Centre Rules the Markets

Alves, Paulo and Ferreira, Miguel

2008

Centre Rules the Markets

Paulo Alves

CMVM
Comissão do Mercado de Valores Mobiliários
Rua Dr. Alfredo Magalhães, 8, 5º
4000-061 Porto
PauloAlves@cmvm.pt

and

Miguel Ferreira

ISCTE
Escola de Gestão
Av. Prof. Aníbal de Bettencourt
1600-189 Lisboa
miguel.ferreira@iscte.pt

Abstract

In this paper we evaluate the impact of the European Monetary Union based on the Fama and French three-factor model. Our research shows that the models based on EMU factors present worse explanatory power than models based on local and international factors, although international factors do not have a significant role. We also find that there is a tendency for the biggest European stock markets to be explained by international factors, contrarily to the smallest. We understand that behaviour as being a signal of integration of the largest capital markets. Finally, we recommend portfolio managers to use the local Fama and French model in the case of small and value stocks and use the local Capital Asset Pricing model in the case of big and growth stocks.

1. Introduction

With the creation of the Economic and Monetary Union (EMU), European monetary policy has converged, and consequently a similar price for similar stocks in all EMU stock markets was an expected outcome. Since there exist a series of doubts regarding such evidence, it is important to identify and to analyse which markets are benefiting the most from the EMU. The suspicion that the larger markets in the EMU, such as Germany and France, are becoming centralised, since they are prime receptors of capital, whilst the others, particularly the smaller markets - such as Austria, Belgium and Portugal - are becoming peripheral, is the primary concern of this research paper. Consequently, firms of smaller markets will have an incentive to quote their stocks in large markets, since the cost of capital will be lower, benefiting from market integration (see for example, Karolyi (1998) and Errunza and Miller (2000)).

In order to test the hypothesis we compare the capital asset pricing model (CAPM) of Sharpe (1964) and Lintner (1965) with the Fama and French (1993) model (FFM) results, following the procedures of Griffin (2002), in order to evaluate the EMU financial integration, as well as to assess which model is more advisable for practitioners.

Despite there being many reasons for local capital markets from the EMU to be integrated, among them – macroeconomic convergence, fiscal policy rules, regulation and the emergence of the single currency – there also exist many impediments to financial integration. For example, the existence in Europe of many stock exchanges, as well as different central securities depositaries, which duplicate instructions and require a continuing development in banking financial services, makes the cost of cross border settlements remain higher than desirable (Carvalho (2004)). Home bias - the proportion of investment in domestic assets in comparison to the value of the local market - is also arguably a source of market segmentation.[1]

CAPM has been the main model to evaluate financial assets since the 1960s (see for example, Brunner *et al* (1998), and Graham and Harvey (2001)), although with different approaches. Despite it having been created to calculate the cost of equity in a segmented market context, at the end of the 1980s, portfolio managers not only looked to the US capital market, but also to other capital markets. During a short period, specifically at the end of 1980s, the market capitalisation of the Tokyo Stock Exchange overtook the NYSE. Henceforth, excess stock return could be explained not only by the covariance of its return with the local market return, but also by the covariance of its return with the return of world market portfolio. In the last three decades asset pricing took into consideration those changes. Thus, emerged the debate between segmented, partially segmented, and integrated markets (see for example, Solnik (1974), Stehle (1977), Errunza and Losq (1985), and Jorion and Schwartz (1986)) and the econometric developments, arising from the discussion between the CAPM based on conditional or unconditional information (see for example, Harvey (1991, 1995), and Bekaert and Harvey (1995)).

During the 1970s and especially in the 1980s a meaningful number of papers enumerated many misspecifications of CAPM. Basu (1977) finds a positive relationship

[1] Empirical research show that portfolio allocation is made not only considering risk diversification, but considering other criteria, such as geographical proximity, information asymmetries between local and foreign investors, cultural differences, as well as different corporate governance standards around the world. Tesar and Werner (1995) show how important geographic proximity is to explain portfolio allocation, given the cross-border investments of Canada in the US, and vice-versa. Kang and Stulz (1997) show that foreign investors in Japan prefer to hold shares of large firms, with good accounting standards and high leverage ratios, amongst other aspects. Dahlquist *et al* (2003) stress the role of corporate governance to explain the home bias. They conclude that home bias is higher in countries where firms are controlled by a small number of domestic shareholders. Grinblatt and Keloharju (2001) emphasise the importance of language and culture in explaining home bias. Their results also show that, for example, Finish companies that publish their annual reports simultaneously in Finish and in Swedish are more able to increase their base of investors.

between expected stock returns and earnings to price ratio. Banz (1981) concludes that small firms have, on average, higher risk adjusted return than large firms. Bhandari (1988) shows a positive relationship between debt to equity and expected stock returns, even controlling some variables like the systematic risk, the firm size and the January effect. Also Chan *et al* (1991) analysing the relationship between expected stock returns and different fundamental variables, find a significantly positive impact on expected returns by market-to-book and cash flow yield. In this context, Fama and French (1993), developed an asset pricing model (FFM), where the stock excess return is not only explained by market excess return, but also by two other two variables, size (measured by market capitalisation) and book-to-market ratio. Thus, we have two portfolios: Small minus Big (SMB) portfolio and a High minus Low (HML) portfolio, depending respectively on market capitalisation and book-to-market. While book-to-market is related to financial distress problems, size is associated to profitability. Smaller stocks lead to lower earnings than larger stocks, and consequently to a higher expected return, after controlling for book-to-market. On the other hand, book-to-market is related to financial distress problems. Firms with high book-to-market systematically present lower earnings on book equity, demonstrating signals of some financial distress problems. Nonetheless, the two factors have been criticised since the mid 1990s. For example, Berk (1995) concludes that size is not a problem of misspecification of CAPM, but is only a consequence of economic risk. If two firms have the same size at time t and consequently the same expected cash-flows at time $t+1$, the firm at most risk will have lower market value in that period; Lakonishok *et al* (1994) explain that high book-to-market stocks (or value stocks) do not present higher average returns than growth stocks as a reward for bearing a higher risk, but as a result of systematic mispricing of naive investors, that tend to extrapolate past earnings growth into the future, leads to an under-pricing of value stocks and over-pricing of growth stocks.

Fama and French (1998) extend the debate between growth and value stocks to thirteen major capital markets around the world. They find that for twelve markets - Italy is the exception - there exists a value premium; moreover, they confirm that value stocks present higher returns than growth stocks and conclude that the world CAPM does not capture the referred premium, reasserting the CAPM misspecification. Still in the international field, Griffin (2002), resorting to the three factor model of Fama and French (1993), compares that model using country factors and global factors, and concludes that the former explains with more accuracy excess stock returns.

The impact of EMU on local capital markets has been abundantly studied by academics, and the results are not completely conclusive. Rouwenhorst (1999), using correlation coefficients shows that the differences on stock returns between European stock markets remain, after the Maastricht Treaty of 1992. Fratzcher (2001) and Hardouvelis *et al* (2001) study the impact of EMU on European stock market integration. Both conclude that the probability of each currency joining EMU, during the 1990s, had a decisive importance on European stock market integration. Adjouté and Danthine (2003) also analyse the European financial integration, and they point out that the current stock exchange fragmentation is one possible source of market segmentation; that is, firms with similar characteristics, but listed in a different stock exchange, are not uniformly priced. Hardouvelis *et al* (2004) conclude that there exists evidence of convergence in the cost of equity of industries across EMU countries, although it remains different from industry to industry.

Moerman (2005) using a similar approach to the one adopted in this research, but using monthly returns, concludes that the Local FFM outperforms the EMU FFM. It must be highlighted however that there exist many differences between both research papers. Whilst we debate the use of CAPM and FFM, he focuses solely on FFM. Although he compares industry with country FFM, we put more emphasis on the applications, namely in matter of forecasting errors.

Results of this research can be summarised as follows. First, regressions based on national and international factors are better than those determined by EMU factors. These results are in line with Griffin (2002) and Moerman (2005). Second, there are signs of different levels of market integration among EMU capital markets: the largest are integrating amongst themselves and the smallest are becoming segmented. In fact, after the single currency the role of international factors began to play a more decisive role in the biggest stock markets. Our results are in line with Griffin (2002), who concludes that the choice of a local or international FFM has a significant impact on the cost-of-equity estimates, and with Fama and French (1997), who find meaningful differences in the cost-of-equity of many firms, whether the local CAPM or FFM is used. Finally, we show that the use of local FFM seems to be more advisable for portfolio analysis, particularly for portfolios of small and high book-to-market firms, than for individual stocks. International FFM, on the other hand, does not produce better forecasts than the local FFM, namely for individual stocks.

This paper proceeds as follows. Section 2 describes the methodology and the data. Section 3 presents the results, that is to say, the regressions of portfolio and firm excess returns. Section 4 extends the analysis to two applications: we estimate and compare the cost of equity of firms, employing different asset pricing models; and we forecast firm and portfolio excess returns, compared to the effective excess return. Section 5 concludes.

2. Methodology and Data

2.1. Methodology

In this paper the three-factor model of Fama and French (1993) is used, with the adjustments adopted by Griffin (2002). The main objective is to clarify whether the local or the global factors are the forces that might best explain the stock returns. In other words, some tests are implemented in order to show how the dichotomy between market integration and market segmentation has been developing across the single currency members since the beginning of nineties.

Basically, FFM is built using the following procedure: i) The market excess return (MER) is obtained through the difference between the stock market return and the risk free asset. Datastream (DS) stock market indices, German Deutschmarks denominated, are used as a proxy of local market return. DS indices were chosen because they represent, in general, more than 99% of local market value. Germany Euro one-month interest rate is used as risk free asset; ii) Stocks were classified by market capitalisation in June of year *t*, using the sample median value, dividing them across Big (B) and Small (S) portfolios;[2] iii) Independently of 2, the sample is divided into three groups of stocks (using the 30% and 70% percentiles), according to their book-to market, using the preceding values of December (year *t-1*) for that ratio, creating the high (H), medium (M), and low (L) book-to-market portfolios; iv) Portfolios are value-weighted and we have 6 portfolios, SL, SM, SH, BL, BM, and BH; v) Size premium is

2 Delisted firms were also ranked, avoiding survivorship bias.

obtained, controlling the firm's book-to-market, from the difference between S ((SL+SM+SH)/3) and B ((BL+BM+BH)/3), resulting in portfolio SMB (small minus big); vi) Distress premium is obtained, controlling the firm's size, through the difference between H ((SH+BH)/2) and L ((SL+BL)/2), resulting in portfolio HML (high minus low).

Next, following Griffin (2002), different functional forms of FFM, using either global or local factors or both, are reported. First, a model based on EMU factors is presented in German Deutschmarks:

$$r_{i,t} = \alpha_i + b_i (EMER_t) + s_i (ESMB_t) + h_i (EHML_t) + \varepsilon_{i,t} \qquad (1)$$

where $r_{i,t}$ is the weekly excess stock return, b_i, s_i, and h_i are the unconditional sensitivities of asset *i* to the factors, and $EMER_t$, $ESMB_t$, and $EHML_t$ represent the EMU factors. They are calculated considering the countries' weight in the EMU portfolio, where $EMER_t = w_{Dt-1}DMER_t + w_{Ft-1}FMER_t$. w_{Dt-1} and w_{Ft-1} are respectively the weight of local and foreign portfolios in the EMU portfolio in the week *t-1*. The same procedures for the size and distress premium are used.

This research also considers an international model, based on local and international sensitivities:

$$r_{i,t} = \alpha_i + b_{Di} (w_{Dt-1} DMER_t) + s_{Di} (w_{Dt-1}DSMB_t) + h_{Di} (w_{Dt-1}DHML_t)$$

$$+ b_{Fi} (w_{Ft-1} FMER_t) + s_{Fi} (w_{Ft-1}FSMB_t) + h_{Fi} (w_{Ft-1}FHML_t) + \varepsilon_{i,t} \qquad (2)$$

where DMER, DSMB, DHML, FMER, FSMB, and FHML are respectively local and international factors.

