New Patterns in International Portfolio Allocation and Income Smoothing

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Abstract

In the wake of monetary unification euro area bond and equity markets have become increasingly integrated. As an evidence of integration in those markets, the volume of international financial asset trading increased considerably. Nevertheless, the substantial decline in home bias among the members is accompanied with a bias of holding more assets from inside of euro area instead of outside which we refer to as "euro bias."

First, this paper explains the euro portfolio bias with the decline primary market transaction costs(gross spread) and lower sovereign risk among euro members. Second and more importantly, we examine the consequences of this euro in bond and equity markets in aggregate data levels. We find that higher correlations among corporate bond prices and compression in government bond yield differentials lead negative effect on smoothing via factor income when the euro domestic investors have euro bond bias. However, in the equity markets, specialization in production among euro members made aggregate euro sector indices not affected from global and regional shocks. Hence, sector indices become the leading force of euro equity markets and create less correlated national stock markets among the markets. We concluded that the more domestic investors have a bias of holding their equity portfolios inside of euro region, i.e. the higher euro portfolio bias, the higher possibility for sharing their income risk exists.

JEL classification: F36, F155, F41, G11, G12
Keywords: Capital Market Integration, Euro Portfolio Bias, Income Smoothing, Transaction Costs.

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1 Introduction

Macroeconomic models are built on the central assumption that economic agents are either rational or near-rational. That is, at the time of making optimal decisions for themselves, individuals determine whether to use all or part of the available information (Akerlof, Dickens, and Perry, 2000). Investments in capital markets, nationally or internationally, are driven by those same principles, suggesting that investors' portfolio allocation is a by-product of not only current news but also on expectations when seeking higher returns in different markets. Grubel (1968) explains investors' rationale for holding internationally diversified portfolio by looking at the mean-variance of both portfolios with purely domestic assets and portfolios with a combination of domestic and foreign assets. He shows that the mean-variance of the latter is smaller than the former. Lewis (1999) substantiates Grubel's main findings by providing both theoretical foundation and empirical evidence. However, Poterba (1991) and Tesar and Werner (1995) have observed that investors in high income countries do not hold foreign financial assets as much as they should optimally. A large portion of their financial assets are from the domestic market, a behavior that is known as "home bias".

Several studies have attempted to explain why the home bias phenomenon occurs in practice. One strand of this literature accentuates the existence of information asymmetry between domestic and foreign assets. Matching the location of mutual fund managers with the headquarters of firms in which funds are invested, Coval and Moskowitz (1999) find that mutual fund managers exhibit a strong preference towards firms whose headquarters are local. They then conclude that the home bias phenomenon exists even within the same country. In a study that relates foreign assets returns with financial assets diversification, Strong and Xu (2003) approach the home bias issue with survey data and reported that mutual fund managers in the US, UK, continental Europe, and Japan all display significant optimism towards the performances of their home country markets. More recently, Faruqee, Li, and Yan (2004) estimate an augmented gravity model of equity holdings to discover that one of the variables that performs remarkably well in explaining home bias is asymmetry of information, when distance is used as its proxy. Along the same line, Portes and Rey (2005) find that informational variables, such as telephone traffic help explain equity home bias which, in their view is consistent with

a role for informational asymmetry.

However, in the last decade, there has been a downward trend in home bias among high income OECD countries, although they still do not reach the optimum levels suggested by the CAPM framework. Among euro area members, a similar trend in home bias level has been observed in this time period. A number of studies including Adam *et al.* (2002), have interpreted the recent decrease in the levels of equity and bond home bias as evidence of further integration in the euro area.[1]

Nevertheless, not only has the volume of cross border portfolio investing increased, but also the composition of the euro domestic investor's international asset choice has changed. Euro domestic investors lean towards holding more financial assets from inside the euro region instead of holding assets from different emerging markets or OECD countries. Substantial decline in home bias in those markets is accompanied with a new concept in the literature, defined as "euro bias." [2] Euro bias has been observed recently for equities as well as for bond markets.[3] One of the main questions of this paper comes in at this point. Why are the financial assets issued in the euro area attractive to domestic investors inside the euro area?

In this paper, first we intend to find the main factor(s) behind the euro portfolio bias. Through the introduction of the single currency, the level of competition among financial intermediaries for underwriting and trading euro-originated financial assets increased remarkably, leading to a reduction in transaction costs. Recently, while government bond returns compressed to low levels and the euro markets' default risk began to fade away, the importance of primary market issuing costs in determining the volume of cross border portfolio holdings has increased even more. We merely claim that one of the main reasons for euro bias-clearly the most important one-is the substantial decline in the primary issuing costs of the financial assets. However, explaining the attractiveness of the euro originated securities with

[1] Adam *et al.* (2002) find that while the share of foreign equity remained mostly the same until the starting date of monetary union, a considerable increase has been observed since then.

[2] In Figure 1, it is clearly observed that the share of EMU originated bonds, held by an OECD investor, increased considerably right after the start of monetary union. However, the share of the equity holdings does not have the same pattern as bond holdings. The euro equity share among OECD members is mostly constant or has been slightly decreasing in recent years.

[3] Hereafter OECD refers to the countries that are high income OECD countries, except for EMU members. These are Australia, Canada, Denmark, Japan, Iceland, Korea Republic, New Zealand, Norway, Singapore, Switzerland, Sweden, UK, and U.S..

only the decline in transaction costs will not be enough. Because of the Maastricht treaty and Stability and Growth Pact, euro members are strictly obliged to improve their fiscal positions. By the starting date of the monetary union, the central governments have had less default risk in their sovereign debts than previously, which is to be considered as another important reason for the euro portfolio bias, in particular in bonds market.

After determining the main reasons behind the "euro portfolio bias", we were motivated to discover the consequences of this bias in smoothing the income, which is one of the main concern of those investors who are holding cross border investments. In recent years, the capital market integration and diversified portfolio holdings create greater possibilities of income smoothing via foreign asset trading. Balli and Sørensen (2007) find that the increased level of capital market integration-higher levels of international asset trading among euro members-created potentials for a higher percentage of income smoothing in the euro area. In a concentrated study, Sørensen *et al.* (2007) argued that the increased level of cross border portfolios lead to higher income smoothing for the high income OECD members. For the domestic investors in euro members, the bias of holding domestic assets has decreased recently, but the investors are now holding more assets from inside of euro regions than previously. How does euro bias influence the smoothing via factor income in the euro region? We document that the euro bond bias fosters a limitation on income smoothing for euro domestic investors due to the perfect correlation among government bond yields and relatively limited volume of corporate bonds. However, we find that the euro equity bias is the primary factor for the higher level of income smoothing in the euro area.

The remainder of the paper is as follows. Section 2 presents a two-asset portfolio model explaining international bond holdings issued by two different markets. Section 3 briefly describes the data set, and section 4 explains construction of the variables, including the direct measurements of bond and equity transaction costs. Section 5 contains the empirical findings that explain the determinants of cross border asset holdings. Section 6 and 7 present the impacts of euro bonds and equity bias on income risk sharing, respectively. Section 8 offers our conclusions.

2 Foreign Portfolio Model

The basic model, following Lewis (1999) and Bernoth *et al.* (2004), is derived from the default risk, transaction cost and international risk framework and is modified for the international bond markets.

Suppose a domestic investor is able to hold both domestic and foreign bonds. In addition, the domestic investor chooses to invest his wealth in both foreign and domestic assets. He will hold foreign bonds as a proportion of his wealth:

$$F_t = \theta \mathrm{A}_t \,, \tag{1}$$

where F_t and A_t refers to the foreign bond holdings of domestic investors and the wealth of the investor at time t, respectively, and $\theta \, \epsilon \, [0, \, 1]$.

With the rest of his wealth he holds domestic bonds:

$$D_t = (1 - \theta)\mathrm{A}_t \,, \tag{2}$$

where D_t refers to the domestic bond holding.

The domestic investor maximizes his utility according to the expected return and the volatility of the return of the portfolio.

$$Max \quad U = [E(\mathrm{A}_t + 1), Var(\mathrm{A}_t + 1)] \,. \tag{3}$$

the first derivative of the utility function, U_1, is bigger than zero, and the second derivative, U_2, is less than zero. The reason obviously is linked to the fact that the investor's utility will increase as the expected wealth at time $t+1$ increases and the variance of the expected wealth decreases. We also assume that the domestic security is subject to some risk, whereas the foreign security contains negligible default risk. More specifically, with a positive probability of $\mathrm{P}(x_t)$, the return of the domestic debt will be paid in full as expected. Here, x_t indicates a set of variables affecting this probability. In the case of default, the investor receives a fraction of his gross payment, $\tau \, \epsilon \, [0, \, 1 + \mathrm{r})$ where r is the interest rate on the domestic bond.

At time t, either the domestic investor is paid in full

$$P(x) * (1 + r)(1 - \theta)\mathrm{A}_t \tag{4}$$

or receives a proportion of the domestic investment

$$(1 - P(x)) * \tau(1 - \theta)\mathrm{A}_t \ . \tag{5}$$

Investors incur transaction costs proportional to their investment in bonds which decrease the liquidity of the bond market. The transaction costs for both domestic and foreign bond holdings, γ_d and γ_f, is a proportion of outstanding bond value.

The domestic investor's expected wealth is

$$E(\mathrm{A}_t{+}1) = [P(x_t)(1{+}r)(1{-}\theta)\mathrm{A}_t{+}(1{-}P(x_t))(1{-}\theta)\mathrm{A}_t\tau]{-}(1{-}\theta)\mathrm{A}_t\gamma_d{+}\theta(1{+}r*)\mathrm{A}_t{-}\theta\mathrm{A}_t\gamma_f \ . \tag{6}$$

The variance of the investor's wealth would be;

$$Var(\mathrm{A}_t + 1) = [P(x_t) * (1 - P(x_t))(1 - \theta)^2(1 + r - \tau)^2\mathrm{A}_t^2 \ . \tag{7}$$

The domestic investor maximize its utility subject to the optimal foreign bond holding,

F.O.C will be;

$$\frac{\partial U}{\partial \theta} = \frac{\partial U}{\partial E(\mathrm{A}_{t+1})}\frac{\partial E(\mathrm{A}_{t+1})}{\partial \theta} + \frac{\partial U}{\partial Var(\mathrm{A}_{t+1})}\frac{\partial Var(\mathrm{A}_{t+1})}{\partial \theta} = 0 \ . \tag{8}$$

For the domestic investor, the optimal share of foreign bond holding will be;

$$\theta = \frac{[(1 - P(x_t))(1 + r - \tau) + (\gamma_d - \gamma_f) + (r^* - r)]\phi}{P(x_t)(1 - P(x_t))(1 + r - \tau)^2} \ , \tag{9}$$

where

$$\phi = -\frac{\partial U}{\partial E(\mathrm{A}_{t+1})} * \frac{\partial Var(\mathrm{A}_{t+1})}{\partial U * 2\mathrm{A}_t} \ . \tag{10}$$

The difference between foreign and domestic bond issuing costs plus return differentials

between domestic and foreign assets outweigh the default risk probability of the domestic asset; *i.e.* $(1 - P(x)(1 + r - \tau) + (\gamma_d - \gamma_f) + (r^* - r) < 0$, the domestic investor will be reluctant to hold foreign assets. According to our model, we assume that the domestic investor holds foreign bonds, since the transaction cost differences and return differences are not very big and do not outweigh the default risk probability. [4]

Equation(9) states that the optimal share of foreign portfolio would be affected by various fundamental factors, such as default risk, transaction costs, the return differentials and the level of relative risk aversion of the domestic investor. The effect of default risk on share of foreign portfolio holdings will be;

$$\frac{\partial \theta}{\partial \tau} = \frac{(P(x_t) - 1)[(P(x_t)(1 - P(x_t))(1 + r - \tau)^2) + 2G]\phi}{[P(x_t)(1 - P(x_t))(1 + r - \tau)^2]^2} < 0 \ , \tag{11}$$

where

$$\text{G}=((P(x_t)(1-P(x_t))(1+r-\tau)^2)*[(P(x_t)-1)\tau+(1-P(x_t))(1+r)+(\gamma_d-\gamma_f)+(r^*-r)] \ .$$

The partial derivative states that when domestic and foreign markets are extremely integrated with each other, domestic investors are willing to hold more foreign portfolios when domestic markets have higher default risks

The transaction costs will be effective in determining foreign bond holding:

$$\frac{\partial \theta}{\partial \gamma_f} = \frac{-\phi}{P(x_t)(1 - P(x_t))(1 + r - \tau)^2} < 0 \ . \tag{12}$$

The transaction costs of the bonds are the cost of intermediation for the placement of new bonds, and they are commonly measured as the sum of the management fee, marketing costs, syndicate fees, and selling concessions divided by the issue size. When costs of gross spreads of foreign bond holding increase, the investor will be happy to go with domestic bonds.

