	45%	46%	35%
Corporate Stocks	19%	24%	16%	18%
Foreign Bonds	34%	46%	31%	31%
Foreign Stocks	34%	37%	33%	33%
Panel D: Percent of securities of whole sample bought by Cayman Islands				
	2003 - 2013	2003 - 2006	2007 - 2009	2010 - 2013
Treasuries	13%	12%	11%	15%
Government Bonds	28%	31%	33%	18%
Corporate Bonds	22%	21%	22%	24%
Corporate Stocks	36%	33%	39%	36%
Foreign Bonds	19%	10%	10%	27%
Foreign Stocks	17%	12%	19%	18%
Panel E: Percent of securities of developed countries bought by UK				
	2003 - 2013	2003 - 2006	2007 - 2009	2010 - 2013
Treasuries	56%	57%	62%	53%
Government Bonds	37%	42%	34%	38%
Corporate Bonds	67%	71%	56%	65%
Corporate Stocks	40%	48%	36%	39%
Foreign Bonds	49%	58%	38%	52%
Foreign Stocks	56%	50%	59%	55%
Panel F: Percent of securities of emerging countries bought by Cayman Islands				
	2003 - 2013	2003 - 2006	2007 - 2009	2010 - 2013

				2013
Treasuries	58%	48%	54%	66%
Government Bonds	57%	58%	68%	42%
Corporate Bonds	63%	62%	64%	63%
Corporate Stocks	68%	64%	71%	68%
Foreign Bonds	60%	50%	48%	65%
Foreign Stocks	56%	50%	59%	55%

Table 2: Treasury Securities

Panel A: Treasuries including the UK and the Cayman Islands

		Whole Sample		Developed		Emerging	
		Bought	Net	Bought	Net	Bought	Net
2003-2013	Mean	1092266	28157	847618	22683	244648	5474
	STD	338961	27997	273809	23507	85024	13891
2010-2013	Mean	1373937	33132	1069299	30206	304638	2926
	STD	236740	34667	184288	28528	90103	16455
	%Δ form 09/07	20%	19%	18%	56%	31%	-66%
2007-2009	Mean	1140852	27936	907577	19414	233275	8523
	STD	283282	30461	232443	25123	67238	13671
	%Δ form 06/03	47%	20%	56%	10%	21%	52%
2003-2007	Mean	774155	23348	580967	17612	193188	5736
	STD	135093	15590	95964	12806	46744	10679
13/10 - 09/07	t-test	4.10 **	.72 *	3.56 **	1.80 **	3.99 **	1.66 *
09/07 - 06/03	t-test	7.18 **	0.83 *	7.94 **	0.39 *	3.22 **	1.05 *
13/10 - 06/03	t-test	15.2 **	1.78 *	15.2 **	2.79 **	7.61 **	0.99 *

Panel B: Treasuries excluding the UK and the Cayman Islands

		Whole Sample		Developed		Emerging	
		Bought	Net	Bought	Net	Bought	Net
2003-2013	Mean	472370	17182	369220	10832	103150	6350
	STD	140650	20593	132516	17256	22920	13037
2010-2013	Mean	608489	21998	506010	16484	102479	5514
	STD	106707	22273	95161	18603	21625	16306
	%Δ form 09/07	35%	96%	47%	354%	-4%	-27%

2007-2009	Mean	451391	11205	344685	3630	106707	7575
	STD	99815	24598	80387	18828	27527	13373
	%Δ form 06/03	28%	-33%	37%	-66%	5%	21%
2003-2006	Mean	351985	16848	250831	10582	1011154	6266
	STD	47664	13568	34538	12146	20448	8533
13/10 - 09/07	t-test	6.86 **	2.10 *	8.21 **	3.12 **	-	-
09/07 - 06/03	t-test	5.52 **	1.24 -	6.57 **	1.93 *	1.06	0.55
13/10 - 06/03	t-test	15.2 **	1.37	17.4 **	6 *	1.84 *	0.31
		1 *					0.28

*, **, *** indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The results are based on a two-sample t-test in combination with a Levene-Test of equal variance.