Finally, a local model is exhibited, where the international factors do not play any role:

$$r_{i,t} = \alpha_i + b_{Di} (w_{Dt-1}\, DMER_t) + s_{D\,i} (w_{Dt-1} DSMB_t) + h_{Di} (w_{Dt-1} DHML_t) + \varepsilon_{i,t} \qquad (3)$$

Thus, if model (2) does not add any explanatory power to model (3), there are signs that suggest the excess return is fundamentally explained by local factors and that financial segmentation continues to exist after the introduction of single currency.

2.2. Data

Data was downloaded from Datastream (DS) and includes a significant number of firms from the following EMU members: Austria, Belgium, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, and Spain. Luxembourg, a founding member, is excluded as result of its small capital market. Greece was also not included because it only adopted the Euro currency at the beginning of 2001. Additionally, the following were also excluded (1) firms from the financial sector, since they have some capital requirements which offer them special features, and (2) firms whose book-to-market is negative, pointing out some financial distress problems.

This analysis focuses on the period from 1990 to 2003, divided into three sub-periods: 1990-1995; 1996-1998; and 1999-2003. The first period was characterised by a preliminary discussion of single currency. After 1996, there were a series of economic policies implemented by local countries in order to assimilate a position on the single currency. There is a suspicion that this was the higher cycle of integration across European capital markets. The last represents the period after the single currency.

Panel A of Table 1 reveals a stable market share among countries during 1990-2003. France and Germany are the biggest markets with more than a half of the EMU market capitalisation, regardless of the period. Italy, the Netherlands, and Spain are median size markets. Their market shares vary from 8% to 18%, depending on the period being considered. Austria, Belgium, Finland, Ireland, and Portugal are the smallest markets. All of them present less than 5% of weight in the EMU portfolio at any point in time. Austria, Ireland, and Portugal with less than 2% are particularly small.

The number of sample firms used to calculate the size and book-to-market premiums increases from 1990 to 2003 (see Panel B). The average number of firms increases from 674 in the first period to 1,892 at the end. This movement has German and French capital markets as its main representatives. The number of firms from the biggest markets, contrary to the remaining markets, increase their weight in our sample - 54% in the first period (363/674) and 63% (1,194/1,892) in the last one. It seems that this can be explained by the reaction to the development of some new markets, particularly the *Neuer Market* and the *Nouveau Marché*, the German and French regulated platforms, created respectively in 1997 and in 1996, whose target focuses on young, small, and high growth stocks (e.g., technology, biotechnology, media and financial services stocks). The remaining countries also created secondary markets with the same objective, although without the same success. However, in absolute terms, as it can be seen in Panel B, the number of firms of each market has been increasing since the mid 1990s. For example, the number of Portuguese firms increased from 17 to 54. The reduced interest rates, the development of European capital markets, the economic growth in the second half of 1990s and the bullish trend, created the ideal atmosphere to carry out IPOs in the Eurozone.

Panel C shows the median market capitalisation by firm during each sub-period. The large number of new firms in French and German stock markets caused a decrease in the median size of firms. On the contrary, Spanish firms experienced an increase in their market capitalisation, as a result of a comparatively lower increase in the number of firms. Austrian and Portuguese stock markets, more than the others, are characterised by a large number of small firms.

Book-to-market by firm is exhibited in Panel D. Austrian and Portuguese stocks present the highest median value for the book-to-market ratio. As a matter of fact, the median book-to-market ratio of Austrian stocks shows a tendency to increase - from 0.52 to 1.06. There is also a small decrease in market-to-book of French, Irish, Italian, and Spanish firms. All other countries manifest no tendency in terms of book-to-market.

3. Empirical Results

The analysis debates the results of CAPM versus FFM, using either the portfolios (High, Low, Small, and Big) or stocks. The absolute value of the intercept or Jensen's alpha, meaning the pricing error, and the adjusted R^2, which represents the explanatory power of a model, are used to evaluate the robustness of each model. Sample data is divided into three sub-periods: 1990-1995, 1996-1998, and 1999-2003. The discussion is carried out based on the following procedures: First, market excess return, size, and distress risk premiums, which are used in the local FFM application, are presented; Second, the results obtained for local, international, and EMU CAPM models, using High, Low, Small, and Big portfolios, ranked by quintiles, are confronted; Third, previous results are compared to those obtained with the FFM, in order to: assess how accurate models based on EMU factors are; evaluate how local size and distress premiums increase the accuracy of CAPM, confronting local FFM with local CAPM ;

and finally, to evaluate international factors, comparing international to local FFM. Finally, this research compares the robustness of different asset pricing models - local CAPM, local FFM and international FFM. Models based on EMU factors are excluded since they reveal poor explanatory power. These results are similar to those found by Griffin (2002) and Moerman (2005), who concluded that global factors explain to a lesser extent time-series variation in return and generally have higher pricing errors than local model.

3.1. EMU Local Premiums

Table 2 shows the weekly local market risk premium or domestic market excess return (DMER), size (DSMB), and distress risk premium (DHML) by country from 1990 to 2003, considering also the following three sub-periods: 1990-95, 1996-98, and 1999-2003.

During 1990-2003 all local market risk premiums followed the same trend. While market risk premium in the first and the third period were characterised by a negative return in the majority of European markets, the opposite occurred in the second period. In the first period, particularly at the beggining, the future Eurozone experienced a period characterised by high interest rates, as a result of tight monetary policies, and economic uncertainty about world economic growth and the uncertain result of the Maastricht Treaty. The last period denotes a correction, after the high-tech bubble in all stock markets around the world. In contrast, the period from 1996 to 1998 is characterised by a positive DMER. The lower interest rates in the Eurozone, the economic perspectives and the investor overreaction, explain the stock market behaviour.

Analysing the DMER by country, with exception to Finland with 12.08% of annual risk premium in the whole sample period, the remaining countries present weak results. Some of the smallest stock markets present the poorest performance. Austria, Belgium, and Portugal, present an annual DMER of -1.31%, 0.01%, and -0.90% respectively. However, their performance has been different throughout time. Although Austria presents, comparatively with the two other countries, a weaker performance in the first two sub-periods, the poorest results for the two other small markets were in the first and the third sub-period. Concerning the biggest and median stock markets, the equity risk premium varies from 0.52% (Germany) to 4.22% (Spain), on an annual basis. These figures are abnormally low, when compared to the traditional results for equity risk premium, however, the facts previously reffered to, offer a valuable explanation for this.[3]

Size premium (DSMB) reveals, in line with DMER, a uniform behaviour across European countries. In fact, it is possible to observe signs regarding the existence of that type of premium whatever the sub-period might be. There are only two countries in the first and in the second period where the size premium is negative (Belgium and Spain in the first and Germany and Portugal in the second period). Thus, there are some signs of size premium on the majority of European markets. Size premium is particulalrly high in Finland, France and Germany. For example, in the French case, the difference between Small and Big portfolios excess return is 15.73%, on an annual basis, for all the sample.

3 For example, Damodoran (1992), advises an equity risk premium of 4.5-5.5, for developed markets with limited listings, and 3.5-4.0 for Germany.

Concerning book-to-market premium (DHML), our results are less homogeneous than those obtained by Fama and French (1998). They find a book-to-market premium in 11 of 12 stock markets of its own sample, while we only find the book-to-market premium in 6 - Austria, Belgium, France, Germany, Ireland, and Spain - of 10 stock markets analysed. However, we can also observe a similar performance around the sample. For all the sample, there are only two stock markets where the distress premium is notoriously negative (Finland and Portugal). These results must be attributed to the second sub-period. From 1996 to 1998 the book-to-market premium is negative for the majority of countries - Austria, Belgium, France, Germany, Ireland, and Spain. However, in the remaining sub-periods, particularly in the last one, signs of financial distress premium are more homogeneous. In fact, with the exception of Portugal, all stock markets present a financial distress premium in such period.

Previous findings are a result of institutional and economic changes that European capital markets witness after the single currency. In fact, the single currency and consequently the lower interest rates, as well as the high-tech euphoria during the second half of 1990s, could explain the stock price behaviour of growth firms. Probably, asset managers did not use the more advisable figures for the cost of equity of growth firms. They estimated a lower cost of equity for growth stocks, substantially increasing their market prices; that is, asset managers used a lower estimate for cost-of-equity, creating the ideal conditions for stock prices to overreact. That should explain what happened after 1999, a sustainable correction of stock market throughout this period of time, which would end in 2002.

3.2. Local, International, and EMU CAPM: Country Analysis

Table 3, Panels A-C, show the results of regressions for excess return of High and Low portfolios. Top and bottom quintiles are used as the dependent variable. Local CAPM, represented by a local factor, international CAPM, defined by a local and international factor, and EMU CAPM, by an EMU factor, are the three specifications considered in Table 3. Table 4 presents an identical analysis, although it considers the excess return of Small and Big portfolios, as the dependent variable.

Analysing the whole period, the primary result regards to the lower performance of the EMU CAPM. Indeed, we observe in both Table 3 and 4 a higher absolute Jensen's alpha and lower adjusted R^2 in comparison with Local and International CAPM. For example, for Low portfolios (see Table 3, Panels A, B, and C) the Jensen's alpha is, on average, 0.134%, 0.132%, and 0.153%, respectively for local, international, and EMU CAPM, and the adjusted R^2 is 58.4%, 59.4%, and 40.4%. For Big portfolios (see Table 4, Panels A, B, and C), the Jensen's alpha is, on average 0.111%, 0.111%, and 0.130%, and the adjusted R^2 is 77.7%, 78.0%, and 48.7%. These results are, in general, similar in the sub-periods. Comparing either EMU CAPM to local FFM or EMU CAPM with international FFM it is possible to show that the former is less accurate than local and international CAPM. On average, considering 120 portfolios (10 countries; 3 periods; 4 categories of portfolios), the following Jensen's alpha were obtained: 0.344% for EMU model, 0.322% for international model, and 0.323% for local model (see Table 7, Panel A). The difference between Jensen's alpha of EMU model and international model (0.022% (1.15% on an annual basis)) presented in Panel B, Table 7 is statistically insignificant (*p-value* = 0.68). The comparison between

Jensen's alpha of EMU model and local model also shows that the difference between both means (0.021%) is also statistically insignificant (*p-value* = 0.69).

Panels A-C of Tables 3 and 4 show the absolute intercept for a variety of models and portfolios. The tendency reaches a steep decrease in the realm of pricing accuracy during the sample. In fact, there are signs that the intercept increased since the beginning of 1990s. For example, Jensen's alpha for High portfolios, considering the local CAPM, increased from 0.135% in the first period, to 0.596% after 1999 (see Table 3, Panel A); for Big portfolios, the intercept of local CAPM increased from 0.095% to 0.151% (see Table 4, Panel A). The specific risk, measured by the absolute intercept, has had a more decisive role in matter of pricing in comparison with systematic risk. The singularity, the small size and the financial structure of new firms can be plausible explanations for such result. Results are more evident for High and Small portfolios (see Tabels 3 and 4). For example, considering the international CAPM, whilst the intercept of Low portfolios changes, on average, from 0.126% to 0.186%, the High portfolio changes from 0.114% to 0.601% (see Table 3, Panel B). The results for adjusted R^2 are in line with Jensen's alpha. Inversely, for example, the average adjusted R^2 for High portfolios, taking into consideration the international CAPM, decreases from 47.5% to 21.9%, the Low portfolios increases from 48.4% to 62.6% (see Panel B, Table 3).