The bond return differentials might not be a good indicator for determining the optimal foreign portfolio holdings. [5] Accordingly, we proxy some bilateral factors to capture the return

[4] When foreign bonds do not give higher returns to the bond holders and the issuing cost of those bonds is incredibly high, then the investor wants to go with domestic bonds even though they carry some risk.

[5] The bond returns are compressed to so small levels that investors do not consider about getting higher return from foreign bond holdings. For that reason we surrogate for the differentials of the rate of returns with various factors.

differentials, such as, GDP growth correlations, distance.

The country fixed effects will be captured by the level of the relative risk aversion of the domestic investors, U_1/U_2. In order to get the domestic risk factor, we take the log function of both sides of equation(9).

$$ln(\theta) = ln(C) + ln(\phi) - ln(B) \ . \tag{13}$$

Where C=[(P(x_t)-1)τ+(1-P(x_t))(1+r)+(γ_d-γ_f)+(r*-r)] and B=P(x_t)(1-P(x_t))$(1 + r - \tau)^2$.

The domestic investor's preferences are also important in the foreign portfolio holdings. When the investor is risk averse and thinks about the variance of his future wealth, i.e. lower U2, he increases the foreign bond holdings since the domestic country is riskier than foreign markets. The relative risk aversion of the domestic country investor might be effective for cross border asset holding. We could not measure directly the risk aversion of the domestic investor, but we proxy some variables for the risk aversion, such as ratio of volume of lower graded bonds (junk bonds) to all bonds issued in the domestic country, or the volume of junk bonds issued and traded in the domestic market . [6]

3 Data

The entire data set of this paper is obtained from various resources. We employed a broad sample to investigate the impact of our variables more effectively. The data set consists of a sample of high income OECD members. [7] We obtained a pair-wise volume of cross border asset holdings in U.S. dollars from the International Monetary Fund's (IMF) Coordinated Portfolio Investment Surveys (CPIS) for years 1997 and 2001–2004. The data set is mostly reliable since the surveys were conducted using consistent guidelines for measuring holdings of equity and bonds across countries. By following Sørensen *et al.* (2007), we obtained data for the market capitalization of bond markets from the Bank for International Settlements

[6] Junk bonds are defined as bonds that are rated as CCC or lower by credit rating institutions.

[7] Dataset include Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Australia, Canada, Japan, Iceland Korea, New Zealand, Norway, Singapore, Sweden, Switzerland, UK, and US.

(BIS) quarterly review. We measured the size of a country's total bond market capitalization as outstanding domestic debt securities minus outstanding short term (less than one year remaining to maturity) domestic securities plus outstanding international bonds and notes. Total market capitalization of equity markets was obtained from the World Development Indicators Database. The data for the total debt and government deficit levels of each country were obtained from International Financial Statistics (IFS).

The transaction costs variables are constructed from two different and complicated data sets. We used the gross spreads for bonds and equities as the primary market transaction cost variable. Bond gross spreads were gathered from straight/fixed-rate corporate bonds issued by industrial firms between January 1997 and December 2004 from Thompson Deals SDC Platinum Database. Gross spreads of the bonds issued by financial or monetary institutions are excluded due to relationships between the underwriters and issuer firms, which causes understatement of the those asset's issuing costs. Therefore, after eliminating those observations, initially, our sample consisted of 16124 non-equity linked fixed-rate corporate bonds issued by non-financial cooperations. We excluded 114 observations which did not contain the total value of issued bonds. Additionally, we deleted 13 observations that included gross spreads higher than 30%.

The primary transaction cots for equities, gross spread costs, were also gathered from Thompson Deals SDC Platinum Database. Again, we excluded costs of those assets that were issued by financial or monetary institutions, due to the uncompetitive market conditions and relationships between the underwriters and issuers. We omitted the observations that do not include total market value of issued equities. We eliminated the gross spreads higher than 30%, which are categorized as "over gross spreads" since the conditions on issuing those assets do not reflect the market optimums. Ultimately, we got 25133 equities that were issued by non-financial firms.

We capture the secondary market transaction costs of the bonds, through calculating the liquidity premium of each corporate bond issued under euro region plus the Denmark, Sweden, and UK bond markets.[8] In the end, the data set consists of 1305 eligible non-callable, non-

[8]The DataStream does not cover corporate bonds in Finland and Iceland; therefore we exclude these countries

equity linked corporate bonds issued and traded in these markets between years 1997 and 2004. Regarding those bond data set, daily bond prices, duration of the bonds and credit rating notes were also gathered from DataStream. Those of the bonds which are neither rated by S&P500 nor Moody's were also included in the calculations. We separated the corporate bond data set for bond years in order to calculate the liquidity premia for each year and market. Daily bonds were checked in detail for omission and data errors. For a given bond year, if the return of the bond was zero for more than 70 percent of the whole year observations, then that observation was eliminated for the entire bond year.[9] In addition to these, we omitted daily prices of the given bond that were 50 percent of the prior day's price. Not only that day's price but also the prior day's price was eliminated.

Other variables that were employed to determine bilateral cross border asset holdings are distance in kilometers, equity market correlations, and GDP growth rate correlations. We obtain the data on distance in kilometers between two countries' capital cities from the airport accommodation web-site of UK.[10]. The equity market correlations of different countries are calculated based on the daily stock market price data taken from Datastream and Morgan Stanley Capital International.

To inquire about equity market indices and obtain the relationship between the income smoothing and euro equity bias, we employed daily sector equity indices from the Dow Jones STOXX. The Dow Jones Euro STOXX size indices are derived from Dow Jones STOXX Database and designed to provide a broad yet liquid representation of large, mid and small capitalization companies in the euro region. The Euro Zone STOXX covers Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain. In the data set, we employed daily returns of 18 leading sector indices constructed. These indices include a total of 300 equities issued among euro members. The sample is taken in the years between 1995 and 2004 to capture the effect of the beginning monetary union on the equity markets more effectively.

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in the calculation of the liquidity premium index.

[9]We have applied the Limited dependent model to proxy for the liquidity premium of the corporate bonds. The limited dependent model needs a sufficient number of non-zero bond returns.

[10]http://www.airport-accommodation.co.uk/worlddistances.php.

Last, risk sharing regressions were performed by gathering the national accounts data from various issues of OECD National Accounts, ECD National Accounts–Main Aggregates (Volume I) and detailed tables (Volume II), covering the period 1990–2004.

4 Volume of International Portfolio Trading and Transaction Costs

Transaction costs associated with issuing financial assets(primary market)and trading the assets in secondary markets is basically one of the important factors for explaining home bias. Domowitz, Glen, and Madhavan (2001) find that transaction costs are important, especially for emerging markets, although Cooper and Kaplanis (1994) claim that only if domestic investors are risk averse, observable costs of holding foreign equity do not explain home bias in equity holdings. Ahearne, Griever, and Warnock (2001) suggest that high transaction costs on foreign stock exchanges might indirectly increase the incentive for foreign firms to list on U.S. exchanges, which does help to explain U.S. home bias. Pagano, Rell, Zechner (2001) show that fragmented, less liquid, and more costly European securities receive fewer cross-listings, and those European firms choosing exchanges on which to list consider the size of transaction costs, among other things (including accounting standards and corporate governance rules). In a recent work, Mann and Meade (2002), using direct measured equity transaction costs from Elkins/McSherry LLC, find that transaction costs have statistically significant but small effects on explaining home bias. Overall, literature does not come to a consensus about the effectiveness of transaction costs on cross border asset trading in markets. At the same time, the literature has not presented any studies related to the transaction costs of bond markets yet. In the following section, by using more established frameworks, we acquire the direct measurement of transaction costs in both bond and equity markets for the primary and secondary markets.

4.1 Gross Spreads

4.1.1 Bond Markets

In this paper, simply, the primary market transaction costs are classified as the underwriter gross spreads; underwriting costs—the commissions and fees—are divided by the issued market value of the security. The underwriter costs consist of the cost of intermediation for the placement of new bonds, and are commonly measured as the sum of the management fee, marketing costs, syndicate fees, and selling concessions. The data set we employed contains the premier market costs for issuing financial assets. We will explain the data set in detail for both bond and equity markets.

In the proper analysis , we collected data from Thompson Deals SDC Platinum Database, which consists of non-equity linked, fixed coupon bonds issued by the private and public sector between January 1997 and December 2004. In favor of calculating the transaction costs, we do not include the bonds issued by financial institutions because of the possibility that they might not be competitively underwritten and that gross spreads might not reflect the real cost of capital when they were issued by securities houses or underwriter companies. Additionally, we have categorized issues according to whether they are borrowed by the public or private sector. Generally, in the euro region, domestic sovereign bonds were underwritten by national central banks. However, there is a non-competitive relationship between the issuer of government bonds and primary buyers in the emerging markets, which will understate the gross spreads. The combination of the public and private issues might hamper reliability of the results. Accordingly, the data set used for this analysis contains 16124 non-equity linked fixed-rate corporate bonds issued by non-financial firms that met this criteria.

For each market, aggregate transaction cost variables are calculated by taking weighted averages of each corporate bond's gross spreads according to the issued market value of those bonds. Kollo (2005) employed a similar data set for the whole euro market and found that the euro area local bond markets responded to the decrease in restrictions and higher numbers of U.S.-based and other euro zone underwriters with a considerable decrease in the underwriter gross spread for euro originated bonds. For our data set, we find a similar trend for the euro markets in comparison with the bonds for the ex-EU members and bonds nominated with U.S.

currency. The competition among the underwriters made gross spreads decrease considerably, particularly by the inception of the euro. In Figure 2, we observe the decline in the transaction costs as a trend beginning before the start of monetary union. The gross spreads increased trivially in years 2002 and 2003. In these years there are effectively U.S.-based world-wide financial shocks.

[insert Figure 2 here]

4.1.2 Equity Markets

For stock market transaction costs, again we used a data set supplied by the Thompson Deals SDC Platinum Database. The transaction costs for equities are the issuing costs, which break down as management fees and a concealed fee or commission fees. These costs are the direct and observable costs. To get the primary transaction cost variable for each market, we add those spreads up and ratio them to total issued market value of those equities, named as gross spreads for equities. We omitted the gross spreads of those equities when the issuer of the equity was a financial or monetary institution, since there is a non-competitive environment for underwriting of these assets. Additionally, we eliminated the observations that consisted of gross spreads higher than 30 % of the total value of outstanding issued equities. After eliminating the observations, we got 25133 equity transaction cost observations that meet previous criteria. The gross spreads for euro area and OECD aggregate markets are presented in Figure 3. The figure documents that the average gross spreads for the equities issued inside the euro zone are remarkably lower than those of equities issued outside the euro zone. By the beginning of monetary union, a downward trend in the transaction costs is also observed. We conclude that there is a similar reason for the decline in bond transaction costs: competition among local and foreign underwriters made equity gross spreads decrease in the euro area. The decline is also felt outside euro markets, although it is not as pronounced as in euro area originated equities.[11]

[insert Figure 3 here]

[11] We verified reliability of our data set by comparing ours with Meade *et al.* (2002)'s. We documented that our data mostly coincides with their data set. However, the comparison is limited to years 1997 through 2001, dues to the availability of the data.

4.2 Liquidity Transaction Costs

The gross spreads are a reliable measurement to capture direct primary market transaction costs for each market. After financial assets are issued in the primary markets, they would be traded in the secondary markets. Investors take into account the liquidity of financial assets as well, when they were allocating their portfolio. However, since we could not find a consistent measurement for the liquidity costs for equity markets, we only construct the liquidity premium for bonds markets.

Generally, the literature concerning measurement of liquidity premia is silent since there are solid difficulties in calculating liquidity premia for bonds. In one recent study, Chen, Lesmond and Wei (2002) (hereafter CLW) applied a liquidity model to get U.S. corporate bonds' liquidity transaction costs and got reliable results. They find that their liquidity estimate of each bond is mostly associated with the bid-asking spread of the bonds even after controlling for the commonly used liquidity determinants. The correlation between the liquidity premium estimates and bid-asking spreads increases as the credit ratings of the corporate bonds go from junk bonds to investment grade ones.

We employed the liquidity estimation technique developed by CLW (2002). This model uses daily bond returns to estimate bond level liquidity costs endogenously. After getting the liquidity cost of each bond for every bond year, we calculated the liquidity cost premium of each market by taking the weighted averages of each bond's liquidity costs as follows,[12]

To reflect the bond pricing for investment grade and junk bonds, we employed the CLW methodology with two factor models, risk free rate and equity market effects. Cornell and Green (1991) model bond return as a linear function of the movements of S&P500 index. CLW model adds the risk free government bond return to capture the effect on high grade bonds. The return process is given as:

[12]For the liquidity premia of each market, we used the equation below

$$LIQ_{j,t} = \sum_{j} liq_{i,t} * \eta_{i,t} \ , \tag{14}$$

where $liq_{i,t}$ is the liquidity cost of bond i at year t and and $\eta_{i,t}$ is the weight of the bond issued in the market j in terms of the value outstanding.

$$R^*_{it} = \beta_{i1} Duration * \Delta R_{f,t} + \beta_{i2} Duration * \Delta SP500_t + \epsilon_{it} \ . \tag{15}$$

R^*_{it} represents the unobserved desired return of firm i and daily time period t that investors would bid given zero transaction costs. $\Delta R_{f,t}$ is the daily change in ten year domestic government bond yield. $\Delta SP500_t$ is the change in daily return in Standard and Poor's 500 index in the domestic market. Duration is measured as modified duration and daily basis.

