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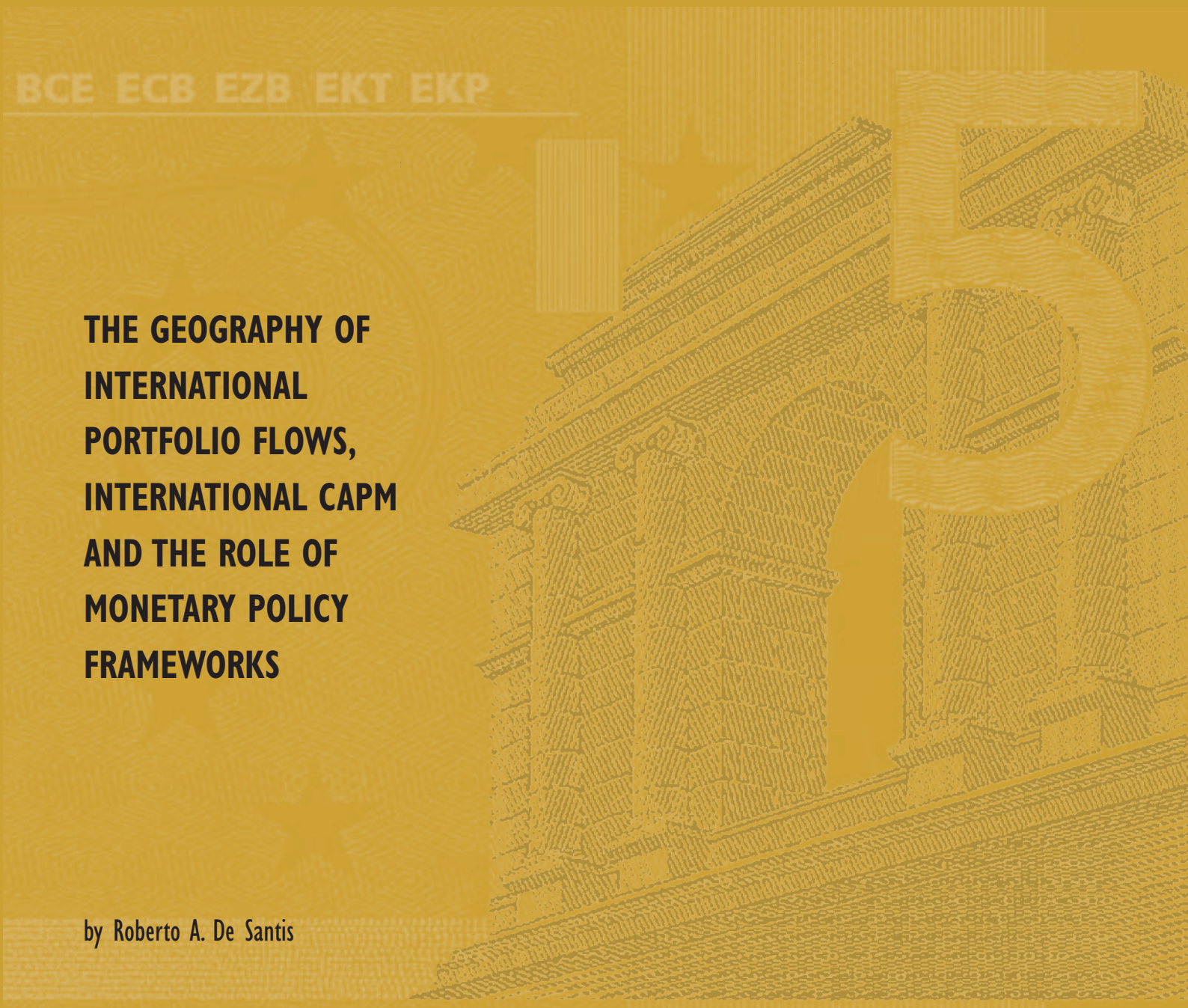

THE GEOGRAPHY OF INTERNATIONAL PORTFOLIO FLOWS, INTERNATIONAL CAPM AND THE ROLE OF MONETARY POLICY FRAMEWORKS

by Roberto A. De Santis

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THE GEOGRAPHY OF INTERNATIONAL PORTFOLIO FLOWS, INTERNATIONAL CAPM AND THE ROLE OF MONETARY POLICY FRAMEWORKS [1]

by Roberto A. De Santis [2]

In 2006 all ECB publications feature a motif taken from the €5 banknote.

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CONTENTS

Abstract

Using bilateral data on international equity and bond flows, we find that the prediction of the International Capital Asset Pricing Model is partially met and that global equity markets might be more integrated than global bond markets. Moreover, over the turbulent 1998-2001 period characterised by an equity bubble and the subsequent burst, we find evidence that investors preferred portfolio assets of countries where the central bank gave relative importance to money. As for EMU, once controlling for diversification benefits and the elimination of the exchange rate risk, we show that cross-border portfolio flows among euro area countries have increased due to the catalyst effect of EMU. Country's shares in the world market portfolio, home bias, initial degree of misallocation across countries, past returns, diversification benefits and EMU can explain 35-40% of the total variation in equity and bond asset flows.

Keywords: Capital flows - Home bias - Risk diversification - EMU - Monetary policy

JEL classification: C13, C21, F37, G11.

Non-Technical Summary

The 1998-2001 period was characterised by the sharp rise in cross-border capital flows globally, the increased percentage of household savings invested in capital markets, the boom and bust of the equity bubble as well as the establishment of European Economic and Monetary Union (EMU) in January 1999.

The first aim of this study is to investigate whether countries allocated money according to the simple prediction of the International Capital Asset Pricing Model (IntCAPM) over the cumulated period 1998-2001. The IntCAPM suggests that international investors should hold assets of each country in proportion to the country's share in the world market portfolio. This implies that all countries, in a world without transaction and information costs, would hold the same portfolio and would diversify their investment in other countries in proportion to the size of their financial markets. In this respect, global indices such as the popular Morgan Stanley Capital International (MCSI) All Country World Index (ACWI), Datastream Global index, Standard and Poor's (S&Ps) Global index, are widely used by investors as their performance benchmarks for the global asset portion of their equity portfolio. We test therefore the hypothesis that countries allocate money according to the simple prediction of the IntCAPM. We also assess the empirical relevance of the IntCAPM for the bond market. In order to carry out this test, we employ the Lehman Brother Multiverse index released in 2001 as the benchmark for the global bond market.

The second aim of the paper is to assess whether, during this turbulent period for asset markets, the central banks' monetary policy frameworks across countries influenced the geography and size of international capital flows. As a consequence of the asset price shocks, international investors might have preferred to re-allocate their portfolio assets towards countries, which gave importance to specific characteristics of monetary policy frameworks. In order to study the role of central banks' institutional frameworks, of central banks' policy objectives and of the importance given to financial stability in the setting of monetary policy instruments, we employ the result of a survey commissioned and coordinated by Bank of England in 1998 aiming at measuring several key characteristics of the monetary frameworks consistently across 94 central banks (Mahadeva and Sterne, 2000). Moreover, given the new monetary policy framework, which came to light in Europe in January 1999, we also look and control for the potential impact of EMU on global portfolio flows.

We find clear evidence that portfolio asset flows are influenced positively by the relative size of the recipient countries' financial markets. The predictions of the IntCAPM are only partially met as the estimated coefficient on the benchmarks is less than unity: 0.4 for the equity portfolio and 0.2 for the bond portfolio. A country,

which sees its market size to increase by 1 percentage point relative to the world market capitalization, would attract international equity (bond) flows amounting to 0.4% (0.2%) of the equity (bond) assets held abroad by foreigners. This might imply that global equity markets are more integrated than global bond markets and that there is still room for further integration in both markets. These results do not change when controlling for home bias and the initial degree of underweight, which enters non-linearly and therefore potentially proxing for initial direct and indirect costs.

We also find that, during the turbulent 1998-2001 period, international investors in both equity and fixed income markets had a tendency to purchase assets issued by countries, whose monetary authorities gave importance to money.

Moreover, we estimate on a 95% confidence interval the potential catalyst effect of the euro within the euro area to amount to USD 22-47 billion in equity securities and USD 32-76 billion in bonds and notes, which implies that EMU might have enhanced risk sharing among euro area member states. The catalyst effect of the euro is estimated after controlling for the elimination of the exchange rate risk among euro area member states and the effect of being member of the European Union (EU). EMU boosted the cross-border investment activity among euro area member states due to the removal of intra-area currency matching rules, the sharing of common plattforms as well as the cross-border merger of the Amsterdam, Brussels and Paris exchanges (Euronext). On average, the impact on the fixed income market is larger possibly because European institutional investors invested massively in domestic government debt. The adoption of the euro currency matching rule allowed them to rebalance into euro-denominated bonds issued by other EMU member states.

Country's shares in the world market portfolio, home bias, initial degree of misallocation across countries, past returns, diversification benefits and EMU can explain 35-40% of the total variation in equity and bond flows. This is a valuable result given that we look at the geography of international portfolio flows during a very difficult period for asset allocators.

1 Introduction

The International Capital Asset Pricing Model (IntCAPM) suggests that international investors should hold assets of each country in proportion to the country's share in the world market portfolio.[1] This implies that all countries, in a world without transaction and information costs, would hold the same portfolio and would diversify their investment in other countries in proportion to the size of their financial markets. In this respect, global indices such as the popular Morgan Stanley Capital International (MCSI) All Country World Index (ACWI), Datastream Global index, Standard and Poor's (S&Ps) Global index, are widely used by investors as their performance benchmarks for the global asset portion of their equity portfolio. The first aim of this paper is to examine whether countries allocate money according to the simple prediction of the IntCAPM. We also assess the empirical relevance of the IntCAPM for the bond market. In order to carry out this test, we employ the Lehman Brother Multiverse index released in 2001 as the benchmark for the global bond market.

It is useful to point out that recent studies have looked at the contemporaneous link between the actual weight of country j in fund i's equity portfolio and the optimal weight suggested by the IntCAPM for emerging markets (Gelos and Wei, 2005). We instead aim at investigating whether the subsequent global allocation of portfolio capital across 23 developed countries and 7 emerging market economies is a function of the optimal weights at the beginning of the period as suggested by the IntCAPM.

In order to carry out such a study, we construct a consistent database on bilateral cross-border equity and bond flows for 30 countries covering in 2001 80% of world's GDP, 84% of world's international investment in equity portfolios and 71% of world's international investment in bonds and notes portfolios. Therefore, the 30 countries of the sample and the cross-section of 870 bilateral observations encompass all important international investment decisions (excluding official investments by monetary authorities).

Specifically, we construct measures of bilateral net asset flows of equities and bonds mainly on the basis of the IMF Coordinated Portfolio Investment Survey (CPIS) database, which reports bilateral holdings at end-1997 and end-2001. We define net asset flows of equities and bonds as the purchases minus the sales of country k's equities and bonds by citizens of country c. The considered period was characterised by the sharp rise in cross-border capital flows globally, the increased percentage of household savings invested in capital markets, the boom and bust of the equity bubble as well as the

[1] The International Capital Asset Pricing Model and the Intertemporal Asset Pricing Model are often referred using the same lable: I-CAPM. We use IntCAPM to avoid confusion.

establishment of European Economic and Monetary Union (EMU) in January 1999. Looking at cumulated portfolio net asset flows over the four-year period 1998-2001 has the advantage of abstracting from short-run variations in international portfolio flows, which could be due to unexpected economic news, cyclical developments as well as phenomena which are difficult to pin down.