Comparing the local and the international CAPM (see Tables 3 and 4) a slight difference is observed in the explanatory power between both models. The adjusted R^2 of the International CAPM is higher, on average, than that obtained for local CAPM (0.45%).[4] The use of foreign factor produces an increase in adjusted R^2, which varies, on average, from 0.1% (80.1%-80.0%), in the case of Big portfolio in the third period,

4 Considering the means of all portfolios.

to 1.5% (24.7%-23.2%), in the case of Small portfolio and in the first period. Additionally, a country comparison does not show supremacy of international CAPM. For example, Panel A, shows adjusted R^2 of Austrian High portfolio being reduced in the first period, after foreign factor had been introduced - 59.4% in comparison to 59.3% (see Table 3, Panels A and B).

3.3. Local, International and EMU FFM: Country Analysis

Panels A-C of Tables 5 and 6 show the regressions of High, Low, Small and Big portfolios excess returns using local, international and EMU FFM.

The first result that must be highlighted for the EMU FFM, as for the EMU CAPM, concerns its poor results. In fact, the mean alpha of Jensen for 120 portfolios (10 countries; 3 periods; 4 categories of portfolios) is 0.276%, 0.208%, and 0.225% respectively for EMU FFM, international FFM, and local FFM (see Panel A, Table 7). According to Panel B, Table 7 the difference between the mean alpha of Jensen using EMU and international FFM (0.068%) is statistically significant (*p-value* = 0.07). However, the same can not be witnessed when comparing the mean difference of Jensen's alphas of EMU FFM and local FFM (0.051%, but *p-value* = 0.19), as well as when the results of international and local FFM are confronted (0.018% and *p-value* = 0.57). Although results not always present statistical significance there are signs that regressions of local and international FFM present higher explanatory power (higher adjusted R^2) and accuracy (lower absolute intercept) than those obtained using EMU model. For example, High portfolios present on average, for whole the period, an intercept (adjusted R^2) of 0.212% (48.4%), 0.190% (50.0%), and 0.239% (25.8%), respectively for local, international, and EMU FFM (see Table 5).

As for the CAPM, the debate seems to be concerned to the local and international FFM. Therefore, the question is whether the introduction of foreign factors produces better portfolio excess return estimates. If Jensen's alpha of international FFM experienced a recent decrease, then we should conclude that there are some signs of market integration in EMU stock markets. In order to evaluate the impact of different factors, (i) local FFM results are compared to those obtained for local CAPM, as a means of assessing local factors (DSMB and SHML), and (ii) international FFM compares with local FFM, showing how valuable international factors (FMER, FSMB, and FSMB) are.

The results of local FFM and local CAPM show that there exist some benefits in employing the first model. In fact, if all country portfolios and sub-periods exhibited in Tables 3-6, Panels A and B are considered - 120 portfolios (10 countries; 4 portfolios; 3 periods) – the mean Jensen's alpha for the local CAPM is higher than that obtained for the local FFM (0.323% and 0.225% respectively). In fact, the difference between both means (0.097%) is statistically significant (*p-value* = 0.03), that is, the introduction of local factors increases model's accuracy (see panel B, Table 7). This result can also be extended to explanatory power. The mean adjusted R^2 of the local CAPM and FFM for different portfolios and periods is 47.44% and 61.21% respectively. Thus, the introduction of size and financial distress premiums seem to be important to produce more accurate results, or in other words, as a means of reducing the asset pricing errors. However, the benefit of using both premiums is not similar for all portfolios. While for portfolios L and B the inclusion of such premiums means indifferent asset pricing errors, the opposite occurs when analyses refer to H and S. Hence, the difference on mean's asset pricing error of portfolios H, L, S, and B – estimates are based on periods and countries, that is 30 observations by category of portfolio – of using local FFM instead of local FFM is -0.163% (*p-value* = 0.02), -0.014% (*p-value* = 0.62), -0.250% (*p-value* = 0.07), and 0.038% (*p-value* = 0.12) respectively (see Panel B, Table 7). Thus, there are signs to indicate that local FFM is more useful when someone is evaluating a portfolio of small and high book-to-market firms.

Concerning local and international FFM, the results show that there is a slight increase in terms of explanatory power and accuracy. The average adjusted R^2 of the 120 portfolios is 62.17% and 61.21%, respectively for international and local FFM. The adjusted R^2 difference between the international and local FFM is 0.96% (62.17%-61.21%), on average, as a result of the inclusion of the three international factors, while the difference between the local FFM and local CAPM is 13.77% (61.21%-47.44%). However, the difference between the mean Jensen's alpha of both models (-0.018%) is statistically insignificant (*p-value* = 0.57). Contrarily to the comparison between local FFM and local CAPM there is no difference between the mean Jensen's alpha for different categories of portfolios. The difference on mean of Jensen's alpha for portfolios H, L, S, and B is -0.035%, -0.008%, -0.021%, and -0.006% respectively (see Panel D, Table 7).

Summing up, whilst the role of International FFM seems to be less relevant than would be expected, local FFM produces better expected portfolio excess returns estimates than local CAPM.

Although the impact of foreign factors in portfolio excess return is reduced, it is important to identify whether the benefit of using both models is related to the size of each stock market. For that purpose we use the difference between the mean Jensen's alpha of international and local FFM as dependent variable, and the average market capitalisation share of each market relative to each sub-period, as the independent variable.

Figure 1 shows that the difference between mean of Jensen's alpha of international and local FFM increases with the stock market capitalisation share, regardless of the period being considered. That is, the larger the stock market is the higher difference on mean Jensen's alpha of international and local FFM is. The market share coefficient is statistical significant at the 10% level (t-statistic = -1.73). However, the impact of size is higher in the last sub-period (see Figure 2). That is, the use of international FFM produces lower asset pricing errors in last sub-period for large capital markets. In fact, the market share coefficient, on one hand, is statistically significant in the last sub-period (t-statistic = -2.09), and on the other hand, size has more impact on changing in asset pricing errors (-0.157 in all period compared to -0.488). Thus, there are some signs of financial integration in large capital markets from EMU, in comparison to small capital markets, particularly after the introduction of single currency. In fact, results from using foreign factors in large capital markets outperform the smallest ones.

3.4. Individual Stock Analysis: Local CAPM and Local and International FFM

Table 8 displays the results for individual stock excess returns using the local CAPM, local FFM, and international FFM. The main objective of comparing local CAPM and local FFM is to observe the statistical importance of using local premiums, whereas the comparison between local and international FFM claims to evaluate the level of integration in firms with different characteristics. For a firm to be included in the sample it is necessary to have significant data, at least, during one sub-period. Hence, there are data for 486 stocks during the sample period and 533, 846, and 1,408 for each sub-period.

Table 8 demonstrates how size and book-to-market premium are valuable in order to explain excess stock return, comparing local FFM to local CAPM. Regressions for the 1990-2003 period show a 3.2% (16.3%-13.1%) increase on adjusted R^2, on average, and a 0.006% (0.142%-0.148%) decreases in the absolute intercept.[5] Comparing the local and international FFM results we can observe a slight increase in explanatory power (1% = 17.3%-16.3%), and a similar absolute intercept (0.142%). Thus, either for portfolio, or for stocks, particularly to the former, the introduction of local premiums improves the modelling accuracy and explanatory power, contrarily to foreign premiums, whose value is ambiguous.

In the first sub-period, local FFM regressions present an explanatory power on average 5.1% (24.3%-19.2%) higher than local CAPM regressions, as well as a lower absolute intercept (-0.001% = 0.171%-0.172%). In the second sub-period, the adjusted R^2 increases 3.8% (19.6%-15.8%) and an intercept decrease of 0.031% (0.296%-0.327%) if local factors were included. Finally from 1999 to 2003, explanatory power changes 3.1% (11.4%-8.3%) increase in explanatory power and accuracy 0.028% (0.288%-0.316%).

The inclusion of international factors, on average, and in comparison with local FFM, produces a reduced impact on the regression explanatory power, 0.7% (25.0%-

[5] 0.31%, on an annual basis.

24.3%), 1% (20.6%-19.6%) and 1.1% (12.5%-11.4%), respectively in the first, second and the third sub-periods. In regard to intercept, the introduction of international factors produces the average following variation, 0.009% (0.180%-0.171%), 0.030% (0.326%-0.296%) and 0.016% (0.304%-0.288%). Thus, the use of international FFM to estimate stock excess return seems inappropriate since asset pricing errors increase with the inclusion of foreign factors. The inclusion of new firms in our sample, some of them with non-synchronous trading, explains why intercept increases, on average, throughout the sample.

4. Out-of-Sample Analysis: Firm and Portfolio Analysis

In this section, the results obtained through local CAPM and local and international FFM are used to evaluate if there are differences when portfolio and firm expected returns are being forecasted.

EMU FFM is not considered in this section because prior results, in the line of those obtained by Griffin (2002) and Moerman (2005), show that EMU FFM underperform all specifications in terms of pricing error and explanatory power.

1.4.1. Expected Cost of Capital

Table 9 presents estimates for the cost of equity by firm. Annual estimates for a firm's cost of equity are obtained using weekly average returns from 1990 to 2003. Following assumptions are applied: (1) only firms whose systematic risk is statistically significant (*t*-statistic > 2) are included in the sample, (2) cost of equity is only calculated when local annual risk premium is on the interval $\{E[RP_{annual}] \pm 1.5\ \sigma_{annualRP}\}$; (3) intercept terms are excluded because estimates of cost of equity are more accurate under such circumstance (see Fama and French (1997)). Thus, on average, the sample considers estimates for cost of equity in 578 firms. France and Ireland are the countries most and least represented in the sample with 156 and 11 firms respectively.

Table 9 shows that the expected stock excess return in some small stock markets underperforms those obtained for large stock markets, namely in Austria, Belgium and Portugal. The results vary from 4.55% to 6.55%, on average. In the opposite extreme of our sample are Finland, Ireland, and Netherlands whose estimates are always higher than 9.25%, whatever the specification used. Contrarily to expected, the cost-of capital is smaller for firms of small countries because the sample of those countries include comparatively a large percentage of big firms.

The difference obtained for local CAPM and FFM estimates are relatively comparable with Fama and French (1997). In their research, comparing local CAPM and FFM, they find a 2% difference in the cost of equity for seventeen industries. In our research, estimates for both models are different in 1.03% (9.30%-8.27%), in average. Although there are countries where such difference is higher than 2.5%, on average, such as is the case in Finland and Netherlands, there are also countries where there is no difference in the estimates for cost of equity, namely for Italy. However, those results must be analysed with caution, because they are dependent of the sample of firms. For example, if a large firm is selected, a lower cost of equity using FFM is expected since it will have a size discount.

The comparison between estimates for cost of equity, using local and international FFM, produces, on average, a 0.77% difference, that is, a 8.3% difference

((10.07%-9.30%)/9.30%). However, the results are not similar around the sample. While in Germany a 0.22% difference ((9.20%-9.22%)/9.22%) between estimates for both models is identified, in Italy a 27.87% difference is observed.

Summing up, our results are in line with the conclusion of Griffin (2002), who concludes that the choice of a local or international FFM has a significant impact on the cost of equity estimates.

1.4.2. Out-of-Sample Analysis: Firm and Portfolio Analysis

In this section the sample of firms and assumptions presented in 1.4.1 is used. Its main objective is to forecast errors of stock and portfolio excess returns. That is, the difference between weekly average return and the weekly expected return of a stock (or a portfolio), during a year. Errors are forecasted based on weekly mean estimates of a year, during 1991 to 2004. Expected average return of a stock or a portfolio, during a year, is calculated based on estimates obtained for different specifications (local CAPM, local FFM, and international FFM) in the year before forecasting a error. For example, to forecast an error of stock excess return in 1991 it is necessary to estimate different specifications during 1990.

Panel A of Table 10 presents forecasted errors of stock excess returns. For that purpose the following expression is used:

$$\frac{1}{T}\frac{1}{N}\sum_{t=1}^{T}\sum_{i=1}^{n}\left|r_{it}-E(r_{it})\right| \qquad (1.4)$$

where r_{i_t} is the weekly average return of a stock i in year t and $E(r_{it})$ is the expected stock return for the same period, using the previous models, as well as prior assumptions. N is the number of stocks.