The return generating process calculates the expected daily return of the bonds if the liquidity cost is zero. In a particular case, if there is a divergence from the daily desired return and realized return, that will reflect the liquidity premium as;

$$R_{it} = R^*_{it} - \alpha_{i2} \tag{16}$$

where R_{it} is the measured return α_{i2} is the effective buyer cost for firm i and α_{i1} is the effective seller cost. Desired and measured daily return differences supposedly generates the liquidity premium for bond of firm i.

Maddala (1983) has explained the general limited dependent variable methodology by combining the return generating function with the liquidity constraints:

$$R^*_{it} = \beta_{i1} Duration * \Delta R_{ft} + \beta_{i2} Duration * \Delta SP500_{ft} + \epsilon_{it} \tag{17}$$

$$R_{it} = R^*_{it} - \alpha_{i1} \qquad if \quad R^*_{it} \leq \alpha_{i1} \tag{18}$$

$$R_{it} = 0 \qquad if \quad \alpha_{i1} \leq R^*_{it} \leq \alpha_{i2} \tag{19}$$

$$R_{it} = R^*_{it} - \alpha_{i2} \qquad if \quad R^*_{it} \geq \alpha_{i2} \tag{20}$$

then the log likelihood estimation is represented as,

$$Lnl = \sum_{1} Ln\frac{1}{(2\pi\sigma_i^2)^2} - \sum_{1}\frac{1}{(2\sigma^2)}(R_i + \alpha_{1,i} - \beta_{i,1}Duration_i t^*\Delta R_{ft} + \beta_{i2}Duration_{it} * \Delta SP500_t)^2$$

$$+\sum_{2} Ln\frac{1}{(2\pi\sigma_i^2)^2} - \sum_{2}\frac{1}{(2\sigma^2)}(R_i + \alpha_{2,i} - \beta_{i,1}Duration_i t^*\Delta R_{ft} + \beta_{i2}Duration_{it} * \Delta SP500_t)^2$$

$$+\sum_{0} Ln(\psi_{2,i} - \psi_{1,i}) \ . \tag{21}$$

To get the estimation of liquidity premia of each bond, we emphasized on the $\alpha_{1,i}$ and $\alpha_{2,i}$. Differences of the coefficients ($\alpha_{2,i}$- $\alpha_{1,i}$) form the liquidity premium on the corporate bond returns as a round trip of transaction costs. For example, $\psi_{2,i}$ represents the cumulative distribution function for each bond year evaluated at$(\alpha_{2,i} - \beta_{i1}Duration * \Delta R_{f,t} + \beta_{i2}Duration * \Delta SP500_t + \epsilon_{it})/\sigma_i$.$\sum_1$ represents the negative non zero measured returns, $\sum_2$ represents the positive non-zero returns and lastly $\sum_0$ represents the zero measured returns. Madalla (1983) and CLW (2002) outline the estimation procedure in the details of their papers. [13]

[insert Figure 4 here]

Estimated values from limited dependent variable procedures indicate the liquidity premium of each corporate bond while it is trading in the markets. For whole firms located in each market, [14] we not only grouped the bonds according to their Moody's or Standard and Poor's rating categories, but also weighted liquidity premia according to corporate bonds' value outstanding in the markets. To our best knowledge, the weighted averages represent a reliable measurement for the liquidity premia of each market. [15]

[13] CLW used various estimation procedures for those bonds which has the number of zero returns less than 5% of trading pattern, in this case sign differences of the buy side costs and sell side costs might occur. They adopt that if both intercept are negative then they sum both of them and take the absolute value, if both are positive again they sum the intercept terms. If sign on α_{i2} is negative and the other is positive then they estimate the liquidity cost as the difference of α_{i1}- α_{i2}.

[14] Figure 1 represents the market liquidity premia for EMU members.

[15] For each bond year and market, we calculate the liquidity premium by taking weighted average of the

5 Empirical Model

Empirically, to show the main determinants behind the international asset holdings for international portfolio holders, we employed the reduced form of our two-asset, two-country portfolio model. The reduced form is presented as;

$$\theta_t^{ic} = \alpha^i + \alpha^c + \beta_0^* Debt_t^{i-c} + \beta_1^* TRANS_t^c + \beta_2^* LIQ_t^c + \beta_3^* EMU + \beta_4^* X_t + \epsilon_t \ , \qquad (22)$$

where dependent variable θ^{ic}, is the share of foreign country (c)'s bond(equity) in the total volume of home country (i)'s foreign bond (equity) portfolio. α^i and α^c are corresponding the fixed effect variables of host and source country respectively. We used several variables to test these fixed effects. Considering the source country, we employed factor market capitalization rate of the source country, PPP adjusted real GDP per capita, as well as the log linearized population.PPP adjusted real GDP per capita, and log linearized population of the host country.[16] $Debt_t^{i-c}$ is the debt to GDP ratio differentials between home and foreign country. In the undergraduate textbooks, fiscal variables reflect the governments quality as a borrower. By employing one of the reliable fiscal variables, debt to GDP ratio, we may be able to obtain the information regarding the government's quality as a borrower. The government's quality as a borrower inevitably reflects on the domestic bond markets as various levels of default risk for the corporate bonds. $TRANS^c$ is the aggregate primary market transaction costs of bonds(equities) in the foreign markets. This variable is created by the taking weighted averages of each bonds(equites)'s gross spreads issued in each foreign market. LIQ^c is the liquidity premium of each bond market, again this aggregate variable is constructed by taking weighted averages of corporate bonds liquidity premia. [17]

Last, X_t stands for some bilateral factors that help to explain the volume of bilateral in-

liquidity premia with respect to the the values of the bonds outstanding. The categories of the corporate bonds according to Standard and Poor's or Moody's Bond ratings are not represented in the paper. Comparison of the same rated bonds in different markets would be another research project coming up in the near future.

[16] Only statistically significant variables are listed in the tables.

[17] We explained the details of creating the liquidity premium for each market in the previous section. Sometimes there are mismatches between the market that security is issued and the security is traded. There are some corporate bonds that are issued, for example, in market A but traded in market B. Data Stream filters these bonds, therefore we did not have the problem of identifying the corporate bonds with their original markets.

ternational asset holdings. Generally we employed the bilateral variables upon which previous literature has a consensus, GDP growth correlations, stock market return correlations, and kilometer distance between the capital cities of the domestic and foreign markets.

5.1 Empirical Findings

In tables 1–4, we present results of panel regressions of the reduced form of the two-asset, two-country portfolio model for bond(equity) markets. The panel regressions control for both home and foreign country fixed effects for years 1997 and 2001 through 2004. Hence, the only explanatory variables included in the regression are those that have variation along sample dimensions and statistically significant coefficents.

Along with our simple theoretical framework, we find that the primary transaction costs(gross spreads) have a negative effect on the cross border asset holdings. In Tables 1 & 2, the coefficients of transaction costs(gross spreads) are negative for samples including Home:OECD, Foreign: OECD and Home: Non-euro, Foreign:euro samples.[18] The very important economic intuition behind the significant coefficient of the primary market transaction costs in those tables can be documented as follows; When the financial asset returns are squeezed to low levels, just like documented after the financial integration took place among highly capitalized markets, investors care more the decline in issuing costs of the bonds. Other explanatory variables have intuitive coefficients where the coefficient of factor market capitalization of the foreign country is positive and statistically significant. One can say that domestic investors are concerned about the market structure of the host country. When the country is more open to foreign investment, i.e, there are fewer restrictions in the foreign market for foreign investments, the investors will be more willing to hold assets from that country. As a bilateral factor,the distance between the home and host country has a negative effect on the cross border holdings, but it is not strongly significant. Last, OECD members' bias toward EMU originated bonds is also explored in table 1. The coefficient of the dummy variable named "EMU" is positive and highly significant, which indicates the "euro bias" for the euro originated bonds

[18]When we have "Home: EMU, Foreign: non-EMU" this limits the sample to country pairs in which the home country is an EMU member while the foreign country is taken from the sample of non-EMU.

held by international portfolio holders.

[insert Table 1 and 2 here]

In Table 2, the effectiveness of primary market transaction costs, gross spreads, on the choice of foreign asset holdings can be explored easily. The non-euro investors lean toward investing more in euro countries which have have lower gross spreads and liquidity premia. Accordingly, even among euro members the transaction costs remain an important factor to explain the attractiveness of foreign securities. As an another factor, the default risk is an important motivation for the decisions of foreign investors. Although the coefficients of the debt to GDP ratio differences are not significant for the entire sample(table 1), for the non-EMU to EMU sample, they are significant and positive. These results state that the foreign investors also think about default risk possibility seriously in their foreign bond holding decisions. When the default risk of the assets-particularly the bonds-decreases in euro markets, investors want to hold more assets from those markets. One can definitely conclude that this is a beneficial side effect of the Maastricht criteria and the stability and growth pact. The investors want to hold more bonds from euro areas since the member states' sharp decline in debt to GDP ratios makes their financial markets contain less default risk.

Table 3 represents the panel data regressions for bond holdings with a smaller sample, Home:euro and Foreign:euro [19]The results are similar to the previous tables. Primary market transaction costs are important factor for determining the cross border asset direction; as a new variable, we added the liquidity risk premia of the each euro market. The liquidity premium has a similar effect with the primary market transaction costs. Investors tend to hold more foreign assets when the liquidisation of those assets is less costly. Another important illustration of this table is that debt to GDP ratio differences are also important for the domestic investor's decisions in euro areas. This finding matches with the simple theoretical framework in section 3, which states that when the members are integrated; i.e. asset return differentials and transaction costs are extremely small, domestic investors want to diversify more to eliminate the domestic default risk. Since some of the member countries are in fiscally vulnerable positions compared to others, the domestic investors in these countries are willing

[19]euro:euro sample indicates that both source and host countries are a member of EMU.

to diversify their bond portfolios to other markets which do not contain such levels of default risk. One possible explanation is that although there is a common sense that the ECB will bail out high debt EMU members from bankruptcy, domestic investors in the euro region do not think like that.

[insert Table 3 and 4 here]

Table 4 illustrates the factors that affect the distribution of local EMU investors' bond portfolios in the world. The results clearly indicate that euro bond bias is mostly explained by the lower default risk among euro markets and lower primary market costs of bonds. The last two columns indicate that the euro bond bias dummy becomes statistically insignificant when we add the default risk and primary market transaction cost variable(gross spread) to the model. This result supports our view that the key factors behind the euro bond bias is the lower transaction costs and lower default risk premium. In order to satisfy the Maastricht criteria and the stability and growth pact, the EMU members achieved a sharp decrease in total debt/gdp ratios, leading to a decline in default risk in those markets. In addition, due to competition among the underwriters and investment banking houses, the gross spreads in the euro area decreased considerably. Consequently, the domestic investor does not need to seek any other securities, when those in EMU markets are issued, traded cheaper and contain less default risk.

Tables 5 and 6 models similar to the previous regressions, but instead we concentrate on the pairwise cross border equity holdings. Similar to Table 4 euro equity bias is observed clearly in Table 5, in the second column. The coefficient of the EMU membership dummy is positive and statistically significant, indicating that local euro investors tend to hold more equities from the euro area instead of holding equities from outside the euro area. Besides, the coefficient of transaction costs is negative and significant, indicating that the local investors tend to hold more assets from markets in which equities are issued in lower costs. Grippingly, the last two columns of the table states that euro bias dummy becomes insignificant when we add the primary market transaction costs(gross spreads) to the model, indicating that euro equity bias is merely explained by the sharp decline in primary market transaction cost(gross spreads) of the euro originated equities. In the third column, we created an interaction variable

by the EMU dummy and transaction costs which is negative and significant, documents that when a local euro investor wants to invest inside of the euro area, they choose assets from markets that have lower issuing costs. This finding also supports our previous findings that primary market transaction costs are important in explaining the euro equity bias.

[insert Table 5 and 6 here]

Table 6 represents the factors that affect the volume of cross border equity holdings for a sample of Home:non-euro and Foreign:OECD. The results are almost similar. Investors care about the market capitalization of the foreign country in which they invest. Distance is again negative, but the coefficient is not strongly significant. Surprisingly, portfolio investors located outside of euro area do not want to hold equity assets from the euro area. The coefficient of EMU is negative and highly significant. Although all investors care about the lower primary transaction costs, they do not invest more in euro area markets which have lower transaction costs. The coefficient of transaction cost is negative but not strongly significant. However, the coefficient of interaction effect constructed by the EMU dummy and transaction costs is negative and significant, indicating that these investors tend to invest more in euro markets in which the issuing cost of equities is lower. However, the negative coefficient of the euro dummy—negative euro bias— for non-euro investors is a different research question and we will clarify this question in another paper.