The second aim of the paper is to assess whether, during this turbulent period for asset markets, central banks' monetary policy frameworks across countries influenced the geography and size of international capital flows.[2] As a consequence of the asset price shocks, international investors might have preferred to re-allocate their portfolio assets towards countries, which gave importance to specific characteristics of monetary policy frameworks. Therefore, we employ the result of a survey commissioned and coordinated by Bank of England in 1998 aiming at measuring several key characteristics of the monetary frameworks consistently across 94 central banks (Mahadeva and Sterne, 2000). Moreover, given the new monetary policy framework, which came to light in Europe in January 1999, we also look and control for the potential impact of EMU on global portfolio flows.

International portfolio flows have skyrocketed in the last fifteen year and a large number of studies have tried to explain their determinants. However, data limitations have meant that these contributions focused to country aggregates of net equity and debt flows (De Santis and Lührmann, 2006), to country aggregates of inflows of equity capital - foreign direct investment plus portfolio equity securities - (Alfaro, et al. 2005) or have only considered a single source country, most often the United States being the recipient or the source of the investment (Bohn and Tesar, 1996; Brennan and Cao, 1997; Coval and Moskowitz, 1999; Froot, O'Connell and Seasholes, 2001; Huberman, 2001; Ahearne, Griever, and Warnock, 2004). Portes and Rey (2005) is the only study which looks at bilateral cross border equity flows between 14 countries pointing to the role played by information costs. De Santis and Gérard (2006) is the only study looking at the determinants of bilateral changes in portfolio country weights in both equity securities and fixed income for a panel of 30 countries pointing to the role played by the non-linear fully hedged diversification benefits, the initial degree of misallocation and the establishment of EMU. Another branch of the

[2] A large body of the literature pointed to the importance of institutional characteristics of the monetary policy framework - such as central banks' independence, accountability and transparency - to control inflationary expectations and safeguard financial stability (i.e. Rogoff, 1985; Alesina and Summers, 1993). Several measures of central banking independence were also constructed and used to study the impact on inflation (Grilli, Masciandaro and Tabellini, 1991; Cukierman, 1992; Jácome and Vázques, 2005).

literature has studied the determinants of bilateral bank and portfolio holdings using empirical methods borrowed from the traditional gravity models of international goods trade (Faruquee, Li and Yan, 2004; Lane and Milesi-Ferretti, 2004; Lane, 2005; Papaioannou, 2005; Aviat and Coeurdacier, 2006).

Our main contribution to the literature is that we find clear evidence that portfolio asset flows are influenced positively by the relative size of the recipient countries' financial markets. The predictions of the IntCAPM are only partially met as the estimated coefficient on the benchmarks is less than unity: 0.4 for the equity portfolio and 0.2 for the bond portfolio. These results do not change when controlling for home bias and the initial degree of underweight, which enters non-linearly and therefore potentially proxing for initial direct and indirect costs.

We also find that, during the turbulent 1998-2001 period, international investors in both equity and fixed income markets had a tendency to purchase assets issued by countries, whose monetary authorities gave importance to money.

Moreover, we estimate on a 95% confidence interval the potential catalyst effect of the euro within the euro area to amount to USD 22-47 billion in equity securities and USD 32-76 billion in bonds and notes, which implies that EMU might have enhanced risk sharing among euro area member states. The catalyst effect of the euro is estimated after controlling for the elimination of the exchange rate risk among euro area member states and the effect of being member of the European Union (EU). EMU boosted the cross-border investment activity among euro area member states due to the removal of intra-area currency matching rules, the sharing of common plattforms as well as the cross-border merger of the Amsterdam, Brussels and Paris exchanges (Euronext).

The proportion of the total variation explained by our empirical models amounts to 35-40% for both equity and bond flows. This is a valuable result given that we look at the geography of international portfolio flows during a very difficult period for asset management.

The reminder of the paper is organized as follows. Section 2 describes the main databases used for the analysis. Section 3 outlines the empirical approach and tests the IntCAPM. Section 4 assesses the role of monetary policy frameworks and estimates the potential impact of EMU on portfolio flows. Section 5 reports how robust the model specifications are when controlling for other variables, which could potentially affect international portfolio flows. Section 6 concludes.

2 Data

Three sets of data are key for our analysis. The first is a data set on bilateral cross-border portfolio holdings used to estimate bilateral equity and bond flows. The second set of data is used to estimate country asset allocation benchmarks. The third set encompasses measures of various characteristics of central banking monetary policy frameworks. We explain the three data set in turn.

2.1 The geography of international portfolio flows

The IMF Coordinated Portfolio Investment Survey (CPIS) database reports the portfolio positions of international investors excluding the official holdings of monetary authorities disaggregated by regions and instruments. More specifically, the CPIS dataset provides a geographical breakdown of international portfolio holdings disaggregated by three instruments – equity securities, long-term debt securities and short-term debt securities – and includes virtually all major international investment, excluding foreign direct investment. An additional advantage of this dataset is the consistency of the compilation criteria:

- participants undertake a benchmark portfolio asset survey at the same time;
- participants follow definitions and classifications that are mutually consistent by following the methodology set out in the 5th edition of the IMF Balance of Payments Manual;
- all participants provide a breakdown of their stock of portfolio investment assets by the country of residency of the non-resident issuer.

The CPIS database for the year 1997 covers 29 of the largest economies in the world, nine of which belonging to the euro area – Austria, Belgium, Finland, France, Ireland, Italy, Netherlands, Portugal and Spain -, the three old EU member states but not members of the euro area – Denmark, Sweden and the United Kingdom -, another ten developed countries – Australia, Bermuda, Canada, Iceland, Israel, Japan, New Zealand, Norway, Singapore, the United States -, four Asian emerging markets – Indonesia, Korea, Malaysia, Thailand - and three Latin American emerging markets – Argentina, Chile and Venezuela. Germany did not report data in 1997, but did so in 2001. Since Germany is a key euro area member and its international portfolio holdings are substantial, we used an annual database on international investment positions from the Bundesbank to derive the geographical allocation of equities and bonds and notes position abroad held by German residents at end-1997. Specifically, we use the Bundesbank 1997 and 2001 records and adjust all the 1997 positions

consistently (including exchange rate movements) to make them comparable to the 2001 holdings recorded in the CPIS.[3]

The change in foreign holdings from end-1997 to end-2001 could be due to capital gains, exchange rate changes, portfolio transactions as well as other adjustments (i.e. reclassifications). Under the hypothesis that cross-border other adjustments are relatively negligible, the actual portfolio flows from the investing country c to the receiving country k over the period 1998-2001, $T_{ck,t}$, can be computed using the IMF data model widely employed in the field of balance of payments, international investment positions and external debt statistics:[4]

$$T_{ck,t} = \left(\frac{Inv_{c,k,01}}{e_{k,01}p_{k,01}} - \frac{Inv_{c,k,97}}{e_{k,97}p_{k,97}} \right) \overline{e}_{k,t}\overline{p}_{k,t} = \left[\frac{Inv_{c,k,01}}{(1+x_{k,t})(1+r_{k,t})} - Inv_{c,k,97} \right] \frac{\overline{e}_{k,t}\overline{p}_{k,t}}{e_{k,97}p_{k,97}},$$

where $Inv_{c,k}$ is the amount invested by country c in country k financial assets and held in country c currency, e_k and p_k are respectively the exchange rate (i.e. country c currency per unit of country k currency) and the the asset price in country k financial assets at the end of periods, $x_{k,t}$ and $r_{k,t}$ are respectively the change in the exchange rate and the total asset return over the four year period, while $\overline{e}_{k,t}$ and $\overline{p}_{k,t}$ are respectively the average exchange rate and the average asset price over the same period. This approach implies that transactions are assumed to occur uniformly over the period 1998-2001. However, it facilitates the computation of the bilateral cross-border portfolio flows, as they do not depend on the choice of the price indices' base year.

As for the exchange rate adjustments, one should note that most of the global portfolio allocation is in US dollars and euro. According to a sub-total of 13 countries used in this study, 75% of equity portfolio and 80% of long-term debt portfolio

[3] In all, we employ a matrix formed by 30 countries (that is 870 observations). However, we excluded from the database the investing countries that allocated explicitly to specific receiving countries less than 75% of their international portfolio either in 1997 or in 2001, or those countries that held less than 100 million of US dollar in their international portfolio in 1997 or in 2001. Therefore, we excluded the investment of Argentina, Indonesia, Israel, Thailand and Venezuela from the equity holdings database and the investment of Iceland, Israel and New Zealand from the long-term debt instrument holdings database. In other words, these economies reported undetermined investment positions vis-à-vis the countries in the sample. Therefore, we opted for excluding them from the cross-section analysis. However, in doing so, we simply loose respectively 0.05% and 0.20% of allocated global equity and bond holdings. Moreover, we excluded all zero entries. Hence, the original database with 870 observations ended up with 667 observations for the equity holdings and with 639 observations for the long-term debt instruments holdings.

[4] See Committeri (2000) for a comprehensive analysis.

are held in these two currencies. International investors also held less than 10% of their portfolios in British pound and Japanese Yen. Therefore, it would be a mistake to use local currencies in estimating cross-border portfolio flows. Moreover, London is a key European financial centre generally issuing European assets in euro. Since the Japanese Yen depreciated by only 1% against the US dollar over the 1998-2001 period and given the lack of a disaggregated currency and geographical breakdown of portfolio holdings, a potential alternative is to assume that all assets issued by European countries are issued in euro, while all assets issued by non-European countries are issued in US dollars. This assumption finds its support by the ECB studies on the international role of the euro, which point out that (*i*) the use of the euro on international markets has a strong regional dimension, as it is focused on countries and financial centres geographically close to the euro area; (*ii*) the City of London plays a pivotal role regarding the use of the euro outside the euro area (ECB, 2003).

Table 1 reports the estimated cross-border portfolio flows aggregated for the 30 countries in the sample and the aggregate cumulated figures reported by the International Financial Statistics (IFS) of the IMF over the same period. The estimated flows and the IFS figures are not directly comparable, as important countries such as offshore centres and several Asian and Latin American countries are not included in the CPIS database. Moreover, the cross-border flows of debt instruments reported by the IFS include official flows from monetary authorities and are the sum of bonds and money market instruments flows. For example, the estimated foreign capital flows in US long-term debt securities amount to USD 173 billion, while the US debt liabilities reported by the IFS, which include the flows of foreign monetary authorities and offshore centres, amount to USD 869 billion. However, it is useful to point out that the reserve assets of Japan, China and South-East Asian countries increased by approximately USD 450 billion over the 1998-2001 period, and it is generally agreed the Asian monetary authorities purchased mostly US Treasury securities. It is also generally believed that monetary authorities might have a different profit-maximising behaviour than private investors. Hence, the exclusion of their investment decisions, which is implicit when using the CPIS database, is cardinal to test the IntCAPM.

Although differences for individual transactions clearly exist, the cross-section is acceptable. In fact, the correlation coefficients between the estimated and the IFS figures amount to 95% and 88% on the asset side of equity and bond securities, and to 90% and 78% on their respective liability side.

The aggregate results for four country groupings show that portfolio flows of euro area member states were substantially larger compared to other regions, particularly

in the bond market (see Table 2). A deeper inspection of the data reveals, first, that all regions of the world purchased euro area assets over the period 1998-2001 (see Figure 1). Second, intra-euro area allocation was extremely high. The portfolio transactions among euro area member states amounted to USD 315 billion in equity securities and USD 754 billion in bonds and notes (see Figure 1a), which represent respectively 31% and 51% of the non-domestic equity and bond assets held on average by euro area member states over the period 1998-2001 (see Figure 1b).

2.2 The empirical proxy for the world market portfolio

The IntCAPM suggests that international investors should hold assets of each country in proportion to the country's share in the world market portfolio. To test this hypothesis, an empirical proxy for the world market portfolio ought to be used. There exist several standard benchmarks for the equity portfolio, such as the popular MCSI ACWI, Datastream Global index, S&P's Global index, as they provide consistent data, have sufficiently long price history and are widely used by global investors. We use the Datastream Global index and compare the results with the S&P's Global index, as both include the country coverage used in this study.

