THE EFFECTS OF EXCHANGE RATE AND INFLATION ON EUROPEAN STOCK MARKET INTEGRATION IN THE EMU[†]

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ABSTRACT

The aim of this paper is to investigate the effects of exchange rate and inflation on the hypothesis of an integrated European stock market in the context of the process of the European Monetary Union (EMU) during the period from January 1993 to December 2004. The extent of the period and the use of Fama and MacBeth [1973]'s methodology for estimating a large number of international asset pricing models, which includes an Adler and Dumas [1983] model, make possible to evaluate this hypothesis as a process towards the full integration in an International CAPM model of one factor. Our results are consistent with this hypothesis but show that the integration is not a homogeneous process throughout the period and for all stocks. Furthermore, the differences of integration between stocks are due to the differences in the dynamics of inflation and exchange risks and a change in the dynamics of risk premiums that translate the inflation and exchange risk premiums into the domestic risk premium.

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KEY WORDS: International asset pricing; exchange rate risk; inflation risk; time-varying beta risks; time-varying risk premiums; European Union.

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1. INTRODUCTION

On 1 January 1999, eleven countries of the European Union (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain) replaced their currencies by the euro which becomes the shared currency for every transaction in the monetary and stock markets. On 1 January 2001 Greece joins them and on 1 January 2002 these twelve countries put euro-denominated notes and coins into circulation. These measures made visible an intensive integration process of European countries to achieve an economic and monetary union (EMU) which can be summarized in three main stages: the creation of a Single Market (1992-93), the convergence of Economies (1994-98), and the adoption of the single currency (1999-today).

The purpose of this paper is to investigate empirically this liberalization and integration process in the European stock markets and specially to analyze the effects of exchange rate and inflation on pricing. Previous studies upon the subject include the seminal paper of Solnik [1974b] for the period from 1966 to 1971, and considering the incremental effects of the European convergence process and the effects of exchange rate on pricing the papers of Carrieri [2001] for the period from 1974 to 1995, De Santis, Gerard and Hillion [2003] from 1974 to 1995 and Hardouvelis, Malliaropulos and Priestley [2006] from 1991 to 1998. Besides, Vassalou [2000] shows that exchange rate and inflation risk factors explain a significant part of the cross-country differences in the returns of assets in an international pricing context. But none of this papers consider the effects of both exchange rate and inflation over a domestic risk factor (diversifiable internationally but not domestically) on the integration process and, to my knowledge, this study presents the first attempt.

We examine the stock exchange of Austria, Belgium-Luxembourg, Finland, France, Germany, Greece, Ireland, Italy, Portugal, Netherlands, Spain (Euro Zone) and United Kingdom using individual monthly security data during the time period from January 1993 until December 2004 in the context of the International Capital Asset Pricing Model (ICAPM) and the three international asset pricing models proposed by Vassalou [2000]. Each of there models in their original and integrated versions, in order to analyze the impact of exchange rate and inflation factors on pricing and also to test the hypothesis of international pricing (see e.g. Stehle [1977]). These models are estimated assuming a conditional approach and using the Fama and MacBeth's [1973] methodology to obtain the series of conditional betas and risk premiums associated to each factor of risk (see e.g. Ferson and Harvey [1991, 99]).

Our results are referred to the whole period 1993-04 and four subperiods 1993-96, 1997-98, 1999-00 and 2001-04, and can be summarized as follows. First, we find empirical evidence about the existence of a specific (non-diversifiable) country risk significant all the while and for the subperiods before 2001. Second, the betas associated to the market, the domestic factor, the inflation and the exchange rate are time-varying through the period and significant all the while for 75%, 66.7%, 6.38% and 0% of the countries respectively; and the ones associated to inflation and common exchange rate are also significant for one or more subperiods for 91.7% of countries. Furthermore, domestic, inflation and exchange rate risks are significantly priced by the market even in the last subperiod. Third, we confirm the evidences presented by Carrieri [2001] and De Santis, Gerard and Hillion [2003] upon the time-varying nature of risk premiums depending on economic conditions, institutional environment and the increase of the degree of integration of European stock markets throughout the 90's. But, we obtain additional evidence which shows that the integration of markets has been neither progressive nor uniform between counties and assets. Whereas the ICAPM is the best international asset pricing model to explain the returns of country portfolios in the subperiod from 2001 to 2004, the best ones for sector and size-book portfolios are an integrated version (with domestic risk significantly priced) of the Grauer, Lizenberger and Stehle model (see Grauer, Litzenberger and Stehle [1976]) and the Solnik-Sercu model (see Solnik [1974a] and Sercu [1980]) respectively in the same subperiod. Finally, our study upon the dynamics of conditional risk premiums after the euro adoption shows a substantial forecast response of the domestic risk premium to the unexpected shocks of the inflation and exchange risk premiums. Therefore the inflation and the exchange rate of euro are factors which could affect negatively in the future of the process of European financial integration.

The rest of the paper is organized as follows. Section 2 outlines the ICAPM and the other three international asset pricing model in their original and integrated versions and lays out our econometric approach. Section 3 describes the data and the portfolio construction methodology. Section 4 discusses the empirical results and Section 5 concludes the paper with a summary.

2. INTERNATIONAL ASSET-PRICING MODELS, INTEGRATION AND METHODOLOGY

Over the last forty years, financial markets have become more open to foreign investors and a vast literature looks at the effects of this liberalization on asset prices (see for instance the review of Solnik [1977], Stulz [1995] and Karolyi and Stulz [2003]). The purpose of this Section is not summarize this literature but present a brief of the main international models, examine how to implement an empirical test of integration (see e.g. Solnik [1974b], Stehle [1977] and Hardouvelis, Malliaropulos and Priestley [2006]), and outline our econometric approach and methodology.

2.1. THE FOUR MODELS INTERNATIONAL CAPM AND THEIR INTEGRATED VERSIONS

In an international setting, two main assumptions are considered in order to evaluate the level of financial integration: identical vs. different consumption opportunity sets and identical vs. different investment opportunity sets across countries. The consumption opportunity sets differ across countries when the relative prices of goods depend on where they are located and/or there are differences between the existing goods in each country and/or there are differences in tastes that determine a different basket of goods. Whereas investment-opportunity sets differs across countries when the barriers to the investment introduce a wedge between returns on assets for residents and for nonresidents.

The International Capital Asset Pricing Model (ICAPM) assumes that financial markets of K+1 countries are perfect, so transportation costs, tariffs, taxes, transaction cost and restrictions to short sales do not exist. And each investor is a price-taker, has the same information and is risk-averse. Consequently, the world market portfolio is efficient and the expected excess return[1] of asset j (over the risk-free interest rate expressed in terms of the reference currency K+1) obeys the following equation:

$$E(r_{jk}) = \gamma_0 + \gamma^w \beta_j^w \qquad [1]$$

where $E(r_{jk})$ is the expected excess of asset j in county k; γ^w is the expected excess return (market risk premium) of the world market portfolio; and β_j^w is the regression beta of asset j with the excess return on the world market portfolio. The original ICAPM implies that $\gamma_0 = 0$, but including this parameter the equation [1] although Black [1972]-type version of the model.

[1] This equation is also fulfilled by nominal returns if the asset in country k with a risk-free nominal return in reference currency has a beta equal to zero in terms of pricing equation and the inflation is nonstochastic or uncorrelated with nominal asset returns in that currency (see Stulz [1995]).

If we assume that inflation is stochastic and the consumption opportunity sets across countries are identical the world market portfolio is also efficient, but the expected excess return satisfy the Grauer, Litzenberger and Stehle [1976] model (GLS):

$$E(r_{jk}) = \gamma_0 + \gamma^{w}\beta_j^{w} + \gamma_{K+1}^{\pi}\beta_{jk}^{\pi} \qquad [2]$$

where γ_{K+1}^{π} is the expected excess return (inflation risk premium of the reference country) of a portfolio which is as highly correlated as possible with the inflation rate in reference country K+1, and β_{jk}^{π} is the regression beta of asset j in country k with the inflation of country K+1.

This hypothesis can be weakened assuming that the investors of the K+1 countries have potentially different consumption preferences. Under this assumption the world market portfolio is not efficient and turns into a component of the new efficient portfolio[2], and the previous models do not hold. Solnik [1974a] and Sercu [1980], and Adler and Dumas [1983] formulate their international asset pricing models in this new context. Solnik [1974a] and the revised version of his model as it appears in Sercu [1980] (S-S) assume that for each country there is a good whose price is constant in the currency of that country; there are as many goods as there are countries investors consume only the good that has zero inflation in their country or inflation is nonstochastic and the investment opportunity set is constant. Hence the investor of country k holds a combination of the world market portfolio and the bond of their country, and the expected excess return must satisfy the following equation:

$$E(r_{jk}) = \gamma_0 + \gamma^{w}\beta_j^{w} + \sum_{k=1}^{K}\gamma_k^{f}\beta_{jk}^{f} \qquad [3]$$

where γ_k^{f} is the expected excess return (exchange risk premium of country k) of a portfolio which is as highly correlated as possible with the return of bond of country k expressed in the reference currency (i.e. the exchange rate between currency k and the reference currency K+1) and β_{jk}^{f} is the regression beta of asset j in country k with the exchange rate between currencies k and K+1.

Finally, the Adler and Dumas [1983] model assumes that inflation is stochastic and investors measure inflation by different prices indexes. Therefore the investor of country k holds a combination of the world market portfolio and an inflation hedge portfolio, and the expected excess return can be written as:

$$E(r_{jk}) = \gamma_0 + \gamma^{w}\beta_j^{w} + \sum_{k=1}^{K+1}\gamma_k^{\pi}\beta_{jk}^{\pi} \qquad [4]$$

where γ_k^{π} is the expected excess return (inflation risk premium of country k) of a portfolio which is as highly correlated as possible with the inflation rate in reference country k and β_{jk}^{π} is the regression beta of asset j in country k with the inflation of country k.

The models described in [2], [3] and [4] allow us to test for the pricing of exchange rate and inflation risk, but not their relative importance. To test the latter hypothesis, following Vassalou [2000], we have to "nest" the three models into one specification[3] (we call it AD model) in the following manner:

$$E(r_{jk}) = \gamma_0 + \gamma^{w}\beta_j^{w} + \sum_{k=1}^{K+1}\gamma_k^{\pi}\beta_{jk}^{\pi} + \sum_{k=1}^{K}\gamma_k^{f}\beta_{jk}^{f} \qquad [5]$$

where the inflation terms are stated in the reference country K+1.

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[2] These models collapse into the ICAPM (in real returns) when investors have logarithmic utility because, in that case, investors' portfolios do not depend on the currency (see e.g. Adler and Dumas [1983] and Stulz [1995]).

[3] It is important notice that [5] does not include the model [4] strictly because the inflation terms are stated in the reference country rather than in local currency.

The hypothesis about a common risk premium across countries and consequently financial market perfectly integrated, is assumed implicitly in the ICAPM and GLS formulations because for these models the purchasing power parity holds and in the S-S model because the risk associated with the currency can be perfectly hedged[4]. And this hypothesis is also accepted (explicitly) in the Adler and Dumas [1983] and our AD model when these models are estimated assuming the same value of risk premium across countries. Thus we can measure the impact of market, inflation and exchange rate risks on pricing but we cannot test if the market is also pricing domestic risks. To evaluate if the market is integrated, following the methodology proposed by Stehle [1977], we have to estimate the integrated versions of the ICAMP, GLS, S-S and AD models and test if the domestic premium risk (risks diversifiable international but not domestically) is zero. To do that, we overparameterize the AD model (we name it integrated AD model) in the following manner:

$$E(r_{jk}) = \gamma_0 + \gamma^w \beta_j^w + \gamma^d \beta_{jk}^d + \sum_{k=1}^{K+1} \gamma_k^\pi \beta_{jk}^\pi + \sum_{k=1}^{K} \gamma_k^f \beta_{jk}^f \quad [6]$$

where γ^d is the expected return (domestic risk premium of country k) of an orthogonal domestic factor, β_{jk}^d is the regression beta of asset j in country k with the orthogonal domestic factor of country k, and this orthogonal domestic factor of country k is the equally weighted index corresponding to the residuals obtained from the projection of the excess returns of domestic market portfolio in country k (r_k) on the excess returns of world market portfolio (r_w) through the regression: $r_k = \alpha_k^{dw} + \beta_k^{dw} r_w + e_k$, $k = 1,...,K+1$.

