Why Returns on Cross-Border Asset Holdings are so Volatile? An Examination of Likely Determinants[*]

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Abstract

Novel to the literature, we examine the volatility of the aggregate returns (both asset returns and capital gains) on cross-border equity and bond holdings. We show using the conventional volume-based measure of financial integration, that as a country becomes more financially integrated (i.e. the volume of the asset holdings increases), the volatility of the financial asset returns tends to decline. Also, as the investors diversify the financial assets across different markets more evenly, the aggregate returns tend to be less volatile. The destination of the cross-border investment also matters, when investors allocate their assets to emerging markets, the returns are more volatile, whereas less volatility is witnessed when assets are allocated in well-established markets. We further look at the determinants of volatility in capital gains, and find that neither diversification of investments nor volume of asset holdings, explain the volatility of the capital gains. Nevertheless destination matters, as investments in developed countries and offshore financial centers are found to generate higher volatility in capital gains. For both asset income returns and capital gains, we also test whether the economic sector of holder of assets have any influence on their volatility. Here we find that higher the share of foreign asset holdings by household sector in an economy, lesser will be the volatility in returns, suggesting that households prefer to hold less risky assets.

JEL Codes: E44, F41, F36.

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[*]The views expressed here are those of the authors and do not reflect the official view of the Qatar Central Bank. The errors that remain are solely ours.

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1 Introduction

There has been an upsurge in cross-border portfolio investments particularly over the last two decades. From 1990 to 2006, global stock market capitalization increases from 30 percent to 80 percent of global GDP, while cross-border equity assets increased by twenty fold, from US$ 0.7 trillion to US$ 14 trillion (Barcke and Schmitz 2008). Apart from the associated benefits of higher returns and lower risk to investors, on a macro level cross-border investments facilitate efficient allocation of savings and investments worldwide, thus enhancing economic growth (Obstfeld and Taylor 2004; Kose et al. 2006). Another prominent benefit of international portfolio holdings is that it facilitates countries in insuring their income and consumption against domestic output shocks, a phenomenon referred in academic literature as risk sharing (some notable contributions in risk sharing literature include, Obstfeld 1994; Lewis 1996; Srensen and Yosha 1998; Lane 2001; Kose et al. 2007; Srensen et al. 2007; Demyanyk et al. 2008; and Artis and Hoffmann 2008). Empirical studies have also established that improved risk sharing in turn enhances economic efficiency by exploiting potential gains associated with industrial specialization and economies of scale (Kalemli-Ozcan et al. 2003; Basile and Girardi 2010).

There are some significant costs associated with increasing financial integration primarily owing to the instability of capital flows. Theoretical models have put forward that greater financial integration, may expose a country to higher volatility in economic growth because of exogenous shocks associated with instability of capital flows (Easterly et al. 2000). Empirical research has also pointed towards destabilising implications of volatility of capital flows. For example, Hausmann and Gavin (1996) estimate that shocks linked to instable capital flows generate macroeconomic volatility in Latin American countries. Easterly et al. (2000) find in their bivariate analysis that volatility in capital flows has a significantly positive relationship with volatility in economic growth. These costs related to volatile capital flows appear to be magnified when considered in view of the empirical findings pointing that countries with higher macroeconomic volatility experience lower economic growth (Ramey and Ramey 1995), adverse income distribution and increase poverty levels (Hausmann and Gavin 1996).

Although there is a voluminous literature investigating various aspects of international capital flows and their associated macroeconomic consequences[1], researchers have not paid much attention on examining the patterns of returns on these foreign capital flows. This limited research is surprising given the understanding that the returns on cross-border investments bear several important microeconomic as well as macroeconomic implications. At micro level, these returns affect the income and

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[1]See, e.g. Coeurdacier and Guibaud (2011, p. 291) for a list of papers on the empirical determinants of bilateral asset holdings.

consumption patterns of the economic agents: investment income returns, comprising dividend and interest earnings, directly affect consumption decisions of economic agents, while capital gains impact consumption mainly through wealth effects (Barcke and Schmitz 2011). At macro scale, patterns of returns on cross-border investments affect the degree of risk sharing and the transmission of financial shocks. Further, cross-border asset returns, particularly through capital gains channel, determine the composition of external assets and liability holdings and also impact exchange rate fluctuations (Lane and Milesi-Ferretti 2003).

The few prominent studies that have provided some evidence on the behaviour of aggregate returns on foreign assets and liabilities include, Bond (1977), Lane (2001), Lane and Milesi-Ferretti (2002a, 2002b, 2003, 2005), Schmitz (2010), Balli et al. (2011a, 2011b), and Barcke and Schmitz (2011). Specifically, Bond (1977) finds that investment income inflows and outflows strongly respond to changes in both short-run and long-run returns on these flows. Lane and Milesi-Ferretti in a series of papers present indirect evidence on the behaviour of aggregate returns and their interrelationship with international investments position. They report substantial differences in rates of returns on foreign assets and liabilities for a broad cross-section of countries (Lane and Milesi-Ferretti 2002a, 2002b); and show that the composition of international investment account (into equity and non-equity groups) are considerably important in determining the aggregate returns on foreign assets and liabilities (Lane and Milesi-Ferretti 2003). Further, in case of both assets as well as liabilities, returns are found to be more volatile than yields.

Studying the role of returns in facilitating income risk sharing, Lane (2001) estimates that neither returns on foreign assets show countercyclical patterns nor returns on foreign liabilities behave pro-cyclically to insulate income from domestic output fluctuations. On the contrary, Balli et al. (2011a) find that returns on foreign liabilities tend to facilitate income risk sharing whereas foreign asset returns have an insignificant effect. Some recent studies have examined the distinct role of the two established channels of foreign asset returns, namely investment income and capital gains, in providing international risk sharing. Towards this end, Bracke and Schmitz (2011) show that capital gains provide a relatively stronger channel than investment income, in detaching consumption from domestic output shocks. Similarly, Balli et al. (2011b) present evidence of a relatively stable risk sharing through capital gains when compared to investment income.

Owing to the aforesaid importance of cross-border asset returns and keeping in view the limited research in this area, our study endeavours to contribute to this strand of literature by examining the factors that influence volatility in aggregate returns on cross-border asset holdings. The findings of

this study will have direct policy relevance. Since without identifying the underlying factors that cause volatility in returns; it would be hard to formulate macroeconomic policies that may prevent potential welfare costs associated with instable asset returns. Nevertheless, implementing conducive policies would in turn supplement risk diversification (risk sharing) thereby reducing a country's exposure to cross-border transmission of financial shocks.

A main reason for paucity of research on foreign asset returns is the unavailability of comparable data on returns for a broad cross-section of countries. We overcome this issue by utilizing a unique dataset on foreign equity and debt returns that has not been widely used in research so far. This data is available from OECD's Annual National Accounts Detailed Tables (Volume II) wherein aggregate (country-level) returns from international equity holdings are reported as distributed income of corporations which predominantly include dividend payments; while aggregate returns on debt holdings include interest payments received on foreign debt investments. Our preliminary investigation of the patterns of aggregate returns point out the presence of considerable variability in both equity and debt returns in our sample of OECD countries (see Figure 1)

Further we scrutinize a number of factors that are possibly crucial in explaining volatility in returns. To begin with, our interest is to investigate whether a higher level of financial integration causes less volatility in foreign asset returns or not. To answer this, we employ a conventional volume-based measure of financial integration, and expect that diversification in foreign investments is an important determinant of volatility in the cross-border asset returns. Second, we compute standard concentration measures to explore the role of diversification in reducing volatility in returns. We also focus on the question of whether destination of investments matters in influencing volatility; that is whether higher foreign investments in countries belonging to a certain group cause less or more volatility in returns. To address this, we study the impact of investments in some selected groups of countries, such as OECD countries, emerging market economies (EMEs), offshore financial centers (OFCs) countries. Finally, we examine the possible role of economic sector of asset holdings in explaining volatility in returns. Since each sector of asset holder (for instance, banks, insurance companies, mutual funds, government and households) has its distinct holding motives particularly with regards to degree of risk appetite, it is pertinent to investigate whether the sector of asset holder matters in affecting volatility in returns.