To our knowledge, a similar benchmark for the bond portfolio for such a number of countries was never used due to difficulty in compiling countries' bond market capitalization at market value. In January 2001, Lehman Brothers launched a new index (i.e. Multiverse index), which provides a broad-based measure of the international fixed-income bond market, with index history dating back to January 1999. Multiverse index provides information on the overall status of the global debt asset class and offers a means to compare the entire global debt asset class across countries.

Table 3 provides the estimated market shares across countries in both equity and bond market, which will then be used to test the IntCAPM. The second and third columns report the equity portfolio weights computed using the market value of Thomson Datastream and S&P's Global indices, respectively. The last two columns report respectively the bond portfolio weights computed using the market value of the Lehman Brothers Multiverse index and the outstanding amount as reported by the BIS. The equity portfolio weights of Datastream and S&P are very similar. Some small differences can be identified for the bond portfolio weights mainly due to the fact that the Lehman Brothers Multiverse index is evaluated at market value while the BIS bond outstanding is at face value.

The computations reported in Table 3 indicate that according to the IntCAPM almost 50% of world portfolio should be invested in US securities. As for the euro

area (ex. Luxembourg and Greece), approximately 14% of world portfolio should be invested in euro area equity securities and 25% in euro area bonds.

We will report the empirical results using Datastream weights for equity portfolio and Lehman Brothers weights for bond portfolio.[5] It is useful to point out that all the results remain invariant when using respectively S&P weights and BIS weights.

2.3 Characteristics of monetary policy frameworks

We employ the result of a comprehensive survey commissioned by Bank of England in 1998, because it aimed at measuring consistently the diversity in monetary frameworks across 94 central banks with a coverage of characteristics that stretches beyond previous studies (Mahadeva and Sterne, 2000). Specifically, we look at the following characteristics: (*i*) short and medium term policy focus - inflation, money, exchange rate, discretionary policy -; (*ii*) institutional characteristics - independence, accountability, transparency of policy explanations; (*iii*) structural characteristics - importance given to financial stability in the setting of monetary policy instruments.

Central bank independency is defined over a range of characteristics covering legal objectives, goal, instruments, finance of the government deficit and term of office of the governor.

The measure of *accountability* was constructed by assessing how far the central bank has a legal or informal responsibility to explain and defend its policies to government and parliament and to involve parliament in monetary policy decisions. Therefore, the measure relates to accountability to a specific target as well as to governmental and parliamentary monitoring of the central bank.

The measure of *policy explanations* is defined over the effort made by the central bank in explaining policy decisions, assessment of the economy, and forecasts and forward-looking analysis. It can be interpreted as one aspect of transparency in that deeper explanations of policy, which allow to understand its goal and the means by which policy-makers react to changes in economic conditions, is one important manifestation of higher degree of transparency.

As for the measures of *monetary policy objectives*, they are defined and classified over the exchange rate, money growth and inflation dimensions, rather than just one dimension and give the degree to which a country's policy focused on a particular objective. Therefore, the survey is constructed to avoid a 100% commitment to a single objective, as in most of cases definitions that focus on the explicit variable

[5] The employed portfolio weights for Bermuda and Iceland amount to 0.01% as indicated by the S&P's Global index.

targeted may not fully capture policy preferences. The general measure of discretion is a non-linear combination of the scores for exchange-rate focus, money focus and inflation focus.

Finally, the *importance of financial stability* in the monetary framework is defined over various financial stability issues, such as the volatility of asset prices, domestic and overseas financial sector insolvency, and credit rationing.

The eight indices range between 0 and 1, where a high score implies more independence, more accountability of central bank to government, more policy explanations to those outside the central bank, higher degree of importance given to policy objectives and financial stability issues (see Table 4).[6]

Some of these indices are also strongly correlated (see Table 5). The focus on the exchange rate is strongly correlated with the focus on inflation and money, with the transparency index and with the importance given to financial stability; in turn, the focus on money is strongly correlated with the importance of financial stability.

Interestingly, independence and accountability are negatively correlated (-20%), which implies that explaining and defending monetary policies to government and parliament and the involvement of parliament in monetary policy decisions might be partly seen by central banks as an infringement to their independence.

3 The Empirical Approach: Testing the IntCAPM

In a fully integrated world where purchasing power parity (PPP) holds, Solnik (1974) and Sercu (1980) show that the international version of the simple CAPM of Sharpe (1964) and Lintner (1965) holds. Moreover, the equilibrium is achieved when all investors hold the world market portfolio, where each country portfolio is weighted by its market capitalization. In this model, the optimal share invested in each country k is equal to that country k's market capitalization weight in the world index portfolio, $w_{k,97}^{Bench}$.

The IntCAPM predicts a coefficient on $w_{k,97}^{Bench}$ equal to unity. However, due to home bias, marginal and fixed transaction costs, asymmetric information, heterogeneous belief about market performance and trend chasing behaviour, the prediction

[6] For a comprehensive analysis on the construction of all the indices measuring the monetary policy frameworks across countries refer to Ch. 4 of Mahadeva and Sterne (2000). Bermuda and Venezuela are not included in the survey. Therefore, we use the US characteristics for Bermuda, as the Bermuda dollar is at par with the US dollar, and the Uruguay characteristics for Venezuela given the similarities of the monetary policy frameworks of these two countries (see Jácome and Vázquez, 2005).

of the IntCAPM might not hold. Therefore, first we regress bilateral portfolio flows in equity and bond securities upon their respective benchmarks, $w_{k,97}^{Bench}$. Next, we control for the degree of home bias, the non-linear degree of misallocation at the beginning of the period and asset performance in the previous period. Specifically, we estimate the following model:

$$t_{ck,t} = \alpha_0 + \alpha_1 w_{k,97}^{Bench} + \alpha_2 HB_{c,97} + \alpha_3 \Delta HB_{c,01} + \alpha_4 DW_{ck,97}^{3} + \alpha_5 r_{k,t-1} + \varepsilon_t$$

where $t_{ck,t}$ denotes the country c's international transactions invested in country k divided by the country c's average international holdings over the 1998-2001 period; $HB_{c,97}$ and $\Delta HB_{c,01}$ are the country c's degree of home bias at the beginning of the period and its first difference over the sample period; $DW_{ck,97}$ denotes the degree of underweight of country k assets in investor c portfolio at the beginning of the period; $r_{k,t-1}$ is the total returns on country k's market portfolio in the previous period; ε_t is a well-behaved term for all other determinants of portfolio asset flows.

Home bias on the part of an investor, $HB_{c,t}$, is broadly defined as the tendency to invest more in domestic assets, even though the risk is shared more effectively if foreign assets are held. We expect that the higher the degree of home bias, the larger the benefits of further cross border investments and the stronger the incentives for international diversification. Hence, net portfolio flows should be positively related to the degree of home bias at the beginning of the period ($\alpha_2 > 0$) and negatively related to its increase over the period ($\alpha_3 < 0$). An index that is generally used to measure home bias is one minus the Foreign Asset Acceptance Ratio (FAAR).[7] FAAR measures the extent to which the share of foreign assets in an investor's portfolio diverges from the share of foreign assets that would be held in a "borderless" global portfolio. By this metric, home bias is higher, the lower FAAR is from unity. Specifically, FAAR is computed as the actual share of foreign assets in total country holdings, $w_{c,t}^{f}$, divided by the optimal share of foreign assets in the total country portfolio, $1 - w_{c,t}^{Bench}$. This implies that

$$HB_{c,t} = 1 - \frac{w_{c,t}^{f}}{1 - w_{c,t}^{Bench}}.$$

Since this measure is investor specific, it also plays the role of country c fixed effect.

The degree of underweight, DW_{ck}, is defined as a difference between the optimal and actual share of country k assets in investor c portfolio. It is generally agreed that the higher are the costs in a particular foreign market, the more severely underweighted that country will be in the investor's portfolios (Ahearne, Griever, and

[7] See for example IMF (2005) and De Santis and Gérard (2006).

Warnock, 2004). Therefore, we use the initial degree of bilateral missallocation partly to instrument the role played by direct and indirect costs and asymmetric information on bilateral cross-border asset transactions. The larger the initial difference between optimal and actual share, the stronger the incentive to learn about the country and to reduce the associated asset allocation costs in order to trade back to optimal weights, reducing the position when the actual weight exceeds the optimal weight and increasing the investment in an asset when it is underweighted. Since our data focus exclusively on the foreign holdings of each country, the optimal weight to be invested in country k by country c is equal to country k's market capitalization in the world market index excluding the investing country c. Then

$$DW_{ck,97} = w_{ck,97}^{Bench} - w_{ck,97},$$

where $w_{ck,97}^{Bench} = \frac{w_{k,97}^{Bench}}{1-w_{c,97}^{Bench}}$ and $w_{ck,97} = \frac{Inv_{c,k,97}}{\sum_k Inv_{c,k,97}}$.

Since re-balancing a portfolio entails both direct and indirect fixed transaction costs, it is unlikely to take place when bilateral actual portfolio weights differ only slightly from bilateral optimal portfolio weights. Therefore, we introduce some non-linearities by taking the cube of this measure. We expect that the degree of underweight at the beginning of the period affects non-linearly and positively the geography of portfolio flows ($\alpha_4 > 0$).[8]

If portfolio decisions are based partly on past returns, then investors might tend to underweight countries whose stock markets have performed poorly. Bohn and Tesar (1996) found that international portfolio flows co-move with lagged measures of expected returns. This suggests that international investors engage in positive feedback trading, also called "trend chasing". To capture this type of "returns-chasing" behaviour à la Bohn and Tesar, we use past returns and expect α_5 to be positive.

The results reported in Table 6 indicate that $w_{k,97}^{Bench}$ is statistically significant, but its coefficient is less than unity: it is equal to 0.4 for equities and 0.2 for bonds. A country, which sees its market size to increase by 1 percentage point relative to the

[8] Ahearne, Griever, and Warnock (2004) and Portes and Rey (2005) pointed out that direct and indirect costs, such as information costs, to trade assets in a particular foreign market are key reasons why the more severely underweighted that country is in the investor's portfolios. While these factors undoubtedly influence firms' decisions about where to invest, a comprehensive evaluation of this motivation is well beyond the scope of this paper, because we do not have measures of bilateral cross-border fixed costs on equity and bond allocation, which often take the form of legal barriers and restrictive regulations. However, once controlling for home bias, the initial non-linear degree of bilateral misallocation could proxy at least partly the initial fixed costs on cross-border portfolio allocation.

world market capitalization, would attract international equity (bond) flows amounting to 0.4% (0.2%) of the equity (bond) assets held abroad by foreigners. The finding that the coefficient on the bond benchmark is half that on the equity benchmark might imply that global equity markets are more integrated than global bond markets.

The results do not change when we control for home bias (specif. 2). On average, the decline in home bias in country c increases international investment towards all destination countries k in both models.

The results also do not change when we control for the non-linear degree of underweight and past performance. Interestingly, the coefficient on $DW_{ck,97}$ is not statistically significant when taking the linear measure (not reported). Conversely, it is strongly statistically significant for the bond flow model when taking the non-linear measure. One potential interpretation is the initial fixed cost argument discussed above. The willingness to close the initial gap between the share of foreign assets that would be held in a "borderless" global portfolio and actual foreign investment weights is an important determinant of bond flows, as it rises the adjusted R^2 by 7 percentage points from 14.6% in specification 2 to 21.9% in specification 3.

Finally, past performance in the destination country is statistically significant for the equity and bond flow models. While no prudent investor assumes future returns will mirror past returns, trend chasing behaviour still characterise the geography of international equity and bond flows in the long term. All in all, the proportion of the total variation explained by the model is quite significant: 31.7% in equity flows and 23.5% in bond flows.