It is worth noticing that ICAPM, GLS, S-S and AD models in their original and integrated versions are based on the assumption that first and second moments are constant. Hence, the marginal and conditional moments are identical and the investment opportunity sets are also identical across countries.

2.2. ECONOMETRIC APPROACH

In order to make our study we have to introduce some additional econometric specifications into the previous models. Firstly, we are interested in analyzing the integration of European stock markets as a process where consumption opportunity and investment opportunity sets across countries are subject to an evolution due to the political and economic agreements signed to extend European integration and the effect of the economic cycle. Therefore, we will assume that the previous theoretical models are satisfied in a conditional form (this is, that their first and second moments are the result of the available information) and we will estimate the models conditionally applying the scaling procedure[5] proposed by Cochrane [1996]. In this paper two instrumentals variables have been chosen for their capacity to predict the evolution of financial markets in the long-medium and short term[6]: the dividend yield on the European equity index (div) and the UK term spread (term) defined as the difference between four and one year Treasury bonds. Secondly, because exchange and inflation rates tend to move together to a large extent, the inclusion of changes of several inflation rates and/or several exchange rates in the same regression could create severe multicollinearity problems. To diminish this problem and increase the efficiency in the estimation of risk premiums simultaneously we propose adapting to the European stock market the reduction of dimensionality in the exchange and inflation

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[4] See the section VII of Adler and Dumas's [1983] paper and specially footnote number 86.

[5] Whereas in the scaling procedure the dynamics are introduced in the discount factors of the equation of valuation of the asset pricing model, in the alternative solution proposed by Dumas and Solnik [1995] the dynamics are introduced on the risk premiums directly.

[6] See e.g. Fama and French [1988, 89], Cochrane [1996] and Ferson and Harvey [1991, 99].

rate variables suggested in Vassalou's [2000] paper. Thus, we summarize the information on twelve inflation rates by means of two indexes: the UK inflation factor (r^{i}) and the excluding-UK inflation factor (r^{D}). Both calculated from the residuals (representing unexpected inflation), get after filtering the inflation series using an ARIMA(0,1,1) model and expressed in pounds sterling. The former is calculated from the innovations of UK inflation rates and the latter is the GDP weighted index of the innovations of all countries in our sample other than the United Kingdom.

As regards to the eleven/one exchange rates variables, we construct two indexes: the common exchange factor which measures movements of exchange rates that tend to be common across countries, and the residual exchange factor which aggregates the fluctuations of exchange rate that are specific to the individual countries. Our procedure involves the following steps. Our sample spans from January 1993 to December 2004, this is a total of 144 monthly observations that we separate into two groups: the pre-euro period (from 1 to 72) and the after-euro[7] one (from 73 to 144). For the observations of pre-euro period we project the changes (in logs) in each of the K countries on the remaining K-1 exchange rates through the following regression for k=1,2,…,11:

$$r_k^f = \delta_{0k} + \sum_{j \neq k} \delta_{jl} r_j^f + e_k \qquad [7]$$

where r_k^f is the logarithmic change in exchange rate of the country k, e_k represent the residual component of r_k^f, $k_k = r_k^f - \delta_{0k} - e_k$ is the common (or systematic) component of the K exchange rates; and $n_k = k_k - \bar{k}$ is the deviation of the common component of the K exchange rates from its mean. Then we construct two equally weighted indexes corresponding to the two sets of residuals for pre-euro period: the common exchange factor defined by $r^{\lambda} = \frac{1}{11}\sum_{k=1}^{11} n_k$ and the residual exchange factor defined by $r^{e} = \frac{1}{11}\sum_{k=1}^{11} e_k$. For the rest of the sample (after-euro period) we simply define this factor as $r^{\lambda} = r_{euro}^{f}$ and $r^{e} = 0$ respectively. The reference currency of this study is the pound sterling.

Based on the data transformations and the conditional approach followed in this paper, we state the integrate AD model in its marginal version (the remaining models can be considered as a particular case of this one) as follows:

$$\begin{aligned} E(r_{jk}) = {} & \gamma_0 + \gamma^{w}\beta_j^{w} + \gamma^{d}\beta_{jk}^{d} + \gamma^{i}\beta_{jk}^{i} + \gamma^{D}\beta_{jk}^{D} + \gamma^{\lambda}\beta_{jk}^{\lambda} + \gamma^{e}\beta_{jk}^{e} + \gamma^{w\cdot div}\beta_j^{w\cdot div} + \gamma^{d\cdot div}\beta_{jk}^{d\cdot div} \\ & + \gamma^{i\cdot div}\beta_{jk}^{i\cdot div} + \gamma^{D\cdot div}\beta_{jk}^{D\cdot div} + \gamma^{\lambda\cdot div}\beta_{jk}^{\lambda\cdot div} + \gamma^{e\cdot div}\beta_{jk}^{e\cdot div} + \gamma^{w\cdot term}\beta_j^{w\cdot term} + \gamma^{d\cdot term}\beta_{jk}^{d\cdot term} \\ & + \gamma^{i\cdot term}\beta_{jk}^{i\cdot term} + \gamma^{D\cdot term}\beta_{jk}^{D\cdot term} + \gamma^{\lambda\cdot term}\beta_{jk}^{\lambda\cdot term} + \gamma^{div}\beta_j^{div} + \gamma^{term}\beta_j^{term} \end{aligned} \qquad [8]$$

where $E(r_{jk})$ is the expected excess of asset j in county k (k=1, …, 12) expressed in pounds; γ^{F}, F=w, d, i, D, λ, e are the risk premiums associate with the world market, domestic, UK inflation, excluding-UK inflation, common exchange and residual exchange factors respectively; $\beta_j^{w}, \beta_{jk}^{F}$, F=d, i, D, λ, e are the beta risks of asset j with the world market, domestic, UK inflation, excluding-UK

[7] Although strictly speaking Greece switch to euro on 1 January 2001 and we have to distinguish two after-euro subperiods from 72 to 96 and from 97 to 144. Both the stability of the drachma in the period from 72 to 96 and the high correlation of the factors considering two subperiods or the whole period: 0.99371 and 0.96889 for the common and residual exchange factor respectively make this distinction worthless.

inflation, common exchange and residual exchange factors respectively; $\gamma^{F\cdot I}$ and $\beta_j^{w\cdot I}, \beta_{jk}^{F\cdot I}$, F=w, d, i, D, λ, e, I=div, term have the same interpretation but referred to the cross effects of each risk factors with the economic cycle; and γ^{I} and β_j^{I} I=div, term are the risk premiums and beta risks associated with the economic cycle.

To estimate the models (see general expression in equation [8]) we use monthly total returns and the two-stage procedure proposed by Fama and MacBeth [1973]. This classic methodology offers some appealing features for this study. This method generates the series of conditional betas and risk premiums associated to each factor of risk and it allows the analysis of the contribution of changes in beta and changes in the risk premium in stock returns[8]. Furthermore, this conditional series, given information available at month t-1, incorporate the changes of the market as a result of the European integration process progressively allowing the study of the gradual integration process of change.

Each model is estimated using a two-stage procedure. In the first step we obtain the series of conditional betas associated to each factor regressing using ordinary least squares (OLS) method the excess returns on each risk factor[9] for the time series of months t−48 to t−1. The slope coefficients in the time-series regressions provide the conditional beta given the information available at month t−1. The second step is to estimate the corresponding cross-sectional regression[10] for each month of the excess returns on the estimated betas. These cross-sectional regressions, which provide the conditional series of risk premiums, are estimated using the seemingly unrelated regression (SUR) method for the previous 48 monthly observations and iterating on the weighting matrix and coefficient vector simultaneously. Then, the risk premiums are jointly estimated using SUR from the series of conditional risk premiums. We also obtain the individual t-statistic for testing the hypothesis than each average premium is zero and the joint Chi-squared statistic for testing the hypothesis that all the risk premiums are equal to zero.

Additionally, to compare the relative performance of the models we estimate using the same procedure two benchmark models: the static null regressing the excess returns on a constant and the conditional null regressing the excess returns on a constant and the betas of instrumental variables, and we compute several measures of performance: (i) the percentage of variance explained by each model over the benchmark models and, in the case of positive percentage, the corresponding likelihood ratio test; (ii) the individual and joint mean tests to contrast if the residuals of each model are equal to zero; and (iii) the likelihood ratio tests between nested models. According to these statistics we define the best model as one with the following properties: it is not significantly worse than another, we accept the joint test of mean equal to zero for their residuals, and it explains the largest percentage of variance over the benchmark models.

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[8] Despite the GARCH methodology (see De Santis and Gerard [1997]) offers an alternative method that allows the specification of time-varying of risk, this is not appropriate for this study because it assumes a dynamic structure for the excess of returns and risk premiums that do not adjust with our descriptive statistics of these series (see Section 3.2).

[9] Other possibility is to estimate the betas jointly according to the most general specification with all the risk factors. The advantage is the reduction of the multicollinearity problems, but the disadvantage is the different economic interpretation of these betas.

[10] To implement this method in the S-S and AD models it is worth to notice that the residual exchange risk factor disappear in the 73 observation, therefore the series of conditional betas associated with the residual exchange has just 72 observations and the regression model changes and, consequently, the series of conditional risk premium are estimated separately for the subperiod 1 to 72 and 73 to 144 and the series of conditional risk premium associated with the residual exchange rate has also 72 observations.

3. DATA, PORTFOLIO CONSTRUCTION AND SUMMARY STATISTICS

Our study uses monthly total stock returns from twelve countries namely Austria, Belgium-Luxemburg[11], Finland, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain (Euro Zone) and United Kingdom (our reference country), and comprises the period from January 1993 to December 2004. These stocks are classified into three sets: the national market set which includes twelve portfolios, the sector set with ten portfolios and the size-book set with nine portfolios. In this Section we offer a description of the data used in our evaluation and upon the construction of the asset sets, and we provide a summary of descriptive statistics.

3.1. DATA

Our sample runs form January 1993 to December 2004, a period which comprises the most relevant dates of the European integration process from the creation of the Single Market (01/01/93) and European Union (01/10/93) to accession treaties with the East European countries. In the rest of paper, for the best understanding of the integration process and empirical results, we will distinguish four indicative subperiods: (i) from January 1993 to December 96: Creation of the Single Market, (ii) from January 1997 to December 98: The Amsterdam Treaty, (iii) from January 99 to December 2000: The adoption of Euro, and (iv) from January 01 to December 04: The Nice Treaty and Stability Programs.

We get the monthly total stock returns series used in this paper from the files of ECOWIN. To obtain these series: we download the series of daily prices, dividends and exchange rates and calculate the monthly total returns from the monthly prices expressed in pounds sterling (our reference currency) that we get spreading evenly the dividends after taxes throughout each year. To make a correction for taxes we use the one proposed by STOXX in the construction of its indexes: Austria 25%, Belgium-Luxembourg 25%, Finland 29%, France 25%, Germany 21.1%, Greece 0%, Ireland 20%, Italy 27%, Netherlands 25%, Portugal 25%, Spain 15% and the United Kingdom 0%. Our data includes (after filtering to remove those assets without information about dividends) 1726 security returns: Austria 62, Belgium-Luxembourg 42, Finland 119, France 262, Germany 267, Greece 23, Ireland 50, Italy 129, Netherlands 139, Portugal 18, Spain 53 and the United Kingdom 562. From this total stock returns series we construct our twelve equal weighted country portfolios. Table 1 shows the contemporaneous correlations and autocorrelations up to six month lag between our country portfolios and its correspondent national market index. The twelve benchmark indexes[12] are: ATX, BXS, the Finland Index, CAC40, DAX30, the SE General Index, the Irish SE, MIB30, AEX, the BTA General Index, IBEX35 and S&P150. It is worth noticing that all these correlations are significant at the 1% level with values in the range [0.37391, 0.83825], showing that our sample constitutes a good representation of European financial markets.

In the rest of the paper, we proxy the European (Euro Zone plus United Kingdom) stock market portfolio with the index Dow Jones STOXX-600 downloaded from STOXX website. All the excess returns are calculated in excess of the 3-month UK Treasury bond return facilitated by the Bank of England. And the series of inflation rates and GDP data are obtained from EUROSTAT.

The instrumental variables dividend yield and UK term spread are obtained from the series of monthly prices of index Dow Jones STOXX-600 with and without dividend adjustments facilitated by STOXX and the spot 1-year and 4-year UK Treasury bond returns from the Bank of England

[11] Our database does not distinguish between Belgium and Luxemburg stock markets so both stock markets are considered as one market in the rest of paper.