Our main findings point out that higher financial integration and diversification of cross-border investments lead to lower volatility in aggregate returns. The destination of the asset holdings matters, as it is found that when investors allocate their assets to emerging markets, the returns are more

volatile, whereas less volatility is witnessed when assets are allocated in OECD markets. The economic sector of holder of assets is also found to influence volatility, as we show that an increased share of investments by households generates less volatile returns. Similarly in case of debt investments, larger debt holdings by non-bank financial institutions (mostly comprising mutual funds and insurance companies) witness less volatility in returns. Lastly, we examine the determinants of volatility in capital gains and find that neither financial integration nor the diversification of investments, significantly explain volatility. Nevertheless destination matters, as investments in developed countries and offshore financial centers are found to generate higher volatility in capital gains. With regards to the role of the sector of holder of assets, an increase in the asset holdings by household sector is found to exhibit lesser volatility in capital gains.

The remainder of the paper is organized as follows. In Section 2, we present detailed explanation on data sources and construction of variables, along with some discussion on the general trends witnessed in the indicators used in our study. Section 3 presents the empirical model and discusses the estimation results. The last section provides concluding remarks.

2 Data and Descriptive Statistics

2.1 Data

We use a broad sample of 34 OECD countries to explore the factors that explain volatility in the returns from the cross-border equity and debt investments for the years 1997 and 2001–2009. New to this literature, we have constructed a unique dependent variable to capture volatility in the cross-border equity and bond returns. Since we intend to employ time series as well as cross section estimations, our variable is suitably adapted for both analysis. For the *panel* estimations, the volatility is computed by taking the absolute value of the change in foreign receipts scaled by total foreign investments, i.e. return to investment ratio (t) minus return to investment ratio $(t - 1)$. This variable is capable of capturing variations in returns over time, while scaling with total foreign investments discount cross-country heterogeneity among our sample of OECD countries. For *cross-section* estimations, the standard deviation of foreign receipts (scaled by total foreign investments) is the appropriate indicator for measuring volatility.

The information on foreign asset returns is taken from OECD's Annual National Accounts Detailed Tables (Volume II). Specifically, equity returns are reported in OECD dataset as distributed income of corporations which predominantly include dividends received from foreign equity investments, while

the interest obtained on foreign debt securities reflect returns from cross-border debt holdings. Furthermore, portfolio returns are simply calculated by summing up equity and debt returns. This data is reported in national currencies, and for uniformity purposes is converted to US dollars using the exchange rates (national currency per US$) from the OECD database.

Data on foreign equity and debt assets is obtained from International Monetary Fund's Coordinated Portfolio Investment Surveys (CPIS), which is the main data source for our study. CPIS data is available for the years 1997 and 2001–2009, that essentially determines the time period for our study. This dataset provides geographical detail of international equity and debt holdings based on the residence of the issuer of the securities. This information is valuable in empirical research because of its reliability and consistency as the surveys are conducted using guidelines that are similar across reporting countries. For our study, this dataset is useful as it enables us to compute several indicators that we anticipate to be vital in explaining volatility in cross-border asset returns. We employ a conventional measure of financial integration which is the sum of portfolio assets and liabilities scaled by a country's Gross Domestic Product (Lane and Milesi-Ferretti 2003). The data for GDP is taken from World Development Indicators (WDI) of World Bank.

Second, we expect that concentration (or the degree of diversification) in investments may be an important determinant of the volatility of the cross-border asset returns. Typically, securities in a concentrated portfolio are believed to be more "active" and provide better returns to investors. CPIS data provides sufficient information that can be utilized to compute standard concentration measures such as concentration ratio. The concentration ratio in cross-border portfolio allocations indicates the share of investments in specified number of largest destination countries. In general, the n-concentration ratio is the percentage of portfolio allocations in n number of largest countries and is computed at time t as:

$$CR_{i,t} = \frac{\sum_{j=1}^{n} \theta_{i,j}}{THOLD_i},$$

where $\theta_{i,j}$ is the amount of investment by country i in country j, and $THOLD_i$ is the total foreign holdings of country i. We have computed concentration ratios for top one, three, five and ten largest destination countries. Concentration ratios range from 0 to 1, with small values of this ratio indicate less concentration and vice versa.

Third, distribution of cross-border investments into distinct groups of countries may affect volatility in their returns. We intend to investigate whether greater foreign investments in countries belonging

to a certain group cause less or more volatility in returns. To examine this, CPIS data is utilized to obtain shares of investment in selected groups of countries, namely OECD countries, emerging market economies (EMEs) and offshore financial centers (OFCs).

Fourth, an important feature of CPIS data is the availability of information on economic sector of holder of assets. There are different types of sectors within a domestic economy that hold foreign assets (such as banks, insurance companies, mutual funds, government and households); and each sector has its distinct holding motives particularly with regards to the degree of risk appetite. Therefore, new to the literature, our interest here is to explore the role of various sectors of asset holders in influencing volatility in foreign asset returns.

As explained earlier, we are also interested in exploring the determinants of volatility in capital gains. Since there are no official estimates on capital gains, we follow the methodology adopted by Lane and Milesi-Ferretti (2005) to calculate net capital gains for our sample countries. Lane and Milesi-Ferretti (2005) present a basic accounting framework that decomposes the changes in the net foreign asset position (ΔNFA_t) into current account balance (CA_t), net capital gains (KG_t) and error term (E_t).[2] This is expressed as:

$$\Delta NFA_t = CA_t + KG_t + E_t$$

By simply rearranging the aforementioned equation, we obtain the net capital gains as:

$$KG_t = \Delta NFA_t - CA_t - E_t$$

Here the net foreign asset position (NFA_t) is calculated as the sum of net equity (equity assets minus equity liabilities), net debt, net foreign direct investment (FDI) and foreign exchange reserves (FX_t), that is:

$$NFA_t = EQT(A)_t - EQT(L)_t + DET(A)_t - DET(L)_t + FDI(A)_t - FDI(L)_t + FX_t$$

where $EQT(A)_t$, $DET(A)_t$ and $FDI(A)_t$ represent stocks of equity, debt and FDI assets, and $EQT(L)_t$, $DET(L)_t$ and $FDI(L)_t$ represent respective liabilities. The data on all these variables are obtained from International Financial Statistics, published by the International Monetary Fund.

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[2]The E_t predominantly captures capital account transfers and other errors and omissions indicating the differences in current account and net capital inflows.

2.2 Descriptive Statistics

The data at our disposal allows us to explore some interesting patterns in cross-border portfolio, equity and debt investments for our sample countries. Table 1 reports descriptive statistics for variables used in time series estimations. As discussed previously, volatility in foreign asset returns is measured as absolute change in foreign asset returns scaled by total foreign investments. This variable has a mean of 0.09, with a maximum value of 1.375 (indicating highest volatility) and a minimum value of 0.0001 (indicating lowest volatility). An interesting feature of this indicator is that volatility in equity receipts (0.23) is found to be much higher than debt receipts (0.12). Moreover, equity markets are more concentrated than debt markets as almost 72% of investments are made in top five countries (on average) compared to 65%. From this, it can be inferred that equity receipts witnessed more volatility presumably because of high level of concentration in comparison to debt markets.

Although concentration ratios have been computed for top one, three, five and ten largest destination countries, here we have only presented concentration ratio for top five countries only since this ratio is used in estimations. For portfolio securities, on average 65% of investments are confined to top five countries, while its value ranges between 40% (minimum) and 98% (maximum). Also for the entire sample period, unreported results[3] show that portfolio investments by non-EU OECD countries (73%) are more concentrated than OECD countries (64%) and EU countries (59%).