4 Portfolio Flows, Monetary Policy Frameworks and EMU

The second aim of the paper is to assess whether central banks' monetary policy frameworks across countries influenced the geography and size of international capital flows during the boom and bust of asset prices at the turn of the century. In this context we also investigate the role of EMU on global portfolio reallocation.

4.1 Monetary Policy Frameworks

We use the IntCAPM as our benchmark and add explanatory variables describing key characteristics of monetary policy frameworks across countries. Therefore, we estimate the following model:

$$t_{ck,t} = \alpha_0 + \alpha_1 w_{k,97}^{Bench} + \alpha_2 HB_{c,97} + \alpha_3 \Delta HB_{c,01} + \alpha_4 DW_{ck,97}^3 + \alpha_5 r_{k,t-1} + \lambda' \mathbf{Mon}_{k,t-1} + \varepsilon_t,$$

where the vector $\mathbf{Mon}_{k,t-1}$, includes variables measuring the following characteristics of the monetary policy framework in country k: (*i*) the central bank's objectives such as the focus on inflation, on money, on the exchange rate, and on discretionary policy, (*ii*) the central bank's institutional factors, such as independence, accountability and transparency and (*iii*) the importance of financial stability in the setting of monetary policy instruments. Results are reported in Table 7.

Among the characteristics related to monetary policy, the focus on money played a significant and positive role in influencing the geography of the portfolio flows. Given the link between asset prices and credit growth (Borio and Lowe, 2004; Detken and Smets, 2004), global portfolio investors might have purchased assets of countries where monetary analysis played a more prominent role.

If the focus on monetary aggregates, credit growth and financial flows helps central banks identifying inflated asset prices and financial imbalances, then portfolio investors would indeed give importance to this characteristic. The empirical results on both equity and bond flows support this hypothesis. In particular, the $\overline{R}^2$ of the model explaining the geography of bond flows increases from 23.5% in the benchmark model (see specification 4 of Table 6) to 28.6% when adding the focus on money by the recipient countries' central bank (see specification 6 of Table 7).

Among the characteristics related to the institutional factors, independence (specifications 9) is found to be significant and with the expected sign only for bond flows, while being accountable is a push factor of bond flows (specifications 10). As already pointed out, independence and accountability are negatively correlated, which implies that explaining and defending monetary policies to government and parliament and the involvement of parliament in monetary policy decisions might be seen by international investors as an infringement to central banks' independence, putting at risk the price stability mandate, which is now a typical mandate by monetary authorities across the globe.

Qualitatively similar results are obtained if we assume that the characteristics of the monetary policy frameworks of the euro area member states converged to those of Germany with the establishment of EMU (see specifications 5a-12a). Under this hypothesis, the focus on the exchange rate becomes strongly negative significant in both equity and bond flow specifications (see specifications 7a). This might imply that global asset allocators over the period 1998-2001 reduced their investment vis-à-vis countries whose monetary authorities gave relative importance to exchange rate targets.

When pooling the indices, which are statistically significant in the same model, independence is not longer significant in the bond flow specification, while the focus on inflation has the positive sign (see specification 13 of Table 8). Given the establishment of EMU in January 1999, we also control for the potential change in the characteristics of the monetary policy frameworks of the euro area member states using the German monetary framework as the benchmark. Results, which are reported in specifications 14 of Table 8, indicate that the focus on money and accountability continue to be robust. These will be the only variables which are consistently significant when we are going to study and control for the effect of EMU.[9]

The fact that the focus on inflation or independence have not systematically influenced international capital flows may be simply due to the fact that the core objective of most of the central banks of the countries in the sample is to enforce price stability with independence being key to control inflationary expectations. Most likely, foreign investors do care about inflation only at relatively high levels.

4.2 The Role of EMU

The establishment of EMU in January 1999 was a fundamental institutional change in the world economy that has affected the direction and the magnitude of global portfolio flows. De Santis and Gérard (2006) uncover evidence of euro area investors having assigned a higher weight to portfolio investment in euro area countries, which implies that EMU has facilitated portfolio market access enhancing risk sharing and regional financial integration. EMU boosted the cross-border investment activity among euro area member states due to the removal of intra-area currency matching rules, the sharing of common plattforms as well as the cross-border merger of the Amsterdam, Brussels and Paris exchanges (Euronext).[10]

To control for the effect of EMU on global capital flows as well as to measure its average impact, we include two sets of binary variables. First we include a dummy which takes the value of 1 if the country receiving the investment belongs to the EMU. The coefficient of this dummy measure the average portfolio asset flow into individual EMU countries for all investors. However, the effect of the single currency

[9] We have also controlled for the average inflation rate over the 10 year period 1992-2001 and the results do not vary.

[10] For example, Europe's life insurance companies could not hold more than 20% of their assets in foreign currencies, unless they were matched by liabilities denominated in the same currency. As the vast majority of those liabilities were denominated in national currency, so were most of the assets. Quantitative restrictions are also typical for pension funds. For a description of the restrictions in the EU before EMU, see IMF (1997, Table 63, pp. 213).

may be more pronounced on the investment decisions of investors residents in the euro area. To control for this differential effect, we include a dummy variable which takes the value of 1 when both investing and receiving countries belong to the EMU. The coefficient of this dummy measure the average portfolio asset flow into individual euro area countries for all euro area investors that comes *in addition to* the average flow observed for all investors. Accordingly, it quantifies the average financial integration effect of EMU for the individual euro area member state.[11]

The binary variables per sé are not sufficient to study the catalyst effect of EMU, because portfolio capital could have been reallocated globally to better exploit the expected diversification benefits and the elimination of the exchange rate risk among euro area member states.

In 1998, the Maastricht process was well underway and investors were keenly aware of the high likelihood that the intra-EMU currency risk would disappear. Therefore, the expected volatility of the exchange rate is assumed to be zero among euro area countries and equal to past volatility for the other cross-border transactions. More specifically, the expected volatility of the exchange rate among euro area member states and other countries of the world is assumed to equal the past volatility of the rest of the world's currencies vis-à-vis the Deutsche Mark.

As a measure of the expected diversification benefit, De Santis and Gérard (2006) suggest to employ the marginal impact on portfolio risk of increasing or decreasing the investors' position in a particular asset. Recall that the foreign investment portfolio variance can be computed as

$$\sigma^2_{P_c t} = \mathbf{w}'_{c,t} \Sigma_{c,t} \mathbf{w}_{c,t}.$$

$\mathbf{w}_{c,t}$ is the vector of weights for the N foreign assets and Σ_c the covariance matrix of returns of the foreign assets, where the subscript c indicates that the covariance and weight are computed from the investing country c's perspective. Then, the decrease in portfolio variance for a marginal increase in the weight invested in asset k can be

[11] A further complication comes from the role of the London market as a major intermediary of foreign investments from and to the rest of the world. Due to the large size and higher sophistication of the London markets, many investors choose to make their foreign investments via the United Kingdom (UK). For example, a Japanese investor may choose to select a British investment manager to invest in Euro-area equities and bonds. The IMF data on portfolio holdings report an accurate country breakdown of bilateral investment, which tries to identify the residence of the issuer. Neverthless, since the city of London is a key European player, we control for that by including two additional dummies. The first dummy takes a value of 1 if the receiving country is the UK. A second dummy takes the value of 1 if the investing country belongs to the EMU and the receiving country is the UK.

interpreted as a measure of the diversification benefit, $\mathbf{DB}_{c,t}$:

$$\mathbf{DB}_{c,t} = -\frac{\partial}{\partial \mathbf{w}_{c,t}} \sigma^2_{P_c t} = -\frac{\partial}{\partial \mathbf{w}_{c,t}} \left[\mathbf{w}'_{c,t} \Sigma_{c,t} \mathbf{w}_{c,t} \right] = -2\Sigma_{c,t} \mathbf{w}_{c,t}.$$

That is,

$$DB_{ck,t} = -\frac{\partial}{\partial w_{ck,t}} \left[\mathbf{w}'_{c,t} \Sigma_{c,t} \mathbf{w}_{c,t} \right] = -2 \sum_{l=1}^{K} w_{cl,t} \sigma_{lk,t},$$

where $DB_{ck,t}$ measures the diversification benefit of adding asset k to investor c's position. Therefore, we should expect it to be positively related to portfolio asset flows.

For an international investor, however, the return on any foreign asset varies not only because of asset specific risk, but also because of unpredictable fluctuations in exchange rates. Since the currency risk exposure of asset portfolios can be hedged through derivatives transactions, it may be of interest to distinguish between the pure asset component and the currency risk component of the diversification benefit motive of portfolio re-allocation. Therefore, we consider three measures of diversification benefits: (i) an aggregate measure of diversification benefits based on the investor's foreign investments returns denominated in his domestic currency, $DB^{Agg}_{ck} = DB(r^c_k)$; (ii) a measure of diversification benefits based on the investor's foreign investments fully hedged returns, $DB^{FH}_{ck} = DB(r^k_k)$; and (iii) a measure of diversification benefits based on the currency component of the investor's foreign investments, $DB^{Curr}_{ck} = DB(x^c_k)$.

The first two measures of the diversification benefit are easy to compute based on investor's currency denominated asset returns and local currency denominated returns respectively. Since $r^c_k = r^k_k + x^c_k$, where r^c_k is the continuously compounded (or log) return on country k portfolio denominated in currency c, and x^c_k the change in the exchange rate between currency k and currency c, the third measure, the currency component of the investor's diversification benefits, is then computed by taking the difference between the first two:

$$DB^{Curr}_{ck} = DB^{Agg}_{ck} - DB^{FH}_{ck}.$$

In our context currency risk is important also because the introduction of the euro eliminated a substantial component of currency risk for many international investments in our sample. Therefore, we would also like to disentangle the currency risk effects of the adoption of the Euro from the aggregate currency risk effects of a change in portfolio allocation. We use the same methodology amply explained in De

Santis and Gérard (2006) to construct the measure of diversification benefits based on currency components.

Since re-balancing a portfolio entails transaction costs, it is unlikely to take place when estimated marginal diversification benefits are of small magnitude. Therefore, to introduce some nonlinearities, we take the cube of the estimated values of the diversification benefits.

The results point out that the coefficient on the expected volatility of the exchange rate is not statistically significant for equity flows and only significant at 10% for bond flows with the correct sign in both cases (see specifications 13 of Tables 9-10). As for the diversification benefit, the aggregate marginal diversification benefit is not statistically significant (not reported), while the fully hedged marginal diversification benefit is positive and statistically significant particularly for bond flows. The results contrast with the findings of Portes and Rey (2005), who found weak support for the diversification motive, possibly because they use bilateral covariances of returns in a common currency as a measure of risk diversification. The impact of the volatility of the exchange rate and of the marginal diversification benefits arising from the currency component are generally small. These findings imply that investors might have preferred to hedge against exchange rate risks over the period 1998-2001.

The econometric results summarised in Tables 9-10 also suggest that, on top of the mere elimination of the exchange rate risk, EMU plaid a key role in the allocation of portfolio capital among countries worldwide as well as among euro area member states, thereby enhancing regional financial integration and risk-sharing. The catalyst effect of EMU, which is on top of the mere elimination of the exchange rate risk and due to the reduction of legal barriers, such as the removal of intra-area currency matching rules, and the sharing of common platforms, such as Euronext, is the estimated coefficient on $D_{EMU,EMU}$. It is positive and strongly statistically significant for both equity and bond flows.