[12] All the data are obtained from ECOWIN and with the exception of Greece (in this case we cannot obtain information about dividends) are monthly total returns. The comparison is performed in pounds sterling.

respectively. Finally, the data to compute the book-size portfolios are also extracted from the files of ECOWIN.

3.2. PORTFOLIO CONSTRUCTION AND DESCRIPTIVE STATISTICS

We consider three sets of test assets: the national market portfolios, the sector portfolios and the book-size portfolios. The ***national market set*** of assets consists of twelve equal weighted country portfolios constructed from the 1726 monthly total stock returns series including a firm in his country portfolio in every month for which price and dividend data are recorded by Ecowin.

Table 2 reports a summary statistics for the national market portfolios, risk factors and instrumentals. The statistics are means, standard deviations, Jarque-Bera statistic, Ljung-Box Q-statistics of the original series and the square series up to order 6, 12 and 24 of the total return series, and the mean statistics of the excess total return series for all the sample and the four subperiods. Our evidences coincide with result from previous studies and we reject the hypothesis of normality at any level for all the series with the exception of Greece returns. There are also evidences about significant dynamic structure in means and variances but the AR and GARCH models do not represent these dynamics accurately. The average excess returns are not significant and negative for any portfolio for the whole period, and they are significant at 5% level and positive for France, Ireland, Spain and the United Kingdom.

Although this asset set provides us with the information about the integration level of domestic markets, we cannot assume that the degree of integration is homogeneous and independent of the characteristics of the assets because it is known that the risk premium to the risk factors is not the same for every industry or firm (see e.g. Jorion [1991] and Dahlquist and Sallstrom [2002]). So it is worth for learning to manage specific risks and discriminate between different asset pricing models, considering two additional sets related with sector and size characteristics. The higher dispersion in average returns of sector and size than national portfolios can be seen in Figure 1, where average returns and standard deviations are depicted. The ***sector set*** consist of ten equal weighted sector portfolios constructed by assigning each stock to one of the RBSS economic sectors according to the information facilitated by REUTERS. And the ***size-book set*** consist of nine equal weighted size and book-sorted portfolios. To construct these portfolios we rank all the stock according to their average of market capitalization at December 31 from 1992 to 2003 and then sort into three categories. Within each of these three categories, we further sort all assets into three categories based on their average of book-to-market ratio[13] at the same date.

Table 3 provides the summary statistics for the sector and size-book portfolios. The results are very similar to the ones discussed for the national market portfolios. We reject the hypothesis of normality at 5% level for all the portfolios with the exception of LH, LM and MH for the size-book asset set; AR and GARCH models are not adequated to describe dynamics in mean and variance; and the average excess returns are not significant and negative for any portfolio for the whole period, specifically they are significant at 5% level and positive for 50 % of sector portfolios and 44.44 % of size-book portfolios.

As regards the summary statistics for the risk factors (see Table 2), the hypothesis of normality is rejected at 5% level for every factor with the exception of the residual exchange factor and the average means are also not significant for any risk factor all the while. In reference to the instrumental

[13] The information used to calculate the numerator of the ratio book-to-market is the stockholders equity of all countries with the exception of Germany. In this case, the data facilitated by Ecowin is the long-term debt instead.

variables the descriptive statistics (see Table 2) confirm the previous work (see Fama and French [1988, 89]) both series are very persistent and the autocorrelations of dividend yield are higher than the ones of UK term spread[14] but they show some tendency towards mean reversion. Despite we cannot reject at 10% level the hypothesis of unit root for both variables; we reject this hypothesis at this level for the longest period from January 1990 to December 2004 (see ADF statistics in Table 2).

4. EMPIRICAL RESULTS

We now turn to the main aim of this paper, namely to investigate the process of integration of European financial markets and the effects of exchange rate and inflation on this process. To start this analysis it is worth stressing that we are studying a process of changes and take all the period globally hides the most relevant results. We will begin with a discussion of our results for the whole period from January 1993 to December 2004.

Tables 4 and 5 present the estimated beta risks for our six sources of risk using the national market set, and sector and size-book sets respectively. We observe that the domestic risks are significant (and positive) at 5% level for 66.7% of country portfolios, 50% of sector portfolios and 33.33 % of size-book portfolios. In contrast the inflation and exchange rate risks are significant at 5% level for a mere 6.4%, 29.8% and 0% of country, sector and size-book portfolios respectively. Although these early results all the while seems to show that the market is not integrated and the effects of inflation and exchange rate are not specially significant, it is also obvious at this point the time-varying nature of this risks. If we repeat the estimation and mean tests for the four subperiods (not include in the paper to save space) we observe that inflation and common exchange risks are significant (for at least one subperiod) for 91.7% of the country portfolios, 90% of sector portfolios and 100% size-book portfolios[15], and residual exchange risks are significant for 50%, 30% and 55.5 % of country, sector and size-book sets.

The estimation of the proposed asset pricing models (see estimation results in Tables 6 and 7, and diagnostic tests in Table 8) also indicate that the European financial markets do not make a common valuation of these risk for whole the period. None of the models explain a positive percentage of variance over the benchmark models, and there is either a common best asset-pricing model for every set. In any case, the best models are the integrated AD model for country portfolios, the S-S model for sector portfolios and the model AD for size-book portfolio. Therefore, the evidences about the integration of European financial market considering all the period are inconclusive.

We will dedicate the rest of the Section to study the evolution of integration process through this period analysing evidences for four indicative subperiods: (i) from January 1993 to December 96, (ii) from January 1997 to December 98, (iii) from January 99 to December 2000, and (iv) from January 01 to December 04. For this analysis, we proceed in four stages. First, we study the existence of a specific (non-diversifiable) country risk and their evolution during this period. Second, having established that these specific country risks tend to disappear throughout the period, we show the persistence of significant domestic and exchange beta risks. Third, we demonstrate that these time-varying beta risk are priced by the market. And finally, we analyse the time-varying risk premiums associated with domestic, exchange rate and inflation risks and the effects of the two latter on the former.

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[14] According with the usual interpretation of a dividend yield related to more persistent aspects of business conditions and a term spread related to short-term variation in business conditions.

[15] The exceptions are Greece and Energy.

4.1. EXISTENCE OF A SPECIFIC (NON-DIVERSIFIABLE) COUNTRY RISK

We start our study analysing the existence of a specific (non-diversifiable) country risk. Though this paper, every asset-pricing model is defined assuming a common risk premium for every diversifiable source of risk, so it implicitly accepts and quantifies (in their integrated version) the hypothesis of a market completely integrated. In this Section we will evaluate the hypothesis of a market partial integrated where there is a common valuation of diversifiable risks but it is also possible the existence of a specific country risk. The model to test the existence of such specific risks (expressed in their marginal form) is the following segmented AD model:

$$\begin{aligned} E(r_{jk}) = {} & \gamma_{0k} + \gamma^{w}\beta_{j}^{w} + \gamma^{d}\beta_{jk}^{d} + \gamma^{i}\beta_{jk}^{i} + \gamma^{D}\beta_{jk}^{D} + \gamma^{\lambda}\beta_{jk}^{\lambda} + \gamma^{e}\beta_{jk}^{e} + \gamma^{w\cdot div}\beta_{j}^{w\cdot div} + \gamma^{d\cdot div}\beta_{jk}^{d\cdot div} \\ & + \gamma^{i\cdot div}\beta_{jk}^{i\cdot div} + \gamma^{D\cdot div}\beta_{jk}^{D\cdot div} + \gamma^{\lambda\cdot div}\beta_{jk}^{\lambda\cdot div} + \gamma^{e\cdot div}\beta_{jk}^{e\cdot div} + \gamma^{w\cdot term}\beta_{j}^{w\cdot term} + \gamma^{d\cdot term}\beta_{jk}^{d\cdot term} \\ & + \gamma^{i\cdot term}\beta_{jk}^{i\cdot term} + \gamma^{D\cdot term}\beta_{jk}^{D\cdot term} + \gamma^{\lambda\cdot term}\beta_{jk}^{\lambda\cdot term} + \gamma^{div}\beta_{j}^{div} + \gamma^{term}\beta_{j}^{term} \end{aligned} \quad [9]$$

where γ_{0k} is the specific (not-diversifiable) risk of country k. This model nests the other asset-pricing models into one specification and therefore it allows us to evaluate the relative importance of these possible risks.

Table 6 shows the results from the estimation of this segmented AD model and the best model to represent total returns of country portfolios for each period and Panel A in Table 8 their diagnosis tests. It is worth noticing that the segmented AD model does not give a good representation of our data all the while: the percentage of variance over the benchmark models is negative and the minimum of the group and its estimation is not unbiased. The estimation for subperiods and the summary series of specific risks computed will show that these specific risks have progressively reduced during the period from 1993 to 2004.

The results from the estimation for the four subperiods can be summarized as follows. The diagnostic tests show that the best model for the ***subperiod 1993-96*** is the segmented AD model. This model is significantly better at 1% level than both benchmark models and the integrated AD model, though its estimation is jointly biased at 5% level. All specific country risks are jointly and individually significant at 1% level and positive for every country with the exception of Austria. In addition, the domestic, excluding-UK inflation, common and residual exchange risks are also significantly priced at 1% level. The integrated AD model is the best model for the ***subperiod 1997-98*** being significantly better at 5% level than both benchmark models, though their estimation is also jointly biased at 5% level. The UK and excluding-UK inflation and common and residual exchange risks are significantly priced at 1% level, but the domestic risk is not significantly priced at 10% level. In the ***subperiod 1999-00*** the integration process recedes and the best model for explaining returns is the segmented AD model. Now, the percentage of variance explained for the model versus the benchmark models is positive but not significantly positive at 5% level, and we cannot reject the joint test of mean of residuals equal to zero at 5%. As regards the estimation results: all specific country risks are jointly significant at 1% level, all specific country risks are also individually significant at 1% with the excepting of Belgium, Netherlands and Spain and positive with the exception of Austria. In addition, the domestic and common exchange risks are significantly priced at 1% level whereas the inflation risk is not priced at 10% level. During ***the subperiod 2001-04*** the integration process recovers positions and the ICAPM is the best model. The estimation is unbiased and the percentage of variance explained for the model over the benchmark models positive. Furthermore, the specific country risks estimated in the segmented AD model are jointly not significant at 10% level.

Since the results for subperiods 1993-96 and 1999-00 show the existence of a specific country risk significantly priced, it is worthwhile to examine the tendency of these specific country risks through this period of time. To implement this study our procedure is as follows. First, we calculate three series summarizing the information of the twelve conditional series of specific country risks obtained from the second stage of Fama and MacBeth's [1973] estimation of the segmented AD model. We will denote these series by average-γ_0, lowest-γ_0 and highest-γ_0. The series average-γ_0 is the average of the twelve conditional series of specific country risks, the series lowest-γ_0 is the average of the three lowest (in absolute value) specific country risks and the series highest-γ_0 is the average of the three biggest ones. And second, we regress these series using weighted least squares estimation[16] on the constant, three dummies (to measure the incremental effect of second, third and forth subperiod), the own series lagged by one month and five economic variables which provide information about the economic cycle[17]: the excess of European market, SMB, HML and both instrumental variables also lagged by one month.

Panel A in Table 9 summarizes the results from these estimations. We observe that all the series have decreased through the period as a function of changes in economic conditions and the institutional environment[18]. Furthermore, these reductions are significant at 5% level for 1997-98, 1999-00 and 2001-04 subperiods. So we must conclude that the recession on the European integration process during the period from 1999 to 2000 was due to the increase of domestic risk premiums and not to an increase of specific country risks. On the other hand, the same regression allows us to quantify the significance of these specific country risks in every subperiod. The results are as follows: the three summary series are significant at 5% level and positive for the subperiod 1993-96, the series average-γ_0 and highest-γ_0 remain significant at 5% level and positive for the subperiods 1997-98 and 1999-00, and average-γ_0 is the only summary series that remains significant at 5% level and positive for the subperiod 2001-04. It is worthy of attention for the latest subperiod than the countries with lowest specific risks are Belgium, Spain, Italy and Ireland and the countries with highest ones are Austria, Greece, Portugal and the United Kingdom.

Overall, according to the conclusions in Hardouvelis, Malliaropulos and Priestley [2006] the reported results show that the European financial markets are converging towards an integrated market. However the significance of the summary series average of the twelve specific country risks must be considered as a warning about this process and indicates that there are frictions in the market that must be reduced persisting in the development of strategies of harmonization among markets.