Table 3: Government Bonds

		Whole Sample		Developed		Emerging	
		Bought	Net	Bought	Net	Bought	Net
2003-2013	Mean	118940	10711	61298	6500	57641	4211
	STD	45020	13847	19517	8738	31136	9110
2010-2013	Mean	103141	7907	58902	3413	44240	4494
	STD	20835	10344	11068	7185	13268	7082
	%Δ form 09/07	-33%	51%	-25%	-38%	-42%	-1703%
2007-2009	Mean	154812	5253	78718	5533	76093	-280
	STD	65097	19809	23141	11615	44867	13218
	%Δ form 06/03	44%	-70%	55%	-46%	33%	-104%
2003-2007	Mean	107835	17608	50630	10313	57204	7295
	STD	26322	7468	13636	5950	24137	5077
13/10 - 09/07	t-test	4.59 **	0.73	4.75 **	0.97	4.13 **	1.97 **
09/07 - 06/03	t-test	4.09 **	3.56 **	6.49 **	2.26 **	2.29 **	3.62 **
13/10 - 06/03	t-test	-	- *	3.26 *	- *	- *	- **

		0.97	5.27		5.12	3.26	2.23	
Panel B: Government Bonds excluding the UK and the Cayman Islands								
		Whole Sample		Developed		Emerging		
		Bought	Net	Bought	Net	Bought	Net	
2003-2013	Mean	62994	7378	38252	3530	24742	3849	
	STD	17483	9763	10691	6181	10573	6523	
2010-2013	Mean	64709	5940	38865	2075	25844	3866	
	STD	16022	7746	8334	5920	10902	6907	
	%Δ form							
	09/07	-8%	139%	-15%	98%	6%	169%	
2007-2009	Mean	70387	2482	45953	1047	24434	1435	
	STD	22032	13057	11577	6297	11496	8521	
	%Δ form							
	06/03	26%	-80%	44%	-85%	2%	-75%	
2003-2007	Mean	55734	12489	31864	6847	23870	5642	
	STD	11623	5615	7864	4875	9602	3014	
13/10 -		-		-	**			
09/07	t-test	1.31	1.41	3.12	*	0.77	0.57	1.44
09/07 -		**	-	**	**	-	**	-
06/03	t-test	3.63	4.31	6.29	*	4.76	0.24	2.83
13/10 -		-	-	**	**	-	**	-
06/03	t-test	3.14	4.74	4.23	*	4.31	0.94	1.63

*, **, *** indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The results are based on a two-sample t-test in combination with a Levene-Test of equal variance.

Table 4: Corporate Bonds

Panel A: Corporate Stocks including the UK and the Cayman Islands							
		Whole Sample		Developed		Emerging	
		Bought	Net	Bought	Net	Bought	Net
2003-2013	Mean	100113	13698	65154	8797	34959	4900
	STD	32291	20195	23387	15779	10901	5602
2010-2013	Mean	77760	-1206	48504	-3027	29256	1821
	STD	14569	8814	10852	7294	5478	2593
	%Δ form	-38%	-110%	-41%	-138%	-33%	-57%

09/07

2007-2009	Mean	125699	12233	82241	7996	43457	4238
	STD	36136	23826	25647	17944	13448	7769
	%Δ form 06/03	22%	-59%	19%	-62%	27%	-50%
2003-2007	Mean	103276	29699	68988	21222	34288	8477
	STD	26452	12095	19877	10002	8807	3566
13/10 - 09/07	t-test	- ** 7.52 *	- ** 3.22 *	- ** 7.41 *	- ** 3.48 *	- ** 5.98 *	- ** 1.79 *
09/07 - 06/03	t-test	** 3.14 *	- ** 4.03 *	** 2.57 *	- ** 3.98 *	** 3.56 *	- ** 3.04 *
13/10 - 06/03	t-test	- ** 5.85 *	- ** 14.3 *	- ** 6.27 *	- ** 13.6 *	- ** 3.36 *	- ** 10.5 *