Unfortunately, the lack of back data on bilateral portfolio flows does not allow us verifying whether the upward trend in intra-euro area portfolio flows from 1998 onwards already started before the establishment of EMU. Indeed, we could have captured the process of financial integration in the EU, as a result of EU policies aiming at liberalising cross-border portfolio allocation among EU member states in the 1990s. However, we can run a similar exercise including binary variables aiming at controlling for the EU effect. Given the strong correlation between the dummies capturing both the EU and the EMU effects, we subtract the EMU dummies from the EU dummies. The estimated coefficient on $D_{EMU,EMU}$ remains strongly statistically

significant in both equity and bond markets (see specifications 14 of Tables 9-10). Moreover, the results reported in specifications 14 and 15 of Tables 9-10 indicate that the European dummies are not statistically significant once we control for London as a major intermediary of euro area foreign investments from and to the rest of the world. Therefore, there is evidence of a positive EMU effect on cross-border portfolio flows. On a 95% confidence level, the catalyst effect of the euro within the euro area over the cumulated period 1998-2001 amounted to USD 22-47 billion in equity securities and USD 32-76 billion in bonds and notes. On average, the impact on the fixed income market is larger possibly because European institutional investors invested massively in domestic government debt. The adoption of the euro currency matching rule allowed them to rebalance into euro-denominated bonds issued by other EMU member states.

All in all, the link between international portfolio flows, the IntCAPM, characteristics of monetary policy frameworks and EMU is quite robust also in terms of adjusted R^2 which is above 35% in both models. This result is very important given that the analysis has been carried out in the middle of an equity bubble and burst, during therefore an extremely difficult period for global asset management.

5 Adding Control Variables

The literature on portfolio flows has put forward a number of variables potentially affecting the cross–border investment allocation. The aim of this section is to assess how robust the results are when adding control variables to specifications 13 of Tables 9-10.

The 'stages of development hypothesis' postulates an inverse U-shaped relationship between capital inflows and relative per capita income. Countries in the early stages of development tend to experience capital inflows, arising from building the infrastructure and expanding domestic markets. In a subsequent phase, as new ideas are transformed into products and services and the country develops some comparative advantages in specific industries, its per capita income rises and capital inflows declines. However, it is often argued that portfolio flows are particularly sizeable among developed countries against the prediction of the 'stages of development hypothesis' (Lucas, 1990). Indeed, country k's GDP per capita polynomial is not statistically significant for the equity market and even positive for the bond market (see specifications 16 of Table 11).

Investment in R&D is generally considered a good policy to enhance the productivity of a country. If capital has a higher return in countries investing in R&D, also the allocation of portfolios should be partly affected. The imperfection in international credit markets can affect the amount and the direction of portfolio flows (Portes and Rey, 2005).[12] A structural determinant of national savings is the demographic profile of a country. Relatively high youth and old-age dependency ratios would bring about net capital inflows, as a relatively large population of dependent young and old has a relatively lower savings rate (Ando and Modigliani, 1963). All these variables are not statistically significant (see specifications 17-19).

Portes and Rey (1995) argue that the sophistication of financial markets is an important determinant of equity flows. However, our results do not support this hypothesis. At the same time, the sophistication of financial markets in the recipient country and its development over time are statistically significant for bond flows (see specifications 20).

Several studies argue that institutions matter in shaping the net flow of capital across countries (Alfaro, et al, 2005; De Santis and Lührmann, 2006). International investment decisions are affected by risks as well as by the countries' institutional framework, as turmoil, violence, instability, rule of law, property rights, freedom influence economic market sentiment. We expect that countries with better institutions should attract portfolio flows. To assess the role of the quality of the institutions, we look at standard indices such as the degree of civil liberties, the degree of political, financial, and economic risks, the degree of perceived corruption, the degree of contract repudiation and expropriation risks.[13] The results are generally weak (see specifications 21-24), possibly because most of the bilateral transactions in this study occur across developed countries, which generally have an adequate institutional setting.

To assess the role of distantness, we consider geographical distance, bilateral trade intensity, phone traffic volume, common language. The phone traffic volume can be interpreted as a proxy of information flows (Portes and Rey, 2005), while common language can be interpreted as a proxy for cultural similarities.[14] Trade in goods

[12] R&D and bank credit to the private sectors are strongly correlated with the GDP per capita (see Table 3), because richer countries have generally more resources to finance the private sector and the expenditure in R&D.

[13] All indices proxing for the quality of the institutions are strongly correlated among them as well as vis-à-vis the GDP per capita in that richer countries have better institutions (see Table 3).

[14] Common language is a dummy, which takes the value of one if receiving and investing countries share the same language. The language groupings are as follows: English (Australia, Bermuda, Canada, Ireland, New Zealand, Singapore, United Kingdom, United States); Spanish (Argentina, Chile, Spain and Venezuela); French (Belgium, Canada and France); German (Austria and Germany);

and services could facilitate the information flow across trade partners increasing the willingness to conduct cross-border portfolio transactions. However, trade costs can also explain the equity portfolio home bias (Obstfeld and Rogoff, 2001). In both interpretations, the deeper the trade relationship between countries, the deeper their asset trade flow. There is some mild evidence for the trade variable affecting equity flows (see specification 26) and for common language having an impact on bond flows (see specification 28).

Finally, we also control for economic growth in the destination country. Negative economic growth performance in the destination country over the previous four years affects positively the subsequent bond flows, possibly because a rebound in GDP growth might be expected (see specifications 29).

The analysis so far presented focused on changes in demand. However, could important shifts occurring also on the supply side affect the results? The Maastricht accord imposed tight restrictions on government debt. The effects of this were not symmetric across countries, and may have had a significant impact on the composition of fixed income securities available to investors. To assess whether the results remain robust to changes on the supply side, we use BIS data to compute the net new international equity and bond issues (the difference between completed issues and redemptions in a given period) over the period 1998-2001, which permit to measure the amount of new fund raised on the international markets. The net issuance of each individual country is then scaled by the total country portfolio. The results indicate that portfolio flows were also affected by the new fund raised on the international markets by the destination country (see specifications 30).

All the results on the other regressors presented in Tables 9-10 remain unaltered when controlling for the effects of all these variables, as implicitly suggested by reporting the adjusted R^2 in Table 11.

6 Conclusions

It is generally believed that the predictions of the International Capital Asset Pricing Model (IntCAPM) do not hold because of home bias, transaction costs, asymmetric information, speculative behaviours of investors, etc. We have presented a simple modelling framework showing that the geography of international portfolio flows is only partly influenced by the IntCAPM. Using bilateral data on international equity and bond flows, we find clear evidence that investors do not hold assets of each

Dutch (Belgium and Netherlands); Scandinavian (Denmark, Norway and Sweden).

country in proportion to the country's share in the world market portfolio. However, the predictions of the IntCAPM are partially met because the estimated coefficient, rather than being one, is 0.4 for equity flows and 0.2 for bond flows. A country, which sees its market size to increase by 1 percentage point relative to the world market capitalization, would attract international equity (bond) flows amounting to 0.4% (0.2%) of the equity (bond) assets held abroad by foreigners. This might also imply that global equity markets are more integrated than global bond markets and that there is still room for further integration in both markets. The results remain invariant when controlling for home bias, the initial degree of misallocation and past returns.

Additional findings suggest that (i) a decline in home bias generates portfolio outflows vis-à-vis all countries; (ii) the higher the initial non-linear degree of misallocation, which might be due to higher fixed transaction costs and information asymmetries, the greater the incentive to reduce them and, consequently, the larger the subsequent bond flows; (iii) asset allocators engage in trend chasing activities in both equity and bond markets in the long term.

We have also investigated whether characteristics of the monetary policy frameworks and the establishment of EMU influenced portfolio asset flows over the turbulent 1998-2001 period for the asset markets. We find clear evidence that investors preferred portfolio assets of countries where the central bank gave relative importance to money. With consumer price inflation well anchored, monetary analysis might have provided a framework for monitoring and assessing developments in asset prices and financial imbalances, cardinal to international investors when forming expectations on future risk-adjusted asset returns. As for EMU, once controlling for diversification benefits and the elimination of the exchange rate risk, we show that cross-border portfolio flows among euro area countries have increased due to the catalyst effect of EMU (i.e. reduction of legal barriers, sharing of common platforms, simplification of cross-border regulations). Therefore, we can safely say that EMU has enhanced regional financial integration among euro area member states in both equity and bonds markets.

All in all, country's shares in the world market portfolio, home bias, initial degree of misallocation across countries, past returns, diversification benefits, monetary policy frameworks and EMU can explain 35-40% of the total variation in equity and bond portfolios over the turbulent 1998-2001 period, characterised by an equity bubble and the subsequent burst.

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Appendix A: Definitions of Variables

Variables	*Definition*
$t_{ck,t}$	International transactions invested in country k divided by the country c's average international holdings
$w^{Bench}_{k,97}$	Country's share in the world market portfolio
$HB_{c,97}$	Home Bias of investing country c in 1997
$\Delta HB_{c,97}$	$HB_{c,01} - HB_{c,97}$
$DW_{ck,97}$	Difference between optimal and actual weights in 1997
$Ret_{k,t-1}$	Total market return of receiving country k, end-1993 to end-1997
$Inflation_{k,98}$	Inflation focus index in country k in 1998: 0 (lowest importance) and 1 (highest importance)
$Money_{k,98}$	Money focus index in country k in 1998: 0 (lowest importance) and 1 (highest importance)
$Exchange\ rate_{k,98}$	Exchange rate focus index in country k in 1998: 0 (lowest importance) and 1 (highest importance)
$Discretion_{k,98}$	Discretion focus index in country k in 1998: 0 (lowest importance) and 1 (highest importance)
$Independence_{k,98}$	Independence index in country k in 1998: 0 (lowest importance) and 1 (highest importance)
$Accountability_{k,98}$	Accountability index in country k in 1998: 0 (lowest importance) and 1 (highest importance)
$Transparency_{k,98}$	Transparency index in country k in 1998: 0 (lowest importance) and 1 (highest importance)
$Financial\ Stability_{k,98}$	Financial stability role index in country k in 1998: 0 (lowest importance) and 1 (highest importance)
$FXvol^{e}_{ck,t-1}$	Standard deviation of the bilateral exchange rate change from 1993 to 1997 with DM being the EMU currency
$D_{c,EMU}$	Dummy is 1 if receiving country belongs to the euro area
$D_{EMU,EMU}$	Dummy is 1 if receiving and investing country belong to the euro area
$D_{c,UK}$	Dummy is 1 if receiving country belongs to the UK
$D_{EMU,UK}$	Dummy is 1 if investing country belongs to EMU and receiving country to the UK
$D_{c,EU}$	Dummy is 1 if receiving country belongs to the EU
$D_{EU,EU}$	Dummy is 1 if receiving and investing country belong to the EU
$DB^{FH}_{ck,t-1}$	Expected diversification benefits - fully hedged returns
$DB^{EMU}_{ck,t-1}$	Expected diversification benefits - internal EMU currency exposure
$DB^{X-EMU}_{ck,t-1}$	Expected diversification benefits - external EMU currency exposure
$pcGDP_{k,97}$	Country k GDP per capita minus the GDP per capita of Norway in 1997 (2000 international PPP - 1000 $)
$pcGDP^{2}_{k,97}$	The square of country k GDP per capita minus the GDP per capita of Norway in 1997 divided by 1000
$Bank\ credit_{k,97}$	Bank credit to the private sector as a ratio to GDP of country k in 1997 minus the world average
$R\&D_{k,97}$	R&D expenditure as a ratio to GDP of country k in 1997 minus the world average
$Young_{k,97}$	Young dependents to working-age population in country k relative to the world average in 1997
$Old_{k,97}$	Old dependents to working-age population in country k relative to the world average in 1997.
$soph_{c,98}$	Sophistication of financial markets in country c in 1998
$soph_{k,98}$	Sophistication of financial markets in country k in 1998
$dsoph_{k,t}$	Change in the sophistication of financial markets in country k, 1998 to 2001
$Liberties_{k,97}$	Civil liberties index in country k in 1997: 0 (highest degree of freedom) and 1 (lowest degree of freedom)
$La\ Porta_{k,97}$	La Porta et. al. index in country k in 1997: 0 (highest risk) and 1 (lowest risk)
$ICRG_{k,97}$	International Country Risk Guide rating in country k in 1997: 0 (highest risk) and 1 (lowest risk)
$Corruption_{k,97}$	Perceived corruption index in country k in 1997: 0 (highest risk) and 1 (lowest risk)
$Distance_{ck,97}$	Ln of physical distance between capital cities
$Trade_{ck,97}$	Country k's export share in country c plus country c's export share in country k in 1997
$Tel_{ck,97}$	Phone traffic (minutes per 1000 subscribers) between investing and receiving markets in 1997
$Language_{ck,97}$	Dummy is 1 if receiving and investing countries share the same language.
$\Delta GDP_{k,t-1}$	Log difference of the receiving country 's GDP in US$ at constant prices from 1993 to 1997
$Issues_{k,t}$	Net new issuance (completed issues minus redemptions) divided by total country k portfolio