The indicator for financial integration has a mean of 3.59 indicating that on average, portfolio assets and liabilities represent 359% of GDP. Such a high value of this indicator is primarily because of the presence of Ireland and Luxembourg in our sample; without which this ratio stands at merely 117%. At the country level, the financial integration ratio exhibits a maximum value of 97 for Luxembourg (most integrated country) and a minimum value of 0.08 for Turkey (least integrated country). The time series trend of this variable shows considerable surge in international financial integration over the sample period. There is an increase of 116 percent in portfolio assets and liabilities (as ratios of GDP) during the period 2001–2009. Even after excluding Ireland and Luxembourg, the increase in financial integration is a substantial 51%. This increase seems to be largely attributed by debt markets that witness a 42% rise in debt assets and liabilities (as ratio of GDP) compared to 12% increase in equity assets and liabilities (as ratio of GDP).

For geographical distribution of cross-border portfolio investments, as expected the largest share of investments are in OECD countries (87%), followed by EMU countries (44%), OFC countries (18%) and EME countries (5%). However, these shares of investments vary substantially across

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[3]These results are available in a Supplement from the corresponding author.

OECD countries ranging 31% for Korea to 99% for Turkey. Another interesting feature is that equity markets in EME and OFC countries attracted more than double the share of investments documented in debt markets; implying that from investors perspective debt instruments offered by these groups of countries are not as attractive as equities.[4] Our data also shows considerable interregional investments by European countries – a phenomenon commonly known in literature as Euro bias[5]. For instance, on average 73% of portfolio investments of EMU countries are confined within the European region compared to merely 39% by non-EU OECD countries. In comparative terms, Euro bias is more evident in debt markets (74%) when compared with equity markets (66%).

With regards to various sector of holder of assets within a domestic economy, non-bank financial institutions on average hold 50% of cross-border portfolio assets, while banks 23%, government 12% and households 9%. However the shares of holdings by these sectors considerably differ in case of equity and debt markets. Banks tend to be more involved in debt instruments as compared to equities since banking institutions hold almost 33% of total debt securities compared to 9% of equity securities. Moreover, as anticipated, share of equity holdings by mutual funds stand at 31% compared to only 13% of total debt holdings. Similarly households tend to be more comfortable in holding equity securities (16%) compared to debt securities (8%).

3   Empirical Model and Estimation Results

3.1   Model Specification

To explore the likely factors underlying the volatility in returns from cross-border portfolio, equity and debt holdings, we estimate multivariate cross-section and panel regressions based on the following equations:

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\begin{aligned}
VOL_i &= \beta_0 + \beta_1 FI_i + \beta_2 CR_i + \beta_3 RS_i + \beta_4 HS_i + \epsilon_i, \quad \text{(Cross Section)} \\
VOL_{i,t} &= \beta_0 + \beta_1 FI_{i,t} + \beta_2 CR_{i,t} + \beta_3 RS_{i,t} + \beta_4 HS_{i,t} + \epsilon_{i,t}, \quad \text{(Panel)}
\end{aligned}
$$

where VOL is the dependent variable capturing volatility in the portfolio/equity/debt returns. As discussed earlier, this indicator is computed separately for the cross-section and panel estimations. For the panel regressions, volatility is computed by taking the absolute change in foreign receipts scaled by

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[4]In fact, emerging markets compensate investors with higher returns (i.e. a higher equity risk premium) than those observed in developed markets. See, Salomons and Grootveld (2003) and Donadelli and Prosperi (2012) for related empirical evidence.

[5]See, e.g. Balli et al. (2011a)

total foreign investments, while for cross-section estimations, the standard deviation of foreign receipts scaled by total foreign investments is used. FI is the measure for financial integration and is calculated as the sum of portfolio assets and liabilities scaled by GDP. CR is the measure for concentration ratio, indicating the share of investments in top five largest destination countries. RS is the set of control variables that represent the share of investments in OECD, EME, OFC and EMU countries. Further, HS is another set of control variables that indicate the holdings of assets by various sectors of domestic economy such as banks, non-banking institutions and households.

We estimate the aforementioned equations by Ordinary Least Squares (OLS) with first-order autoregressive disturbances and heteroscedasticity consistent standard errors. Here the first-order autoregressive disturbances are assumed to adjust auto-correlation in the error term.

3.2 Empirical Results

The estimation results are presented for the dependent variable capturing volatility in cross-border asset returns (portfolio, equity and debt returns), regressed on two base variables (financial integration and concentration ratio) and seven control variables. As mentioned earlier, these control variables comprise two sets of variables, representing firstly, the share of investments in different groups of countries, such as, OECD, EME, OFC and EMU countries; and secondly, the economic sector of the holder of foreign assets such as banks, non-bank financial institutions and households. We also include the control variables separately to our base model, to investigate their effect on both signs and loadings of the base explanatory variables. At the same time we additionally check whether these control variables do bear some explanatory power of dependent variable or not.

3.2.1 Panel Estimations

Tables 3, 4 and 5 present panel estimates for portfolio, equity and debt securities, respectively. In all cases, the dependent variable is the volatility in the portfolio/equity/debt returns computed by taking the absolute change in foreign receipts scaled by total foreign investment. Let us begin by interpreting Table 3. We find that a higher level of financial integration is manifested in a reduction in volatility of cross-border portfolio returns (column 3a), whereas a higher degree of portfolio concentration in just a few countries (or equivalently, a less diversified portfolio) leads to an increase in volatility of returns. These findings confirm the basic economic intuitions of portfolio choice theory at the international level (see, e.g. Karolyi and Stulz, 2003). Further, in a study using data from G7 countries, Bhamra et al. (2012) also found that return volatility decreases with (greater) financial integration, while return

correlation increases. We are not aware of any academic papers supporting our evidence that higher diversification causing lower return volatility using cross-border portfolio data, although our results are in agreement with the prediction of the theoretical models.

Columns 3b to 3h introduce control variables one at a time to our base model (column 3a), in order to examine their effect on both the signs and loadings of the base explanatory variables. As it shows, except for OECD countries, a higher contribution of investment from emerging, OFCs and EMU countries leads to an increase in portfolio return volatility. However, save for the emerging market share, the effects of the remaining geographic shares are not statistically significant. With regard to the emerging-market effect, a likely reason is the ebb and flow of "hot money" (among other candidate variables) itself as a major source of market volatility in emerging countries. Typically, emerging market assets "have historically been regarded as inherently risky and particularly vulnerable to international shocks that result in a general increase in investor risk perceptions" (Ammer et al., 2010, p. 1). Not surprisingly, after the collapse of Lehman Brothers in September 2008, emerging market countries, among other regional groupings, experienced the strongest steep drop-off in cross-border capital flows including FDI, purchases and sales of foreign equities and debt securities, and cross-border lending and deposits – see MGI (2009). Further analysis on the EM-specific volatility is given below.

Columns 3f to 3h show the impact of asset holdings by various economic sectors on the volatility of cross-border asset return. Although parameter estimates on these indicators are not statistically significant, the inclusion of such variables significantly increased the explanatory power of our models. In Column 3i, we have included first set of control variables related to shares of investments in distinct group of countries along with the two base variables. As it shows, financial integration, concentration ratio and emerging market share stand as the key determinants of the volatility in the cross-border asset return.