4.2. STRUCTURAL CHANGE IN THE BETA RISKS

Let us turn our attention to the series of beta risks associated to market, domestic, inflation and exchange rate risks. In this Section we will examine whether these risks are time-varying as a function of changes in economic conditions and the institutional environment, and if the magnitudes of these risks (and hence the risk premium component in the asset-pricing equation) are related to the

[16] Each weight series is obtained from the regression of the squared series on the constant and the three dummies using the same estimated coefficient all the while.

[17] The excess of market returns has been used to foresee the economic cycle in several paper such as Fama and French [1988, 89]. In addition, the portfolios SMB and HML are computed from the size-book portfolios using the expressions: SMB=(LH+LM+LL-HH-HM-HL)/3 and HML=(LH+MH+HH-LL-ML-HL)/3, and can be interpreted simultaneously as factors of risk (see e.g. Fama and French [1995, 96]) and predictors of economic cycle (see Liew and Vassalou [2000] and Vassalou [2001]).

[18] The variable dividend yield contributes to explain the changes of gammas_0_m and gammas_0_b positively and significantly at 5% level, whereas the UK term spread contributes to explain the changes of the three summary series negatively and significantly at 1% level.

characteristics of assets. To implement this analysis we proceed, in a similar way than when we study in Section 4.1 the conditional series of specific country risks, as follows: summarizing the conditional series of beta risks for each factor and portfolio, which are obtained from the first stage of Fama and MacBeth's [1973] estimation, in three summary series for each risk factor and set called with the name of the beta risk preceded by average, highest or lowest referring to the average of all the set, the three highest ones and the three lowest ones respectively; and implementing the corresponding regressions of each summary series on a constant, three dummies and the lagged economic variables.

Panels B, C and D in Table 9 report the results from these regressions for all the series of beta risks using the country set, and for domestic, UK inflation, excluding-UK inflation and common exchange rate using the sector and size-book sets[19]. We will start with the results for ***national country set***. Although the average beta risks for all country are nearly no significant and we cannot appreciate significant differences between countries and subperiods, these ones make visible when we considerate the lowest beta domestic, inflation and exchange rate risks. We can summarize the regression and related tests results as follows: (i) the average market risk is significant at 1% level and positive[20] whereas the average domestic, inflation and exchange rate are no significant at 5% level; (ii) the lowest UK-inflation risk is increasing and it is significant at 5% level and negative for the four considered subperiods; (iii) the lowest excluding UK-inflation risk is decreasing and it is significant at 1% level and positive for the four subperiods; (iv) the lowest common exchange rate risk is significant and positive; and (v) the lowest domestic risk is increasing and it is significant at 1% level and positive for the four subperiods, and the highest domestic risk is significant at 1% level for the period 1993-96 and negative. The capacity of economic variables to explain these dynamics is weak: SMB and HML are significant at 5% and 10% level respectively for the average excluding-UK inflation risk; SMB and dividend yield and UK term spread are significant at 10% and 1% level respectively for the average common exchange rate risk; UK term spread is significant at 10% for the average residual exchange rate risk; and SMB is significant at 5% for the highest excluding-UK inflation risk, and dividend yield is significant at 5% level for the highest domestic, lowest excluding-UK inflation and lowest common exchange rate risks.

Overall, the results for country portfolio show a reduction of the risks associated to inflation and exchange rate in accordance with the ICAPM model assumed for the period from 2001 to 2004. But also show that some countries are more sensible than others to domestic risk, and it is worth recalling that this risk seems to be priced in recession periods. For regulatory and managerial proposes is also worthy of notice that for the period 2001-04 the level of exposure to domestic, inflation and currency risks is as follows. The less exposed counties are Austria, Belgium and Netherlands to the domestic risk; Austria, Greece and Ireland to the UK inflation risk; Austria, Spain and Italy to the excluding-UK inflation risks; and Germany, Finland and United Kingdom to the common exchange rate risk. And the more exposed ones are Germany, France and Portugal to the domestic risk; Germany, France and Netherlands to the UK inflation risk; Germany, Greece and United Kingdom to the excluding-UK inflation risk, and Austria, Greece and Italy to the common exchange rate risk.

The results for ***sector and size-book sets*** are similar to the ones discussed for national country set even thought the exposures to excluding-UK inflation and common exchange rate risks for some portfolios are larger. Similarly: (i) the average market risk of the sector portfolios is significant at 5% level and positive for the subperiods 1993-96 and 1997-98, and the lowest market risks of both sector

[19] The rest of results from regressions for market and residual exchange risks are not included in the paper to save space.

[20] The lowest market risk is also significant at 5% level and positive.

and size-book portfolios are significant at 1% level and positive for the four subperiods; (ii) the lowest domestic risks of sector and size-book portfolios are significant at 5% and positive for the four subperiods whereas the highest ones are no significant at 5% level; and (iii) the lowest UK-inflation risk of sector portfolios is significant at 1% level and negative while the one of size-book portfolios is no significant at 5% level. And the differences, owing to exposure to excluding-UK inflation and common exchange risks, are the following. For sector portfolios, which is the set most sensible to these risks: (iv) the lowest excluding-UK inflation risk is significant at the 1% level and positive for the subperiods 1993-96 and 1997-98; and (v) the average and lowest common exchange risks are significant at 5% level and positive for the subperiods 1997-98, 1999-00 and 2001-04 and the highest one also significant but negative. For size-book portfolios (vi) the average common exchange rate risk is significant at 5 % level and positive for the subperiod 1997-98 and the highest one for the subperiods 1997-98, 1999-00, 2001-04. Related to the capacity of economic variables to explain these dynamics: the dividend yield is significant at 5% level for highest domestic, all UK inflation, average and highest excluding-UK inflation and all common exchange rate risks of sector portfolios; and for lowest market and domestic, all UK inflation, and average and highest excluding-UK inflation risks of size-book portfolios. And the UK term spread is significant at 5% for lowest and highest market, lowest UK inflation and highest excluding-UK inflation, and average and highest common exchange rate risks of sector portfolios.

In conclusion, we observe according with an integrated market scenario that the beta risks associated to domestic, inflation and exchange rate tend to reduce throughout the period but this process is not concluded and is not also exempted from threats. It is also worthy of attention than the lowest domestic risks of all asset sets and the average, lowest and highest-common exchange risks of sector and the highest one of size-book portfolios still persist for the period form 2001 to 2004.

4.3. EVALUATION OF INTERNATIONAL ASSET-PRICING MODELS

A further discussion of this issue requires come back to the evaluation of international asset-pricing models. In Section 4.1 we established the best model for explaining the country portfolios returns all the while and for the four subperiods of this study, but the new evidences of Section 4.2 about the highest exposure to inflation and exchange rate risks of the sector and size-book portfolios and the several papers establishing differences between the risk premiums due to own firm hedging strategies (see e.g. Geczy, Milton and Schrand [1997]) and/or investor strategies associated to country, industry, size and book ratio of firms (see e.g. Roll [1992], Heston and Rouwenhorst [1994], Griffin and Karolyi [1998] and Petrella [2005]) justify this new attempt for the sector and size-book sets.

Table 7 resumes the results from the estimation for sector and size-book sets and Table 8 their performance statistics. As it was pointed at the introduction of Section 4, although the chosen models are the integrated AD model for country portfolios, the S-S model for sector portfolios and the model AD for size-book portfolio, the diagnosis tests for the whole period and so estimation results are inconclusive. Hence, it is worthwhile to evaluate the international asset-pricing models by subperiods.

The results from the estimation for the four subperiods can be summarized as follows. We noticed at Section 4.1 that the segmented AD model is the best model for explaining country portfolios returns for the ***subperiod 1993-96***. This partial integration scenario with significant specific country risks deserves a special care in the interpretation of our estimation results for sector and size-book portfolios and gives an explanation for the bad performance of all asset-pricing models for this data. In spite of his bad performance, the preferred model for this subperiod is the GLS model for sector and size-book portfolios. Besides, the market premium is significant at the 1% level and negative (while it is positive for national country set) and the UK inflation premium is significant at 1% level (while it is not significant at 5% level for country portfolios) and positive. In the ***subperiod 1997-98*** the domestic risk left to be significant priced by the market for country portfolios thought both inflation and exchange rate risks remain significantly priced. The best models for sector and size-book sets are the integrated GLS model (whose domestic premium is also not significant at 10% level) and the ICAPM respectively. Thus the European financial markets push ahead the integration process. In addition, the market premium is not significant at 10% level for sector portfolios and significant at 1% level and negative for size-book portfolios. Our previous results for the ***subperiod 1999-00*** and country portfolios point to a recession in the integration of European stock markets with the reappearance of domestic risks significantly priced. With reference to sector and size-book sets the best models are the ICAPM for sector portfolios and the AD model for size-book portfolios. None of them includes a domestic premium but the excluding-UK inflation and exchange rate premiums are now significantly (at 1% level) priced. As regards to the market risk premium it is significant at 1% level for sector and size-book assets but is negative for sector portfolios. Singularly, because the best model for country portfolios is the ICAPM, the evidences of integration of market for the ***subperiod 2001-04*** are weak when we consider sector and size-book sets. The best asset-pricing models are the integrated GLS model for the sector portfolios and the integrated S-S model for the size-book portfolios. Furthermore, the domestic risk premium is significant at 1% level and negative for sector portfolios, and also significant at 1% level but positive for size-book portfolios. With reference to the rest of risk premiums: the UK-inflation risk premium is significant at 1% level and negative for sector set, the common exchange rate risk premium is significant at 1% level and positive for size-book set, and the market risk premium is significant at 1% for both sets but negative for size-book portfolios.

The overall performance of these models for sector and size-book portfolios is poorer than for country portfolios since the estimations are unbiased excepting for subperiod 1993-96 and size-book assets but the percentage of variance explained for the model versus the benchmark models is positive only for subperiod 1999-00 and size-book portfolios and for subperiod 2001-04. But, interestingly the estimated domestic coefficient, inflation and exchange rate coefficients from the integrated AD model for sector and size-book portfolios suggest an effect of compensation between the domestic risk premium and the inflation and exchange rate risk premiums. We will investigate this mechanism in the next Section.

To sum up, our results indicate that the domestic risks, which are statistically significant for portfolios of all asset sets, are also significantly paid by the market for sector and size-book portfolio. This is, for those assets which are actually more sensible to inflation risks and especially to exchange rate risks. Therefore, the integration process does not extend their effects among all assets equally and we can talk about more or less integrated asset sets. To make a quantification of the mis-specification errors for subperiod 2001-04 when we assume an ICAPM model independently of the characteristics of assets we estimate, using the mean of the average beta risks series an overvaluation of excess total returns of 12.17% for sector assets and an undervaluation of 119.50% for size-book assets.

4.4. STRUCTURAL AND RELATIVE CHANGES IN THE RISK PREMIUMS

We will conclude this study examining the structural and relative changes in the series of market, domestic, UK and excluding-UK inflation, and common and residual exchange rate risk premiums. Specifically, we will analyze whether these risks are time-varying as a function of changes in economic conditions and the institutional environment, the tendency of this series during the period of study, and the possible relation between the domestic risk premium and the inflation and exchange rate risk premiums postulated in the previous Section. To make the first analysis we regress, using weighted least squares estimation[21], the series of conditional risk premiums obtained from the second stage of Fama and MacBeth's [1973] estimation of AD model for each asset set on the constant, three dummies (to measure the incremental effect of second, third and forth subperiod), the own series lagged by one month, five economic variables related with the economic cycle: the excess of European market, SMB, HML and both instrumental variables lagged by one month, and the corresponding residual (from the regressions implemented in Section 4.2) of average beta risk series also lagged by one month. And to realize the latter we estimate two multivariate VAR(1) models in the residuals obtained from the projection of the risk premiums on a constant, a dummy (signalling the change of subperiod), the previous five economic variables lagged by one month and all the residuals of average beta risk series also lagged by one month for the periods pre-euro (1993-98) and post-euro (1999-04) for each data set.