Panel B: Corporate Stocks excluding the UK and the Cayman Islands

		Whole Sample		Developed		Emerging	
		Bought	Net	Bought	Net	Bought	Net
2003-2013	Mean	35607	5271	22709	2459	12898	2812
	STD	9104	8675	6260	6381	3941	2897
2010-2013	Mean	32182	-1520	21308	-2421	10874	901
	STD	5460	4074	4221	3638	2687	1003
	%Δ form 09/07	-19%	-135%	-12%	-246%	-30%	-66%
2007-2009	Mean	39820	4301	24189	1654	15630	2647
	STD	11918	9535	8034	6476	4844	3877
	%Δ form 06/03	11%	-66%	5%	-79%	21%	-45%
2003-2007	Mean	35874	12790	23000	7942	12874	4848
	STD	8354	4459	6289	3676	2948	1791
13/10 - 09/07	t-test	- ** 3.57 *	- ** 3.44 *	- ** 1.96 **	- ** 3.39 *	- ** 5.31 *	- ** 2.64 *
09/07 - 06/03	t-test	** 1.70 *	- ** 4.95 *	** 0.74	- ** 5.23 *	** 3.02 *	- ** 3.16 *
13/10 - 06/03	t-test	- ** 2.56 *	- ** 16.4 *	- ** 1.55 *	- ** 13.9 *	- ** 3.48 *	- ** 13.3 *

*, **, *** indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The results are based on a two-sample t-test in combination with a Levene-Test of equal variance.

Table 5: Corporate Stocks

Panel A: Corporate Stocks including the UK and the Cayman Islands							
		Whole Sample		Developed		Emerging	
		Bought	Net	Bought	Net	Bought	Net
2003-2013	Mean	544775	6289	255313	4842	289463	1446
	STD	229263	11513	96858	8926	136832	5596
2010-2013	Mean	563077	3921	265578	2177	297499	1744
	STD	64332	11338	28814	9604	40925	4595
	%Δ form 09/07	-28%	-62%	-25%	-74%	-30%	-4%
2007-2009	Mean	781392	10238	353355	8420	428037	1817
	STD	245471	14133	111968	9394	140467	8716
	%Δ form 06/03	124%	80%	106%	75%	141%	109%
2003-2007	Mean	349011	5694	171515	4824	177496	870
	STD	122989	8610	36615	6861	90773	3012
13/10 - 09/07	t-test	- ** 5.20 *	- * 2.27 *	- ** 4.59 *	- ** 2.98 *	- ** 5.41 *	- 0.05
09/07 - 06/03	t-test	** 9.70 *	** 1.71 *	** 9.38 *	** 2.03 **	** 9.34 *	** 0.63
13/10 - 06/03	t-test	10.6 ** 9 *	- 0.86	13.9 ** 9 *	- 1.55	** 8.35 *	** 1.10
Panel B: Corporate Stocks excluding the UK and the Cayman Islands							
		Whole Sample		Developed		Emerging	
		Bought	Net	Bought	Net	Bought	Net
2003-2013	Mean	244721	2987	152532	2469	92190	518
	STD	100140	7371	68659	6591	35955	2474
2010-2013	Mean	258204	1370	161719	765	96486	605
	STD	26649	8485	17255	7467	13095	2485
	%Δ form 09/07	-26%	-75%	-28%	-84%	-22%	-20%
2007-2009	Mean	349820	5451	225389	4697	124431	753
	STD	102845	8367	75105	7444	35060	3452
	%Δ form 06/03	130%	98%	154%	88%	95%	195%
2003-2007	Mean	152414	2757	88702	2502	63712	255
	STD	44893	4462	18113	4158	29549	1376
13/10 - 09/07	t-test	- ** 5.22 *	- * 2.19 *	- ** 4.99 *	- ** 2.39 *	- ** 4.55 *	- 0.23
09/07 - 06/03	t-test	** 10.8 *	** 1.75 *	** 10.7 *	** 1.59	** 8.39 *	** 0.82

13/10 -			**	-		**	-		**	
06/03	t-test	14.0	*	1.00	20.2	*	1.41	7.03	*	0.85

*, **, *** indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

The results are based on a two-sample t-test in combination with a Levene-Test of equal variance.