On the other hand, in Panel B are presented forecasted errors of portfolio excess return, in value weighted-basis, considering the stocks used in Panel A:

$$\frac{1}{\sum_{t=1}^{T}\sum_{i=1}^{n} MV_{it}} \sum_{i=1}^{T}\sum_{i=1}^{n} MV_{it} \left|(r_{it} - E(r_{it})\right| \qquad (1.5)$$

where MV_i is the average market capitalisation of a firm i in year t.

Analysing the forecasted errors, size and distress risk premium seem to be more advisable factors to evaluate portfolio than stock excess returns. In fact, the introduction of those two factors produces more accurate estimates for portfolios, because while the use of local FFM in comparison with local CAPM produces, on average, a decrease of 8.82% for stocks - ((0.74%-0.68%)/0.68%) - in terms of accuracy, for portfolios we observe an increase of 5.66% - ((0.50%-0.53%)/0.53%).

On the other hand, comparing local and the international FFM there is a small difference in terms of forecasting power, although international FFM presents poorer results. In fact, the introduction of the three new factors increases the amplitude of forecasted errors. Forecasted errors change, on average, from 0.74% to 0.77% and from 0.50% to 0.51%, respectively in case of excess stock returns and excess portfolio returns.

1.5. Conclusion

The main objective of this research is to evaluate whether the biggest stock markets of EMU are becoming centralised and the smallest peripheral. For that purpose, different alternative CAPM and FFM specifications are compared, which consider different local and foreign factors.

In line with Griffin (2002) and Moerman (2005), this research shows that models based on global factors are less accurate than models based on local and foreign factors.

There are also important signs to illustrate that international factors produce more accurate estimates in larger capital markets, particularly after the introduction of single currency. Thus, it seems that the largest firms are becoming integrated between themselves, and the smallest are becoming segmented.

This paper also shows that the choice of model's specification has a significant impact on the cost-of-equity estimates, as Fama and French (1997) and Griffin (2002) conclude.

Finally, results reveal that the use of domestic size and book-to-market risk seem to be more advisable factors to consider for portfolio than for firm. International factors, on the other hand, seem to be inadequate to estimate either portfolio or stock excess returns.

References

Adjaouté, K., and J. Danthine, 2003, European financial integration and equity returns: A theory-based assessment, Working Paper, International Center for Financial Asset Management and Engineering.

Bhandari, L., 1988, Debt/Equity Ratio and Expected Common Stock Returns: Empirical Evidence, Journal of Finance, 1988, 43, 507-528

Banz, R., 1981, The relation between return and market value of common stocks, Journal of Financial Economics 9, 3-18.

Basu, S., 1977, Investment performance of common stocks in relation to their price-earnings: A test of the efficient market hypothesis, Journal of Finance 32, 663-682.

Bekaert, G., and C. Harvey, 1995, Time-varying world market integration, Journal of Finance 32, 663-682.

Berk, J., 1995, A critique of size-related anomalies, Review of Financial Studies 8, 275-286.

Brunner, R., K. Eades, R. Harris, and R. Higgins, 1998, Best practices in estimating the cost of capital: Survey and synthesis, Financial Practice and Education 8, 13-28.

Carvalho, C., 2004, Cross-border securities clearing and settlement infrastructure in the European Union as a prerequisite to financial markets integration: Challenges and perspectives, Working Paper, Hamburg Institute of International Economics.

Chan, L., Y. Hamao, and J. Lakonishok, 1991, Fundamentals and stock returns in Japan, Journal of Finance 46, 1739-1764.

Dahlquist, M., L. Pinkowitz, R. Stulz, and R. Wlliamson, 2003, Corporate governance and the home bias, Journal of Financial and Quantitative Analysis 38, 87-110.

Damodaran, A., 1992, Investment valuation (John Wiley).

Errunza, V., and D. Miller, 2000, Market segmentation and the cost of capital in international equity markets, Journal of Financial and Quantitative Analysis 35, 577-600.

Errunza, V., and E. Losq, 1985, International asset pricing under mild segmentation: Theory and test, Journal of Finance 40, 105-124.

Fama, E., and K. French, 1993, Common risk factors in the returns on stocks and bonds, Journal of Financial Economics 33, 3-56.

Fama, E., and K. French, 1997, Industry costs of equity, Journal of Financial Economics 43, 153-194.

Fama, E., and K. French, 1998, Value versus growth: The international evidence, Journal of Finance 53, 1975-1999.

Fratzscher. M., 2001, Financial market integration in Europe: On the effects of EMU on stock markets, Working Paper, European Central Bank.

Graham, J., and C. Harvey, 2001, The theory and practice of corporate finance: Evidence from the field, Journal of Financial Economics 60, 187-243.

Griffin, J., 2002, Are the Fama and French factors global or country specific?, Review of Financial Studies 15, 187-243.

Grinblatt, M., and M. Keloharju, 2001, How distance, language, and culture influence stock-holdings and trades, Journal of Finance 56, 1053-1073.

Hardouvelis, G., D. Malliaropulos, and R. Priestley, 2001, EMU and European stock market integration, http://ssrn.com/abstract=280775.

Hardouvelis, G., D. Malliaropulos, and R. Priestley, 2004, The impact of globalization on the equity cost of capital, Working Paper, Center for Economic and Policy Research.

Harvey, C., 1991, The world price of covariance risk, Journal of Finance 46, 111-157.

Harvey, C., 1995, Predictable risk and returns in emerging markets, Review of Financial Studies 8, 773-816.

Jorion, P., and E. Schwartz, 1986, Integration vs segmentation in the Canadian stock market, Journal of Finance 41, 603-614.

Kang, J., and R. Stulz, 1997, Why there is a home bias? An analysis of foreign portfolio equity ownership in Japan, Journal of Financial Economics 46, 3-28.

Karolyi, G., 1998, Why do companies list shares abroad?: A survey of the evidence and its managerial implications, Financial Markets, Institutions & Instruments 7, Number 1.

Lakonishok, J., A. Shleifer, and R. Vishny, 1994, Contrarian investment, extrapolation, and Risk, Journal of Finance 49, 1541-1578.

Lintner, J., 1965, The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets, Review of Economics and Statistics 47, 13-37.

Moerman, G., 2005, How domestic is the Fama and French three-factor model? An application to the Euro area, Working Paper, Erasmus Research Institute of Management.

Newey, W., and K. West, 1987, A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix, Econometrica 55, 703-708.

Rouwenhorst, K., 1999, European equity markets and the EMU, Financial Analyst Journal, May/June, 57-64.

Sharpe, W., 1964, Capital asset prices: A theory of capital market equilibrium under conditions of risk, Journal of Finance 19, 425-442.

Solnik, B., 1974, The international pricing of risk: An empirical investigation of the world capital market structure, Journal of Finance 29, 365-378.

Stehle, R., 1977, An empirical test of the alternative hypothesis of national and international pricing of risky assets, Journal of Finance 32, 365-378.

Tesar, L., and I. Werner, 1995, Home bias and high turnover, Journal of International Money and Finance 14, 467-493.

Table 1: Sample Description by Countries

AU, BG, FL, FR, GR, IR, IT, NL, PT, and SP are respectively Austria, Belgium, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, and Spain. Panel A shows Datastream country weights in the EMU portfolio. Panel B indicates annual average number of firms by period used to build the size and the distress risk premiums. Panel C indicates the median size of firms in Panel B. Panels D indicates the median book-to-market of firms in Panel B.

Panel A: Datastream Country Weights (%)										
	AU	BG	FL	FR	GR	IR	IT	NL	PT	SP
1990-03	1.2	4.3	2.9	25.2	27.5	1.4	12.1	15.7	1.2	8.3
1990-95	1.6	4.8	1.5	24.6	31.1	1.2	10.6	15.8	0.8	8.0
1996-98	1.2	4.5	2.5	23.0	27.6	1.5	11.7	18.2	1.6	8.3
1999-03	0.8	3.7	4.7	27.3	23.2	1.7	14.3	14.2	1.4	8.8
Panel B: Number of Firms										
	AU	BG	FL	FR	GR	IR	IT	NL	PT	SP
1990-03	39	52	68	350	391	25	114	88	34	60
1990-95	28	33	30	147	216	20	78	64	17	41
1996-98	41	47	65	347	335	22	100	88	38	57
1999-03	51	78	115	559	635	32	165	117	54	86
Panel C: Median Market Capitalisation by Firm (€ millions)										
	AU	BG	FL	FR	GR	IR	IT	NL	PT	SP
1990-03	45	131	112	65	63	97	148	145	47	262
1990-95	55	108	128	110	87	46	109	110	48	203
1996-98	37	138	146	88	71	136	132	190	39	219
1999-03	45	127	95	50	52	179	176	155	53	333
Panel D: Median Book-to-Market by Firm										
	AU	BG	FL	FR	GR	IR	IT	NL	PT	SP
1990-03	0.82	0.61	0.63	0.58	0.51	0.59	0.75	0.54	0.94	0.66
1990-95	0.52	0.58	0.57	0.69	0.42	0.64	0.88	0.63	1.06	0.77
1996-98	0.87	0.54	0.62	0.61	0.48	0.54	0.90	0.43	1.02	0.65
1999-03	1.06	0.65	0.67	0.53	0.61	0.50	0.66	0.53	0.91	0.60

Table 2: Descriptive Statistics of Variables

Domestic market excess return (DMER) is obtained, considering a DS country indices and Germany Euro-mark one month, as proxies for market return and risk-free-asset. Small minus big (DSMB) is the return difference between S (small firms) and B (big firms) domestic portfolios. High minus low (DHML) is the return difference between H (high book-to-market firms) and L (low book-to-market firms) domestic portfolios. EMU results are value-weighted. Variables are weekly means, calculated on a value-weighted basis, for the following four periods: 1990-1995; 1996-1998; 1999-2003; and 1990-2003. Results are a weekly percentage.

	DMER		**SMB**		**HML**	
	Mean	**Stdev**	**Mean**	**Stdev**	**Mean**	**Stdev**
Panel A: 1990-2003						
Austria	-0.025	1.707	0.067	2.311	0.234	2.572
Belgium	0.000	2.436	0.128	2.026	0.050	2.258
Finland	0.220	4.538	0.148	2.810	-0.102	3.207
France	0.045	2.770	0.281	3.163	0.144	3.479
Germany	0.010	2.724	0.140	2.044	0.259	1.880
Ireland	0.090	2.615	0.055	2.878	0.056	2.917
Italy	0.018	3.131	0.108	2.059	0.000	2.262
Netherlands	0.055	2.545	0.097	2.056	-0.004	2.178
Portugal	-0.017	2.352	0.078	2.394	-0.092	2.677
Spain	0.080	2.699	0.014	2.236	0.249	2.365
E.M.U.	0.053	2.433	0.142	1.735	0.120	1.638
Panel B: 1990-1995						
Austria	-0.159	2.926	-0.005	2.195	0.055	2.517
Belgium	-0.137	1.756	-0.024	1.813	0.059	1.709
Finland	-0.019	3.597	0.162	2.871	-0.104	2.812
France	-0.131	2.231	0.066	2.067	0.059	1.421
Germany	-0.108	2.092	0.105	1.390	0.102	1.299
Ireland	-0.020	2.515	0.004	2.532	0.175	3.000
Italy	-0.176	3.025	0.105	1.956	-0.021	2.108
Netherlands	-0.017	1.572	0.034	1.504	0.051	1.866
Portugal	-0.218	1.876	0.041	2.480	-0.149	2.753
Spain	-0.078	2.506	-0.132	2.286	0.258	2.443
E.M.U.	-0.094	1.763	0.056	1.093	0.061	0.799
Panel C: 1996-1998						
Austria	0.121	2.319	0.024	2.237	-0.116	2.561
Belgium	0.561	2.183	0.552	2.389	-0.412	2.947
Finland	0.853	3.615	0.120	2.228	-0.563	2.565
France	0.496	2.621	0.017	1.905	-0.109	1.609
Germany	0.434	2.560	-0.096	1.937	0.112	1.499
Ireland	0.561	2.621	0.064	1.912	-0.131	2.467
Italy	0.606	3.393	-0.001	2.372	0.004	2.439
Netherlands	0.531	2.723	0.118	1.642	-0.548	1.592
Portugal	0.643	3.086	-0.021	2.671	-0.127	2.797
Spain	0.655	2.912	0.265	2.190	-0.161	2.092
E.M.U.	0.533	2.423	0.048	1.348	-0.127	0.815
Panel D: 1999-2003						
Austria	0.048	1.707	0.181	2.487	0.658	2.596
Belgium	-0.171	3.140	0.056	2.004	0.315	2.326
Finland	0.126	5.841	0.149	3.049	0.178	3.903
France	-0.013	3.359	0.698	4.528	0.400	5.468
Germany	-0.103	3.393	0.325	2.662	0.535	2.536
Ireland	-0.060	2.704	0.113	3.655	0.025	3.064
Italy	-0.100	3.061	0.177	1.980	0.025	2.338
Netherlands	-0.144	3.256	0.159	2.744	0.257	2.714
Portugal	-0.173	2.294	0.183	2.102	-0.002	2.515
Spain	-0.077	2.754	0.039	2.198	0.485	2.401
E.M.U.	-0.059	3.033	0.324	1.386	0.355	2.509