Consequently, reasons behind the euro portfolio bias of international portfolio holders are clearly observed in these regressions. The decrease in default risk and the substantial decline in transaction costs make the local euro domestic investors to hold more assets from the euro region instead of holding assets from other OECD markets. Inevitably, there exists a "euro bias " among the local investors in the euro area. Like other "biases" in the international economics literature, there exist some consequences of euro portfolio bias for the investors, particularly in aggregate levels. In the following sections, we inquire into the consequences of euro portfolio bias in terms of income risk sharing.

6 Euro Portfolio Bias and Smoothing via Factor Income

The theoretical framework of international trade in securities claims that people can insure their income against country specific output risks by holding an international portfolio. At the aggregate level, holding foreign financial assets might possibly create net factor income flows that partially isolate the idiosyncratic GDP fluctuations. In any possible case of negative GDP shocks, net factor income from holding cross border assets might buffer that shock. By following Sørensen and Yosha (1998), we employ the following model to measure the level of factor income smoothing for each country:

$$\Delta \log \text{GDP}_t^i - \Delta \log \text{GNP}_t^i = \nu_{f,t} + \beta_f \ \Delta \log \text{GDP}_t^i + \epsilon_{i,t} \ , \tag{23}$$

where $\Delta \log \text{GDP}$ is the annual change in GDP per capita in constant prices and $\Delta \log \text{GNP}$ is the annual change in GNP per capita in constant prices. When coefficient of β_f is bigger than zero, net factor income from abroad is not perfectly correlated with idiosyncratic outputs, offering some risk sharing for the domestic output shocks. As the value of the coefficients gets closer to one, in aggregate level, country i experiences greater income smoothing from cross border asset holdings.

Balli and Sørensen (2007) find that increased volume of international asset holdings is the main reason for the higher percentage of smoothing via factor income in the euro region. Higher income smoothing is experienced particularly in the wake of monetary union. Figure 5 illustrates the time varying income risk sharing panel estimations for the equation above, for different sub-samples, i,e, for euro members and OECD countries. Smoothing via factor income income risk sharing reached its peak right after the start of the monetary union for euro members; however, income risk sharing is still negative for the OECD members, even though portfolio home bias phenomena in those countries has been fading away.

[insert Figure 5 here]

In the following part of the paper, we inquire into the consequences of cross border asset holdings on income smoothing, particularly for euro area domestic investors. Domestic investors are holding high volumes of cross border investments, but they exhibit euro bias in

their foreign portfolios that restrict the diversification of the portfolios to more broad markets. Accordingly, the portfolio diversification is limited and theoretically might cause an adverse effect on income risk sharing for those investors.

6.1 Euro Bond Bias

Indeed, the single currency has had a visible impact in the re-organization of European bond markets. The most radical change is the swift integration of the euro area bond market right after the introduction of the single currency. The volume of international bond trading inside the euro region has been accelerated recently. As an evidence of the financial integration among euro markets, government bond yield differentials among members fell sharply and stretched to very low levels compared to the non-euro countries' bond yields, even though the default risk of the benchmark bonds across the members is not homogenous. [20] We theorize that the reason behind the sharp decline in the government bond yield differentials is that, to some extent, changes in local yields are now driven by common rather than by local news, i.e., local factors are no longer effective for explaining government bond yields . When markets are fully integrated, bond yields respond only to common shocks; domestic risk factors will not be as effective. Therefore, purely local risk factors cannot be diversified away by investing in bonds in different regions.

In order to measure the integration level in euro government bond markets, we constructed the following regression;

$$\Delta \mathrm{RF}_t^i = \alpha_t + \beta_{fg} * \Delta \mathrm{RF}_t^{ger} + \varepsilon_t \ , \tag{24}$$

where $\Delta \mathrm{RF}^i$ is the changes in daily prices of the 10 year government benchmark bond yield for member country and $\Delta \mathrm{RF}^{ger}$ is the daily change in the 10 year Germany government bond yield. The coefficient β_{fg} represents how the markets integrated with each other. When the

[20] However, remarkable convergence of government bond spreads are not effectively a sign of differences in fiscal positions across the member countries. Balli (2008) showed that some euro members have higher debt to GDP ratios, such as Belgium or Spain, but they have lower government bond yields compared to Austria or France, which have better fiscal positions compared to those countries. We can conclude that the default risk premiums are not adequately reflected in the public bond yields. One explanation is that investors believe that the ECB will bail out any member government that gets into trouble in paying its debt.

coefficient is close to 1, local bond markets are considerably less affected by idiosyncratic local news than they were prior to monetary union. The non-diversified risk in the local bond markets are because of the common shocks. The Figure 6 represents the time varying β_{fg}. The correlation of all euro government bond yields with Germany government bond yields gradually increased and reached levels close to the one as of the beginning of 1999, and for Greece after 2002. This result clearly shows that the volatility of the German government bonds fully explains the volatility of the other member states, and the local factors that previously explained the government bond yields are almost eliminated. Accordingly, the diversification of the government bonds inside the euro area will add nothing in terms of income smoothing for the local investors.

[insert Figure 6 here]

The other segment of the bond market, i.e., the corporate bond market, is relatively less developed in the euro region compared to the U.S. corporate market. On the other hand, in recent years the size of this market has grown rapidly, starting right before the start of monetary union. Generally, the market is dominated by debt issued by highly-rated financial corporations. Figure 7 reflects corporate bond yield spreads for the different credit ratings. In particular, near the beginning of monetary union there is a swift decline in the yield spreads [21] for the corporate bonds, and the decline in the yield spreads continued until 2004 with the exception of the year 2002.

[insert Figure 7 here] In order to explore whether corporate bond returns are influenced by local and/or common factors, we utilize the following regression:

$$\Delta \mathrm{R}_t^i = \beta_{fc} \Delta \mathrm{R}_{\mathrm{f}t} + \beta_s \mathrm{MFI} + \varepsilon_t \ , \tag{25}$$

where the $\Delta \mathrm{R}_t^i$ is the daily percentage change in the corporate return for each bond. $\Delta \mathrm{R}_f$ is the daily percentage change in the 10 year domestic government bond yield [22]. Corporate bonds

[21] Yield spreads for corporate bonds are calculated by subtracting the return of corporate bonds from the government bond return that is issued in same market.

[22] Euro aggregate government bond yields are measured by taking the weighted average of the government bond yields in the region.

are categorized according to their credit ratings and regressions are done for each category[23]. Table 7 illustrates the coefficients of β_{fc} for the biggest two national euro corporate markets, Germany and France. It is clearly observed that β_{fc} is increasing in the value over time and moving closer to 1 for higher rated bonds. When corporate bonds' ratings are in investment grade levels i.e, the ratings are ranged from AAA to A, the return risks of the corporate bond are mostly hedged with the government bond returns, which means that high rated corporate bonds are co-moving with government bonds in terms of the returns. Additionally, correlations with government bond returns are higher when the corporate bond is issued by a monetary or financial institution. The results are similar for both markets, even though the correlations are higher among German corporate bonds.

Table 8 represents similar regressions above for the entire euro corporate bond market. The results are similar to the previous table. As the default risk on corporate bond decreases i.e, the credit ratings of the bonds increases, β_{fc} moves closer to 1. In addition, the beta coefficient is moving gradually to 1 as time passes. The gradual convergence states that higher credit rated bonds do not reflect the idiosyncratic properties of the bonds or the market they issued, since they are converging to government bond returns regardless of the wide range of fiscally vulnerable markets.

[insert Table 8 here]

In the meantime, there has been a dramatic growth in the lower rated corporate bond market segments since the beginning of monetary union. Although these bonds have some potential to diversify income risk in the euro area, i.e the correlations between these bond returns and government bond returns are lower, investors generally tend to hold higher rated bonds from international bond markets instead of low graded corporate bonds. [24] Besides, the diversification possibility is very low because the volume of these low graded bonds is limited

[23] We do not use the bonds that is rated lower than A, the number of these bonds is very limited in the beginning of the monetary union.

[24] Although the CPIS survey data is a detailed study, it does not contain the decomposition of the foreign holding of bonds; i.e., there is no information on whether foreign bonds held by the domestic investor are issued by the corporate or public sector. However, theoretical models and some limited surveys and coefficients of default risk parameters in Tables 2-4 gave us a clue that rational domestic investors would not hold lower rated foreign corporate bonds.

compared to higher rated bonds. [25]

since the new issuance of corporate bonds are concentrated on the limited sectors, and in addition, the large majority of the corporate bonds are issued by financial or monetary institutions, returns on these bonds are co-moving with government bonds. Thus, local investors will possibly be worse off when they settle their bond portfolio-when they have euro bond bias-inside the euro region. Although overall cross border investment in the euro bond markets has increased, investors have a bias of holding a bigger share of bonds in the euro bond markets instead of investing outside of the euro region. Consequently, the "euro bond bias" definitely restricts the income smoothing via capital market mechanisms in the euro region in aggregate levels, in spite of the higher volume of cross border asset diversification.

7 Euro Equity Bias

So far, we explored that euro area local investors have a bias of holding their bond portfolios inside of the euro area. Both the compression of the yields in the bond markets and convergence of the yields of risk free assets diminished the euro area local investors' possibility of having a diversified bond portfolio when they have euro bond bias. Therefore, holding more bonds from inside the euro area rather than outside creates a negative impact on income smoothing for the domestic investors across the euro region.

[insert Table 9 here]

The paper, so far, did not answer why higher income smoothing via capital market mechanism in euro area exists. On the other hand, Table 9 and Figure 5 show that euro region has experienced a remarkable increase in income smoothing via market mechanism in aggregate levels. In fact, the leading factors behind the remarkable income smoothing are the cross border equity holdings. The cross border equity holdings of local euro investors increased considerably in recent years, resembling the pattern in foreign bond holdings. Figure 8 shows

[25] Beale *et al.* (2004) graphed the distribution of euro area corporate bonds in terms of their ratios. The volume of corporate bonds changed from 2 % to 15 % between years 1997-2003. Since the returns of these are less correlated with government bond returns, the effect of junk bonds would be small even if they were traded and used as diversification of income risk.

the volume of cross border equity holdings relative to GDP. The decomposition of the volume of cross border equity holdings of euro members is represented in Figure 9. According to the figures and results in Table 5, the volume of foreign equity holdings increased in the euro region, and similar to behavior in bond markets, the domestic investors in the euro area tend to hold more euro originated equities instead of investing in other OECD members' equity markets or emerging markets.

[insert Figure 8 and 9 here]

7.1 Driving Force in Euro Equity Markets: Sector Indices

According to standard theoretical frameworks, higher levels of economic integration across regions enhance the specialization in production. Recently, Kalemli-Ozcan *et al.* (2003) have provided empirical evidence that economic integration across high income OECD countries, particularly EU members, increases the production specialization, thereby resulting in well-known benefits. The euro region has experienced the benefits of this specialization by having more independent financial markets. However, the effects of industrial specialization in the euro area could not be observed in the bond markets due to the concentration of euro corporate bonds in a limited number of sectors. On the other hand, equity markets have experienced the impact of specialization remarkably, particularly right after the start of the monetary union.

The specialization in production across euro members leads to "strong" production sectors in the entire euro area, and the firms that formed those sectors mostly have the similar output fluctuations even though they might not be settled in the same country. [26] Figure 10 points out the correlations of 18 important sector indices developed by Dow Jones STOXX. [27] In the

[26] The sectors have been observed to have formed clusters. These clusters are named as "super-sectors" by Krause (2002). He claim that the sector indices are the leading force for stock market returns.

[27] Euro 600 STOXX sector index contains the 12 euro members and global 600 index includes 15 EU countries and higher income OECD members. The Countries included in the global index are; Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, Canada United States, Australia, Hong Kong, Japan, New Zealand and Singapore.

figure, the sector correlations are calculated as;

$$\sum_{j=1,j\neq i}^{m}\sum_{i=1}^{m}\frac{(\eta_{ij}\omega_{ij}-m)}{2}\ , \tag{26}$$

η_{ij} is the correlation of the two sector indices i and j and ω_{ij} is the weights of the two indices in the total value of the equities outstanding in euro region.

[insert Figure 10 here]

From the figure, we explore the fantastic decrease in the average correlations of sector equity returns in the euro area until 2002. [28] According to the theoretical frameworks, one could possibly argue that higher level specialization in production across the euro region created strong industry sectors. In the equity markets, the specialization makes sector equity indices independent of each other and of the aggregate euro indices.[29] Sector equity indices are independent of each other, but, we claim that those sector indices are also the leading force of the euro equity markets. Therefore, we propose that they would not be affected by global and regional shocks as much as they were before the start of monetary union.