Finally, column 3j presents the full model with both sets of control variables along with the two base indicators. A first remark is that the estimated coefficients of the full model have larger magnitude and higher statistical significance than those from the remaining specifications. Moreover, all the economic factors lead to a considerable increase of explanatory power, as the values of R^2 increase to 0.78 (from just 0.09 for the base model shown in column 3a). An interesting result that emerges from the full model is that a greater share of asset holding by households leads to a reduction of volatility in portfolio returns. A proper interpretation of this result is challenging because household financial behavior has many special features that are not captured by textbook models (Campbell, 2006). We

will get back to this issue in the discussion of cross-section estimation in the next section. Column 3j also shows that the creation of the European monetary union contributed to an elevation in the volatility of the cross-border asset return. Hence, despite the elimination of currency risk within the EMU, the increase in the volatility in returns may have stemmed from an increase in the correlation of national stock indices (both within and outside the EMU countries), thereby diminishing the benefits of international diversification.[6] In contrast, a higher share of non-bank financial institutions lowers return volatility, the effect is significant at the 10% level.

Since equity and bond investors look at the financial investment very differently, it is instructive to compare how differently the key variables of our model affect the return volatility of the two assets. Tables 4 and 5 report results for equity and debt assets, respectively. To get things interesting, we compare the estimates in the two tables simultaneously. A first remark is that, in general, the magnitude of the estimated parameters is not only higher for debt assets, they also tend to more statistically significant than their equity counterparts. However, in terms of the explanatory power of the model (indicated by R^2), neither of these models seem to dominate. Interestingly, unlike debt assets, we find that both financial integration and concentrated portfolio didn't exert any (statistically) significant effect on the volatility of cross-border equity returns, although the estimated coefficients have correct sign for the two base variables (see columns 4a and 5a in the respective tables). A potential explanation for this empirical result is that in the last decade (2000–2010), equity markets have endured more volatility and disappointing returns compared to bond markets (see further discussion below). This calls for the need for additional factors to explain the source of the volatility in the cross-border asset returns.

As in Table 3, we first include a set of geographic variables followed by economic sector variables, one at a time, in the base model. According to Tables 4 and 5, greater investment share in emerging market economies elevate volatility in both equity and debt returns, although the impact is statistically significant for equities only. In the past decade, emerging markets' financial stock grew much faster than that of developed countries, thanks to new issuance and stronger earning expectations as well as increased valuations. For example, of the $387 billion net new equity issuance in 2010, 60% of new issuance occurred on stock exchanges in China and other emerging markets (MGI, 2011b). Between 2000 and 2009, the stock of equity and debt in emerging markets grew by an average of 18.3% a year, compared with only 5% in developed countries (MGI, 2011b). Moreover, as shown in Figure 1 in Ammer et al. (2010), despite the substantial co-movement with mature stock markets, the emerging

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[6]Adjaout and Danthine (2000) warned this possibility at the very introduction of the euro. For empirical evidence of increase in bond and equity return correlation both within and outside the EMU, see Cappiello et al. (2006).

market stock price indexes exhibited a relatively more volatile path over the 1992–2009 period. These facts help explain the larger magnitude of the estimated parameters associated with emerging market share (than those of OECD and EMU markets) in explaining the volatility in cross-border asset returns. By comparison, although higher asset holding in both OECD and EMU market is associated with a reduction in volatility in cross-border equity and bond returns (see columns b and d in both Tables 4 and 5), their impacts are not always statistically significant. This is to be expected since matured stock markets (amongst OECD countries) are, by definition, exhibit lower price volatility than their emerging-market counterparts.

To date, we have little understanding of the activities of offshore financial centers and their linkages with other financial centers (OFCs). Although OFCs are not typically the ultimate source or final destination for cross-border investment, data complied recently by Lane and Milesi-Ferretti (2010) show a strong financial interconnections between OFCs and advanced economies.[7] Our results indicate that a greater participation by OFCs depress (elevate) volatility in cross-border equity (bond) returns. This asymmetric effect is likely driven by the time-varying share of global portfolio equity and debt assets invested in OFCs. As reported by Lane and Milesi-Ferretti (2010), OFC's portfolio equity share has climbed from just under 6% to over 9% over 2001–2007, whereas the portfolio debt share has remained relatively stable in the 5-6% range.

Among the three economic sectors, only the non-bank financial institutions (NBFIs) exerted statistically significant effect on the volatility of the cross-border asset returns. Unlike banks, NBFIs do not face stringent capital and liquidity requirements, which may affect global liquidity conditions in ways that are largely beyond the scope of regulatory policies (BIS, 2011). Our results show that a higher share of NBFIs leads to an elevation of volatility in equity returns, but dampens volatility for debt returns (see column g in both Tables 4 and 5). This asymmetry in risk exposure is consistent with NBFIs increasing reliance on short-term debt instruments,[8] since by choosing short-term contracts NBFIs keep the option to pull out quickly in the face of a market crash. Although not statistically significant at standard confidence levels, our results suggest that as banks and household sectors increase their share of portfolio holdings in a country, the volatility of equity (debt) returns falls (rises).

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[7]As stated in Lane and Milesi-Ferretti (2010), according to a 2008 report by the United States Government Accountability Office, about 732 companies trading in the US stock exchanges are incorporated in the Cayman Islands – a Caribbean island home to nearly three-quarters of all OFC financial transactions. Gonzalez and Schipke (2011) reported that against the combined $8 trillion worth of cross-border assets and liabilities held by the US, Germany, and France in 2009, the OFCs held assets and liabilities worth of some $5 trillion.

[8]For example, in Ireland NBFIs accounted for more than half of total bank credit in 2008. Although total bank credit to NBFIs in the US and the euro area has levelled off since the start of the crisis in 2007, they grew strongly in the years prior to the crisis. See Graph 5 in BIS (2011, p. 19).

Finally, columns i and j in Tables 4 and 5 respectively show results with *one* and *two* sets of control variables added to the base model. A first remark is that volatility in equity return appears to be best explained by the model containing only the geographic-specific variables (column i in Table 4), whereas both geographic and economic sector controls are useful in explaining the volatility of debt returns (column j in Table 5). Results show that after accounting for the level of financial integration and portfolio concentration, the share of emerging markets, OFCs and EMU countries explain just over one-quarter of the variation in the cross-border equity returns (the R^2 is only 0.28, see column i in Table 4). Although adding the second set of controls dramatically improves model's explanatory power (R^2 jumps up to 0.81), most factors become statistically insignificant. Nevertheless, both portfolio concentration and emerging market share continue to appear as the leading determinants of (higher) volatility in the cross-border equity returns. By comparison, an array of factors account for the observed volatility in the cross-border debt return. As column j in Table 5 shows, save for household share, all other variables stand as statistically significant determinants of debt-return volatility, albeit in different forms and magnitude.

What could explain the difference in the degree of various determinants to explain the volatility in the cross-border equity and bond returns? During the most part of the first decade of the 21st century, the equity and debt markets in developed countries behaved very differently. In the euro area, for instance, the creation of the single currency had led to the remarkable convergence in bond yields (both corporate and sovereign) and the associated reduction in volatility (Balli et al., 2011); whereas such integration seems to have been limited in euro area's equity markets, relative to bond markets (Bekaert et al., 2011). In the unraveling of the recent global crisis, although both global equity and bond markets suffered a clear setback, much of the damage was suffered in global equity markets (see MGI, 2009). Both in the US and the UK, the past decade had produced some of the worst real ten-year equity returns in more than a century. For example, the 10-year S&P composite index rolling returns stood -4% and -3% in 2008 and 2009, respectively, a rare occurrence in 130 years of US stock market history.[9] Further, measuring volatility with number of days per year that daily price change exceeded 3%, daily price movements on exchanges across Europe and the US appeared more volatile during 2000s, compared to that for 1990s and 1980s.[10] The severe decline in (global) equity asset value was partly compensated through increased (new) issuance of debt securities (both private and government), as well as an acceleration in bank deposits (reflecting both a flight to safety by depositors and aggressive efforts by banks to attract deposits).

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[9]See Exhibit 21 in MGI (2011) for a graphical illustration.
[10]See Exhibit 19 in MGI (2011) for a graphical illustration.