Table 3: Excess Returns of High and Low Portfolios using CAPM

High and Low portfolios excess returns are dependent variables. They represent the top and bottom quintile. Variables are value-weighted, calculated on a weekly basis for the following periods: 1990-1995; 1996-1998; 1999-2003, and 1990-2003. DS country indices are used as local market proxy. Germany Euro-Mark one-month is the risk-free asset proxy. The method of estimation is ordinary least squares, using the Newey and West (1987) covariance estimator that is consistent in the presence of both heteroskedasticity and autocorrelation of unknown form. Domestic Model is a result of regression $r_{i,t} = \alpha_i + b_{Di}(w_{Dt-1}\,DMER_t) + \varepsilon_{i,t}$, where $r_{i,t}$ is the portfolio (High or Low) excess return in period t, DMER is the domestic excess return, and α is a constant. w_{Dt-1} is the weight of a local portfolio in EMU. b_{Di} is the unconditional sensitivity of asset i to the factor. EMU Model is a result of regression: $r_{i,t} = \alpha_i + b_i(EMER_t) + \varepsilon_{i,t}$, where $EMER_t$ represents the EMU factor. It is also calculated using a value-weighted basis. $EMER_t = w_{Dt-1}DMER_t + w_{Ft-1}FMER_t$, where w_{Dt-1} and w_{Ft-1} are respectively the weight of local and foreign portfolios in the EMU portfolio in the week $t-1$. International Model is the result of regression: $r_{i,t} = \alpha_i + b_{Di}(w_{Dt-1}\,DMER_t) + b_{Fi}(w_{Ft-1}\,FMER_t) + \varepsilon_{i,t}$.

Panel A: Local CAPM

	1990-2003		1990-1995		1996-1998		1999-2003	
	$\lvert\alpha\rvert$	Adj. R^2	$\lvert\alpha\rvert$	Adj. R^2	$\lvert\alpha\rvert$	Adj. R^2	$\lvert\alpha\rvert$	Adj. R^2
High								
Austria	0.382	0.229	0.153	0.594	0.354	0.085	0.674	0.071
Belgium	0.293	0.387	0.254	0.432	0.014	0.531	0.521	0.318
Finland	0.335	0.080	0.253	0.459	0.171	0.506	0.377	0.055
France	0.455	0.444	0.205	0.556	0.217	0.556	0.813	0.373
Germany	0.404	0.350	0.058	0.843	0.446	0.230	0.891	0.186
Ireland	0.504	0.046	0.202	0.206	0.579	-0.003	0.934	0.044
Italy	0.013	0.589	0.031	0.729	0.078	0.631	0.066	0.475
Netherlands	0.052	0.236	0.029	0.251	0.224	0.428	0.383	0.204
Portugal	0.482	0.009	0.001	0.102	1.421	-0.005	0.897	0.025
Spain	0.319	0.409	0.169	0.518	0.513	0.403	0.407	0.323
Mean	0.324	0.278	0.135	0.469	0.402	0.336	0.596	0.208
Low								
Austria	0.029	0.434	0.003	0.490	0.056	0.681	0.237	0.343
Belgium	0.162	0.532	0.146	0.473	0.386	0.632	0.030	0.510
Finland	0.207	0.743	0.164	0.620	0.298	0.870	0.083	0.875
France	0.185	0.808	0.144	0.768	0.111	0.764	0.230	0.844
Germany	0.095	0.520	0.127	0.305	0.149	0.615	0.298	0.680
Ireland	0.242	0.338	0.146	0.259	0.122	0.492	0.466	0.353
Italy	0.125	0.685	0.026	0.615	0.199	0.739	0.203	0.704
Netherlands	0.066	0.701	0.051	0.590	0.172	0.782	0.026	0.702
Portugal	0.186	0.554	0.337	0.220	0.177	0.801	0.152	0.665
Spain	0.044	0.525	0.095	0.482	0.379	0.501	0.159	0.566
Mean	0.134	0.584	0.124	0.482	0.205	0.688	0.188	0.624

Panel B: International CAPM								
	1990-2003		1990-1995		1996-1998		1999-2003	
	|α|	**Adj. R^2**	**|α|**	**Adj. R^2**	**|α|**	**Adj. R^2**	**|α|**	**Adj. R^2**
				High				
Austria	0.371	0.235	0.151	0.593	0.329	0.082	0.710	0.085
Belgium	0.288	0.389	0.003	0.443	0.012	0.529	0.515	0.317
Finland	0.352	0.165	0.290	0.473	0.194	0.513	0.429	0.129
France	0.453	0.444	0.203	0.557	0.237	0.556	0.840	0.387
Germany	0.409	0.351	0.060	0.845	0.418	0.230	0.891	0.183
Ireland	0.504	0.045	0.210	0.205	0.624	-0.003	0.934	0.041
Italy	0.008	0.591	0.030	0.728	0.091	0.630	0.067	0.473
Netherlands	0.068	0.268	0.017	0.286	0.275	0.469	0.329	0.227
Portugal	0.476	0.012	0.003	0.101	1.321	-0.004	0.889	0.023
Spain	0.319	0.408	0.175	0.517	0.493	0.414	0.407	0.322
Mean	0.325	0.291	0.114	0.475	0.399	0.341	0.601	0.219
				Low				
Austria	0.034	0.436	0.000	0.489	0.061	0.679	0.247	0.347
Belgium	0.163	0.532	0.145	0.474	0.382	0.632	0.022	0.513
Finland	0.215	0.750	0.158	0.619	0.321	0.876	0.057	0.877
France	0.185	0.808	0.145	0.769	0.141	0.770	0.226	0.844
Germany	0.073	0.548	0.125	0.309	0.110	0.621	0.297	0.679
Ireland	0.245	0.382	0.157	0.260	0.103	0.495	0.469	0.354
Italy	0.120	0.688	0.030	0.618	0.163	0.744	0.206	0.703
Netherlands	0.067	0.701	0.067	0.601	0.164	0.782	0.033	0.702
Portugal	0.182	0.564	0.341	0.224	0.148	0.803	0.144	0.672
Spain	0.040	0.530	0.095	0.481	0.375	0.499	0.158	0.572
Mean	0.132	0.594	0.126	0.484	0.197	0.690	0.186	0.626
				Panel C: EMU CAPM				
				High				
Austria	0.333	0.084	0.109	0.225	0.286	0.059	0.788	0.051
Belgium	0.259	0.269	0.191	0.323	0.121	0.391	0.441	0.214
Finland	0.363	0.163	0.420	0.155	0.044	0.379	0.428	0.132
France	0.440	0.397	0.191	0.385	0.198	0.448	0.843	0.389
Germany	0.380	0.277	0.047	0.696	0.396	0.223	0.882	0.169
Ireland	0.534	0.016	0.254	0.079	0.669	-0.006	0.913	0.017
Italy	0.038	0.370	0.077	0.340	0.097	0.429	0.023	0.397
Netherlands	0.076	0.265	0.044	0.263	0.271	0.466	0.324	0.230
Portugal	0.481	0.012	0.099	0.026	1.290	-0.005	0.787	0.011
Spain	0.360	0.282	0.221	0.316	0.573	0.352	0.402	0.265
Mean	0.326	0.213	0.165	0.281	0.394	0.274	0.583	0.187
				Low				
Austria	0.073	0.121	0.034	0.194	0.158	0.358	0.140	0.026
Belgium	0.130	0.323	0.091	0.299	0.502	0.488	0.119	0.260
Finland	0.420	0.336	0.330	0.093	0.635	0.448	0.373	0.432
France	0.167	0.706	0.135	0.597	0.099	0.600	0.273	0.793
Germany	0.057	0.531	0.130	0.274	0.062	0.580	0.279	0.625
Ireland	0.278	0.284	0.203	0.107	0.192	0.301	0.450	0.403
Italy	0.097	0.515	0.005	0.339	0.158	0.549	0.147	0.577
Netherlands	0.099	0.575	0.110	0.454	0.181	0.669	0.038	0.590
Portugal	0.210	0.241	0.249	0.064	0.250	0.414	0.013	0.290
Spain	0.000	0.413	0.058	0.275	0.475	0.365	0.167	0.495
Mean	0.153	0.404	0.135	0.270	0.271	0.477	0.200	0.449

Table 4: Excess Returns of Small and Big Portfolios using CAPM

Small and Big portfolios excess returns are dependent variables. They represent the top and bottom quintile. Variables are value-weighted, calculated on a weekly basis for the following periods: 1990-1995; 1996-1998; 1999-2003, and 1990-2003. DS country indices are used as local market proxy. Germany Euro-Mark one-month is the risk-free asset proxy. The method of estimation is ordinary least squares, using the Newey and West (1987) covariance estimator that is consistent in the presence of both heteroskedasticity and autocorrelation of unknown form. Domestic Model is a result of regression $r_{i,t} = \alpha_i + b_{Di}(w_{Dt-1}\,DMER_t) + \varepsilon_{i,t}$, where $r_{i,t}$ is the portfolio (High or Low) excess return in period t, DMER is the domestic excess return, and α is a constant. w_{Dt-1} is the weight of a local portfolio in EMU. b_{Di} is the unconditional sensitivity of asset i to the factor. EMU Model is a result of regression: $r_{i,t} = \alpha_i + b_i(EMER_t) + \varepsilon_{i,t}$, where $EMER_t$ represents the EMU factor. It is also calculated using a value-weighted basis. $EMER_t = w_{Dt-1}DMER_t + w_{Ft-1}FMER_t$, where w_{Dt-1} and w_{Ft-1} are respectively the weight of local and foreign portfolios in the EMU portfolio in the week $t-1$. International Model is the result of regression: $r_{i,t} = \alpha_i + b_{Di}(w_{Dt-1}\,DMER_t) + b_{Fi}(w_{Ft-1}\,FMER_t) + \varepsilon_{i,t}$.