Indeed, right after the start of EMU, sector indices in the euro region became more independent from euro aggregate and world aggregate equity indices. Euro equity markets have experienced these results mostly in the first three years of the start of the monetary union. However, the U.S. markets experienced a series of negative shocks from negative economic growth during the first six months of 2002. As a result, the U.S. stock market fell by about 17 percent over the first 6 months of the year. Many other markets around the world declined after the U.S. market crash. The negative effect of U.S. based shocks has been felt by each euro market,[30] and by the sector indices in the euro region as well. Sector returns declined as a range from 15 percent to 44 percent in the first half of 2002. The stock market crash led to sector indices being more dependent on local and common shocks. Nevertheless, after the

[28] In that year the global stock market crash took place. After the remedying of the market crash, average correlations began to decrease again.

[29] Global sector indices developed by Dow Jones also experienced a similar trend in sector indices return correlations; however, those indices are mostly formed by euro equities.

[30] In particular, the euro markets have been affected from US negative growth seriously. Over the same 6 month period, Finlands stock market fell by 30 percent, Irelands by 14 percent whereas Portugal and Spain's equity markets have fallen by 10 percent.

recovery period, sectors became the driving force again.

In this regard, the national indices would be influenced by the performance of the sector indices, since those firms that formed sector indices are included in the national aggregate indices as well. Figure 11 represents the weighted average of time varying correlations of pairwise national indices and sector indices together. We propose that production specialization creates stronger sectors and sector indices in equity markets. Expectedly, these sector indices lead to less correlated national equity markets across the euro region. We conclude that the remarkable decrease in the national stock market correlations is because of the strong the sector equity indices. In the figure 11, it is undeniably exhibited that the average correlation of national indices and sector indices are moving together.[31]

[insert Figure 11 here]

Indeed, the new formation of the euro equity markets bias leads mostly to better possibilities for local investors when they diversify their portfolios in the euro area. Surprisingly, for the first time in the international macroeconomics literature, we can talk about the potential benefits of a "bias". Euro equity bias is incredibly effective on income smoothing due to lower correlations among euro area sector indices. Figure 12 presents factor income risk sharing among EMU members and time varying weighted average correlations of sector indices. The dotted line is the time varying factor income risk sharing estimated cross sectionally and smoothed by using a normal kernel with standard deviation equal to 2. This regression denotes the income smoothing as a percentage of the change in GDP in aggregate levels. The non-dotted line is the weighted average correlations of euro sector equity indices. The lines are nothing but the mirror image of each other if we neglect the values. Intuitively, an increased level of income smoothing is achieved through higher industrial specialization across the members. Higher industrialization creates stronger sector indices and national indices that are not involved with regional and world shocks and are not correlated to each other. However, although sectoral and national indices were not affected by global and world shocks at all 2003,

[31]The industrially specialized EMU members have potential to experience asymmetric national output shocks even though the recent literature has foreseen capital market integration and euro bias as a reason for synchronization of euro area markets with US Anderton *et al.* (2004) argue that global economic integration and international linkages have actually resulted in a greater degree of synchronization of international activities at global level between euro area and US.

when the U.S. based negative shock occurred in 2003, the sectors were affected poorly. Since the sector indices co-moved in this period, there was no gain from diversification given that euro bias in the equity markets became ineffective for the year 2003.

[insert Figure 12 here]

Accordingly, the monetary union is relatively new and members have not completed perfect specialization among each others yet, the world-wide market crash affected sector indices poorly, as well as the income risk sharing potentials of "euro biased" investors. However, over all, income risk sharing across the euro region is present in higher levels compared to other OECD members, because of the specialization in production in the euro region and the euro equity bias among the domestic investors.

8 Concluding Remarks

Since the early days of monetary union, euro area financial markets have been integrated progressively. As the evidence of high level economic integration, we observe that the volume of foreign financial asset trading increased considerably. However, the domestic investors in euro region tend to hold more assets from the euro area instead of investing outside the euro area. From the empirical framework, we documented that transaction cost is the leading factor for the attractiveness of bonds in the euro area. The substantial decline in bond underwriting costs gained more importance as well as the lower sovereign debt positions of the federal governments made the local investors to diversify their portfolio mainly insider of the euro borders. We explore the connection of the euro bond bias via better fiscal positions of the euro members and the lower primary market transaction costs(namely gross spreads) for the bond issued in euro region. For the equity markets, we find similar results. The local euro investors have euro equity bias just like that found in bonds. The remarkable decline in the primary market transaction costs made local investors diversify their foreign portfolios mostly inside the euro area.

Apparently, the decrease in home bias is accompanied with a new concept for local euro investors: "euro portfolio bias". At this time, euro members experienced higher levels of income smoothing by the beginning of the monetary union. However, these countries have a

bias of diversifying their foreign portfolio primarily to euro markets. We explore that, due to limitations of corporate bond issuance in certain sectors and perfect correlation of government bond returns across the members, euro bond bias causes a negative impact on factor income smoothing. One can possibly conclude that diversifying the default risk of local euro investors without doubt leads to restriction of income smoothing via factor incomes aborad. On the other side of the coin, financial and economic integration enhances the specialization in production across euro members by the beginning of the monetary union. As one benefit of the specialization, there exist strong production sector indices in the equity markets that are not influenced by global nor regional shocks. Euro equity markets now have a leading force, production sector indices. Expectedly, these indices create national market indices that are less affected by global shocks and more independent from each other. Ultimately, we claim that euro equity bias led to an extreme level of income smoothing among euro members, thanks to the strong sector indices that emerged at the beginning of monetary union.

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Table 1: **Determinants of Foreign Bond Portfolio Holdings**

	Home: OECD Foreign: OECD	Home: OECD Foreign: OECD	Home: OECD Foreign: OECD
FMC^c	0.39 (2.89)	0.38 (3.18)	0.42 (3.15)
DEBT^{i-c}	0.21 (1.12)		0.33 (1.77)
TRANSACTIONCOST^c		−1.11 (−2.93)	−1.31 (−2.08)
EMU^c	1.43 (9.21)	1.55 (6.23)	2.01 (6.61)
DISTANCE	−0.12 (−1.66)	−0.13 (−0.2)	−0.17 (−1.61)
GDPCORRELATION	0.26 (0.99)	0.18 (1.01)	0.34 (0.68)
SAMPLE	462	462	462

*Notes:*Panel regressions are done for country by country bond holdings. Home refers to the classification of the domestic country. Foreign refers to the classification of the country issuing the foreign asset. For example, when we have "Home: EMU, Foreign: non-EMU" this limits the sample to country pairs in which the home country is an EMU member while the foreign country is taken from the sample of non-EMU. Heteroscedasticity consistent t-statistics are given in parenthesis. Annual data is used for years 1997, 2001–2004. OECD includes Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Iceland, Japan, Korea Republic, Netherlands, Norway, New Zealand, Portugal, Spain,Sweden, Switzerland, UK, and US. The dependent variable is the share of foreign country (c)'s bond in the total volume of home country (i)'s foreign bond portfolios. FMC^c is defined as the foreign country's share of world market capitalization. DEBT^{i-c} is the total debt to GDP ratio differentials between home and foreign country. TRANSACTIONCOST^c are the expenses in the process of issuing the corporate bonds in the foreign country. The details of this variable is given in the text. Distance is logarithm of the distance in miles between the capital cities of home and foreign country. EMU is a dummy variable equal to 1 if foreign country is a member of EMU, zero elsewhere.

Table 2: **Determinants of Foreign Bond Portfolio Holdings**

	Home: non-EMU Foreign: EMU	Home: non-EMU Foreign: EMU	Home: non-EMU Foreign: EMU	Home: non-EMU Foreign: EMU
FMC^c	0.43	0.44	0.34	0.44
	(3.15)	(3.25)	(2.91)	(3.01)
DEBT^{i-c}	0.36	0.33		0.35
	(2.01)	(2.44)		(2.34)
TRANSACTIONCOST^c			−1.11	−1.16
			(−2.21)	(−2.08)
LIQUIDITYPREMIUM^c		−0.81	−0.88	−0.87
		(−2.09)	(−2.18)	(−2.11)
DISTANCE	−0.14	−0.15	−0.14	−0.16
	(−1.41)	(−1.2)	(−1.33)	(−0.61)
GDPCORRELATION	0.22	0.25	0.44	0.32
	(1.09)	(1.43)	(1.54)	(0.99)
SAMPLE	273	273	273	273

*Notes:*Panel regressions are done for country by country bond holdings. Home refers to the classification of the domestic country. Foreign refers to the classification of the country issuing the foreign asset. For example, when we have "Home: EMU, Foreign: non-EMU" this limits the sample to country pairs in which the home country is an EMU member while the foreign country is taken from the sample of non-EMU. Heteroscedasticity consistent t-statistics are given in parenthesis. non-EMU: Australia, Canada, Denmark, Iceland, Japan, Korea Republic, Norway, New Zealand, Sweden, Switzerland, UK, and US. EMU: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain. Annual data is used for years 1997, 2001–2004. The dependent variable is the share of foreign country (c)'s bond in the total volume of home country (i)'s foreign bond portfolios. FMC^c is defined as the foreign country's share of world market capitalization. DEBT^{i-c} is the total debt to GDP ratio differentials between home and foreign country. TRANSACTIONCOST^c are the expenses in the process of issuing the corporate bonds in the foreign country. The details of this variable is given in the text. Distance is logarithm of the distance in miles between the capital cities of home and foreign country. EMU is a dummy variable equal to 1 if foreign country is a member of EMU, zero elsewhere.

Table 3: **Determinants of Foreign Bond Portfolio Holdings**

	H: EMU F: EMU	H: EMU F: EMU	H: EMU F: EMU	H: EMU F: EMU	H: EMU F: EMU
FMC^c	0.44 (10.46)	0.38 (8.16)	0.41 (9.12)	0.49 (3.13)	0.44 (3.11)
DEBT^{i-c}			3.11 (7.11)	3.18 (7.76)	2.67 (7.51)
TRANSACTIONCOST^c	−1.46 (−4.56)		−0.98 (−3.79)		−1.87 (−5.64)
LIQUIDITYPREMIUM^c		−0.83 (−3.16)		−0.87 (−4.18)	−0.76 (−6.15)
DISTANCE	−0.25 (−0.81)	−0.31 (−0.44)	0.11 (0.71)	−0.12 (−0.98)	−0.38 (−1.33)
GDPCORRELATION	−0.33 (−1.41)	−0.11 (−1.43)	−0.12 (−1.22)	−0.13 (−1.43)	−0.44 (−1.33)
SAMPLE	110	110	110	110	110

Notes: Panel regressions are done for country by country bond holdings. Home refers to the classification of the domestic country. Foreign refers to the classification of the country issuing the foreign asset. For example, when we have "Home: EMU, Foreign: non-EMU" this limits the sample to country pairs in which the home country is an EMU member while the foreign country is taken from the sample of non-EMU. Heteroscedasticity consistent t-statistics are given in parenthesis. EMU: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain. Annual data is used for years 1997, 2001–2004. The dependent variable is the share of foreign country (c)'s bond in the total volume of home country (i)'s foreign bond portfolios. FMC^c is defined as the foreign country's share of world market capitalization. DEBT^{i-c} is the total debt to GDP ratio differentials between home and foreign country. TRANSACTIONCOST^c are the expenses in the process of issuing the corporate bonds in the foreign country. The details of this variable is given in the text. Distance is logarithm of the distance in miles between the capital cities of home and foreign country EMU is a dummy variable equal to 1 if foreign country is a member of EMU, zero elsewhere.

Table 4: **Determinants of Foreign Bond Portfolio Holdings**

	Home: EMU Foreign: OECD	Home: EMU Foreign: OECD	Home: EMU Foreign: OECD	Home: EMU Foreign: OECD
FMC^c	0.33	0.46	0.35	0.35
	(3.19)	(3.58)	(3.04)	(3.13)
DEBT^{i-c}	0.3		0.31	0.33
	(2.88)		(2.48)	(2.67)
TRANSACTIONCOST^c		−0.33	−0.33	−0.41
		(−2.13)	(−2.24)	(−2.89)
EMU^c	1.33	1.31		1.77
	(3.11)	(1.13)		(0.34)
DISTANCE	−0.07	−0.05	−0.03	−0.04
	(−0.66)	(−0.57)	(−0.40)	(−0.40)
GDPCORRELATION	0.11	−0.02	0.04	0.13
	(1.32)	(−0.87)	(1.94)	(1.11)
SAMPLE	231	231	231	231

Notes: Panel regressions are done for country by country bond holdings. Home refers to the classification of the domestic country. Foreign refers to the classification of the country issuing the foreign asset. For example, when we have "Home: EMU, Foreign: non-EMU" this limits the sample to country pairs in which the home country is an EMU member while the foreign country is taken from the sample of non-EMU. Heteroscedasticity consistent t-statistics are given in parenthesis. OECD includes Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Iceland, Japan, Korea Republic, Netherlands, Norway, New Zealand, Portugal, Spain,Sweden, Switzerland, UK, and US. EMU: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain. Annual data is used for years 1997, 2001–2004. The dependent variable is the share of foreign country (c)'s bond in the total volume of home country (i)'s foreign bond portfolios. FMC^c is defined as the foreign country's share of world market capitalization. DEBT^{i-c} is the total debt to GDP ratio differentials between home and foreign country. TRANSACTIONCOST^c are the expenses in the process of issuing the corporate bonds in the foreign country. The details of this variable are given in the text. Distance is logarithm of the distance in miles between the capital cities of home and foreign country. EMU is a dummy variable equal to 1 if foreign country is a member of EMU, zero elsewhere.