It is always hard (and hazardous) to explain capital market moves. In our conjecture, the confluence of many factors including the ones used here and those not observed (e.g. policy and behavioral factors) contributed to the dramatic rise and the subsequent fall in financial globalization (indicated by cross-border capital flows) in the past ten years are directly attributable to the changing volatility in equity and bonds returns.

3.2.2 Cross-Section Estimations

We now turn to the cross-sectional implications of our empirical model for the determinants of the volatility of the cross-border equity and debt return in OECD countries. Tables 6, 7 and 8 present cross-section estimates for portfolio, equity and debt securities, respectively. As before, the dependent variable is the volatility in the portfolio/equity/debt returns, but in this case is calculated as the standard deviation of returns scaled by total foreign investments. Further, the cross-section regression uses time-averaged data to estimate the parameters, thus providing a long-run perspective of the determinant of the volatility in the cross-border asset returns.

Eyeballing the results in Tables 6–8 we notice that in most cases while the signs of the estimated cross-section parameters are in the same direction with those of the estimated panel parameters, the magnitude of the estimated parameters of the former is higher than the latter.[11] This is likely due to the failure to adjust for potential parameter heterogeneity, which is likely in a cross-country context. Nevertheless, when using cross-section regressions of time-averaged data, Phillips and Moon (1999) showed that both the pooled least squares regression and the fixed effects regression provide consistent estimates of this long-run average relationship. This is because the relations are parameterized in terms of the matrix regression coefficient of the long-run average covariance matrix for the cross-section, instead of using covariance matrix for the data (as is practiced in conventional regressions). We, therefore, follow Phillips and Moon (1999) and interpret the estimated coefficients as average cross-country long-run effects.

Nevertheless, although it would be difficult interpret the estimates unambiguously, the cross-section results are suggestive of a negative (positive) impact of financial integration (concentration ratio) on the volatility of the cross-border asset returns (Table 6). The results of remaining models reported in Table 6 are somewhat similar to their panel counterparts (Table 3), albeit with vastly different coefficient estimates. Crucially, for the full model (column 6j), the cross-section estimates also suggest

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[11]Such upward bias of cross-sectional estimates or the downward bias of panel estimates is not uncommon in empirical research. See, among others, Freeman (1984) and Krol (1996) for evidence of varying estimates due to estimation technique.

that a higher portfolio share in emerging markets (by households) elevates (dampens) the the volatility of the cross-border asset returns. The emerging-market–volatility nexus has already been discussed, let us interpret the results of the household sector as a major determinants of the return volatility.

The finding that a higher (portfolio) share by household has a long-run negative impact on the volatility of returns is both appealing and puzzling. It is appealing because it emphasizes the crucial role that households portfolio holdings play in reducing overall market volatility. Not only the amount invested by households, its composition into equity and debt also seems important. As shown by column j in Tables 7 and 8, the long-run effect of volatility reduction is greater when households hold more debt (than equity) securities. Although, it is worth mentioning here that both in the US and Western Europe households placed a larger share of their financial assets in equities than fixed-income securities (MGI, 2011).[12] On the other hand, the puzzling side of this result is that it appears unconvincing with the findings of a large body of empirical evidence that suggest that generally household portfolios are poorly diversified, with many people reporting substantial holdings of a single stock – see Campbell (2006) for a survey of the evidence on household portfolio choice. Nevertheless, the observed reduction in volatility through greater household participation can be interpreted as the natural outcome of greater risk sharing facilitated by increased integration.

Summing up, our analysis has brought to light a number of key determinants that influence the volatility of the cross-border asset return. Among the factors that explain the elevation in the volatility are (rising) portfolio concentration and a greater share of asset holdings by emerging market economies. In contrast, more financial integration and greater household share cause a reduction in the volatility. The creation of the European monetary union added volatility in both equity and bond markets, indicating that increased market ties opened the door to financial contagion. Greater asset holdings by OFCs and NBFIs increase overall market volatility, although they affect the volatility in equity and bond markets in a opposing way. Overall, both the cross-sectional and panel estimates provided very somewhat similar results, leading us to conclude that results obtained in this study are indeed robust.

3.2.3 Volatility in Capital Gains

In the last part of our empirical analysis we explore the determinants of volatility of cross-border capital gains, which are primarily the outcome of changes in market price of the asset as well as

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[12]By comparison, investors in emerging markets keep most of their assets in bank deposits or physical assets (such as real estates and gold), which reflects lower income levels, underdeveloped financial markets and other barriers to diversification. See MGI (2011) for further discussion.

exchange rate fluctuations. As Figures 1–3 in Balli et al. (2012) show, capital gains typically are large and unpredictable. Further, Balli et al. (2012) found that risk sharing from capital gains (at about 6%) is higher and stable than risk sharing from factor income flows for European Union countries and OECD countries.

As before, we examine whether the same factors used in the aforementioned discussion explain the variability in net capital gains. Table 9 presents the results of the panel estimation. As it shows, financial integration has a significantly negative effect on the volatility in capital gains, while diversification of assets does not exert significant influence on the volatility (column a). However, the influence of the financial integration disappear when one or both sets of controls variables are included in the regressions (columns i and j). Focusing on the full model (column j), we find that compared with the OECD countries, a greater share by EMU countries led to a reduction in the volatility of capital gains. In the EMU countries, variation in capital gains reflected pure return-driven component since the exchange rate-driven component was absent as a result of the monetary union. This result should be of interest for euro area policymakers in light of the negative stories on eurozone since the outbreak of the European sovereign-debt crisis in 2009.

Table 10 reports the long-run effects obtained from the cross-section estimation of time-averaged data. Over the long-run, neither financial integration nor diversification plays a significant role in explaining the variance in capital gains. Similar to the panel results, we find that greater OECD and OFCs share elevates volatility, while higher share by EMU countries dampens volatility. Although the EMU effect is not statistically significant, due likely to small number of observations. Finally, as in panel data, a higher household share reduces volatility in capital gains.

4 Conclusion

Examining the patterns of returns on cross-border investments has attracted very little attention in research. The few exceptions include, Bond (1977), Lane (2001), Lane and Milesi-Ferretti (2002a, 2002b, 2003, 2005), Balli et al. (2011a, 2011b), and Barcke and Schmitz (2011), that have provided some evidence on the behaviour of aggregate returns on foreign assets and liabilities. This is surprising keeping in view the fact that the returns on cross-border investments significantly determine the degree of risk sharing and the transmission of financial shocks. The present study is a contribution to this strand of literature.

We use a broad sample of 34 OECD countries to explore the determinants of volatility of aggregate

returns on cross-border equity and debt investments for the period 1997 and 2001-2009. For this purpose, we utilize a unique dataset on country-level equity and debt returns to construct our dependent variable, that captures volatility in panel as well as cross-section settings. We also split returns into its two established channels, namely investment income and capital gains and examine these channels separately because of their distinct characteristics.

Our main findings point out that higher financial integration and diversification of cross-border investments lead to lower volatility in aggregate returns. The destination of the asset holdings matters, as it is found that when investors allocate their assets to emerging markets, the returns are more volatile, whereas less volatility is witnessed when assets are allocated in OECD markets. The economic sector of holder of assets is also found to influence volatility, as we show that an increased share of investments by households generates less volatile returns. Similarly in case of debt investments, larger debt holdings by non-bank financial institutions (mostly comprising mutual funds and insurance companies) witness less volatility in returns. Lastly, we examine the determinants of volatility in capital gains and find that neither financial integration nor the diversification of investments, significantly explain volatility. Nevertheless destination matters, as investments in developed countries and offshore financial centers are found to generate higher volatility in capital gains. With regards to the role of the sector of holder of assets, an increase in the asset holdings by household sector is found to exhibit lesser volatility in capital gains.