Panel A: Local CAPM

	1990-2003		**1990-1995**		**1996-1998**		**1999-2003**	
	|α|	**Adj. R^2**	**|α|**	**Adj. R^2**		**|α|**	**Adj. R^2**	**|α|**
				Small				
Austria	0.362	0.062	0.045	0.388	0.099	0.039	1.066	-0.003
Belgium	0.255	0.084	0.189	0.107	0.349	0.252	0.181	0.014
Finland	0.570	0.037	0.129	0.191	0.732	0.114	0.868	0.023
France	0.530	0.254	0.179	0.127	0.499	0.270	0.965	0.314
Germany	0.654	0.123	0.049	0.330	0.715	0.133	1.326	0.069
Ireland	1.250	0.011	0.259	0.076	0.849	-0.002	2.774	0.006
Italy	0.370	0.205	0.019	0.520	0.670	0.211	0.629	0.097
Netherlands	0.233	0.204	0.076	0.237	0.398	0.249	0.360	0.178
Portugal	0.927	0.010	0.016	0.118	1.162	0.029	2.133	0.006
Spain	0.599	0.118	0.265	0.227	1.217	0.117	0.561	0.044
Mean	0.575	0.111	0.123	0.232	0.669	0.141	1.086	0.075
				Big				
Austria	0.092	0.768	0.132	0.865	0.045	0.809	0.024	0.651
Belgium	0.067	0.729	0.104	0.763	0.001	0.740	0.008	0.697
Finland	0.155	0.769	0.079	0.751	0.011	0.956	0.046	0.919
France	0.167	0.954	0.102	0.964	0.149	0.955	0.236	0.959
Germany	0.109	0.907	0.021	0.944	0.088	0.898	0.232	0.942
Ireland	0.187	0.621	0.169	0.685	0.155	0.660	0.286	0.590
Italy	0.061	0.835	0.041	0.869	0.125	0.837	0.205	0.872
Netherlands	0.065	0.905	0.036	0.932	0.047	0.920	0.182	0.910
Portugal	0.135	0.488	0.217	0.375	0.252	0.809	0.199	0.685
Spain	0.069	0.790	0.051	0.774	0.110	0.869	0.093	0.773
Mean	0.111	0.777	0.095	0.792	0.098	0.845	0.151	0.800

Panel B: International CAPM

	1990-2003		1990-1995		1996-1998		1999-2003	
	|α|	Adj. R^2	|α|	Adj. R^2	a	Adj. R^2	a	Adj. R^2
				Small				
Austria	0.363	0.061	0.042	0.387	0.108	0.033	1.073	-0.007
Belgium	0.252	0.085	0.187	0.112	0.347	0.248	0.178	0.011
Finland	0.581	0.062	0.143	0.191	0.696	0.139	0.919	0.037
France	0.522	0.271	0.187	0.193	0.472	0.284	0.974	0.315
Germany	0.653	0.122	0.052	0.350	0.693	0.130	1.328	0.068
Ireland	1.252	0.011	0.269	0.074	0.905	0.002	2.776	0.007
Italy	0.368	0.204	0.027	0.530	0.669	0.206	0.624	0.095
Netherlands	0.240	0.218	0.081	0.236	0.385	0.249	0.319	0.211
Portugal	0.919	0.013	0.031	0.160	1.139	0.024	2.117	0.004
Spain	0.603	0.119	0.292	0.236	1.175	0.129	0.561	0.041
Mean	0.575	0.116	0.131	0.247	0.659	0.144	1.087	0.078
				Big				
Austria	0.085	0.774	0.137	0.867	0.040	0.808	0.026	0.650
Belgium	0.071	0.732	0.104	0.763	0.131	0.740	0.005	0.703
Finland	0.165	0.783	0.086	0.751	0.019	0.957	0.073	0.923
France	0.168	0.954	0.100	0.966	0.165	0.958	0.236	0.959
Germany	0.098	0.917	0.021	0.945	0.075	0.899	0.231	0.942
Ireland	0.188	0.624	0.181	0.688	0.138	0.662	0.286	0.593
Italy	0.065	0.836	0.041	0.868	0.094	0.841	0.209	0.874
Netherlands	0.064	0.905	0.020	0.944	0.059	0.923	0.184	0.910
Portugal	0.135	0.487	0.218	0.373	0.271	0.809	0.201	0.685
Spain	0.068	0.790	0.056	0.775	0.121	0.874	0.093	0.773
Mean	0.111	0.780	0.096	0.794	0.111	0.847	0.155	0.801

Panel C: EMU CAPM

				Small				
Austria	0.335	0.010	0.072	0.173	0.067	0.015	1.081	-0.003
Belgium	0.243	0.064	0.170	0.092	0.407	0.193	0.170	0.011
Finland	0.596	0.060	0.218	0.051	0.726	0.138	0.933	0.040
France	0.520	0.269	0.188	0.194	0.468	0.283	0.986	0.311
Germany	0.642	0.106	0.049	0.333	0.673	0.127	1.321	0.055
Ireland	1.270	0.009	0.308	0.030	0.959	-0.006	2.768	0.010
Italy	0.353	0.146	0.002	0.325	0.665	0.136	0.605	0.090
Netherlands	0.249	0.210	0.111	0.163	0.391	0.232	0.326	0.213
Portugal	0.930	0.011	0.045	0.106	1.171	0.016	2.028	0.003
Spain	0.631	0.095	0.321	0.184	1.229	0.127	0.558	0.036
Mean	0.577	0.098	0.148	0.165	0.676	0.126	1.078	0.077
				Big				
Austria	0.037	0.224	0.094	0.389	0.171	0.439	0.087	0.098
Belgium	0.037	0.402	0.040	0.420	0.244	0.501	0.099	0.351
Finland	0.338	0.384	0.255	0.145	0.289	0.543	0.434	0.467
France	0.149	0.817	0.087	0.684	0.129	0.777	0.275	0.910
Germany	0.068	0.830	0.009	0.761	0.006	0.797	0.214	0.874
Ireland	0.248	0.295	0.262	0.258	0.255	0.379	0.246	0.292
Italy	0.036	0.538	0.086	0.409	0.089	0.607	0.156	0.703
Netherlands	0.104	0.701	0.091	0.483	0.079	0.715	0.105	0.788
Portugal	0.162	0.152	0.054	0.059	0.370	0.330	0.065	0.202
Spain	0.120	0.532	0.102	0.465	0.273	0.535	0.084	0.610
Mean	0.130	0.487	0.108	0.407	0.190	0.562	0.177	0.530

Table 5: Excess Returns of High and Low Portfolios using FFM

High and Low portfolios excess returns are dependent variables. They represent the top and bottom quintile. Variables are value-weighted, calculated on a weekly basis for the following periods: 1990-1995; 1996-1998; 1999-2003, and 1990-2003. DS country indices are used as local market proxy. Germany Euro-Mark one-month is the risk-free asset proxy. The method of estimation is ordinary least squares, using the Newey and West (1987) covariance estimator that is consistent in the presence of both heteroskedasticity and autocorrelation of unknown form. Domestic Model is a result of regression $r_{i,t} = \alpha_i + b_{Di} (w_{Dt-1} DMER_t) + s_{Di} (w_{Dt-1} DSMB_t) + h_{Di} (w_{Dt-1} DHML_t) + \varepsilon_{i,t}$, where $r_{i,t}$ is the portfolio (High or Low) excess return in period t, DMER is the domestic excess return, DSMB is the return difference between S (local small firms) and B (logal big firms), DHML is the return difference between H (high book-to-market firms) and L (low book-to-market firms), and α is a constant. w_{Dt-1} is the weight of a local portfolio in EMU. b_{Di}, s_{Di}, and h_{Di} are the unconditional sensitivities of asset i to the factors. EMU Model is a result of regression: $r_{i,t} = \alpha_i + b_i (EMER_t) + s_i (ESMB_t) + h_i (EHML_t) + \varepsilon_{i,t}$, where $EMER_t$ ESMB, and EHML represent EMU factors. They are calculated considering the countries weight in the EMU portfolio. Thus, we have, for example, $EMER_t = w_{Dt-1} DMER_t + w_{Ft-1} FMER_t$, where w_{Dt-1} and w_{Ft-1} are respectively the weight of local and foreign portfolios in the EMU portfolio in the week t-1. International Model is the result of regression: $r_{i,t} = \alpha_i + b_{Di} (w_{Dt-1} DMER_t) + s_{Di} (w_{Dt-1} DSMB_t) + h_{Di} (w_{Dt-1} DHML_t) + b_{Fi} (w_{Ft-1} FMER_t) + s_{Fi} (w_{Ft-1} FSMB_t) + h_{Fi} (w_{Ft-1} FHML_t) + \varepsilon_{i,t}$.

Panel A: Local FFM

	1990-2003		**1990-1995**		**1996-1998**		**1999-2003**	
	|α|	**Adj. R^2**	**|α|**	**Adj. R^2**	**|α|**	**Adj. R^2**	**|α|**	**Adj. R^2**
				High				
Austria	0.279	0.340	0.125	0.641	0.327	0.559	0.207	0.402
Belgium	0.289	0.526	0.177	0.575	0.123	0.575	0.357	0.501
Finland	0.266	0.369	0.253	0.616	0.051	0.722	0.253	0.432
France	0.452	0.497	0.152	0.707	0.317	0.787	0.794	0.400
Germany	0.157	0.633	0.013	0.880	0.358	0.456	0.243	0.721
Ireland	0.325	0.208	0.153	0.467	0.419	0.071	0.590	0.225
Italy	0.032	0.731	0.039	0.852	0.027	0.756	0.007	0.635
Netherlands	0.055	0.459	0.065	0.558	0.002	0.496	0.090	0.457
Portugal	0.055	0.593	0.165	0.308	0.254	0.717	0.351	0.625
Spain	0.182	0.549	0.083	0.581	0.369	0.541	0.084	0.575
Mean	0.212	0.484	0.122	0.619	0.225	0.568	0.298	0.497
				Low				
Austria	0.027	0.497	0.025	0.610	0.045	0.729	0.120	0.367
Belgium	0.183	0.601	0.148	0.540	0.318	0.666	0.109	0.646
Finland	0.244	0.748	0.146	0.675	0.204	0.904	0.006	0.881
France	0.177	0.834	0.161	0.791	0.142	0.847	0.179	0.885
Germany	0.173	0.585	0.002	0.531	0.218	0.667	0.310	0.706
Ireland	0.271	0.366	0.169	0.320	0.159	0.514	0.483	0.380
Italy	0.154	0.768	0.041	0.660	0.212	0.847	0.238	0.782
Netherlands	0.066	0.723	0.066	0.678	0.103	0.786	0.063	0.714
Portugal	0.194	0.559	0.290	0.309	0.154	0.804	0.179	0.673
Spain	0.050	0.588	0.045	0.502	0.294	0.576	0.117	0.703
Mean	0.154	0.627	0.109	0.562	0.185	0.734	0.180	0.674