Table 6: Foreign Bonds

		Panel A: Foreign Bonds including the UK and the Cayman Islands								
		Whole Sample		Developed		Emerging				
		Bought	Net	Bought	Net	Bought	Net			
2003-2013	Mean	220436	5197	152302	5811	68134	-614			
	STD	95078	12187	54752	11797	52148	4500			
2010-2013	Mean	320995	4670	190320	5810	130675	-1140			
	STD	56779	13327	43159	12694	29991	5051			
	%Δ form 09/07	57%	-34%	17%	-25%	217%	-80%			
2007-2009	Mean	203834	7074	162654	7707	41180	-634			
	STD	61057	14206	56112	13536	18376	5746			
	%Δ form 06/03	54%	64%	53%	76%	60%	754%			
2003-2007	Mean	132329	4317	106520	4391	25809	-74			
	STD	27016	9073	21201	9246	6942	2402			
13/10 -			**	-			16.8	**	-	
09/07	t-test	9.06	*	0.80	2.46	**	0.66	8	*	0.43
09/07 -			**			**		**	-	
06/03	t-test	6.56	*	1.02	5.71	*	1.27	4.77	*	0.55
13/10 -			**			**		23.6	**	-
06/03	t-test	9	*	0.15	7	*	0.63	0	*	1.32

		Panel B: Foreign Bonds excluding the UK and the Cayman Islands							
		Whole Sample		Developed		Emerging			
		Bought	Net	Bought	Net	Bought	Net		
2003-2013	Mean	104254	8422	77258	8644	26996	-222		
	STD	49711	18742	40070	18252	16310	3650		
2010-2013	Mean	137369	7999	92131	8140	45239	-141		
	STD	28353	21129	22039	20270	10207	4297		
	%Δ form 09/07	13%	-14%	-8%	-18%	111%	-79%		

2007-2009	Mean	121873	9306	100411	9986	21462	-680
	STD	52184	19599	50324	19149	8998	4536
	%Δ form 06/03	110%	14%	123%	23%	66%	-1799%
2003-2007	Mean	57924	8183	45020	8143	12904	40
	STD	22497	15674	20139	15578	3290	1763
13/10 - 09/07	t-test	1.61 *	0.29	0.92	0.42	11.1 ** 1 *	- 0.56
09/07 - 06/03	t-test	6.89 ** *	0.29	6.24 ** *	0.49	5.44 ** *	- 0.90
13/10 - 06/03	t-test	15.2 ** 1 *	- 0.05	10.9 ** 3 *	0.00	20.8 ** 9 *	- 0.27

*, **, *** indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The results are based on a two-sample t-test in combination with a Levene-Test of equal variance.

Table 6: Foreign Stocks

		Whole Sample		Developed		Emerging	
		Bought	Net	Bought	Net	Bought	Net
2003-2013	Mean	284258	6873	197608	4925	86651	1948
	STD	111000	8307	68890	8661	43100	4257
2010-2013	Mean	308173	7460	209776	4821	98397	2640
	STD	34565	7790	23721	8502	12426	3957
	%Δ form 09/07	-20%	102%	-19%	205%	-22%	26%
2007-2009	Mean	383819	3686	258137	1583	125681	2103
	STD	108760	10664	69931	11131	40029	5963
	%Δ form 06/03	107%	-58%	84%	-79%	175%	85%
2003-2007	Mean	185673	8675	140042	7536	45631	1139
	STD	78966	5958	51783	5388	28353	2684
13/10 - 09/07	t-test	- ** 4.02 *	1.88 *	- ** 3.98 *	1.51	- ** 3.95 *	0.50
09/07 - 06/03	t-test	** 9.25 *	- 2.53 **	** 8.53 *	- ** 2.96 *	** 3 *	0.90
13/10 -	t-test	9.85 **	-	8.48 **	- *	11.8 **	2.18 *