Panels A to C in Table 10 report the estimated coefficient from the univariate regressions. The results from these regressions can be summarized as follows: (i) the market risk premium shows a common tendency for all the asset sets: it is positive (and significant at 10% level for country portfolios) for the subperiod 1993-96, it decreases (significantly at 5% and 10% level for country and size-book portfolios respectively) in the subperiod 1997-98, it increases[22] (significantly at 5% level for country portfolios) in the subperiod 1999-00, and it continues increasing (significantly at 1% level for sector portfolios) during the subperiod 2001-04; (ii) the domestic risk premium (significant at 1% level for size-book assets and negative for all assets and subperiod 1993-96) declines significantly through the period for country assets whereas it grows significantly for sector and size-book assets[23]; (iii) Both inflation risk premiums decrease through the period for the three asset sets but excluding-UK inflation risk premium does significantly[24]; and (iv) the common exchange risk premium increases significantly through the period for country assets whereas it decrease also significantly for sector and size-book portfolios in subperiods 1997-98 and 1999-00 and increase not significantly in subperiod 2001-04[25]. As regards to the capacity of economic variables and the beta risks to explain these dynamics: (iv) the UK inflation risk premium for country portfolios and for sector and size-book portfolios react opposite to economic cycle (the coefficients of term are significant at 5% level and positive for country portfolios and negative for sector and size-book portfolios); (v) the UK inflation, excluding-UK inflation and common exchange rate risk premiums are more sensible to the behaviour of corresponding beta risk than the rest of series[26]; and (vi) the market risk premium for country portfolios is explained significantly by EXM, the domestic risk premium for country portfolios and for size-book portfolios by SMB and EXM respectively, the UK inflation risk premium for every asset set by UK term spread, the excluding-UK inflation risk premium for country and sector portfolios by

[21] Each weighted series is obtained from the regression of the squared series on the constant and the three dummies using the same estimated coefficient all the while.

[22] The market risk premium decreases for sector portfolios but not significantly at 10% level in the subperiod 1999-00.

[23] The domestic risk premium declines significantly at 5% level in the subperiod 1999-00 for country portfolios whereas it grows significantly at 1% level in the subperiods 1997-98 and 1999-00 for sector and size-book portfolios and in the subperiod 2001-04 for size-book portfolios.

[24] The excluding-UK inflation risk premiums decrease significantly at 1% and 10% level in subperiod 1997-98 for country and size-book sets and at 5% level in subperiods 1999-00 and 2001-04 for sector portfolios.

[25] The common exchange risk premium increases significantly at 5% level in the subperiod 1999-00 for country assets. In contrast it decreases significantly for sector (at 1% level) and size-book (at 5% level) sets in the subperiod 1997-98 and for sector (at 10% level) in the subperiod 1999-00.

[26] The beta risk coefficients of UK inflation risk premiums are significant at 1% level for all asset sets, the ones of excluding-UK inflation risk premiums are significant at 5% level for country and sector sets, and the ones of common exchange rate risk premiums are significant at 10% level for country and sector sets. In contrast, the beta coefficients of the rest of series are not significant.

SMB and EXM respectively, and the common and residual exchange rate risk premiums for sector portfolios (at also 1% level) by UK term spread.

Let us turn now our attention to the forecasting relation between risk premiums in a multivariate context and, for a best understanding, let us to discount these significantly differences in the dynamics of risk premiums due to economic cycle and beta risks thereof. The main results of our dynamic analysis of orthogonalized risk premiums are summarized in the Figures 2, 3 and 4, plotting the generalized impulse-response function of the (orthogonalized) domestic risk premium to one standard deviation innovations of the (orthogonalized) inflation and exchange rate risk premiums, the generalized impulse-response function of the (orthogonalized) inflation and exchange rate risk premiums risk premiums to one standard deviation innovations of the (orthogonalized) domestic risk premiums, and the impulse-response function of the (orthogonalized) domestic risk premium to one standard deviation innovations of (orthogonalized) inflation and exchange risk premiums given the (orthogonalized) domestic and market risk premiums respectively. And in the Panel D of Table 10, which reports the forecast error variance decomposition of (orthogonalized) domestic risk premiums of 6 and 12 months ahead based on the following order: (orthogonalized) domestic, market, common exchange, residual exchange, inflation UK and inflation excluding UK risk premiums. The dynamic analysis of the orthogonalized risks premiums using the generalized impulse-response functions shows clear differences in the complex patterns of causality between risk premiums for the periods pre- and post-adoption of the euro and between the country set and sector and size-book sets, which can be summarized as follows: (i) the impact response of the (orthogonalized) inflation and exchange risk premiums to the shocks of the (orthogonalized) domestic risk premium is lower than 0.3% for the pre-euro period and all the assets whereas it is higher than 0.3% and persistent for more than one month ahead for the post-euro and sector and size-book assets[27]; and (ii) the impact response of the (orthogonalized) domestic risk premium to the shocks of the (orthogonalized) inflation and exchange risk premiums are lower than 0.3% for country assets and both periods, while it is higher than 0.3% for sector and size-book assets and pre-euro period, and higher than 0.3% and persistent for the post-euro period[28]. Overall, there are evidences that the (orthogonalized) inflation and exchange risk premiums are cause of the (orthogonalized) domestic risk premiums and vice versa and thus we cannot establish the direction of causation between both groups of risk premiums without other assumptions. It is worth considering, therefore, the measure of the shocks of the (orthogonalized) inflation and exchange risk premiums at a given point in time on the (expected) future value of the (orthogonalized) domestic risk premiums beyond the forecast information contained in the domestic and market risk premiums. The analysis of the impulse-response of the (orthogonalized) domestic risks premium given

[27] The impacts of shocks of the domestic risk premium on the UK inflation risk premiums last for 23 months ahead with values in the range from -2.57% to 33.9% for sector assets and 14 months ahead and values from -15.5% to -0.36% for size-book assets; on the excluding-UK inflation risk premiums last for 18 months and values from -1.52% to 2.73% for sector assets and 11 months and values from -7.35% to -0.35% for size-book assets; and on the common exchange risk premiums for one month ahead and value -0.35% for sector assets and for 6 months and values from -2.20% to -0.47% for size-book assets.

[28] For the pre-euro period, the response of domestic risk premium to the shocks of inflation and exchange risk premiums lasts one month ahead for sector and size-book assets with values of -0.73, 0.61 and -0.59% for residual exchange, common exchange and inflation excluding-UK risk premium shocks and sector assets, and values of -0.42% for common exchange risk premium shocks and size-book assets. For the post-euro period, the response of domestic risk premium to the shocks of the inflation excluding-UK risk premium lasts for 11 months ahead with values in the range from 0.26% to 0.79% for sector assets and one month ahead and value -0.38% for size-book assets; to the shocks of the common exchange risk premium for 9 months and values from -046% to 0.70% for sector assets and 2 months and values -0.51% and -0.39% for size-book assets; and to the shocks of the UK inflation risk premiums for 9 months and values from 0.33% to 1.34% for sector assets.

the (orthogonalized) domestic and market risks premiums to one standard innovation of the (orthogonalized) inflation and exchange rate risk premiums (reported in Figure 4) shows that (iii) the conditional impact response of the (orthogonalized) domestic risk premium to the shocks of the (orthogonalized) inflation and exchange risk premiums are lower than 0.3% for pre-euro period and all assets sets and for post-euro period and size-book portfolios, whereas it is higher than 0.30% and positive for post-euro period and country assets and higher than 0.30%, persistent and positive for post-euro period and sector assets[29]. To complete this picture we also calculate the forecast error variance decomposition of the (orthogonalized) domestic risk premium (reported in Panel D of Table 10) for 6 and 12 months ahead, the results prove the increasing percentage of variance explained for the (orthogonalized) inflation and exchange risk premium from 1.35% to 17.93% for country assets and from 5.03% to 40.13% for sector assets and a small reduction from 1.6% to 1.08% for size-book assets.

In conclusion, our results show a change in the dynamics of risk premiums after the adoption of euro that produces a forecast revision at rise of the domestic risk premium from the additional and relevant information provided by inflation and common risk premiums. The magnitude and persistence of these effects would depend on the characteristic of assets and could increase for some assets due to the highest of sensibility of the dynamics of inflation and exchange risk premiums to the behaviour of beta risks.

5. CONCLUSIONS

This paper examined the level of integration achieved by the stock markets of Euro Zone plus United Kingdom and, specially, the effects of inflation and exchange rate on this process and on the asset pricing from January 1993 to December 2004. This study was implemented using three asset sets: country, sector and size-book portfolios and estimating four international asset pricing models, namely ICAPM and the GLS, S-S and AD models as approached by Vassalou [2000] in their original and integrated (following the integration test model suggested by Stehle [1977]) versions.

The results can be summarized as follows. Our findings based on the country portfolios show that the European financial markets are converging towards an integrated market through the period from January 1993 to December 2004. More specifically, the specific country risks are significantly diminishing all the while and the European financial market evolved from a segmented AD model, which assumed the existence of specific country risks and paid for risks associated to domestic, inflation and exchange rate risk factors for the subperiod 1993-96 into an ICAPM model for the subperiod 2001-04. Furthermore, the results for the periods 1993-96 and 1997-98 are in accord with the ones provided by Carrieri [2001] and De Santis, Gerard and Hillion [2003] for the period from 1974 to 1995 and by Hardouvelis, Malliaropulos and Priestley [2006] for the period from 1991 to 1998 assuming that the inflation rate was zero or nonstochastic. But, we also showed that this is not a homogenous process and some countries are more sensible than others to specific country (non-diversifiable) risks and to domestic (diversifiable and probably priced in recession cycles) risks. Furthermore, we found significant evidences about non-zero domestic beta risk for the subperiod 2001-04.

[29] The conditional response of domestic risk premium to the shocks of the inflation UK risk premium is 0.30% for 3 months ahead for country assets and last from 3 to 8 months ahead with values in the range [0.4, 0.60] for sector assets; to the common exchange risk premium is 0.30% for 5 months ahead for country assets and last from 2 to 10 months ahead with values in the range [0.31, 1.02] for sector assets; and to the inflation excluding-UK risk premium last from 2 to 10 months ahead with values in the range [0.40, 0.64] for sector assets.

A further study of the issue considering the other two asset sets highlighted the effects on the inflation and exchange rate on both the valuation of assets and the European stock market integration process itself. The main results are the following:

- The exposures to inflation and exchange rate risk for sector and size-book portfolios are larger than the ones for country portfolios and some of them significant for the subperiod 2001-04. In addition, some domestic beta risks are also significant for the subperiod 2001-04.
- The domestic, inflation and exchange rate risks are priced significantly for sector and size-book portfolios. The average calculated errors of mis-specification when an ICAPM is assumed are in the order of an overvaluation of 12.17% for sector portfolios and an undervaluation of 119.50% for size-book assets.
- The domestic risk premium for country assets decline whereas the one for sector and size-book assets increase significantly during the period. Furthermore, our results show a change in the dynamics of risk premiums after the adoption of euro that produces a forecast revision at rise of the (after discounting the effects of the economic cycle and dynamics of beta risks) domestic risk premium from the additional and relevant information provided by inflation and common risk premiums with an explanation of 17.93% of 12-months-ahead forecast errors of the (orthogonalized) domestic risk premium for country assets and of 40.13% for sector assets.
- The magnitude and persistence of these changes in the dynamics of risk premiums would depend on the characteristic of assets and could increase in response of the sensibility of the dynamics of inflation and exchange risk premiums to the behaviour of beta risks.

In our opinion these findings have some important implications. First, the significant domestic risks for some country portfolios are a warning about the existence of financial barriers among the countries. Second the characteristics of assets (independently of the country) differentiate the level of sensibility to inflation and exchange rate risks and could affect significantly in the pricing of the asset. Third, the detected changes in the dynamics of risk premiums after the adoption of euro represents another warning for the European stock market process since an unexpected increase in the inflation or exchange risk premiums wouldl lead an increase in the domestic risk premium and hence a loss to the integration process. Finally, to penetrate into the degree of integration would suppose to reduce financial barriers among countries and control inflation, but likely this integration will be towards an international asset pricing model like the one suggested by Adler and Dumas [1983].