Panel B: International FFM

	1990-2003		1990-1995		1996-1998		1999-2003	
	|α|	Adj. R^2	|α|	Adj. R^2	|α|	Adj. R^2	|α|	Adj. R^2
				High				
Austria	0.226	0.348	0.079	0.647	0.275	0.558	0.198	0.397
Belgium	0.224	0.538	0.140	0.588	0.009	0.586	0.260	0.507
Finland	0.215	0.421	0.298	0.627	0.100	0.718	0.222	0.485
France	0.361	0.524	0.160	0.705	0.308	0.785	0.006	0.460
Germany	0.167	0.635	0.010	0.884	0.253	0.466	0.251	0.728
Ireland	0.283	0.213	0.150	0.479	0.530	0.068	0.491	0.229
Italy	0.073	0.734	0.050	0.856	0.050	0.762	0.046	0.634
Netherlands	0.026	0.485	0.050	0.590	0.142	0.543	0.033	0.476
Portugal	0.138	0.605	0.125	0.312	0.243	0.713	0.549	0.640
Spain	0.147	0.552	0.073	0.586	0.272	0.564	0.020	0.579
Mean	0.190	0.500	0.113	0.628	0.218	0.576	0.208	0.513
				Low				
Austria	0.004	0.499	0.038	0.609	0.067	0.730	0.175	0.373
Belgium	0.159	0.604	0.135	0.540	0.175	0.680	0.072	0.648
Finland	0.259	0.757	0.126	0.673	0.222	0.905	0.149	0.894
France	0.210	0.842	0.169	0.793	0.159	0.852	0.286	0.900
Germany	0.089	0.638	0.004	0.559	0.154	0.679	0.249	0.752
Ireland	0.233	0.418	0.194	0.335	0.189	0.517	0.400	0.354
Italy	0.121	0.786	0.050	0.673	0.161	0.849	0.224	0.807
Netherlands	0.065	0.725	0.091	0.696	0.094	0.785	0.083	0.713
Portugal	0.165	0.581	0.255	0.333	0.162	0.804	0.134	0.696
Spain	0.009	0.621	0.042	0.502	0.181	0.587	0.051	0.741
Mean	0.131	0.647	0.110	0.571	0.156	0.739	0.182	0.688
				Panel C: EMU FFM				
				High				
Austria	0.230	0.104	0.069	0.245	0.222	0.074	0.648	0.057
Belgium	0.190	0.307	0.146	0.332	0.019	0.413	0.333	0.262
Finland	0.269	0.197	0.372	0.173	0.152	0.383	0.337	0.195
France	0.377	0.440	0.126	0.440	0.374	0.504	0.670	0.438
Germany	0.236	0.388	0.003	0.724	0.391	0.356	0.556	0.297
Ireland	0.394	0.050	0.224	0.150	0.706	0.000	0.654	0.054
Italy	0.173	0.412	0.193	0.387	0.016	0.490	0.201	0.443
Netherlands	0.017	0.308	0.079	0.361	0.265	0.492	0.184	0.267
Portugal	0.247	0.051	0.147	0.045	1.156	-0.015	0.315	0.070
Spain	0.254	0.323	0.161	0.336	0.457	0.416	0.283	0.299
Mean	0.239	0.258	0.152	0.319	0.376	0.311	0.418	0.238
				Low				
Austria	0.164	0.143	0.007	0.206	0.267	0.361	0.255	0.046
Belgium	0.121	0.322	0.103	0.300	0.004	0.499	0.113	0.262
Finland	0.528	0.380	0.309	0.092	0.271	0.491	0.722	0.491
France	0.233	0.747	0.184	0.635	0.175	0.673	0.351	0.841
Germany	0.022	0.596	0.084	0.319	0.031	0.587	0.179	0.706
Ireland	0.210	0.309	0.225	0.134	0.102	0.326	0.323	0.431
Italy	0.070	0.554	0.010	0.350	0.072	0.549	0.136	0.639
Netherlands	0.113	0.575	0.160	0.506	0.168	0.671	0.008	0.604
Portugal	0.134	0.278	0.216	0.117	0.376	0.422	0.122	0.376
Spain	0.009	0.454	0.032	0.317	0.333	0.374	0.105	0.546
Mean	0.160	0.436	0.133	0.298	0.180	0.495	0.231	0.494

Table 6: Excess Returns of Small and Big Portfolios using FFM

Small and Big portfolios excess returns are dependent variables. They represent the top and bottom quintile. Variables are value-weighted, calculated in a weekly basis for the following periods: 1990-1995; 1996-1998; 1999-2003, and 1990-2003. DS country indices are used as local market proxy. Germany Euro-Mark one-month is the risk-free asset proxy. The method of estimation is ordinary least squares, using the Newey and West (1987) covariance estimator that is consistent in the presence of both heteroskedasticity and autocorrelation of unknown form. Domestic Model is a result of regression $r_{i,t} = \alpha_i + b_{Di}(w_{Dt-1}\,DMER_t) + s_{D\,i}(w_{Dt-1}DSMB_t) + h_{Di}(w_{Dt-1}DHML_t) + \varepsilon_{i,t}$, where $r_{i,t}$ is the portfolio (Small or Big) excess return in period t, DMER is the domestic excess return, DSMB is the return difference between S (local small firms) and B (logal big firms), DHML is the return difference between H (high book-to-market firms) and L (low book-to-market firms), and α is a constant. w_{Dt-1} is the weight of a local portfolio in EMU. b_{Di}, $s_{D\,i}$, and h_{Di} are the unconditional sensitivities of asset i to the factors. EMU Model is a result of regression: $r_{i,t} = \alpha_i + b_i(EMER_t) + s_i(ESMB_t) + h_i(EHML_t) + \varepsilon_{i,t}$, where EMER, ESMB, and EHML represent EMU factors. They are calculated considering the countries weight in the EMU portfolio. Thus, we have, for example, $EMER_t = w_{Dt-1}DMER_t + w_{Ft-1}FMER_t$, where w_{Dt-1} and w_{Ft-1} are respectively the weight of local and foreign portfolios in the EMU portfolio in the week t-1. International Model is the result of regression: $r_{i,t} = \alpha_i + b_{Di}(w_{Dt-1}\,DMER_t) + s_{D\,i}(w_{Dt-1}DSMB_t) + h_{Di}(w_{Dt-1}DHML_t) + b_{Fi}(w_{Ft-1}\,FMER_t) + s_{F\,i}(w_{Ft-1}FSMB_t) + h_{Fi}(w_{Ft-1}FHML_t) + \varepsilon_{i,t}$.

Panel A: Local FFM

	1990-2003		**1990-1995**		**1996-1998**		**1999-2003**	
	|α|	**Adj. R^2**	**|α|**	**Adj. R^2**	**|α|**	**Adj. R^2**	**Adj. R^2**	**|α|**
			Small					
Austria	0.148	0.269	0.076	0.533	0.087	0.090	0.369	0.449
Belgium	0.223	0.218	0.260	0.305	0.199	0.436	0.114	0.099
Finland	0.317	0.496	0.040	0.427	0.418	0.396	0.359	0.618
France	0.423	0.400	0.167	0.595	0.444	0.349	0.765	0.455
Germany	0.473	0.334	0.039	0.573	0.615	0.198	0.908	0.405
Ireland	0.882	0.310	0.212	0.320	0.738	0.021	1.979	0.348
Italy	0.153	0.561	0.027	0.664	0.366	0.542	0.208	0.562
Netherlands	0.174	0.336	0.054	0.445	0.346	0.317	0.324	0.336
Portugal	0.299	0.311	0.087	0.234	1.004	0.052	0.122	0.494
Spain	0.487	0.340	0.316	0.345	0.556	0.519	0.087	0.467
Mean	0.358	0.357	0.128	0.444	0.477	0.292	0.523	0.423
			Big					
Austria	0.125	0.803	0.140	0.886	0.055	0.827	0.048	0.696
Belgium	0.087	0.779	0.083	0.805	0.206	0.785	0.078	0.788
Finland	0.173	0.781	0.102	0.755	0.078	0.961	0.088	0.923
France	0.170	0.955	0.104	0.973	0.164	0.961	0.223	0.964
Germany	0.152	0.916	0.029	0.953	0.135	0.924	0.275	0.944
Ireland	0.286	0.694	0.186	0.752	0.230	0.740	0.484	0.681
Italy	0.101	0.850	0.026	0.913	0.169	0.891	0.251	0.905
Netherlands	0.082	0.918	0.038	0.938	0.035	0.940	0.213	0.922
Portugal	0.148	0.487	0.219	0.487	0.248	0.807	0.204	0.695
Spain	0.106	0.807	0.061	0.776	0.173	0.888	0.230	0.853
Mean	0.143	0.799	0.099	0.824	0.149	0.872	0.209	0.837

Panel B: International FFM

	1990-2003		1990-1995		1996-1998		1999-2003	
	|α|	**Adj. R^2**	**|α|**	**Adj. R^2**	**|α|**	**Adj. R^2**	**Adj. R^2**	**|α|**
				Small				
Austria	0.079	0.270	0.097	0.538	0.145	0.094	0.468	0.446
Belgium	0.186	0.226	0.230	0.318	0.054	0.459	0.099	0.090
Finland	0.289	0.501	0.036	0.425	0.283	0.421	0.413	0.617
France	0.339	0.457	0.162	0.606	0.402	0.452	0.595	0.504
Germany	0.424	0.351	0.045	0.606	0.521	0.191	0.866	0.405
Ireland	0.885	0.307	0.197	0.321	0.689	0.013	2.074	0.342
Italy	0.104	0.574	0.047	0.686	0.306	0.548	0.227	0.582
Netherlands	0.122	0.353	0.045	0.457	0.264	0.321	0.207	0.349
Portugal	0.120	0.326	0.072	0.272	0.881	0.053	0.181	0.503
Spain	0.523	0.341	0.310	0.349	0.571	0.516	0.177	0.475
Mean	0.307	0.371	0.124	0.458	0.411	0.307	0.531	0.431
				Big				
Austria	0.113	0.809	0.125	0.889	0.065	0.827	0.054	0.697
Belgium	0.084	0.780	0.096	0.806	0.162	0.783	0.054	0.789
Finland	0.163	0.794	0.095	0.756	0.097	0.961	0.173	0.933
France	0.177	0.955	0.108	0.973	0.217	0.965	0.252	0.965
Germany	0.144	0.924	0.026	0.956	0.115	0.924	0.283	0.945
Ireland	0.246	0.701	0.179	0.756	0.195	0.751	0.417	0.688
Italy	0.078	0.854	0.031	0.914	0.111	0.894	0.245	0.910
Netherlands	0.075	0.918	0.016	0.948	0.035	0.940	0.208	0.921
Portugal	0.109	0.497	0.159	0.503	0.294	0.805	0.205	0.717
Spain	0.073	0.818	0.058	0.775	0.143	0.891	0.168	0.879
Mean	0.126	0.805	0.089	0.828	0.143	0.874	0.206	0.845

Panel C: EMU FFM

				Small				
Austria	0.183	0.030	0.098	0.220	0.095	0.051	0.875	0.002
Belgium	0.172	0.096	0.134	0.174	0.211	0.238	0.116	0.013
Finland	0.413	0.141	0.157	0.098	0.451	0.223	0.007	0.139
France	0.371	0.398	0.141	0.480	0.404	0.443	0.744	0.417
Germany	0.476	0.240	0.041	0.540	0.494	0.177	1.045	0.175
Ireland	1.175	0.019	0.259	0.060	0.803	-0.010	2.726	0.016
Italy	0.097	0.276	0.055	0.412	0.357	0.262	0.186	0.234
Netherlands	0.121	0.280	0.077	0.303	0.246	0.267	0.102	0.275
Portugal	0.567	0.052	0.083	0.133	1.050	0.032	1.304	0.049
Spain	0.498	0.113	0.263	0.245	0.770	0.157	0.469	0.045
Mean	0.407	0.164	0.131	0.266	0.488	0.184	0.757	0.136
				Big				
Austria	0.031	0.256	0.090	0.389	0.235	0.442	0.015	0.133
Belgium	0.045	0.409	0.063	0.425	0.222	0.507	0.090	0.376
Finland	0.399	0.409	0.216	0.149	0.007	0.576	0.678	0.510
France	0.201	0.828	0.116	0.743	0.225	0.798	0.318	0.916
Germany	0.080	0.830	0.003	0.768	0.087	0.802	0.211	0.873
Ireland	0.171	0.311	0.256	0.265	0.051	0.460	0.144	0.299
Italy	0.006	0.542	0.151	0.424	0.048	0.607	0.141	0.718
Netherlands	0.135	0.706	0.100	0.490	0.102	0.726	0.166	0.804
Portugal	0.076	0.189	0.003	0.128	0.492	0.343	0.001	0.311
Spain	0.106	0.539	0.107	0.476	0.004	0.535	0.110	0.635
Mean	0.125	0.502	0.111	0.426	0.147	0.580	0.187	0.558

Table 7: Mean Alfa of Different Portfolios

Panel A presents the mean alfa´s for different portfolios (120 = 3 periods; 4 portfolios; 10 markets). Panel B presents mean differences of alfa for different models. Panel C presents mean differences of Alfa bteween Local CAPM and Local FFM (by type of portfolio). Panel B presents mean differences of alfa between local FFM and Internacional FFM (by type of portfolio).