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Table 1: Descriptive statistics

	Mean	Median	Max.	Min.	Std. Dev.	Obs.
Portfolio Securities						
Receipt to investment ratio (absolute change)	0.092	0.022	1.375	0.000	0.206	231
Financial integration	3.590	1.017	97.886	0.076	13.280	318
Concentration ratio (top five countries)	0.645	0.625	0.981	0.405	0.121	318
OECD countries share	0.865	0.892	0.994	0.318	0.090	318
Emerging markets share	0.045	0.029	0.401	0.001	0.051	313
Offshore financial centers share	0.182	0.168	0.654	0.001	0.112	317
EMU countries share	0.439	0.437	0.820	0.017	0.204	318
Banks share	0.239	0.205	0.896	0.003	0.174	186
Non-bank financial institutions share	0.503	0.526	0.988	0.001	0.230	176
Insurance companies share	0.182	0.159	0.933	0.001	0.135	168
Mutual funds share	0.204	0.183	0.573	0.015	0.121	146
General government share	0.119	0.015	0.757	0.000	0.204	124
Non financial sector share	0.170	0.137	0.570	0.001	0.138	164
House holds share	0.096	0.062	0.419	0.000	0.099	107
Equity Securities						
Receipt to investment ratio (absolute change)	0.228	0.027	5.261	0.000	0.634	246
Financial integration	3.590	1.017	97.886	0.076	13.280	318
Concentration ratio (top five countries)	0.716	0.711	1.000	0.060	0.127	318
OECD countries share	0.876	0.903	1.000	0.060	0.110	317
Emerging markets share	0.065	0.038	0.819	0.000	0.090	304
Offshore financial centers share	0.282	0.244	0.762	0.001	0.177	313
EMU countries share	0.418	0.393	0.874	0.001	0.219	314
Banks share	0.092	0.045	0.726	0.000	0.138	162
Non-bank financial institutions share	0.610	0.644	1.000	0.001	0.269	166
Insurance companies share	0.167	0.126	0.978	0.001	0.150	153
Mutual funds share	0.306	0.268	1.000	0.015	0.215	138
General government share	0.138	0.016	0.812	0.000	0.230	99
Non financial sector share	0.230	0.171	0.999	0.000	0.193	156
House holds share	0.156	0.119	0.490	0.003	0.133	104
Debt Securities						
Receipt to investment ratio (absolute change)	0.123	0.027	2.014	0.000	0.299	238
Financial integration	3.590	1.017	97.886	0.076	13.280	318
Concentration ratio (top five countries)	0.652	0.625	1.000	0.088	0.122	296
OECD countries share	0.854	0.889	1.000	0.108	0.114	296
Emerging markets share	0.033	0.021	0.346	0.000	0.036	277
Offshore financial centers share	0.119	0.107	0.762	0.000	0.091	293
EMU countries share	0.465	0.507	0.829	0.022	0.215	293
Banks share	0.333	0.300	0.918	0.004	0.205	174
Non-bank financial institutions share	0.414	0.442	0.920	0.000	0.228	162
Insurance companies share	0.198	0.195	0.721	0.001	0.143	151
Mutual funds share	0.127	0.120	0.548	0.000	0.099	134
General government share	0.147	0.015	0.790	0.000	0.232	103
Non financial sector share	0.147	0.080	0.694	0.004	0.154	154
House holds share	0.081	0.036	0.547	0.002	0.105	97

This table reports the descriptive statistics for a sample of 34 OECD countries for the years 1997 and 2001-2009. The variables include; receipt to investment ratio (absolute change) which is the absolute value of the change in receipts to investment ratio [i.e. receipts to investment ratio (t) - receipts to investment ratio (t-1)]; financial integration is foreign portfolio investments and liabilities to GDP ratio; concentration ratio is the percentage share of investment in five largest destination countries; OECD countries share, emerging markets share, offshore financial centres share and European Monetary Union countries share are the percentage shares of foreign portfolio investments made in the mentioned groups of countries; and, banks share, non-bank financial institutions share, insurance companies share, mutual funds share, general government share, non-financial sector share households are the percentage shares of portfolio holdings by these sectors of source countries.

Table 3: Factors explaining volatility in returns on **portfolio** securities (panel estimation)

	(3a)	(3b)	(3c)	(3d)	(3e)	(3f)	(3g)	(3h)	(3i)	(3j)
Financial integration	-0.103*	-0.097*	-0.132**	-0.077*	-0.099*	-0.988	-11.785*	-13.907*	-0.120***	-3.025*
	(-1.784)	(-1.745)	(-2.453)	(-1.671)	(-1.793)	(-1.595)	(-1.863)	(-1.848)	(-3.042)	(-1.650)
Concentration ratio (top five countries)	0.356**	0.369**	0.525**	0.334**	0.399*	0.073	-0.046	0.536	0.697**	1.690***
	(2.271)	(2.435)	(2.064)	(1.995)	(1.918)	(0.304)	(-0.177)	(0.846)	(2.395)	(5.271)
OECD countries share		-0.149							-0.152	-0.903***
		(-0.878)							(-0.659)	(-3.103)
Emerging markets share			1.853**						1.961**	4.545***
			(2.027)						(2.172)	(11.976)
Offshore financial centers share				0.196					-0.041	0.344
				(0.695)					(-0.234)	(0.754)
European Monetary Union countries share					0.066				0.229*	0.533**
					(0.528)				(1.842)	(2.151)
Banks share						-0.105				-0.030
						(-0.589)				(-0.130)
Non-bank financial institutions share							0.312			-0.281*
							(1.387)			(-1.869)
House holds share								-0.345		-0.861***
								(-1.299)		(-4.478)
Observations	231	231	229	231	231	152	140	90	229	90
R-squared	0.09	0.09	0.27	0.10	0.09	0.19	0.23	0.27	0.36	0.78

This table reports estimations with time fixed effects where dependent variable is the absolute value of the change in portfolio receipts to investment ratio [i.e. receipts to investment ratio (t) - receipts to investment ratio (t-1)] for a sample of 34 OECD countries for the years 1997 and 2001-2009. The explanatory variables include; financial integration which is foreign portfolio investments and liabilities to GDP ratio; concentration ratio is the percentage share of investment in five largest destination countries; OECD countries share, emerging markets share, offshore financial centres share and European Monetary Union countries share are the percentage shares of foreign portfolio investments made in the mentioned groups of countries; and, banks share, non-bank financial institutions share and households share are the percentage shares of portfolio holdings by these sectors of source countries. The coefficients of financial integration are multiplied by 100. Heteroskedasticity consistent t-statistics are given in parenthesis. ***,**, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 4: Factors explaining volatility in returns on **equity** securities (panel estimation)

	(4a)	(4b)	(4c)	(4d)	(4e)	(4f)	(4g)	(4h)	(4i)	(4j)
Financial integration	-0.003	-0.003	-0.005*	-0.003	-0.002	-0.142	-0.127*	-0.119	-0.004**	-0.019
	(-1.244)	(-1.373)	(-1.827)	(-1.456)	(-1.209)	(-1.282)	(-1.867)	(-1.016)	(-2.467)	(-0.501)
Concentration ratio (top five countries)	0.229	0.612	-0.022	1.150	0.770	-0.361	0.380	0.008	1.028***	0.799**
	(0.297)	(1.0424)	(-0.032)	(1.627)	(1.240)	(-0.805)	(0.574)	(0.017)	(3.312)	(2.161)
OECD countries share		-0.922							-0.905	-0.795*
		(-1.113)							(-0.993)	(-1.788)
Emerging markets share			2.229***						2.238***	5.250***
			(6.124)						(7.061)	(5.570)
Offshore financial centers share				-0.765					-1.310*	0.124
				(-1.598)					(-1.770)	(0.524)
European Monetary Union countries share					-0.118				1.195*	0.033
					(-0.405)				(1.905)	(0.107)
Banks share						-0.122				0.197
						(-1.070)				(0.510)
Non-bank financial institutions share							0.497*			-0.087
							(1.807)			(-0.685)
House holds share								-0.437		-0.013
								(-1.460)		(-0.039)
Observations	245	245	239	244	244	136	135	85	238	79
R-squared	0.05	0.07	0.18	0.10	0.07	0.18	0.19	0.17	0.28	0.81