Table 5: **Determinants of Foreign Equity Portfolio Holdings**

	H: EMU F: OECD	H: EMU F: OECD	H: EMU F: OECD	H: EMU F: OECD
FMC^c	0.39	0.43	0.37	0.41
	(12.15)	(10.44)	(12.11)	(10.11)
TRANSACTIONCOST^c	−0.40		−0.33	−0.35
	(−11.28)		(−10.01)	(−7.68)
EMU^c	0.12	0.07	0.11	0.21
	(1.19)	(2.75)	(1.19)	(0.87)
EMU^c*TRANSACTIONCOST^c			−0.06	
			(−2.25)	
DISTANCE	−0.11	−0.14	−0.14	−0.11
	(−0.81)	(−0.71)	(−0.69)	(−1.15)
GDPCORRELATION	0.21	0.44	0.31	−0.14
	(1.81)	(1.71)	(1.82)	(−0.41)
SAMPLE	198	198	198	198

Notes: Panel regressions are done for country by country equity holdings. Home refers to the classification of the domestic country. Foreign refers to the classification of the country issuing the foreign asset. For example, when we have "Home: EMU, Foreign: non-EMU" this limits the sample to country pairs in which the home country is an EMU member while the foreign country is taken from the sample of non-EMU. Heteroscedasticity consistent t-statistics are given in parenthesis. EMU: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, and Spain. OECD includes Australia,Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Iceland, Japan, Korea Republic, Netherlands, Norway, New Zealand, Portugal, Spain,Sweden, Switzerland, UK, and US. Annual data is used for years 1997, 2001–2004. The dependent variable is the share of foreign country (c)'s equity in the total volume of home country (i)'s foreign equity portfolios. FMC^c is defined as the foreign country's share of world market capitalization. DEBT^{i-c} is the total debt to GDP ratio differentials between home and foreign country. TRANSACTIONCOST^c are the expenses in the process of issuing the equities in the foreign country.The details of this variable is given in the text. Distance is logarithm of the distance in miles between the capital cities of home and foreign country. EMU is a dummy variable equal to 1 if foreign country is a member of EMU, zero elsewhere.

Table 6: **Determinants of Foreign Equity Portfolio Holdings**

	H: non-EMU F: OECD	H: non-EMU F: OECD	H: non-EMU F: OECD	H: non-EMU F: OECD
FMC^c	0.67	0.71	0.71	0.69
	(13.18)	(12.11)	(11.14)	(7.28)
TRANSACTIONCOST^c	−0.24		−0.11	−0.08
	(−1.79)		(−2.23)	(−4.01)
EMU^c		−3.35	−2.13	−3.46
		(−9.19)	(−4.01)	(−4.14)
EMU^c*TRANSACTIONCOST^c			−0.75	
			(−9.16)	
DISTANCE	−0.11	−0.22	−0.17	−0.18
	(1.13)	(−1.31)	(−1.19)	(−2.13)
GDPCORRELATION	−0.11	−0.12	−0.21	−0.16
	(−0.06)	(−0.56)	(−0.21)	(−1.22)
SAMPLE	228	228	228	228

Notes: Panel regressions are done for country by country equity holdings. Home refers to the classification of the domestic country. Foreign refers to the classification of the country issuing the foreign asset. For example, when we have "Home: EMU, Foreign: non-EMU" this limits the sample to country pairs in which the home country is an EMU member while the foreign country is taken from the sample of non-EMU. Heteroscedasticity consistent t-statistics are given in parenthesis. OECD includes Australia,Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Iceland, Japan, Korea Republic, Netherlands, Norway, New Zealand, Portugal, Spain,Sweden, Switzerland, UK, and US. non-EMU: Australia, Canada, Denmark, Iceland, Japan, Korea Republic, Norway, New Zealand, Sweden, Switzerland, UK, and US. Annual data is used for years 1997, 2001–2004. The dependent variable is the share of foreign country (c)'s equity in the total volume of home country (i)'s foreign equity portfolios. FMC^c is defined as the foreign country's share of world market capitalization. DEBT^{i-c} is the total debt to GDP ratio differentials between home and foreign country. TRANSACTIONCOST^c are the expenses in the process of issuing the corporate bonds in the foreign country. The details of this variable is given in the text. Distance is logarithm of the distance in miles between the capital cities of home and foreign country. EMU is a dummy variable equal to 1 if foreign country is a member of EMU, zero elsewhere.

Table 7: **Corporate Bond Return Correlation with Government Bond Returns for years 1997–2004**

	France			Germany		
	AAA	AA	A	AAA	AA	A
β_f	0.61	0.50	0.41	0.77	0.68	0.61
	(6.22)	(7.14)	(6.77)	(12.11)	(9.24)	(6.18)
MFI	0.21	0.15	0.11	0.13	0.16	0.18
	(2.11)	(3.19)	(2.11)	(2.44)	(2.11)	(2.31)

Notes: This table illustrates the effect of the daily changes of government bond returns on the corporate bond returns for Germany and France bond markets. The panel model for each country is defined as:

$$\Delta \log \mathrm{R}_t^i = \beta_{fg}^* \Delta \log \mathrm{R}_t^g + \beta_s^* MFI + \varepsilon_t \ . \tag{27}$$

T-statistics are given in brackets. $\Delta \log \mathrm{R}_t^i$ is the daily change in the corporate bond yield i in the given market, whereas $\Delta \log \mathrm{R}_t^g$ is the daily government bond yield change in the same market. MFI is a dummy variable which takes 1 when the corporate bond is belonged to a financial or monetary institution. AAA, AA, A are the credit ratings of the bonds. Following Merrill Lynch, we use a composite measure of Moody's and Standard & Poors ratings. For those that are rated as "NR" the observations are dropped from calculations.

Table 8: **Corporate Bond Return Correlations with Government Bond Returns**

	1997	1998	1999	2000	2001	2002	2003	2004
AAA								
β_f	0.44	0.47	0.51	0.53	0.60	0.64	0.65	0.69
	(0.075)	(0.027)	(0.081)	(0.043)	(0.08)	(0.05)	(0.021)	(0.12)
MFI	0.25	0.35	0.06	0.11	0.21	0.071	0.13	0.14
	(0.04)	(0.03)	(0.005)	(0.03)	(0.02)	(0.04)	(0.02)	(0.04)
AA								
β_f	0.39	0.47	0.51	0.54	0.58	0.54	0.55	0.64
	(0.075)	(0.027)	(0.081)	(0.043)	(0.08)	(0.05)	(0.021)	(0.13)
MFI	0.22	0.24	0.12	0.16	0.11	0.11	0.09	0.15
	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.04)	(0.03)	(0.03)
A								
β_f	0.31	0.31	0.38	0.44	0.52	0.51	0.54	0.58
	(0.067)	(0.038)	(0.072)	(0.056)	(0.091)	(0.067)	(0.073)	(0.091)
MFI	0.16	0.19	0.16	0.21	0.15	0.21	0.19	0.24
	(0.06)	(0.05)	(0.02)	(0.04)	(0.06)	(0.06)	(0.09)	(0.10)

Notes: This table illustrates the effect of the daily government bond return changes on the corporate bond returns for entire euro region. The panel model is defined as:

$$\Delta \log \mathrm{R}_t^i = \beta_{fc} * \Delta \log \mathrm{R}_t^g + \beta_s * MFI + \varepsilon_t \ . \tag{28}$$

Standard errors are given in brackets. $\Delta \log \mathrm{R}_t^i$ is the daily change in the corporate bond yield issued in euro area, whereas $\Delta \log \mathrm{R}_t^g$ is the daily government bond yields change in euro area. This variable is created by taking weighted averages of each benchmark government bond yields. MFI is a dummy variable which takes 1 when the the firm issued the corporate bond is a financial or monetary institution, zero elsewhere. AAA, AA, A are the credit ratings of the bonds. Following Merrill Lynch, we use a composite measure of Moody's and Standard & Poors ratings.

Table 9: **Factor Income Smoothing Among OECD Members and EMU States**

	EMU		OECD-EMU	
	1995–2004	1999–2004	1995–2004	1999–2004
β_f	8.21	12.01	−4.2	−5.4
	(2.73)	(4.01)	(−2.1)	(−2.71)

Notes: EMU: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Spain, Portugal. OECD-EMU: Australia, Canada, Denmark, Iceland, Japan, Korea Republic, New Zealand, Norway, Singapore, Switzerland, Sweden, UK, and US. Percentages of shocks absorbed at each level of smoothing. T statistics are in brackets. β_f is the GLS estimate of the slope in the regression of $\Delta \log \text{GDP}^i - \Delta \log \text{GNP}^i$ on $\Delta \log \text{GDP}^i$.