Appendix B: Data Sources

Data	*Primary Sources*	*Secondary Sources*
International portfolio holdings	IMF - CPIS 1997, 2001	Germany: Bundesbank, 1997
Real, nominal and per capita GDP	World Bank - WDI	
Equity market capitalization	Thomson Datastream / S&P	Bermuda Stock Exchange
Bond market capitalization	Lehman Brother	
Domestic bond outstanding	BIS	
Equity markets total returns	Thomson Datastream	Bermuda Stock Exchange
Bond markets total returns	JP Morgan	
Exchange rates	Thomson Datastream	
Phone traffic volume	World Bank - WDI	
Age dependency ratios	UN World Population Prospects	
Trade values	IMF	Bermuda and Israel: OECD
Bank credit to the private sector	World Bank - WDI	
R&D expenditure	World Bank - WDI	
Civil liberties index	Freedom House	
La Porta index	La Porta et al. (1998)	
ICRG index	International Country Risk Guide	
Corruption index	Transparency International	
Monetary policy frameworks	Mahadeva and Sterne (2000)	
Sophistication of financial markets	World Economic Forum	
Net new issuance	BIS	

Table 1
Estimated and IFS Portfolio Flows by Country, 1998-2001
(USD millions)

The first four columns of the table report the results of the estimated net asset transactions over the cumulated period 1998-2001 aggregated for the 30 countries of the sample. The last four columns report the countries' equity and debt flows over the same period reported by the IFS database of the IMF. The estimated and the IFS figures are not directly comparable, as offshore centers, several Asian and Latin American countries as well as the offical flows of monetary authorities are not included in the CPIS database. Moreover, the debt instruments flows reported by the IFS is the sum of bonds and money market instruments flows.

	Estimated using CPIS (30 countries)				IFS (all countries)			
	Equity		Bonds		Equity		Debt instruments	
Countries	Asset (1a)	Liability (2a)	Asset (3a)	Liability (4a)	Asset (1b)	Liability (2b)	Asset (3b)	Liability (4b)
Argentina	7218	-11550	-156	-35509	3057	-14178	1894	9046
Australia	26894	-4497	4210	-5550	21335	28269	13919	34153
Austria	16946	-1668	29931	47256	25912	2034	52613	89330
Belgium	32027	11444	67878	43694	NA	NA	NA	NA
Bermuda	-28958	57574	2077	249	NA	NA	NA	NA
Canada	66765	-11080	-2879	-23388	87687	46318	10347	7349
Chile	1739	-2394	1403	33	7266	460	2460	4358
Denmark	23105	-605	12126	-2865	24464	3184	23611	20122
Finland	16423	46761	26493	-3564	19943	32284	30176	8233
France	96886	95292	204504	159606	96931	130205	318101	286335
Germany	168440	87823	166482	196319	312046	134411	317931	373599
Iceland	1202	124	61	1197	1340	69	142	2836
Indonesia	2	1528	456	-4435	NA	-5732	0	-92
Ireland	87894	44127	107199	26771	116637	248967	227336	40136
Israel	1119	3397	2999	1448	1430	6966	3586	-94
Italy	103132	17	121421	217951	176871	7215	178246	295727
Japan	30703	108697	89918	-7570	77403	157815	362394	133065
South Korea	111	22260	-2066	-34398	1201	39288	5558	-5681
Malaysia	-401	-7773	-9	-6245	NA	NA	0	283
Netherlands	80771	80545	112355	183460	125570	64234	164841	195377
New Zealand	2071	-3323	1944	-1362	3482	-332	1187	1534
Norway	31222	2658	29083	9315	34820	3296	36574	20665
Portugal	3041	3744	11857	24835	5088	5642	20095	22219
Singapore	9342	15916	30799	8844	34461	2739	12749	801
Spain	40517	29490	65833	79518	63973	46972	132118	100706
Sweden	43503	-12463	19732	-7562	59076	11439	31101	11821
Thailand	-79	3033	208	-6708	NA	2486	505	-3329
UK	-10753	344075	59398	73361	120922	391493	188547	152808
USA	284130	233116	-68280	173220	431506	469311	39486	868766
Venezuela	1	-1250	-930	-13873	17	61	-178	632
Total	1135015	1135015	1094048	1094048	1861258	1814914	2175337	2670705
Corr. coefficient	(1): 0.95	(2):0. 91	(3): 0.88	(4): 0.78				

Table 2

Estimated and IFS Portfolio Flows by Regions, 1998-2001

(USD billions)

The figures report the portfolio flows of equity and fixed income aggregated for four country groupings. The 10 EMU countries are: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain. The three non-EMU EU countries are: Denmark, Sweden, the United Kingdom. The 10 non-EU developed countries include: Australia, Bermuda, Canada, Iceland, Israel, Japan, New Zealand, Norway, the United States, Singapore. The seven emerging markets are: Argentina, Chile, Indonesia, Korea, Malaysia, Thailand, Venezuela. The first four columns of the table report the results of the estimated net asset transactions over the cumulated period 1998-2001 aggregated for the 30 countries of the sample. The last four columns report the countries' equity and debt flows over the same period reported by the IFS database of the IMF. The estimated and the IFS figures are not directly comparable, as offshore centers, several Asian and Latin American countries as well as the offical flows of monetary authorities are not included in the CPIS database. Moreover, the debt instruments flows reported by the IFS is the sum of bonds and money market instruments flows.

	Estimated from CPIS (30 countries)				IFS (all countries)			
	Equity		Bonds		Equity		Debt instrum.	
Countries	Asset	Liabil.	Asset	Liabil.	Asset	Liabil.	Asset	Liabil.
	(1a)	(2a)	(3a)	(4a)	(1b)	(2b)	(3b)	(4b)
10 EMU countries	646.1	397.6	914.0	975.8	943.0	672.0	1441.5	1411.7
3 non-EMU EU	55.9	331.0	91.3	62.9	204.5	406.1	243.3	184.8
10 non-EU developed	424.5	402.6	89.9	156.4	693.5	714.5	480.4	1069.1
7 emerging markets	8.6	3.9	-1.1	-101.1	11.5	22.4	10.2	5.2
Total	1135.0	1135.0	1094.0	1094.0	1861.3	1814.9	1805.1	2337.6
Corr. coefficient	(1): 0.99	(2): 0.96	(3): 0.97	(4): 0.84				

Table 3
Portfolio Weights
(percentage share)

This Table presents the sample descriptive statistics for portfolio weights used to test the validity of the IntCAPM.

	Equity portfolio		Bond portfolio	
	Datastream Global Index end-97	S&P Global Index end-97	Lehman Brothers Multiverse Index end-98	BIS end-97
Argentina	0.31	0.26	0.39	0.16
Australia	1.35	1.28	0.55	0.56
Austria	0.17	0.15	0.72	0.64
Belgium	0.64	0.59	1.96	1.43
Bermuda	-	0.01	0.02	0.01
Canada	2.47	2.46	2.56	2.07
Chile	0.29	0.31	0.03	0.19
Denmark	0.40	0.41	0.88	1.26
Finland	0.35	0.32	0.83	0.26
France	3.32	2.92	6.12	4.10
Germany	4.18	3.57	6.06	7.76
Iceland	-	0.01	0.00	0.02
Indonesia	0.12	0.13	0.04	0.29
Ireland	0.24	0.21	0.25	0.12
Israel	0.13	0.20	0.01	0.43
Italy	1.80	1.49	5.65	5.46
Japan	12.51	9.59	7.18	16.37
Korea	0.14	0.20	0.17	0.37
Malaysia	0.36	0.40	0.01	0.18
Netherlands	2.75	2.03	2.14	1.45
New Zealand	0.17	0.13	0.13	0.07
Norway	0.30	0.29	0.18	0.26
Portugal	0.30	0.17	0.32	0.24
Singapore	0.53	0.46	0.11	0.07
Spain	1.25	1.26	2.48	1.31
Sweden	1.10	1.18	1.09	1.03
Thailand	0.09	0.10	0.01	0.05
United Kingdom	10.50	8.64	4.74	2.78
United States	44.90	48.92	53.57	48.02
Venezuela	0.04	0.06	0.11	0.11
Sub total	90.69	87.73	98.31	97.06
Total (USD billion)	17,634	23,116	10,355	19,054

Table 4

This Table presents the sample descriptive statistics for the characteristics of the monetary policy framework (see Mahadeva and Sterne, 2000, pp. 141-162). The eight indices range between 0 and 100, where a high score implies more independence, more accountability to governments, more policy explanations to those outside the central bank, higher degree of importance given to policy objectives and financial stability issues

	Policy focus				Institutional factors			Structural factor
	Inflation	Money	Exchange rate	Discretion	Independence	Accountability	Transparency	Financial Stability
Argentina	0	0	100	0	79	100	53	58
Australia	94	0	0	6	73	83	78	8
Austria	0	0	88	13	68	67	27	17
Belgium	0	0	94	6	77	33	68	8
Bermuda	19	25	0	84	92	83	95	33
Canada	88	0	6	16	91	100	79	33
Chile	88	0	31	28	93	17	83	17
Denmark	0	0	94	6	88	75	70	0
Finland	56	0	63	66	91	92	74	8
France	40	46	58	84	90	83	53	50
Germany	19	88	13	29	96	17	70	33
Iceland	19	0	75	34	59	92	65	8
Indonesia	50	63	6	66	56	83	83	83
Ireland	19	0	75	34	87	83	78	8
Israel	88	0	13	19	66	100	68	33
Italy	44	44	50	94	88	58	81	33
Japan	50	0	0	50	93	0	89	50
Korea	63	75	6	59	73	83	88	58
Malaysia	44	0	38	75	85	83	71	67
Netherlands	0	0	88	13	91	83	79	8
New Zealand	94	0	0	6	89	100	92	8
Norway	0	0	69	31	57	50	89	17
Portugal	6	0	75	28	85	83	78	33
Singapore	19	0	56	53	90	25	49	17
Spain	56	0	63	66	80	83	59	33
Sweden	100	0	13	6	97	83	95	42
Thailand	31	6	6	75	82	50	67	83
United Kingdom	100	0	0	0	77	100	94	16
United States	19	25	0	84	92	83	95	33
Venezuela	25	0	88	25	70	83	4	17

Table 5

Correlation Matrix of the State of Development, Quality of the Institutions and Monetary Frameworks Variables

The variables of this table are labelled as follows: GP = Countries' GDP per capita minus the GDP per capita of Norway; BC = Bank credit to the private sector/GDP minus world share; RD = R&D expenditure/GDP minus world share; CL = Civil liberties index; LP = La Porta index; IC = ICRG index; PC = Perceived corruption index; INF = Inflation focus index; MON = Money focus index; FX = Exchange rate focus index; DIS = Discretion focus index; IND = Independence index; ACC = Accountability index; TRA = Transparency index; FS = Role of financial stability index.