This table reports the multivariate estimations with time fixed effects where dependent variable is the absolute value of the change in equity receipts to investment ratio [i.e. receipts to investment ratio (t) - receipts to investment ratio (t-1)] for a sample of 34 OECD countries for the years 1997 and 2001-2009. The explanatory variables include; financial integration which is foreign portfolio investments and liabilities to GDP ratio; concentration ratio is the percentage share of investment in five largest destination countries; OECD countries share, emerging markets share, offshore financial centres share and European Monetary Union countries share are the percentage shares of foreign equity investments made in the mentioned groups of countries; and, banks share, non-bank financial institutions share and households share are the percentage shares of equity holdings by these sectors of source countries. Heteroskedasticity consistent t-statistics are given in parenthesis. ***,**, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 5: Factors explaining volatility in returns on **debt** securities (panel estimation)

	(5a)	(5b)	(5c)	(5d)	(5e)	(5f)	(5g)	(5h)	(5i)	(5j)
Financial integration	-0.148*	-0.082	-0.134**	-0.103	-0.134*	-11.749	-8.449	-13.592	-0.086*	-0.089**
	(-1.841)	(-1.337)	(-2.380)	(-1.312)	(-1.685)	(-1.415)	(-1.169)	(-1.094)	(-1.843)	(-2.174)
Concentration ratio (top five countries)	0.609**	0.777**	0.402	0.616**	0.701**	0.727***	0.456	0.571	0.820*	1.961***
	(2.122)	(2.462)	(1.468)	(2.486)	(2.439)	(3.093)	(1.461)	(0.753)	(1.619)	(2.839)
OECD countries share		-0.606*							-0.474	-0.539**
		(-1.792)							(-0.855)	(-2.210)
Emerging markets share			2.908						2.799	8.567***
			(1.389)						(1.328)	(7.188)
Offshore financial centers share				0.490					0.025	-1.512*
				(1.577)					(0.064)	(-1.737)
European Monetary Union countries share					-0.003				0.255	0.802***
					(-0.025)				(0.979)	(2.935)
Banks share						0.520				0.891***
						(1.628)				(3.055)
Non-bank financial institutions share							-0.405*			-0.594***
							(-1.648)			(-3.313)
House holds share								0.688		0.517
								(0.727)		(1.178)
Observations	238	238	230	238	237	147	135	84	229	83
R-squared	0.07	0.11	0.17	0.09	0.09	0.23	0.19	0.21	0.20	0.80

This table reports multivariate estimations with time fixed effects where dependent variable is the absolute value of the change in debt receipts to investment ratio [i.e. receipts to investment ratio (t) - receipts to investment ratio (t-1)] for a sample of 34 OECD countries for the years 1997 and 2001-2009. The explanatory variables include; financial integration which is foreign portfolio investments and liabilities to GDP ratio; concentration ratio is the percentage share of investment in five largest destination countries; OECD countries share, emerging markets share, offshore financial centres share and European Monetary Union countries share are the percentage shares of foreign debt investments made in the mentioned groups of countries; and, banks share, non-bank financial institutions share and households share are the percentage shares of debt holdings by these sectors of source countries. The coefficients of financial integration are multiplied by 100. Heteroscedasticity consistent t-statistics are given in parenthesis. ***,**, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6: Factors explaining volatility in returns on **portfolio** securities (cross-section estimation)

	(6a)	(6b)	(6c)	(6d)	(6e)	(6f)	(6g)	(6h)	(6i)	(6j)
Financial integration	-0.174*	-0.161	-0.223**	-0.146	-0.165*	-0.152	-17.592	-0.219*	-0.255**	-9.868*
	(-1.849)	(-1.677)	(-2.435)	(-1.518)	(-1.854)	(-1.495)	(-1.525)	(-1.854)	(-2.421)	(-2.320)
Concentration ratio (top five countries)	0.877**	0.879**	0.933	0.869*	0.996	0.547	0.397	1.114	1.440**	3.069**
	(2.183)	(2.184)	(1.650)	(1.999)	(1.667)	(1.146)	(0.722)	(0.744)	(2.305)	(3.558)
OECD countries share		-0.271							-0.592	-0.308
		(-0.813)							(-0.984)	(-0.587)
Emerging markets share			2.993*						3.239*	6.267**
			(1.745)						(1.863)	(3.457)
Offshore financial centers share				0.203					-0.641	1.307
				(0.319)					(-0.975)	(1.136)
European Monetary Union countries share					0.130				0.523*	0.735
					(0.431)				(1.739)	(1.459)
Banks share						0.146				-0.268
						(0.401)				(-0.567)
Non-bank financial institutions share							0.218			-0.344
							(0.512)			(-1.027)
House holds share								-0.448		-1.680**
								(-0.813)		(-3.085)
Observations	28	28	28	28	28	20	20	15	28	15
R-squared	0.14	0.14	0.35	0.14	0.14	0.27	0.28	0.35	0.39	0.93

This table reports the multivariate cross-section regressions where dependent variable is the standard deviation of portfolio receipts to investment ratio for a sample of 34 OECD countries for the years 1997 and 2001-2009. The explanatory variables include; financial integration which is foreign portfolio investments and liabilities to GDP ratio; concentration ratio is the percentage share of investment in five largest destination countries; OECD countries share, emerging markets share, offshore financial centres share and European Monetary Union countries share are the percentage shares of foreign portfolio investments made in the mentioned groups of countries; and, banks share, non-bank financial institutions share and households share are the percentage shares of portfolio holdings by these sectors of source countries. The coefficients of financial integration are multiplied by 100. Heteroscedasticity consistent t-statistics are given in parenthesis. ***,**, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 7: Factors explaining volatility in returns on **equity** securities (cross-section estimation)

	(7a)	(7b)	(7c)	(7d)	(7e)	(7f)	(7g)	(7h)	(7i)	(7j)
Financial integration	-0.602	-0.581	-0.769	-0.642	-0.575	-20.164	-24.217	-24.861	-8.139	-10.574
	(-0.971)	(-1.042)	(-1.289)	(-1.093)	(-0.993)	(-0.977)	(-1.396)	(-0.892)	(-1.548)	(-0.733)
Concentration ratio (top five countries)	0.553	1.476	1.091	0.728	0.466	-0.480	1.085	0.128	2.970	1.903
	(0.297)	(0.911)	(0.589)	(0.329)	(0.224)	(-0.551)	(0.764)	(0.105)	(1.599)	(1.223)
OECD countries share		-3.170							-4.183	2.346
		(-1.144)							(-1.011)	(0.734)
Emerging markets share			5.669***						4.043**	10.321*
			(3.626)						(2.052)	(2.622)
Offshore financial centers share				-0.349					-3.173	0.668
				(-0.371)					(-1.241)	(0.416)
European Monetary Union countries share					0.297				2.637	-0.177
					(0.382)				(1.134)	(-0.124)
Banks share						-0.505				-0.653
						(-0.952)				(-0.533)
Non-bank financial institutions share							0.975*			0.026
							(1.733)			(0.046)
House holds share								-0.480		-0.826
								(-0.794)		(-0.928)
Observations	28	28	28	28	28	18	19	14	28	14
R-squared	0.02	0.10	0.24	0.03	0.03	0.14	0.43	0.18	0.35	0.89