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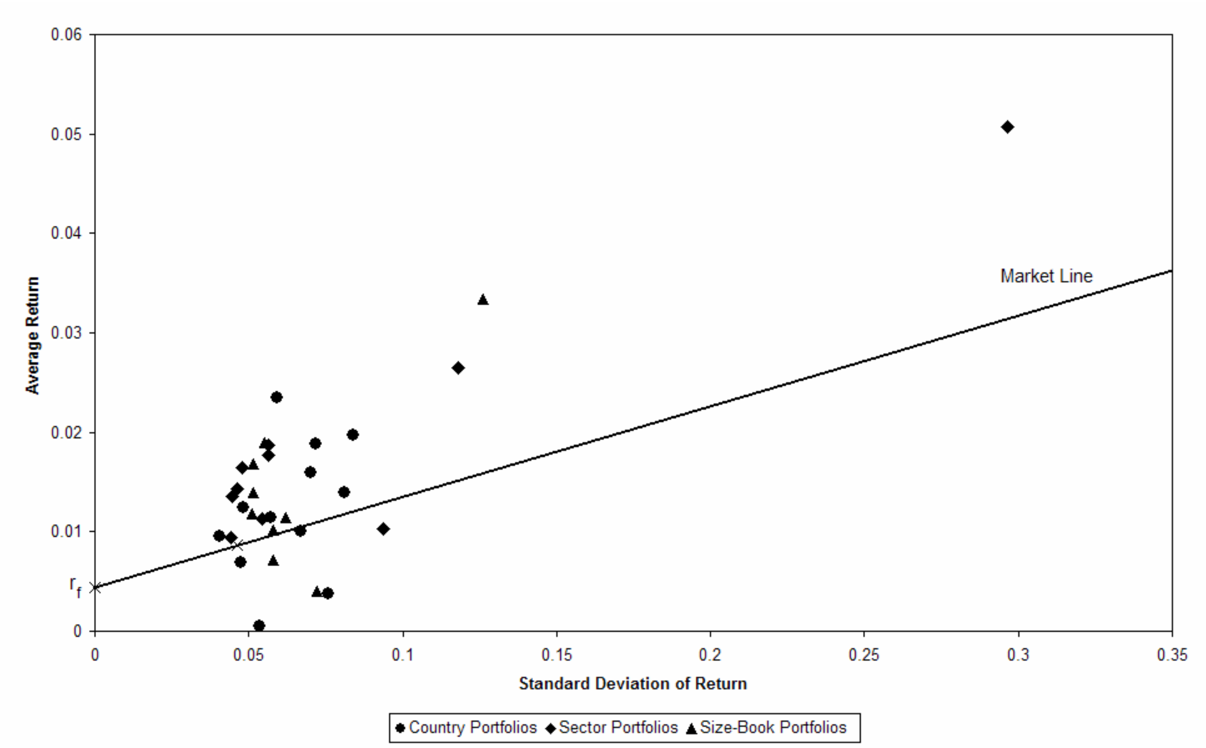
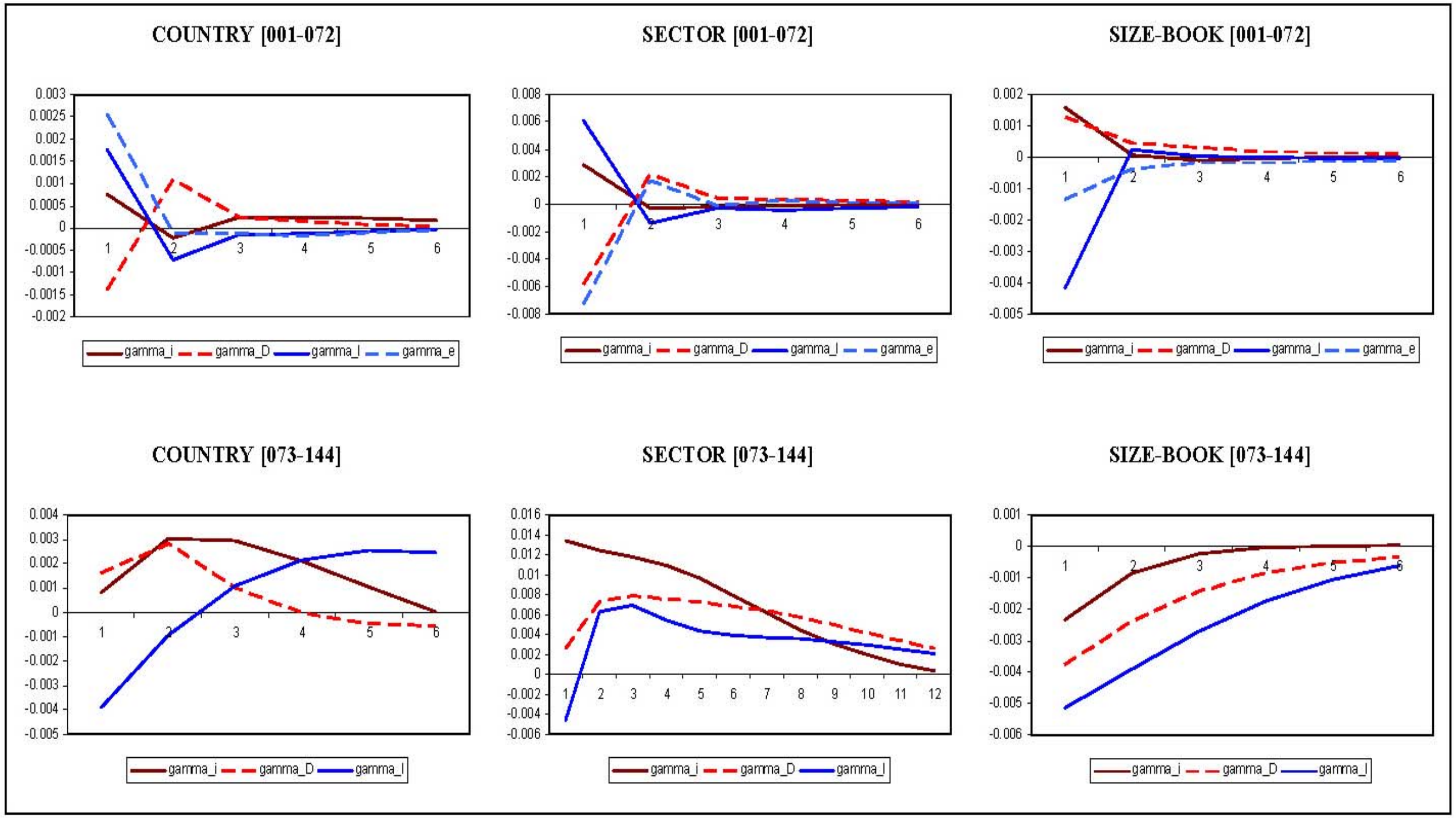
TABLES AND FIGURES



This figure shows the average monthly total returns and the standard deviations of returns for country, sector a size-book sets. The market line is calculated using the Dow Jones Stoxx-600 as a proxy of the European stock market (Euro zone plus UK) and r_f is the average monthly 3-month UK Treasury return bond.

All the returns are in pounds sterling and the sample period is from January 1993 to December 04.

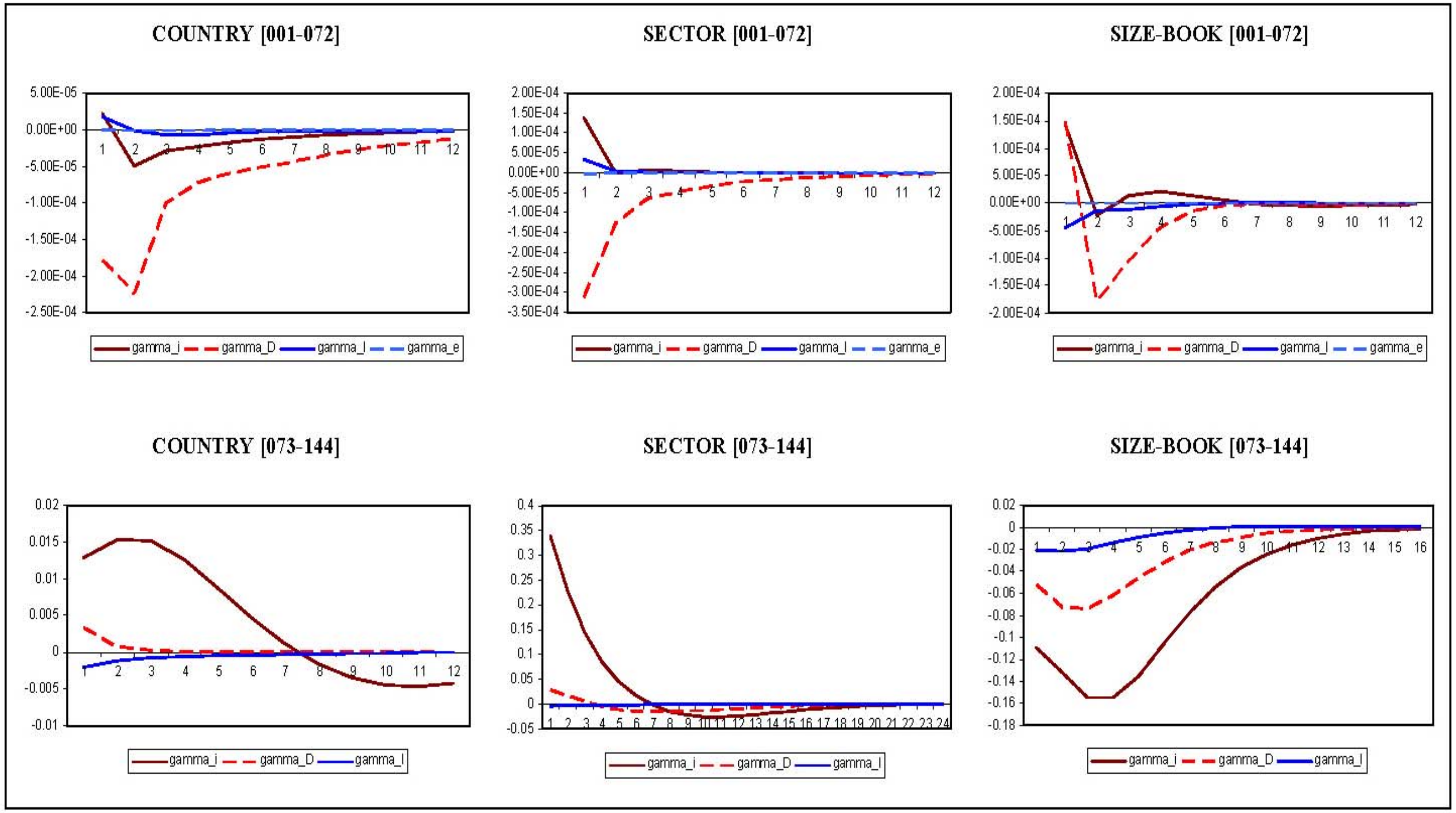
Figure 1: Country, sector a size-book portfolio total returns



This figure shows the generalized impulse-response function of the orthogonalized domestic risk premium to one standard deviation innovations of the orthogonalized inflation and exchange rate risk premiums.

The sample period is from January 1993 to December 04.