	Development			Quality of the Institutions				Monetary Policy Frameworks							
	GP	BC	RD	CL	LP	IC	PC	INF	MON	FX	DIS	IND	ACC	TRA	FS
GP	1.00														
BC	0.29	1.00													
RD	0.66	0.32	1.00												
CL	-0.65	-0.09	-0.45	1.00											
LP	0.87	0.31	0.67	-0.65	1.00										
IC	0.78	0.08	0.42	-0.54	0.79	1.00									
PC	0.71	0.02	0.53	-0.58	0.85	0.77	1.00								
INF	-0.17	-0.08	0.18	-0.01	-0.01	-0.18	0.15	1.00							
MON	-0.10	0.03	0.10	0.17	-0.17	-0.27	-0.35	-0.05	1.00						
FX	0.08	-0.44	-0.24	-0.07	0.01	0.30	0.01	-0.68	-0.32	1.00					
DIS	-0.15	0.32	-0.09	0.30	-0.20	-0.22	-0.37	-0.12	0.44	-0.21	1.00				
IND	0.21	0.39	0.29	-0.24	0.37	0.40	0.37	0.12	0.06	-0.21	0.16	1.00			
ACC	-0.10	-0.37	-0.02	-0.19	-0.04	-0.23	0.08	0.26	-0.19	0.03	-0.12	-0.20	1.00		
TRA	0.28	0.37	0.34	-0.31	0.31	0.12	0.27	0.37	0.12	-0.60	0.08	0.28	0.02	1.00	
FS	-0.58	0.23	-0.26	0.56	-0.61	-0.70	-0.72	0.09	0.42	-0.38	0.49	-0.02	-0.05	0.07	1.00

Table 6
International Portfolio Asset Flows and IntCAPM

$$t_{ck,t} = \alpha_0 + \alpha_1 w_{ck,97}^{Bench} + \alpha_2 HB_{c,97} + \alpha_3 \Delta HB_{c,01} + \alpha_4 DW_{ck,97}^{3} + \alpha_5 r_{k,t-1} + \varepsilon_t$$

This table reports the results of the cross sectional regression of the equity and bond net asset flows. The explanatory variables are described in Appendix A. The sample size is $n = 667$ for equity flows and $n = 639$ for bond flows. White Heteroskedasticity-Consistent Standard Errors and Covariance. Standard errors for the coefficients are reported in parentheses. ***, **, *: statistically significant at 1%, 5% and 10%, respectively.

	Equity Net Asset Flows				Bond Net Asset Flows			
	Specif 1	Specif 2	Specif 3	Specif 4	Specif 1	Specif 2	Specif 3	Specif 4
Cst	0.005***	-0.036	-0.036*	-0.039**	0.012***	-0.011**	-0.011**	-0.023***
	(0.002)	(0.019)	(0.002)	(0.019)	(0.002)	(0.006)	(0.006)	(0.006)
$w_{k,97}^{Bench}$	0.427***	0.425***	0.449***	0.441***	0.190***	0.193***	0.233***	0.232***
	(0.095)	(0.092)	(0.128)	(0.127)	(0.067)	(0.067)	(0.061)	(0.061)
$HB_{c,97}$		0.038	0.038	0.038		0.015**	0.016**	0.017**
		(0.024)	(0.024)	(0.024)		(0.008)	(0.008)	(0.008)
$\Delta HB_{c,01}$		-0.111***	-0.111***	-0.112***		-0.074***	-0.068***	-0.069***
		(0.027)	(0.027)	(0.027)		(0.013)	(0.012)	(0.013)
$DW_{ck,97}^{3}$			-0.460	-0.491			1.384***	1.386***
			(1.149)	(1.147)			(0.285)	(0.282)
$r_{k,t-1}$				0.006***				0.039***
				(0.002)				(0.007)
$Adjusted\ R^2$	0.283	0.315	0.315	0.317	0.104	0.146	0.219	0.235
$F-Stat$	263.55	102.92	77.63	63.06	74.85	37.37	45.65	40.15

Table 7
International Portfolio Flows and Characteristics of Monetary Policy Frameworks

$$t_{ck,t} = \alpha_0 + \alpha_1 w_{k,97}^{Bench} + \alpha_2 HB_{c,97} + \alpha_3 \Delta HB_{c,01} + \alpha_4 DW_{ck,97}^{3} + \alpha_5 r_{k,t-1} + \lambda' \mathbf{Mon}_{k,t-1} + \varepsilon_t$$

This table reports the results of the cross sectional regression of portfolio net asset flows. Each explanatory variable of this Table is added as an additional regressor to the IntCAPM reported in specifications 4 of Table 6. As for the characteristics of the monetary policy framework, the indices range between 0 and 1 and a higher score is associated with the higher degree of importance given to policy objectives, to institutional characteristics and to financial stability issues. The explanatory variables are described in Appendix A. The sample size is $n = 667$ for equity flows and $n = 639$ for bond flows. White Heteroskedasticity-Consistent Standard Errors and Covariance. Standard errors for the coefficients are reported in parentheses. ***, **, *: statistically significant at 1%, 5% and 10%, respectively.

Specif.	Explanatory	Equity flows			Bond flows		
number	Variable	Coeff.	*s.e.*	$\overline{R}^2$	Coeff.	*s.e.*	$\overline{R}^2$
		Policy focus					
5	$Inflation_{k,98}$	0.004	(0.006)	0.317	-0.011**	(0.004)	0.237
6	$Money_{k,98}$	0.021***	(0.007)	0.322	0.062***	(0.012)	0.286
7	$Exchange\ rate_{k,98}$	-0.006	(0.006)	0.309	0.005	(0.005)	0.234
8	$Discretion_{k,98}$	0.003	(0.007)	0.317	0.010	(0.008)	0.236
		Institutional factors					
9	$Independence_{k,98}$	0.003	(0.014)	0.317	0.046***	(0.016)	0.240
10	$Accountability_{k,98}$	0.006	(0.008)	0.317	-0.025***	(0.009)	0.245
11	$Transparency_{k,98}$	0.006	(0.008)	0.317	-0.007	(0.006)	0.234
		Structural factors k					
12	$Financial\ Stability_{k,98}$	0.014	(0.009)	0.318	-0.006	(0.008)	0.233
		Policy focus with Germany being the benchmark for other euro area countries					
5a	$Inflation_{k,98}$	0.003	(0.007)	0.317	-0.014***	(0.004)	0.239
6a	$Money_{k,98}$	0.009**	(0.004)	0.319	0.030***	(0.004)	0.275
7a	$Exchange\ rate_{k,98}$	-0.011***	(0.004)	0.319	-0.018***	(0.004)	0.240
8a	$Discretion_{k,98}$	-0.004	(0.014)	0.313	-0.016**	(0.007)	0.236
		Institutional factors with Germany being the benchmark for other euro area countries					
9a	$Independence_{k,98}$	0.003	(0.012)	0.317	0.063***	(0.014)	0.247
10a	$Accountability_{k,98}$	-0.000	(0.006)	0.317	-0.029***	(0.005)	0.261
11a	$Transparency_{k,98}$	0.012	(0.009)	0.318	-0.006	(0.007)	0.234
		Structural factors with Germany being the benchmark for other euro area countries					
12a	$Financial\ Stability_{k,98}$	0.010	(0.009)	0.317	-0.006	(0.007)	0.234

Table 8

International Portfolio Flows, IntCAPM and Monetary Policy Frameworks

$$t_{ck,t} = \alpha_0 + \alpha_1 w_{ck,97}^{Bench} + \alpha_2 HB_{c,97} + \alpha_3 \Delta HB_{c,01} + \alpha_4 DW_{ck,97}^{3} + \alpha_5 r_{k,t-1} + \lambda Mon_{k,t-1} + \varepsilon_t$$

This table reports the results of the cross sectional regression of portfolio net asset flows summarising findings in Tables 6-7. This table also reports the results when controlling for the potential change in the characteristics of the monetary policy frameworks, as a consequence of the establishment of EMU, using the German characterisitcs as a target-benchmark for other euro area countries. Other explanatory variables are described in Appendix A. The sample size is $n = 667$ for equity flows and $n = 639$ for bond flows. White Heteroskedasticity-Consistent Standard Errors and Covariance. Standard errors for the coefficients are reported in parentheses. ***, **, *: statistically significant at 1%, 5% and 10%, respectively.

	Equity Asset Flows				Bond Asset Flows			
	Specif 13		Specif 14		Specif 13		Specif 14	
Cst	-0.043**	(0.019)	-0.043**	(0.019)	-0.028***	(0.008)	-0.027***	(0.008)
$w_{k,97}^{Bench}$	0.433***	(0.127)	0.436***	(0.128)	0.237***	(0.060)	0.214***	(0.062)
$HB_{c,97}$	0.037	(0.024)	0.037	(0.024)	0.016**	(0.008)	0.015*	(0.008)
$\Delta HB_{c,01}$	-0.112***	(0.027)	-0.112***	(0.027)	-0.071***	(0.011)	-0.072***	(0.011)
$DW_{ck,97}^{3}$	-0.516	(1.143)	-0.519	(1.145)	1.363***	(0.287)	1.366***	(0.275)
$r_{k,t-1}$	0.008***	(0.002)	0.008**	(0.003)	0.033***	(0.007)	0.064***	(0.012)
$Money_{k,t98}$	0.021***	(0.007)	0.021***	(0.007)	0.026**	(0.005)	0.059***	(0.012)
$Inflation_{k,98}$	-	-	-	-	0.007*	(0.004)	0.003	(0.004)
$Accountability_{k,98}$	-	-	-	-	-0.012**	(0.005)	-0.023***	(0.007)
$\mathrm{d}Money_{k,98}$			0.002	(0.005)			-0.008	(0.017)
$\mathrm{d}Inflation_{k,98}$							0.033**	(0.016)
$\mathrm{d}Accountability_{k,98}$							-0.039	(0.024)
Adjusted R^2	0.322		0.321		0.276		0.301	
$F - Stat$	53.70		45.99		31.37		25.94	

Table 9

International Equity Flows, IntCAPM, Monetary Policy Frameworks and EMU

$$t_{ck,t} = \alpha_0 + \alpha_1 w_{ck,97}^{Bench} + \alpha_2 HB_{c,97} + \alpha_3 \Delta HB_{c,01} + \alpha_4 DW_{ck,97}^{3} + \alpha_5 r_{k,t-1} + \lambda Mon_{k,t-1} + \gamma FXvol_{ck,t-1}^{e} + \beta_1 D_{k\subset EMU} + \beta_2 D_{k\subset EMU} \cdot D_{c\subset EMU} + \beta_3 D_{k\subset UK} + \beta_4 D_{k\subset EMU} \cdot D_{c\subset UK} + \beta_5 \left(D_{k\subset EU} - D_{k\subset EMU}\right) + \beta_6 \left(D_{k\subset EU} \cdot D_{c\subset EU} - D_{k\subset EMU} \cdot D_{c\subset EMU}\right) + \varphi DB_{ck,t-1}^{3} + \varepsilon_t$$

This table reports the results of the cross sectional regression of portfolio equity net asset flows summarising findings in Tables 6-8. This table also reports the results when controlling for the potential effect of EMU and of marginal diversification benefits. Explanatory variables are described in Appendix A. The sample size is $n = 667$ White Heteroskedasticity-Consistent Standard Errors and Covariance. Standard errors for the coefficients are reported in parentheses. ***, **, *: statistically significant at 1%, 5% and 10%, respectively.