This table report the univariate and multivariate cross-section regressions where dependent variable is the standard deviation of equity receipts to investment ratio for a sample of 34 OECD countries for the years 1997 and 2001-2009. The explanatory variables include; financial integration which is foreign portfolio investments and liabilities to GDP ratio; concentration ratio is the percentage share of investment in five largest destination countries; OECD countries share, emerging markets share, offshore financial centres share and European Monetary Union countries share are the percentage shares of foreign equity investments made in the mentioned groups of countries; and, banks share, non-bank financial institutions share and households share are the percentage shares of equity holdings by these sectors of source countries. The coefficients of financial integration are multiplied by 100. Heteroscedasticity consistent t-statistics are given in parenthesis. ***,**, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 8: Factors explaining volatility in returns on **debt** securities (cross-section estimation)

	(8a)	(8b)	(8c)	(8d)	(8e)	(8f)	(8g)	(8h)	(8i)	(8j)
Financial integration	-0.180*	-0.123	-0.161**	-0.114	-0.184*	-0.131*	-10.419	-11.240	-0.060	-10.308
	(-1.781)	(-1.415)	(-2.388)	(-1.202)	(-1.751)	(-1.803)	(-1.413)	(-0.957)	(-0.988)	(-1.486)
Concentration ratio (top five countries)	1.361***	1.463***	1.176***	1.275***	1.419***	1.355***	1.198***	0.809	1.830***	8.201*
	(3.749)	(3.381)	(2.833)	(5.126)	(3.355)	(7.530)	(4.672)	(0.707)	(2.906)	(2.852)
OECD countries share		-0.523							-1.020	3.265
		(-1.130)							(-1.137)	(1.419)
Emerging markets share			3.915*						3.905	7.501
			(1.720)						(1.685)	(2.015)
Offshore financial centers share				0.734					0.234	14.639
				(1.659)					(0.361)	(2.057)
European Monetary Union countries share					0.063				0.527	0.596
					(0.342)				(1.360)	(1.064)
Banks share						0.568***				-1.064
						(3.400)				(-1.314)
Non-bank financial institutions share							-0.402			-1.282*
							(-1.486)			(-2.402)
House holds share								1.017		-1.852
								(0.613)		(-2.038)
Observations	28	28	28	28	28	19	19	13	28	13
R-squared	0.27	0.30	0.44	0.31	0.27	0.53	0.48	0.33	0.51	0.87

This table reports the multivariate cross-section regressions where dependent variable is the standard deviation of debt receipts to investment ratio for a sample of 34 OECD countries for the years 1997 and 2001-2009. The explanatory variables include; financial integration which is foreign portfolio investments and liabilities to GDP ratio; concentration ratio is the percentage share of investment in five largest destination countries; OECD countries share, emerging markets share, offshore financial centres share and European Monetary Union countries share are the percentage shares of foreign debt investments made in the mentioned groups of countries; and, banks share, non-bank financial institutions share and households share are the percentage shares of debt holdings by these sectors of source countries. The coefficients of financial integration are multiplied by 100. Heteroscedasticity consistent t-statistics are given in parenthesis. ***,**, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 9: Factors explaining volatility in **net capital gains** (panel estimation)

	(9a)	(9b)	(9c)	(9d)	(9e)	(9f)	(9g)	(9h)	(9i)	(9j)
Financial integration	-0.156**	-0.179**	-0.142	-0.145**	-0.157**	-0.069	-5.072	-5.879	-0.061	-3.093
	(-2.078)	(-2.036)	(-1.382)	(-1.938)	(-2.070)	(-1.324)	(-0.799)	(-1.074)	(-0.558)	(-0.830)
Concentration ratio (top five countries)	0.038	-0.216	0.010	0.072	0.006	-0.009	-0.076	-0.206	-0.569	-0.967
	(0.189)	(-0.922)	(0.052)	(0.297)	(0.025)	(-0.024)	(-0.223)	(-0.520)	(-1.463)	(-1.522)
OECD countries share		0.796							1.539**	2.078*
		(1.564)							(2.157)	(1.839)
Emerging markets share			-0.238						-0.732	0.900
			(-0.209)						(-0.636)	(0.852)
Offshore financial centers share				0.093					0.944	2.056***
				(0.276)					(1.506)	(2.964)
European Monetary Union countries share					-0.052				-0.573*	-1.327***
					(-0.412)				(-1.738)	(-2.997)
Banks share						-0.287				0.191
						(-1.475)				(0.599)
Non-bank financial institutions share							0.036			-0.186
							(0.264)			(-0.895)
House holds share								-0.498**		-0.719**
								(-2.507)		(-2.120)
Observations	159	159	157	159	159	103	91	65	157	65
R-squared	0.04	0.10	0.04	0.04	0.04	0.12	0.07	0.13	0.19	0.44

This table reports the multivariate cross-section regressions where dependent variable is the absolute value the absolute value of the change in net capital gains to portfolio investment ratio [net capital gains to portfolio investment ratio (t) - net capital gains to portfolio investment ratio (t-1)] for a sample of 34 OECD countries for the years 1997 and 2001-2009. The explanatory variables include; financial integration which is foreign portfolio investments and liabilities to GDP ratio; concentration ratio is the percentage share of investment in five largest destination countries; OECD countries share, emerging markets share, offshore financial centres share and European Monetary Union countries share are the percentage shares of foreign portfolio investments made in the mentioned groups of countries; and, banks share, non-bank financial institutions share and households share are the percentage shares of portfolio holdings by these sectors of source countries. The coefficients of financial integration are multiplied by 100. Heteroscedasticity consistent t-statistics are given in parenthesis. ***,**, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 10: Factors explaining volatility in **net capital gains** (cross-section estimation)

	(10a)	(10b)	(10c)	(10d)	(10e)	(10f)	(10g)	(10h)	(10i)	(10j)
Financial integration	-0.411	-0.414	-0.505	-0.318	-0.402	-33.569	-35.337	-7.824	-0.497	-8.883
	(-1.512)	(-1.491)	(-1.333)	(-1.176)	(-1.519)	(-1.345)	(-1.305)	(-1.489)	(-0.865)	(-1.459)
Concentration ratio (top five countries)	0.067	0.058	0.286	0.312	0.337	-0.954	-0.919	-0.265	0.912	-0.399
	(0.059)	(0.048)	(0.279)	(0.263)	(0.341)	(-0.558)	(-0.541)	(-0.546)	(0.698)	(-0.407)
OECD countries share		0.068							-0.236	3.193**
		(0.069)							(-0.108)	(2.632)
Emerging markets share			2.736						3.835	-1.498
			(0.708)						(0.705)	(-0.589)
Offshore financial centers share				0.704					0.163	4.509***
				(0.842)					(0.072)	(5.341)
European Monetary Union countries share					0.290				0.484	-1.003
					(0.642)				(0.312)	(-1.712)
Banks share						0.280				0.092
						(0.461)				(0.183)
Non-bank financial institutions share							0.011			0.009
							(0.033)			(0.033)
House holds share								0.178		-2.122*
								(0.209)		(-2.273)
Observations	25	25	25	25	25	19	19	15	25	15
R-squared	0.02	0.02	0.04	0.03	0.03	0.24	0.23	0.08	0.06	0.78

This table reports the multivariate cross-section regressions where dependent variable is the standard deviation of net capital gains for a sample of 34 OECD countries for the years 1997 and 2001-2009. The explanatory variables include; financial integration which is foreign portfolio investments and liabilities to GDP ratio; concentration ratio is the percentage share of investment in five largest destination countries; OECD countries share, emerging markets share, offshore financial centres share and European Monetary Union countries share are the percentage shares of foreign portfolio investments made in the mentioned groups of countries; and, banks share, non-bank financial institutions share and households share are the percentage shares of portfolio holdings by these sectors of source countries. The coefficients of financial integration are multiplied by 100. Heteroscedasticity consistent t-statistics are given in parenthesis. ***,**, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.