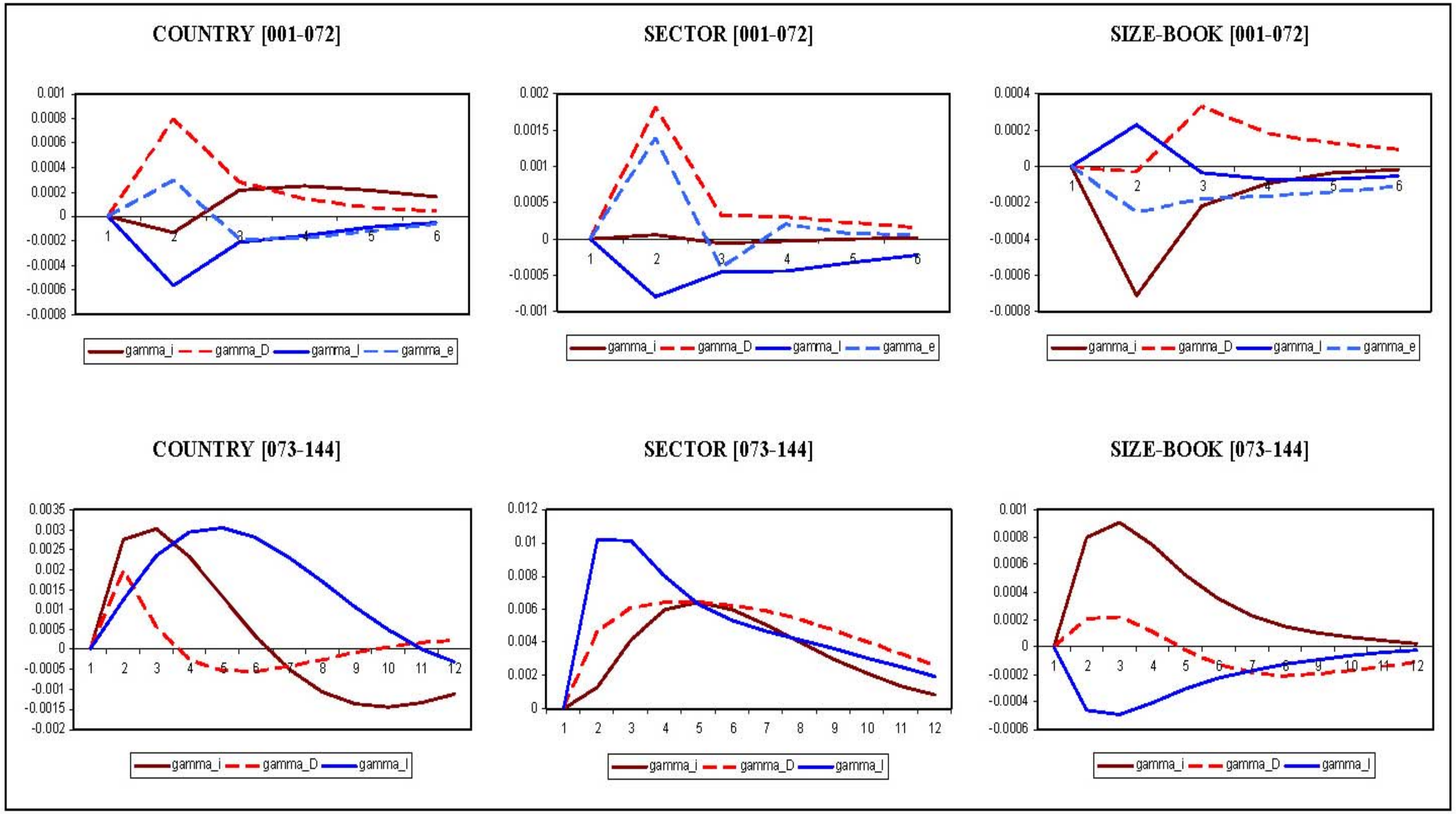
Figure 2: Response of domestic risk premium to generalized one SD innovations



This figure shows the generalized impulse-response function of the orthogonalized inflation and exchange rate risk premiums risk premiums to one standard deviation innovations of the orthogonalized domestic risk premiums.

The sample period is from January 1993 to December 04.

Figure 3: Response to generalized one SD innovations of domestic risk premium



This figure shows the conditional impulse-response function of the orthogonalized domestic risk premium to one standard deviation innovations of orthogonalized inflation and exchange risk premiums given the orthogonalized domestic and market risk premiums.

The sample period is from January 1993 to December 04.

Figure 3: Conditional response of domestic risk premium to generalized one SD innovations

	Austria	Belgium	Finland	France	Germany	Greece
[0]	0.82460**	0.78976**	0.71098**	0.37391**	0.70172**	0.82844**
[1]	0.82226**	0.79183**	0.71213**	0.37413**	0.70170**	0.82809**
[2]	0.81958**	0.79406**	0.71448**	0.37450**	0.70069**	0.82813**
[3]	0.81830**	0.79388**	0.71522**	0.37398**	0.70027**	0.82895**
[4]	0.81858**	0.79493**	0.71452**	0.37414**	0.69937**	0.83102**
[5]	0.82024**	0.80443**	0.71687**	0.37424**	0.69942**	0.83568**
[6]	0.82024**	0.81093**	0.71681**	0.37526**	0.69776**	0.83825**

	Ireland	Italy	Netherlands	Portugal	Spain	United Kingdom
[0]	0.48878**	0.73283**	0.81255**	0.75633**	0.76619**	0.37714**
[1]	0.48865**	0.73055**	0.81144**	0.75582**	0.76516**	0.37712**
[2]	0.48787**	0.73038**	0.81280**	0.75586**	0.76554**	0.37945**
[3]	0.48870**	0.72893**	0.81372**	0.75598**	0.76443**	0.37923**
[4]	0.48730**	0.72762**	0.81355**	0.75653**	0.76482**	0.38113**
[5]	0.48656**	0.73079**	0.81443**	0.75636**	0.76486**	0.38291**
[6]	0.56219**	0.73059**	0.81346**	0.75531**	0.76490**	0.40623**

This table presents the contemporaneous and up to 6 month lagged correlations coefficients between each county portfolio total return and its correspondent country market index total return. The number between square brackets denotes the number of lags.
All the returns are in pounds sterling and the sample period is from January 1993 to December 04. (^ significant at 10%, * at 5% and ** at 1% levels.)

Table 1: Statistical properties of the country portfolios

Country Portfolios	Mean	SD	JB	Q(6)	Q(12)	Q(24)	$Q^2(6)$	$Q^2(12)$	$Q^2(24)$	H_0: ER=0 1-144	1-48	49-72	73-96	97-144
Austria	0.00046	0.05348	62.84**	7.192	12.585	17.679	4.172	4.883**	19.624**	-0.88979	-1.85953*	-0.470619	-1.066093	1.927851^
Belgium	0.00958	0.04058	13.55**	2.711	7.506	20.953	1.802	29.512**	51.567**	1.51844	0.477612	1.293289	0.878634	0.465789
Finland	0.0114	0.05728	74.55**	7.865	27.830**	49.748**	3.008	25.323**	34.458**	1.45727	1.350059	1.002582	-0.085345	0.36509
France	0.01973	0.08376	20974.5**	4.153	16.723	28.532	0.104	1.816**	1.9791**	2.18839*	1.277597	1.009407	1.323466	1.518272
Germany	0.01392	0.08126	184.86**	6.889	10.382	20.570	0.597	6.814**	14.366**	1.39964	1.779675^	1.440078	-0.167268	0.613547
Greece	0.00383	0.07594	0.35132	8.683	11.090	24.661	1.874	4.887**	25.947**	-0.03036		1.182562	-0.323102	-0.372446
Ireland	0.01882	0.0716	77.24**	16.66**	34.870**	58.063**	8.042	18.783**	25.534**	1.98190*		1.156716	0.625654	1.576753
Italy	0.01593	0.07011	870.36**	8.448	55.527**	81.308**	1.509	92.048**	123.780**	1.93288	1.249673	1.298427	1.033617	0.158262
Netherlands	0.00687	0.04746	12.120**	9.465	18.352**	28.386**	9.160	21.178**	38.223**	0.61335	0.949616	0.841224	-0.849549	0.166415
Portugal	0.01004	0.067	1196.85**	6.402	20.062**	42.296**	0.497	13.149**	14.068**	1.00248	-0.08732	1.935368^	-0.509833	-0.190714
Spain	0.01246	0.04814	24.72**	9.499	15.188**	24.263**	1.475	5.961**	16.333**	1.99450*	2.048738*	1.200228	-0.220643	1.22648
United Kingdom	0.02349	0.05902	277.00**	9.068	61.720**	116.903**	5.316	38.083**	91.539**	3.86947**	1.396477	1.373135	1.802441^	2.126538*

Risk Factors	Mean	SD	JB	Q(6)	Q(12)	Q(24)	$Q^2(6)$	$Q^2(12)$	$Q^2(24)$	H_0: R=0 1-144	1-48	49-72	73-96	97-144
Market (in excess)	0.00419	0.04609	22.87973**	1.09028	5.4222	11.855	24.465	17.732**	24.999*	33.845^	1.796522^	1.452592	0.356062	-0.630933
Domestic	-0.0003	0.02857	409.96276**	-0.12417	22.3970**	56.381**	99.239**	1.5758	20.467^	24.312	-1.349795	0.217295	-1.028341	1.422564
UK Inflation	-0.00026	1.21546	35259.1558**	-0.00258	1.6319	9.9641	19.162	0.0545	0.1431	0.3655	1.060573	1.909891^	0.780474	-0.942464
Ex-UK Inflation	0	0.30559	11.99298**	1.64E-09	10.893	65.557**	116.210**	1.9978	22.712*	35.336^	0.461264	-3.4189**	0.350165	0.945313
Common Exchange	0.00001	0.02005	1.40191	0.0077	2.2058	14.076	27.219	12.491^	14.377	25.518	0.029727	-0.027034	-1.024431	0.986907
Residual Exchange	1.39E-09	0.001728	9.262505**	6.82	2.1914	4.1313	14.430	1.9529	4.1648	5.5526	0.101176	-0.13863		

Instrumentals	Mean	SD	JB	Q(6)	Q(12)	Q(24)	$Q^2(6)$	$Q^2(12)$	$Q^2(24)$	1993-2004 ADF	1993-2004 p-value	1990-2004 ADF	1990-2004 p-value
div(-1)	0.23282	0.10054	6.56841*	27.789**	753.65**	1323.9**	2014.8**	751.73**	1314.7**	-3.15171	0.099	3.534275	0.039
term(-1)	0.00041	0.00059	0.76552	8.443**	649.49**	965.72**	1199.4**	430.58**	548.07**	-1.86337	0.3488	-2.786596	0.0622

This table presents a summary of statistics for the country portfolios, the risk factors total returns and one month lagged instrumental variables. The reported statistics are as follows: mean, standard deviation (SD), Jarque–Bera statistic (JB) for normality, Ljung-Box test statistics of order 6, 12 and 24 for the original (Q(r), r=6, 12 and 24) and the square ($Q^2(r)$, r=6, 12 and 24) series, and the mean equal zero test for the series itself (H_0: R=0) or the series of excess returns (H_0: ER=0) for the whole sample period (1-144) and the four subperiods analyzed in the text (1-48, 49-72, 73-96 and 97-144 observations). ADF represents the augmented Dickey-Fuller statistic of unit root.
All the data are in pounds sterling and the sample period is from January 1993 to December 04.
(^ significant at 10%, * at 5% and ** at 1% levels.)

Table 2: Summary statistics for country portfolios, risk factors and instrumentals

Sector Portfolios	Mean	SD	JB	Q(6)	Q(12)	Q(24)	$Q^2(6)$	$Q^2(12)$	$Q^2(24)$	H_0: ER=0				
										1-144	1-48	49-72	73-96	97-144
Basic	0.009473	0.044285	33.96689**	4.8371	29.269**	47.086**	3.97	3.4651	20.726^	1.361677	0.583462	0.198691	0.73873	1.069196
Cyclical	0.016455	0.047866	8.761232*	3.2981	17.07	31.71	6.5721	11.185	20.622	3.011934**	1.954455^	1.032772	1.330284	1.645599
Energy	0.026516	0.117962	0.012518	1.1976	2.8721	8.4827	0.3008	0.4511	0.9231	1.943606^	-0.612121	-0.031301	1.43693	1.74733^
Financial	0.013557	0.044634	66.11829**	4.302	34.07**	51.709**	4.6053	38.87**	51.424**	2.453032*	0.682782	1.758346^	0.917743	1.4433
Health	0.011294	0.054237	269.9135**	9.2619	15.591	22.341	1.5845	2.1903	9.1228	1.511719	1.51452	-0.431682	1.613055	0.277911
Industrial	0.017726	0.056418	2406.521**	1.363	12.345	24.527	0.7037	1.019	1.8589	2.817479**	2.155501*	1.100212	1.316965	0.943758
Non Cyclical	0.018685	0.056435	3656.685**	4.4089	37.218**	62.584**	0.298	7.5509	12.342	2.897970**	1.737613^	1.832261^	-0.00534	2.067508*
Technology	0.010245	0.093672	18.6421**	3.1903	6.1247	20.131	15.954*	29.579**	44.179**	0.712687	0.082033	1.439582	0.518708	-0.10881
Telecom	0.050654	0.296426	0.00009	0.7225	2.5826	10.272	0.0936	0.1811	0.5294	1.615688	-0.265978	2.409304*	0.086662	1.269183
Utilities	0.014254	0.046085	66.76356**	12.565*	29.997**	38.256**	11.048^	47.464**	104.17**	2.550572*	1.703905^	1.789434^	0.482817	1.178408