Panel A - Mean Alfa

	EMU CAPM (a)	Local CAPM (b)	Internacional CAPM (c)	EMU FFM (d)	Local FFM (e)	International FFM (f)
All Portfolios	0,344%	0,323%	0,322%	0,276%	0,225%	0,208%
High	0,381%	0,378%	0,372%	0,315%	0,215%	0,180%
Low	0,202%	0,172%	0,170%	0,181%	0,158%	0,150%
Small	0,634%	0,626%	0,626%	0,459%	0,376%	0,355%
Big	0,158%	0,115%	0,121%	0,148%	0,152%	0,146%

Panel B - Mean differences of Alfa (120 portfolios)

	Mean Differences	p -value
(a) - (b)	0,021%	0,69
(a) - (c)	0,022%	0,68
(a) - (d)	0,068%	0,16
(a) - (e)	0,118%	0,01
(a) - (f)	0,136%	0,00
(b) - (c)	0,001%	0,99
(b) - (d)	0,047%	0,34
(b) - (e)	0,097%	0,03
(b) - (f)	0,115%	0,01
(c) - (d)	0,046%	0,35
(c) - (e)	0,097%	0,03
(c) - (f)	0,136%	0,01
(d) - (e)	0,051%	0,19
(d) - (f)	0,068%	0,07
(e) - (f)	0,018%	0,57

Panel C - Mean differences of Alfa bteween Local CAPM and Local FFM (by type of portfolio)

High ((e)-(b))	-0,163%	0,02
Low ((e)-(b))	-0,014%	0,62
Small ((e)-(b))	-0,250%	0,07
Big ((e)-(b))	0,038%	0,12

Panel D - Mean differences of Alfa bteween Local FFM and International FFM (by type of portfolio)

High ((e)-(b))	-0,035%	0,42
Low ((e)-(b))	-0,008%	0,74
Small ((e)-(b))	-0,021%	0,84
Big ((e)-(b))	-0,006%	0,80

Table 8: Firm Excess Returns – Local CAPM, Local FFM, and International FFM

Firm excess returns are dependent variables. Only firms whose data is available during a period have been considered. Variables are calculated in a weekly basis for the following periods: 1990-1995; 1996-1998; 1999-2003; and 1990-2003. DS country indices are used as local market proxy. Germany Euro-Deutschmark one-month is the risk-free asset proxy. The method of estimation is ordinary least squares, using the Newey and West (1987) covariance estimator that is consistent in the presence of both heteroskedasticity and autocorrelation of unknown form. Models are as previously defined. N is the number of firms.

	Local CAPM		**Local FF**		**International FF**		
	|α|	**Adj. R^2**	**|α|**	**Adj. R^2**	**|α|**	**Adj. R^2**	**N**
			1990-2003				
Austria	0.403	0.147	0.255	0.174	0.208	0.176	19
Belgium	0.080	0.149	0.086	0.177	0.080	0.183	26
Finland	0.127	0.065	0.100	0.133	0.090	0.160	19
France	0.129	0.126	0.122	0.138	0.130	0.151	123
Germany	0.120	0.088	0.153	0.099	0.164	0.106	128
Ireland	0.193	0.097	0.189	0.156	0.173	0.168	18
Italy	0.120	0.161	0.130	0.196	0.146	0.202	70
Netherlands	0.081	0.142	0.097	0.174	0.111	0.186	45
Portugal	0.124	0.121	0.163	0.129	0.185	0.135	10
Spain	0.100	0.209	0.122	0.256	0.133	0.261	28
Mean	0.148	0.131	0.142	0.163	0.142	0.173	486
			1990-1995				
Austria	0.206	0.271	0.216	0.319	0.237	0.324	22
Belgium	0.138	0.191	0.125	0.254	0.137	0.263	26
Finland	0.159	0.186	0.178	0.232	0.171	0.238	20
France	0.188	0.137	0.193	0.175	0.197	0.178	132
Germany	0.154	0.145	0.169	0.178	0.171	0.185	154
Ireland	0.184	0.130	0.181	0.185	0.180	0.193	19
Italy	0.150	0.329	0.164	0.382	0.193	0.390	71
Netherlands	0.145	0.110	0.156	0.169	0.158	0.180	48
Portugal	0.209	0.136	0.169	0.208	0.194	0.217	12
Spain	0.183	0.281	0.159	0.328	0.162	0.329	29
Mean	0.172	0.192	0.171	0.243	0.180	0.250	533
			1996-1998				
Austria	0.230	0.128	0.218	0.160	0.280	0.164	39
Belgium	0.331	0.166	0.283	0.195	0.280	0.206	42
Finland	0.391	0.160	0.328	0.218	0.319	0.231	53
France	0.311	0.111	0.302	0.125	0.305	0.134	210
Germany	0.283	0.076	0.289	0.086	0.357	0.094	236
Ireland	0.276	0.144	0.284	0.203	0.331	0.216	20
Italy	0.262	0.219	0.219	0.274	0.265	0.280	89
Netherlands	0.286	0.178	0.245	0.220	0.301	0.230	80
Portugal	0.476	0.204	0.400	0.243	0.447	0.249	27
Spain	0.427	0.191	0.395	0.231	0.374	0.250	50
Mean	0.327	0.158	0.296	0.196	0.326	0.206	846
			1999-03				
Austria	0.634	0.066	0.468	0.087	0.489	0.091	42
Belgium	0.210	0.111	0.230	0.140	0.259	0.145	61
Finland	0.195	0.039	0.177	0.078	0.191	0.094	83
France	0.350	0.074	0.320	0.091	0.360	0.107	425
Germany	0.318	0.044	0.365	0.054	0.380	0.055	442
Ireland	0.374	0.070	0.289	0.125	0.265	0.145	25
Italy	0.246	0.158	0.243	0.190	0.249	0.204	121
Netherlands	0.247	0.102	0.233	0.130	0.237	0.148	101
Portugal	0.389	0.074	0.331	0.105	0.364	0.108	43
Spain	0.199	0.096	0.223	0.141	0.245	0.150	65
Mean	0.316	0.083	0.288	0.114	0.304	0.125	1,408

Table 9: Cost of Equity by Firm

Annual estimates for cost of equity by firm are calculated (i) considering only firms whose systematic risk presents a statistical significance (t - stat > 2), (ii) years where the local annual risk premium is on the interval $\{E[RP_{annual}] \pm 1.5\ \sigma_{annualRP}\}$, and (iii) excluding intercept terms because as Fama and French (1997) show it produces more accurate estimates. Independent variables are obtained considering weekly means of each year. Cost of equity is annualised. N is the average annual number of firms.

	Local CAPM	**Local FF**	**International FF**	**Average**	**N**
Austria	4.43%	4.99%	4.23%	4.55%	20
Belgium	5.71%	6.40%	7.86%	6.65%	32
Finland	15.92%	18.53%	16.89%	17.11%	32
France	7.39%	8.24%	8.94%	8.19%	156
Germany	7.59%	9.22%	9.20%	8.67%	142
Ireland	12.50%	13.29%	14.33%	13.37%	11
Italy	6.12%	6.17%	7.89%	6.73%	79
Netherlands	9.25%	11.79%	13.78%	11.61%	50
Portugal	5.71%	5.27%	7.45%	6.14%	18
Spain	8.11%	9.08%	10.16%	9.12%	39
Mean	8.27%	9.30%	10.07%	9.21%	578

Table 10: Forecast Errors – Firm and Portfolio Analysis

Sample is based on firms used in Table 8. Forecasted errors of stock excess returns are obtained through: $\frac{1}{T}\frac{1}{N}\sum_{t=1}^{T}\sum_{i=1}^{n}\left|r_{it}-E(r_{it})\right|$ where r_{it} is the weekly average return of a stock *i* in year *t* and $E(r_{it})$ is the stock expected return in the same period. N is the number of stocks.

Portfolio Forecasted errors are obtained through:

$$\frac{1}{\sum_{t=1}^{T}\sum_{i=1}^{n}MV_{it}}\sum_{i=1}^{T}\sum_{i=1}^{n}MV_{it}\left|r_{it}-E(r_{it})\right|$$

, where MV_{it} is the average market capitalisation of a firm *i* in year *t*.

Panel A: Out-of-Sample by Firm			
Country	Local CAPM	Local FFM	International FFM
Austria	0.57%	0.65%	0.71%
Belgium	0.57%	0.60%	0.63%
Finland	0.80%	0.81%	0.81%
France	0.59%	0.71%	0.73%
Germany	0.64%	0.72%	0.74%
Ireland	0.60%	0.61%	0.63%
Italy	0.68%	0.71%	0.76%
Netherlands	0.65%	0.70%	0.74%
Portugal	0.91%	1.01%	1.03%
Spain	0.80%	0.86%	0.90%
Mean	0.68%	0.74%	0.77%
Panel B: Out-of-Sample by Portfolio			
Country	Local CAPM	Local FFM	International FFM
Austria	0.48%	0.47%	0.52%
Belgium	0.34%	0.34%	0.34%
Finland	0.73%	0.72%	0.75%
France	0.38%	0.40%	0.38%
Germany	0.51%	0.50%	0.49%
Ireland	0.55%	0.58%	0.55%
Italy	0.54%	0.45%	0.42%
Netherlands	0.53%	0.52%	0.54%
Portugal	0.68%	0.44%	0.51%
Spain	0.59%	0.56%	0.59%
Mean	0.53%	0.50%	0.51%

Fig. 1 : Difference on mean Jensen's alpha between international and local FFM, for each sub-period, is the dependent variable. Size (country market capitalisation weight in EMU portfolio), during each sub-period, is the independent variable. There are 3 periods and 4 portfolios, thus 120 observations.

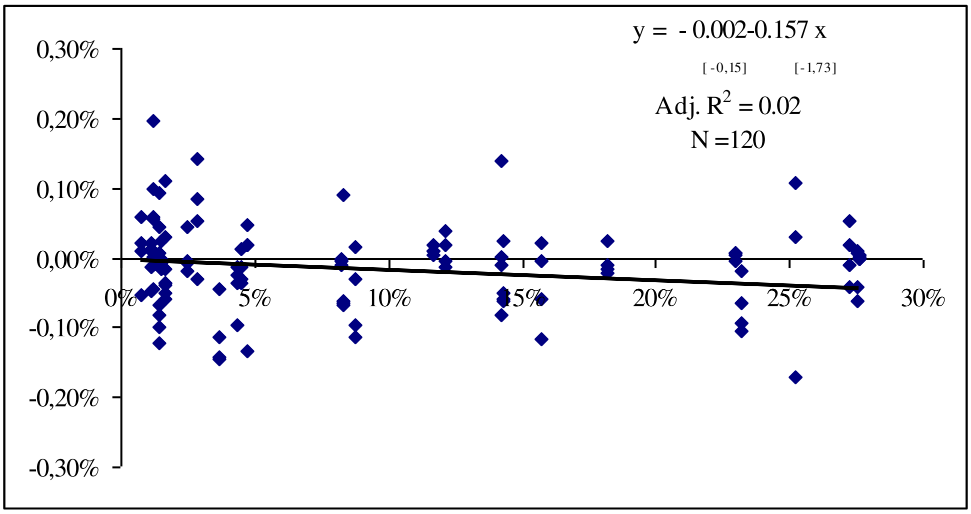

Fig. 2 : : Difference on mean Jensen's alpha between international and local FFM, for last sub-period, is the dependent variable. Size (country market capitalisation weight in EMU portfolio), during last sub-period, is the independent variable. There is 1 period and 4 portfolios, thus 40 observations.