Figure 1

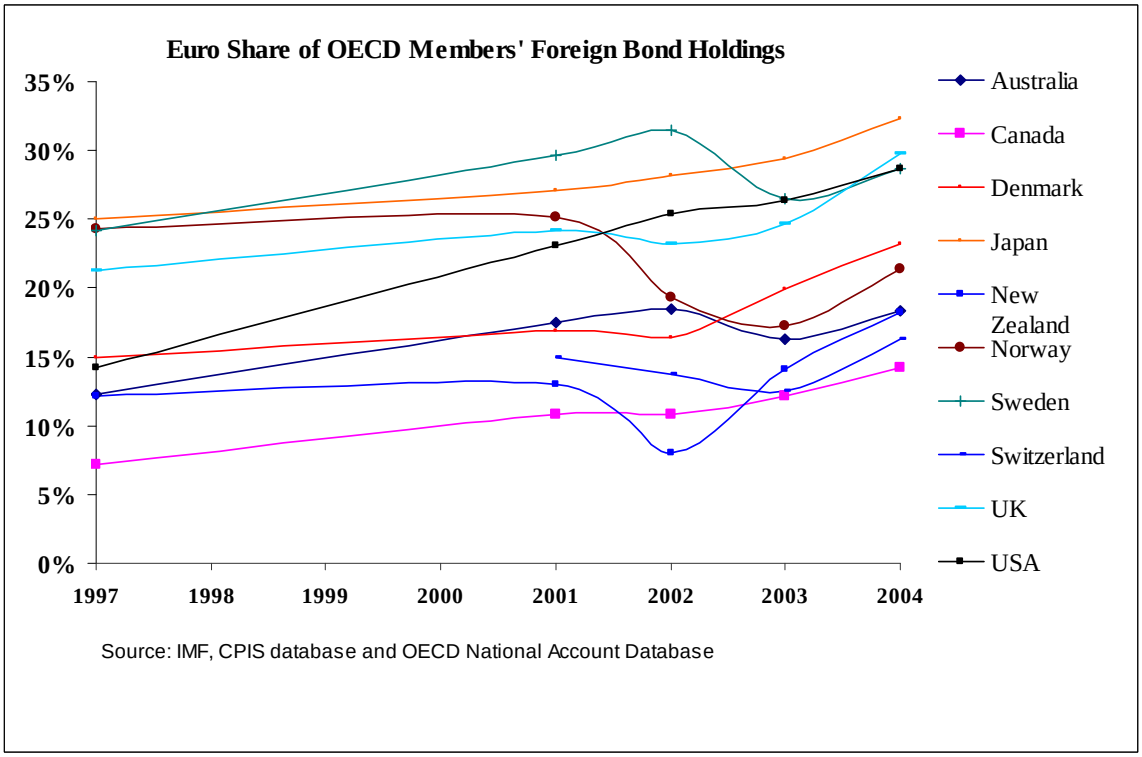


Figure 2

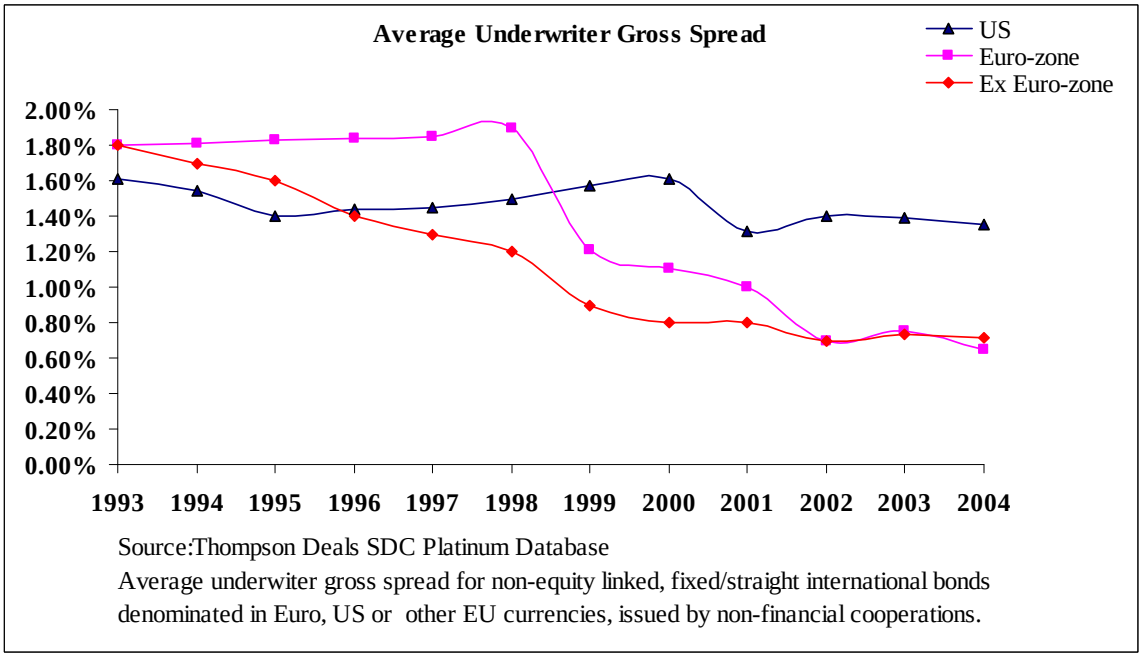
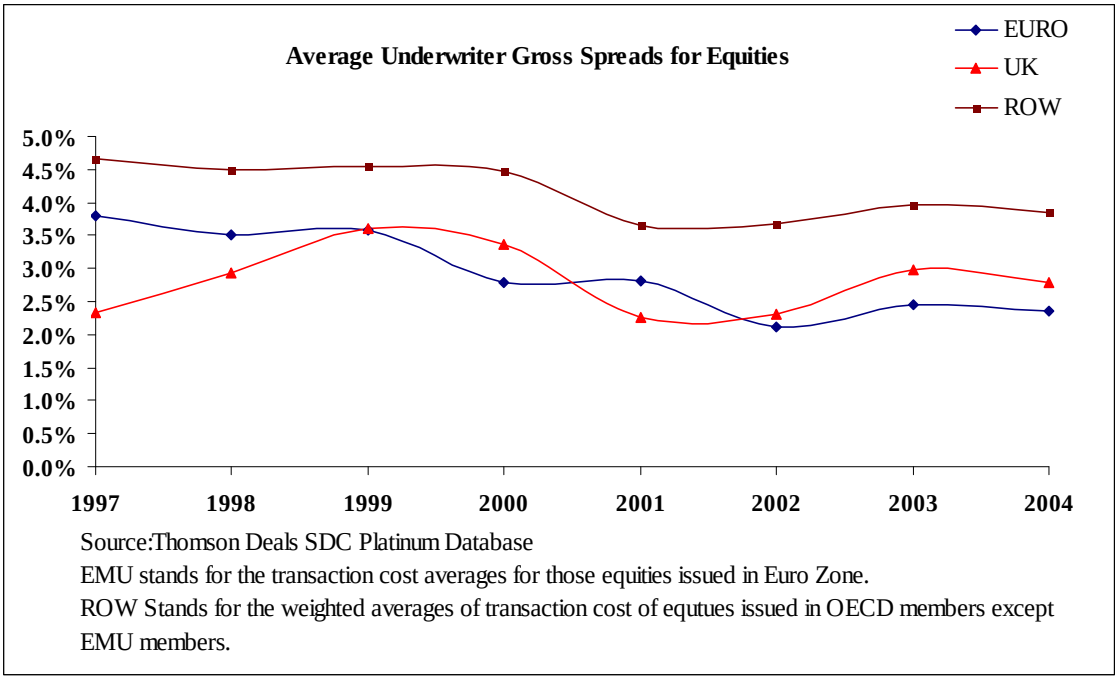
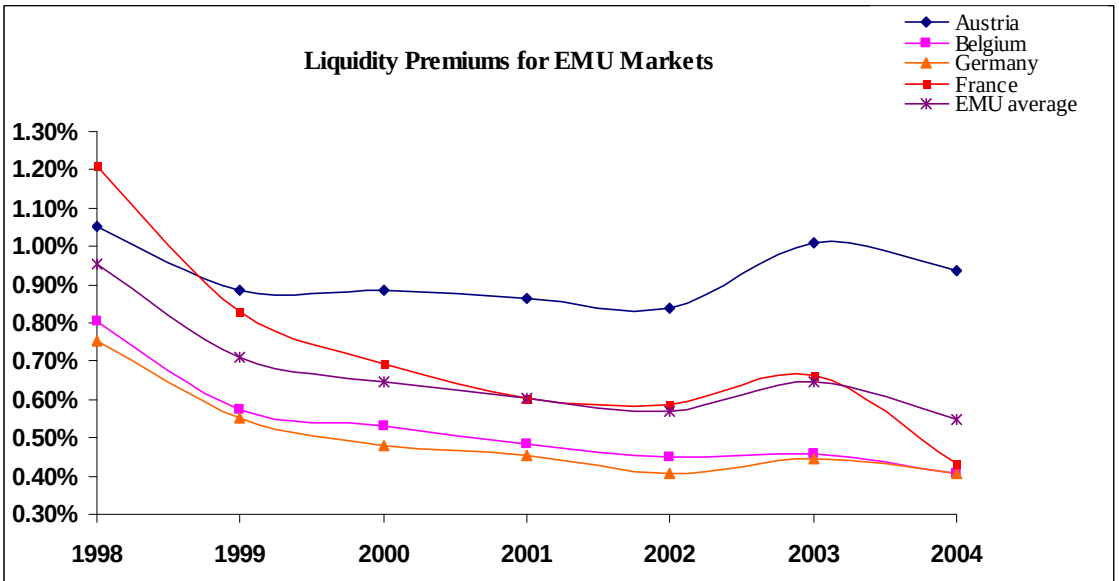


Figure 3



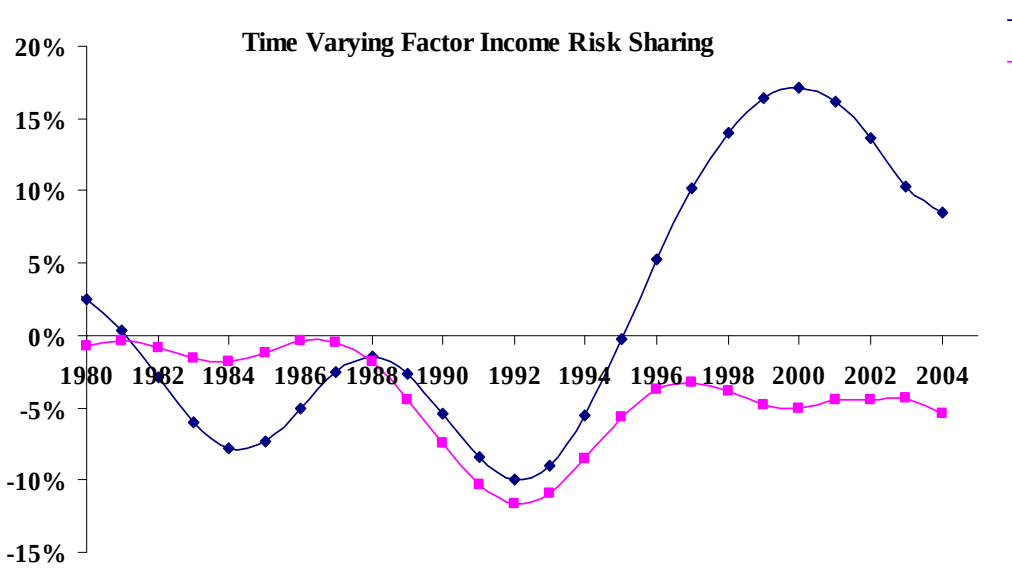
Source:Thomson Deals SDC Platinum Database
EMU stands for the transaction cost averages for those equities issued in Euro Zone.
ROW Stands for the weighted averages of transaction cost of equtues issued in OECD members except EMU members.

Figure 4



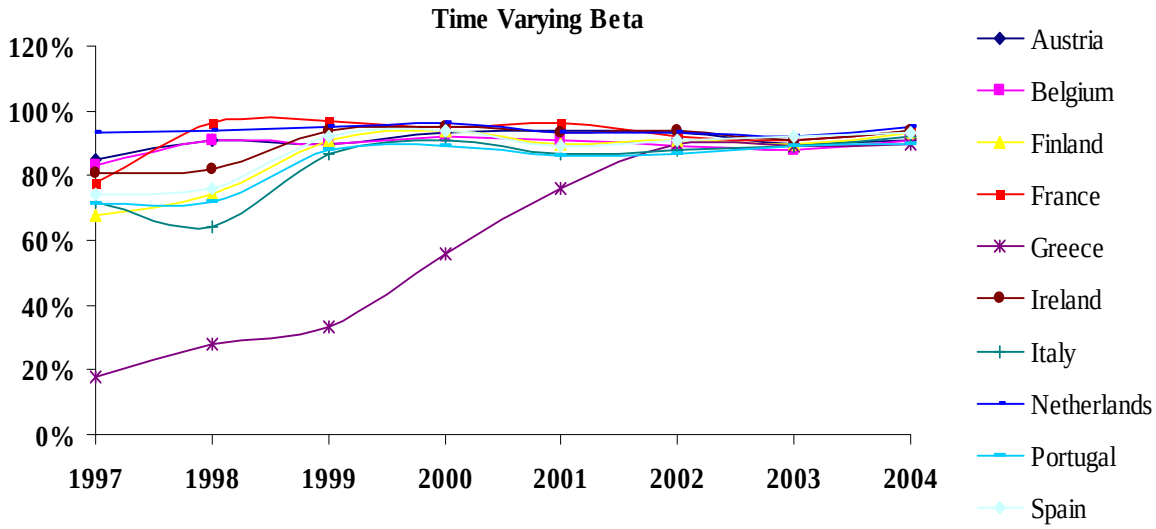
Source: Datastream.
Liquidity cost of each market is the weighted average of the liquidity premium of each corporate bonds. The calculation of the liquidity premium is explained in detail in the text.

Figure 5



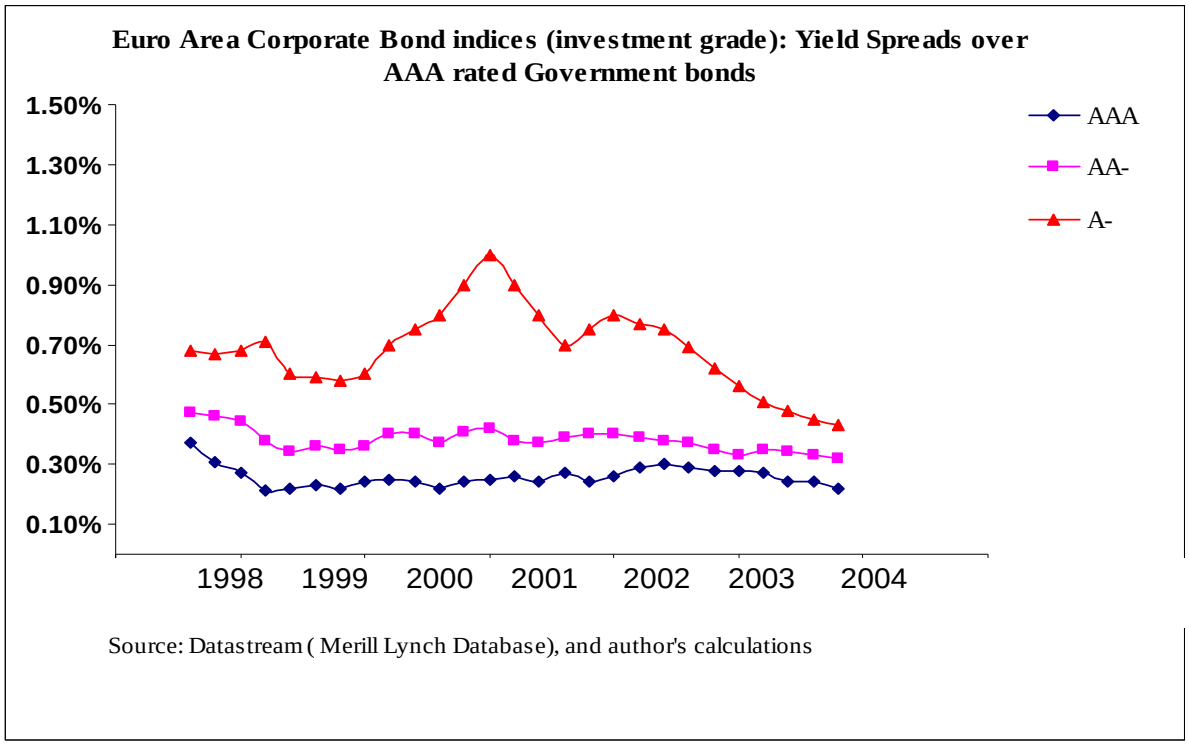
Risk sharing is estimated cross-sectionally year-by-year and is smoothed by using a normal kernel with bandwidth (standard deviation) equal to 2.
EURO includes the member countries except Luxembourg.
OECD refers to the high income OECD countries except Euro members.