	Specif 13		Specif 14		Specif 15	
Cst	-0.046**	(0.019)	-0.046**	(0.020)	-0.046**	(0.019)
$w_{k,97}^{Bench}$	0.422***	(0.116)	0.456***	(0.111)	0.428***	(0.116)
$HB_{c,97}$	0.045*	(0.024)	0.045*	(0.024)	0.045*	(0.024)
$\Delta HB_{c,01}$	-0.079***	(0.024)	-0.077***	(0.025)	-0.076***	(0.025)
$DW_{ck,97}^{3}$	-0.348	(1.096)	-0.491	(1.087)	-0.343	(1.098)
$r_{k,t-1}$	0.005*	(0.003)	0.001	(0.003)	0.003	(0.003)
$Money_{k,t-1}$	0.022***	(0.006)	0.018***	(0.006)	0.021***	(0.006)
$FXvol_{ck,t-1}^{e}$	-0.068	(0.247)	-0.087	(0.248)	-0.064	(0.247)
$D_{c,EMU}$	-0.007	(0.005)	-0.006	(0.006)	-0.006	(0.005)
$D_{EMU,EMU}$	0.033***	(0.006)	0.038***	(0.007)	0.036***	(0.007)
$D_{c,UK}$	0.013	(0.032)	-	-	0.009	(0.032)
$D_{EMU,UK}$	0.083**	(0.040)	-	-	0.076*	(0.039)
$D_{c,EU} - D_{c,EMU}$	-	-	0.014	(0.011)	0.004	(0.006)
$D_{EU,EU} - D_{EMU,EMU}$	-	-	0.018**	(0.009)	0.010	(0.007)
$DB_{ck,t-1}^{FX^3}$	17.14**	(8.555)	20.17**	(8.278)	17.64**	(8.499)
$DB_{ck,t-1}^{EMU^3}$	0.971*	(0.509)	0.588	(0.542)	0.795	(0.519)
$DB_{ck,t-1}^{X-EMU^3}$	0.063	(0.049)	0.064	(0.049)	0.062	(0.049)
Adjusted R^2	0.366		0.352		0.366	
$F - Stat$	28.48		26.85		25.04	

Table 10

International Bond Flows, IntCAPM, Monetary Policy Frameworks and EMU

$$t_{ck,t} = \alpha_0 + \alpha_1 w^{Bench}_{ck,97} + \alpha_2 HB_{c,97} + \alpha_3 \Delta HB_{c,01} + \alpha_4 DW^3_{ck,97} + \alpha_5 r_{k,t-1} + \lambda Mon_{k,t-1} + \beta_1 D_{k\subset EMU} + \gamma FXvol^e_{ck,t-1} + \beta_1 D_{k\subset EMU} + \beta_2 D_{k\subset EMU}\cdot D_{c\subset EMU} + \beta_3 D_{k\subset UK} + \beta_4 D_{k\subset EMU}\cdot D_{c\subset UK} + \beta_5 \left(D_{k\subset EU} - D_{k\subset EMU}\right) + \beta_6 \left(D_{k\subset EU}\cdot D_{c\subset EU} - D_{k\subset EMU}\cdot D_{c\subset EMU}\right) + \varphi DB^3_{ck,t-1} + \varepsilon_t$$

This table reports the results of the cross sectional regression of bond net asset flows summarising findings in Tables 6-8. This table also reports the results when controlling for the potential effect of EMU and of marginal diversification benefits. Explanatory variables are described in Appendix A. The sample size is $n = 639$. White Heteroskedasticity-Consistent Standard Errors and Covariance. Standard errors for the coefficients are reported in parentheses. ***, **, *: statistically significant at 1%, 5% and 10%, respectively.

	Specif 13		Specif 14		Specif 15	
Cst	-0.019**	(0.007)	-0.020***	(0.007)	-0.019**	(0.007)
$w^{Bench}_{k,97}$	0.212***	(0.058)	0.215***	(0.058)	0.213***	(0.058)
$HB_{c,97}$	0.012	(0.007)	0.012	(0.007)	0.012	(0.007)
$\Delta HB_{c,01}$	-0.050***	(0.010)	-0.050***	(0.010)	-0.051***	(0.010)
$DW^3_{ck,97}$	1.354***	(0.258)	1.360***	(0.256)	1.354***	(0.259)
$r_{k,t-1}$	0.042***	(0.011)	0.040***	(0.012)	0.041***	(0.012)
$Money_{k,t-1}$	0.047***	(0.011)	0.046***	(0.011)	0.045***	(0.011)
$Accountability_{k,98}$	-0.017**	(0.007)	-0.014**	(0.007)	-0.016**	(0.007)
$FXvol^e_{ck,t-1}$	-0.158*	(0.092)	-0.166*	(0.092)	-0.155*	(0.093)
$D_{c,EMU}$	0.009*	(0.004)	0.010**	(0.005)	0.009**	(0.005)
$D_{EMU,EMU}$	0.037***	(0.008)	0.038***	(0.008)	0.036***	(0.008)
$D_{c,UK}$	0.039***	(0.013)	-	-	0.037***	(0.013)
$D_{EMU,UK}$	-0.017	(0.019)	-	-	-0.016	(0.019)
$D_{c,EU} - D_{c,EMU}$	-	-	0.015**	(0.006)	0.003	(0.006)
$D_{EU,EU} - D_{EMU,EMU}$	-	-	-0.003	(0.006)	-0.001	(0.005)
$DB^{FX^3}_{ck,t-1}$	37283***	(4880)	36135***	(4925)	37244***	(4836.8)
$DB^{EMU^3}_{ck,t-1}$	-12.367	(82.86)	-13.813	(82.58)	-11.969	(82.93)
$DB^{X-EMU^3}_{ck,t-1}$	-0.150	(0.100)	-0.156	(0.100)	-0.150	(0.100)
Adjusted R^2	0.366		0.359		0.364	
$F - Stat$	25.59		24.85		22.52	

Table 11

International Portfolio Flows, Development, Institutions, Distantness and Net issuance

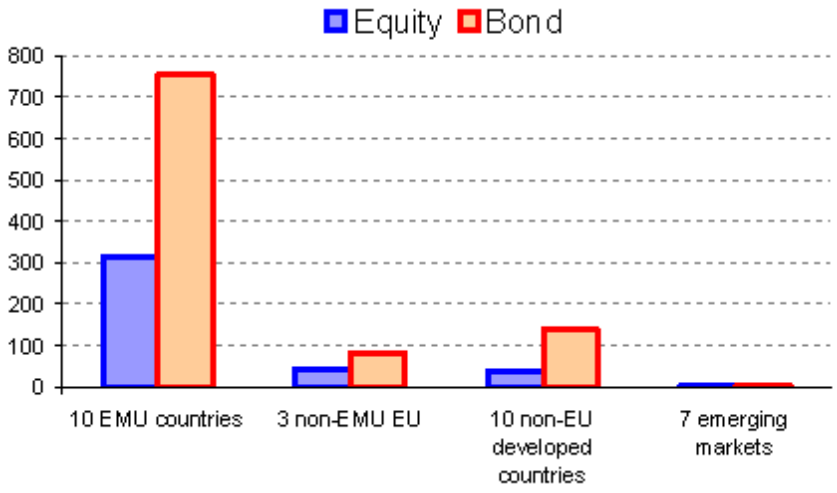
This table reports the results of a cross sectional regression of portfolio net asset flows. Each explanatory variable of this Table is added as an additional regressor to the model specifications 13 of Tables 9-10. The explanatory variables are described in Appendix A. The sample size is $n = 667$ for equity flows and $n = 639$ for bond flows. White Heteroskedasticity-Consistent Standard Errors and Covariance. Standard errors for the coefficients are reported in parentheses. ***, **, *: statistically significant at 1%, 5% and 10%, respectively.

Specif.	Explanatory	Equity flows			Bond flows		
number	Variable	Coeff.	*s.e.*	$\overline{R}^2$	Coeff.	*s.e.*	$\overline{R}^2$
		Degree of economic development					
	$pcGDP_{k,97}$	-0.000	(0.001)		0.002***	(0.001)	
16	$pcGDP^2_{k,97}$	0.002	(0.020)	0.364	0.055**	(0.025)	0.367
17	$Bank\ credit/GDP_{k,97}$	0.002	(0.005)	0.365	-0.003	(0.002)	0.366
18	$R\&D/GDP_{k,97}$	0.081	(0.224)	0.365	-0.102	(0.158)	0.366
	$Young_{k,97}$	0.031	(0.021)		0.005	(0.032)	
19	$Old_{k,97}$	0.028	(0.052)	0.365	0.007	(0.060)	0.364
	$\text{soph}_{c,98}$	0.001	(0.002)		0.001	(0.002)	
	$\text{soph}_{k,98}$	0.000	(0.002)		0.005***	(0.002)	
20	$\text{dsoph}_{k,t}$	-0.003	(0.007)	0.364	0.009**	(0.005)	0.367
		Institution quality					
21	$Liberties_{k,97}$	0.006	(0.007)	0.365	0.008	(0.005)	0.366
22	$La\ Porta_{k,97}$	-0.004	(0.014)	0.365	0.014	(0.019)	0.366
23	$ICRG_{k,97}$	-0.038	(0.035)	0.365	0.008	(0.021)	0.366
24	$Corruption_{k,97}$	-0.003	(0.007)	0.365	0.009	(0.007)	0.366
		Distantness					
25	$Distance_{ck,97}$	-0.004	(0.003)	0.367	0.001	(0.002)	0.366
26	$Trade_{ck,97}$	0.043*	(0.026)	0.368	0.002	(0.046)	0.366
27	$Tel_{ck,98}$	-0.007	(0.007)	0.366	0.002	(0.008)	0.366
28	$Language_{ck,97}$	-0.000	(0.009)	0.365	0.015**	(0.007)	0.371
		Mocroeconomic cycle					
29	$\Delta GDP_{k,t-1}$	0.001	(0.027)	0.365	-0.039**	(0.017)	0.368
		Net new issuance					
30	$Issues_{k,t}$	0.032*	(0.017)	0.366	0.022***	(0.006)	0.372

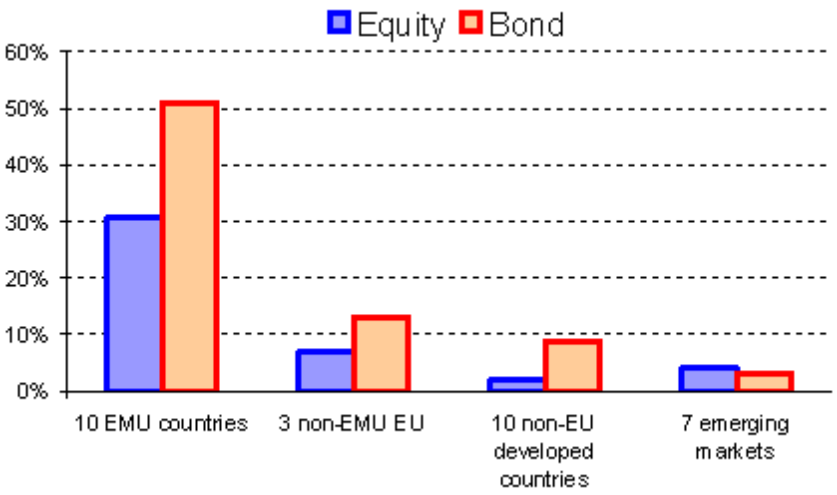
Figure 1
Changes in non-Domestic Euro Area Assets by Region

(a) reports the estimated portfolio net flows of EMU assets transacted by residents of region i over the period 1998-2001 aggregated for four country groupings. (b) reports the estimated flows relative to foreign assets held in region i over the average period 1998-2001. The 10 EMU countries are: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain. The 3 non-EMU EU countries are: Denmark, Sweden, the United Kingdom. The 10 non-EU developed countries include: Australia, Bermuda, Canada, Iceland, Israel, Japan, New Zealand, Norway, the United States, Singapore. The 7 emerging markets are: Argentina, Chile, Indonesia, Korea, Malaysia, Thailand, Venezuela.

a. Total amount of non-domestic EMU portfolio asset flows purchased by region i (USD billions)



b. Share of non-domestic EMU portfolio flows in foreign portfolio holdings (%)



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