Figure 6



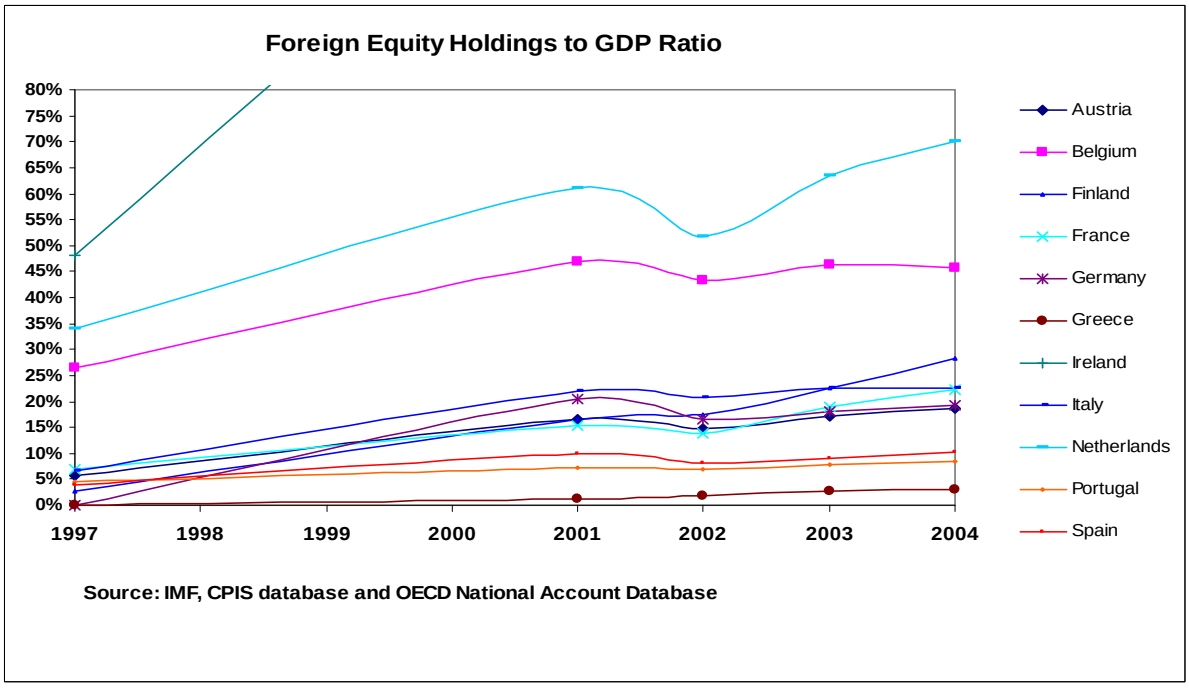
Source: Datastream and author's calculations
The graph illustrates how much the local government bond return is explained by German government bond return.

Figure 7



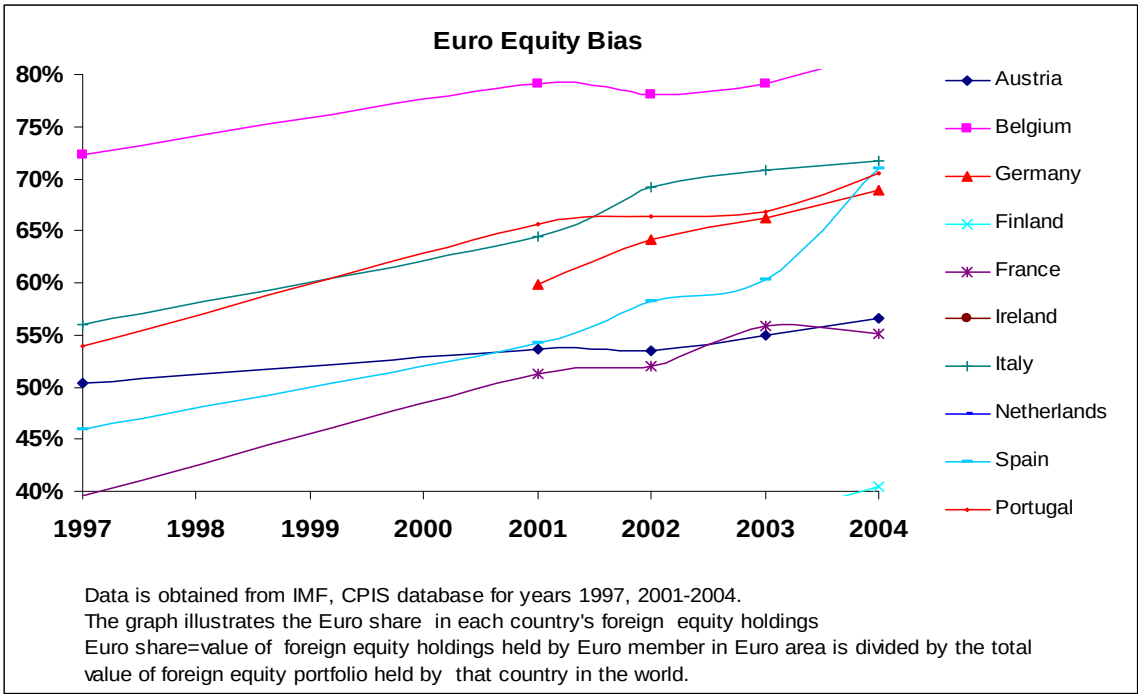
Source: Datastream (Merill Lynch Database), and author's calculations

Figure 8



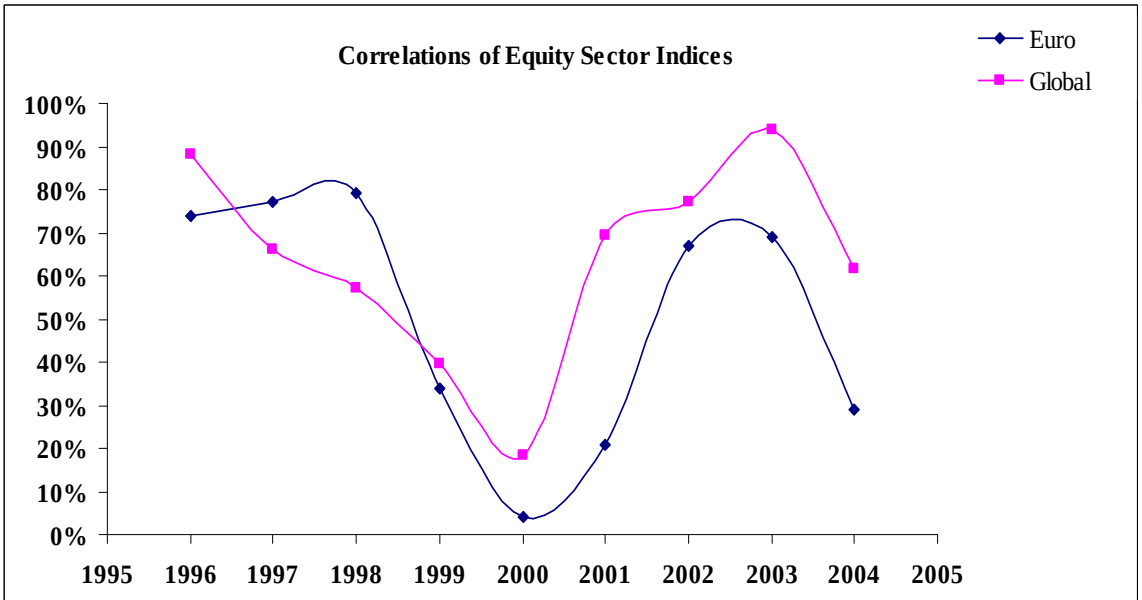
Source: IMF, CPIS database and OECD National Account Database

Figure9



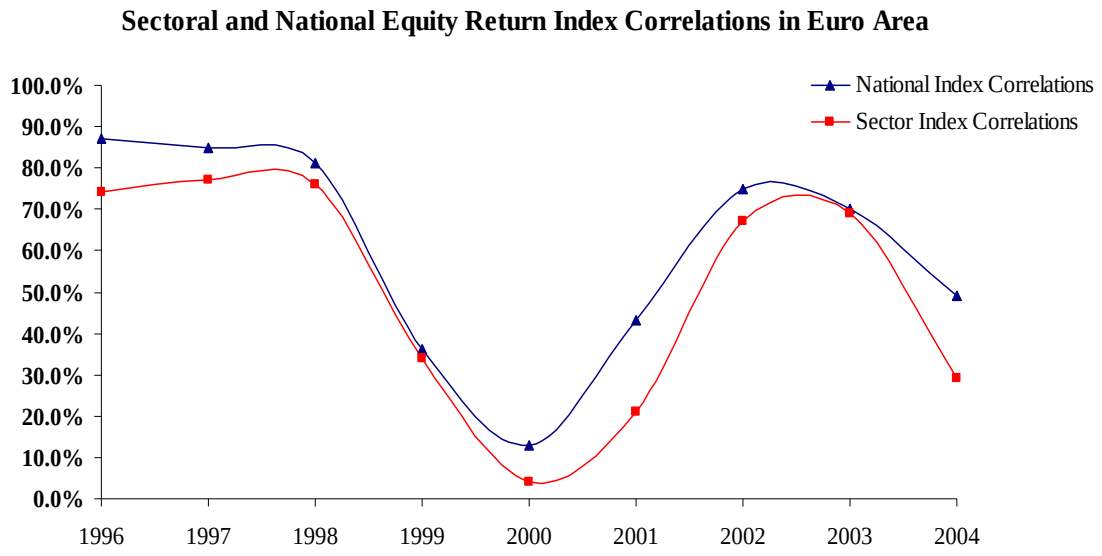
Data is obtained from IMF, CPIS database for years 1997, 2001-2004.
The graph illustrates the Euro share in each country's foreign equity holdings
Euro share=value of foreign equity holdings held by Euro member in Euro area is divided by the total value of foreign equity portfolio held by that country in the world.

Figure10



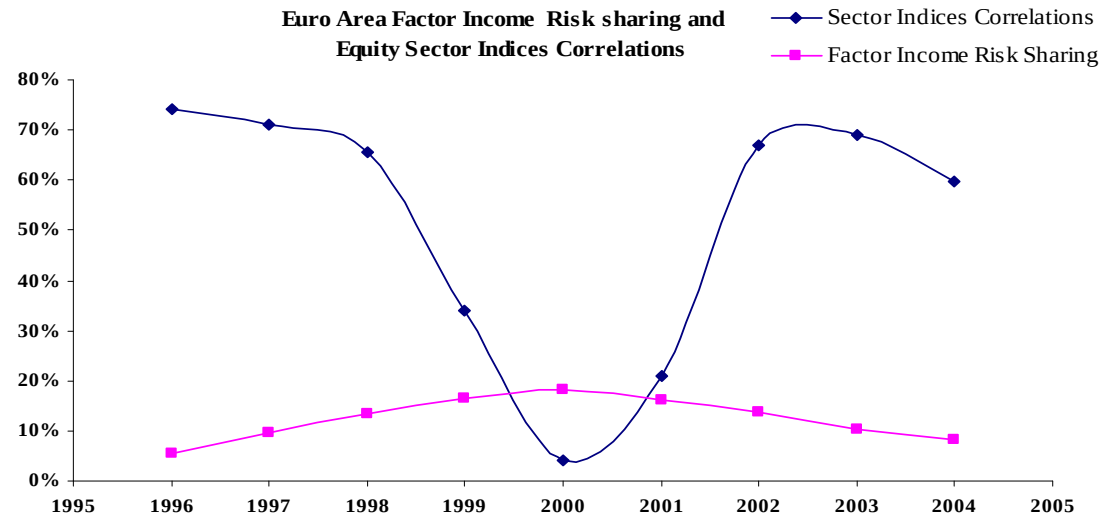
Euro : stands for the Weighted averages of correlations between 18 basic sectors for equities issued in Euro markets
Global: stands for the sector indices issued for 35 OECD members.
List of OECD members is available in the text.

Figure 11



Source: DataStream and Dow jones Stoxx Database.
Indices are calculated by taking weighted average of pairwise sectoral or national equity return correlations.

Figure 12



Risk sharing is estimated cross-sectionally year-by-year and is smoothed by using a normal kernel with bandwidth (standard deviation) equal to 2.
Sector indices correlations are calculated by taking weighted average of the sector index correlations.