Size-Book Portfolios	Mean	SD	JB	Q(6)	Q(12)	Q(24)	$Q^2(6)$	$Q^2(12)$	$Q^2(24)$	H_0: ER=0				
										1-144	1-48	49-72	73-96	97-144
HH	0.033422	0.126062	12817.84**	25.308**	70.979**	99.756**	1.4838	23.354*	25.798	2.755991**	-0.081487	0.74716	-1.411712	0.223408
HL	0.011839	0.051075	15.01897**	11.521^	30.582**	54.78**	18.316**	35.264**	43.034**	1.734644^	0.348857	0.213568	-0.277408	0.538074
HM	0.018949	0.055036	12.86295**	2.4646	36.689**	63.003**	5.5844	33.005**	51.898**	3.165885**	-0.648186	1.04515	0.717191	1.369407
MH	0.013888	0.051606	4.666058	5.982	16.93	24.939	3.7828	9.6047	25.41	2.197524*	0.537356	1.223724	1.53674	0.485428
ML	0.011454	0.061972	42.26058**	6.934	15.256	20.741	6.6809	14.772	17.597	1.237277	2.677903**	1.702906	1.038481	0.937644
MM	0.016856	0.051676	6.370053*	5.678	10.157	21.177	3.0215	9.2828	23.925	2.758704**	1.224413	2.061185*	1.557525	1.949156^
LH	0.010131	0.058108	0.249004	2.6877	9.2632	21.233	10.402	14.252	26.975	1.17061	0.508294	-0.252977	1.532723	0.942991
LL	0.003992	0.072214	158.4075**	2.405	6.8884	14.824	4.9042	27.796**	38.468*	-0.06679	2.562116*	1.019578	1.471214	0.712381
LM	0.007173	0.057891	0.019938	4.4692	10.592	20.161	2.8775	7.0841	20.438	0.517773	1.065931	0.685517	2.271748*	0.835834

This table presents a summary of statistics for the country portfolios, the risk factors total returns and one month lagged instrumental variables. The reported statistics are as follows: mean, standard deviation (SD), Jarque–Bera statistic for normality, Ljung-Box test statistics of order 6, 12 and 24 for the original (Q(r), r=6, 12 and 24) and the square ($Q^2(r)$, r=6, 12 and 24) series, and the mean equal zero test for the series of excess returns (H_0: ER=0) for the whole sample period (1-144) and the four subperiods analyzed in the paper (1-48, 49-72, 73-96 and 97-144 observations).
All the data are in pounds sterling and the sample period is from January 1993 to December 04.
(^ significant at 10%, * at 5% and ** at 1% levels.)

Table 3: Summary statistics for sector and size-book portfolios

Average Betas : Country Set		β^w	β^d	β^i	β^D	β^λ	β^e
Austria	1-144	0.53998	6.01105**	1.30021	-0.85463	0.79931	0.57009
	1-48	-0.761714	-0.064263	0.393424	-0.112907	-0.051491	17.41230
	49-72	0.759141**	0.293993**	0.006143**	-0.031512**	0.399901**	7.985580**
	73-96	0.559252**	0.294180**	0.012326**	-0.034778**	0.726001**	
	97-144	0.417464**	0.575816**	0.001899**	-0.023435**	0.883433**	
Belgium	1-144	2.72430**	-0.85664	1.08054	-0.5128	6.70629**	-0.30007
	1-48	0.617540	*-3.486437*	0.136499	-0.089289	0.927264**	-11.36398
	49-72	0.925740**	0.831266**	-0.028118*	0.038074*	0.304934*	7.628141*
	73-96	0.799326**	0.866802**	-0.021540**	0.022730**	0.323064**	
	97-144	0.577814**	0.553946**	-0.010924**	-0.029737**	0.742554**	
Finland	1-144	6.65986**	16.05159**	-1.1694	0.63007	0.10386	1.1695
	1-48	4.991592**	2.017674**	-5.108686	0.631667	0.361626	244.6904
	49-72	0.816288**	1.645733**	-0.012851**	0.018667**	0.177881**	7.555199**
	73-96	0.869534**	1.453377**	-0.014576**	0.013586**	0.446741**	
	97-144	0.691258**	0.815301**	-0.008498**	-0.019508**	0.340924**	
France	1-144	14.50170**	16.20146**	-1.15329	0.8458	0.00222	1.03994
	1-48	1.591072**	0.815647**	-1.890137	0.320578	-1.014695	83.69539
	49-72	0.759332**	0.664471**	-0.008912**	0.028268**	0.415127**	0.836096*
	73-96	0.751090**	0.684705**	-0.001074	0.008146**	0.474818**	
	97-144	0.785354**	*1.499400***	-0.009536**	-0.038849**	0.578270**	
Germany	1-144	12.19146**	32.25452**	-1.2127	1.00333	-0.01772	1.25235
	1-48	1.801736**	0.890504**	-2.319886	0.453762	-0.629357	90.89430
	49-72	0.850240**	0.958652**	-0.015598**	0.016881**	0.152351**	4.272098**
	73-96	0.966930**	1.164090**	-0.022233**	0.009885**	0.297990**	
	97-144	1.299725**	1.708080**	-0.027592**	-0.051603**	0.322843**	
Greece	1-144	1.04055	0.79408	-0.44173	-0.26679	0.26338	0.45845
	1-48						
	49-72	2.003301**	4.201012	-0.011594	-0.517389	9.485208	29.90852
	73-96	1.187972	6.639696	-0.116011	0.150334	-1.648517	
	97-144	0.590781**	0.230329	-0.006708	-0.070667	-0.619134	

This table shows the mean of estimated conditional beta risks of country portfolios associated to the six sources of risk considered in the paper and their significance level for the whole period (1-144) and four subperiods (1-48, 49-72, 73-96 and 97-144 observations).The sample period is from January 1993 to December 04.
(^ significant at 10%, * at 5% and ** at 1% levels.)

Table 4: Average estimated beta risks for country portfolios

Average Betas: Country Set		β^{w}	β^{d}	β^{i}	β^{D}	β^{λ}	β^{e}
Ireland	**1-144**	5.06292**	0.52533	-0.067	-1.19594	1.36404	0.60887
	1-48						
	49-72	0.384402	3.804542	0.151493	0.078429	2.793347	311.3043
	73-96	0.906712	-2.657466	-0.138654	-1.886618	1.661830	
	97-144	0.646982**	0.680561**	-0.010979**	-0.030180**	0.791761**	
Italy	**1-144**	3.56720**	5.84559**	-0.93598	1.17073	2.87668**	1.06654
	1-48	-0.196829	-0.048644	0.239994	-0.040787	0.210205	125.9305
	49-72	1.809493	1.952553**	-5.858581	0.103441*	0.210889	20.31060
	73-96	1.061234**	2.275345**	-0.057489**	0.109715**	0.395696**	
	97-144	0.770546**	0.947645**	-0.016343**	0.005386	0.838565**	
Netherlands	**1-144**	11.58947**	19.44181**	-1.21115	1.3981	0.39071	1.13419
	1-48	1.405262**	0.833677**	-1.744950	0.362841	0.144181	64.26179
	49-72	0.604052**	0.766312**	-0.010634**	0.025009**	0.459952**	0.402934
	73-96	0.756062**	0.828315**	-0.003154**	0.009487**	0.450403**	
	97-144	0.830434**	0.750350**	-0.008681**	-0.033350**	0.594706**	
Portugal	**1-144**	2.92781**	1.99374*	1.30575	1.09835	8.36694**	0.2407
	1-48	1.899980	2.999625	0.218967	0.036029	0.768277**	4.804629
	49-72	1.439330**	2.115296**	-0.068381*	0.112810*	0.949167*	9.917180
	73-96	1.057613**	2.264177**	-0.032656**	0.034904**	0.835329**	
	97-144	0.672193**	1.293639**	-0.009166**	-0.026227**	0.666460**	
Spain	**1-144**	1.85127	-0.99422	1.29279	0.69641	9.21145**	0.71613
	1-48	0.725644	-5.359925	0.322757	0.102455	1.866957**	21.82170
	49-72	0.667821**	0.752356**	-0.015154	0.030777*	0.373870**	2.762130
	73-96	0.681625**	0.722335**	-0.015550**	0.022337**	0.689188**	
	97-144	0.623391**	0.855565**	-0.009955**	-0.007536**	0.871765**	
United Kingdom	**1-144**	6.93650**	22.64521**	-1.32799	0.14508	-1.07989	1.4
	1-48	0.955736**	0.413581**	-1.405955	0.086873	-3.672214	50.13591
	49-72	0.501487**	0.762097**	-0.037496**	0.008737**	0.292221**	5.941473**
	73-96	0.505141**	0.840760**	-0.038396**	-0.003988**	0.252385**	
	97-144	0.482619**	1.029332**	-0.017292**	-0.049920**	0.087101**	

Table 4 (continued)

		β^w	β^d	β^i	β^D	β^λ	β^e
Average Betas: Sector Set	Basic	13.64058**	11.85204**	-1.166551	0.500553	0.134296	1.050864
	Cyclical	9.437583**	11.05797**	-1.121073	2.390566*	-0.608052	1.060103
	Energy	1.629492	2.171467*	-1.155021	1.883176^	1.320782	0.898536
	Financial	6.902561**	20.88499**	-1.165606	0.896668	0.309132	1.12128
	Health	4.833501**	1.974066*	1.62783	-0.476143	8.14033**	-0.57815
	Industrial	2.883865**	1.576943	1.239686	-1.202112	3.030009**	-0.162437
	Non Cyclical	0.879649	1.014889	-0.418594	0.528532	0.84761	-0.078202
	Technology	8.82711**	1.080857	0.361982	-0.705843	-1.373747	-0.805153
	Telecom	4.73587**	-0.171953	-1.192509	1.939114^	2.731615**	0.747204
	Utilities	1.452859	-0.82458	1.193047	-0.035187	7.728295**	0.44864
Average Betas: Size-Book Set	LL	2.879791**	1.071033	0.997534	-0.319895	-1.136563	-0.629262
	LM	-0.416098	-1.034831	-0.034375	-1.143167	1.867383^	1.864492^
	LH	1.514515	0.516806	0.497963	-1.306623	2.619555**	0.299897
	ML	-0.826447	-1.006321	-1.091371	1.998636*	1.801845^	1.496563
	MM	4.480215**	1.039238	-0.135369	-0.023117	-0.251515	-0.229207
	MH	6.923845**	15.2426**	-1.010146	-0.586566	-0.775369	1.225947
	HL	3.243892**	0.828375	2.237751*	-1.131363	4.60933**	1.897113^
	HM	18.5081**	16.90667**	-1.295428	0.716301	0.042032	1.015444
	HH	7.30335**	15.67817**	-1.21067	0.828633	-0.099139	1.110662

This table shows the mean of estimated conditional beta risks of country portfolios associated to the six sources of risk considered in the paper and their significance level. The sample period is from January 1993 to December 04.
(^ significant at 10%, * at 5% and ** at 1% levels.)

Table 5: Average estimated beta risks for sector and size-book portfolios

Country Portfolios		γ_0	γ^{w}	γ^{d}	γ^{i}	γ^{D}	γ^{λ}	γ^{e}	$\gamma^{w\text{-}div}$	$\gamma^{d\text{-}div}$	$\gamma^{i\text{-}div}$	$\gamma^{D\text{-}div}$
Integ. AD Model 2nd best 1-144	1-72	0.017994**	0.000104	-0.006013**	-0.000455**	-0.001791**	0.000115**	-2.42E-06**	-0.000807**	-0.001259*	0.000157**	0.000232**
	73-144	0.001680*	0.011470**	-0.008668**	0.164997*	-0.005165	0.007628**		-0.002182**	0.001328**	-0.051486*	0.000416
Integ. AD Model 2nd best	1-48	0.027102**	0.000460**	-0.008397**	0.000203**	0.000267**	7.12E-05**	-5.12E-08	-0.001185**	-0.001787*	0.000171**	-6.78E-05**
Integ. AD Model	49-72	-0.000222	-0.000607**	-0.001243	-0.001773**	-0.005908**	0.000202**	-7.17E-06**	-5.04E-05	-0.000203	0.000130**	0.000831**
S-S Model 2nd best	73-96	0.003165**	-0.000249				0.005670**		0.000666**			
ICAPM Model	97-144	-0.002512*	0.017054**						-0.003186*			
		$\gamma^{\lambda\ div}$	$\gamma^{e\ div}$	$\gamma^{w\text{-}term}$	$\gamma^{d\text{-}term}$	$\gamma^{i\text{-}term}$	$\gamma^{D\text{-}term}$	$\gamma^{\lambda\ term}$	$\gamma^{e\ term}$	γ^{div}	γ^{term}	χ^2-statistic
Integ. AD Model 2nd best 1-144	1-72	-4.84E-06**	2.05E-07	1.42E-08	-9.37E-07*	-2.05E-06**	-4.24E-07**	1.74E-07**	9.32E-09**	-0.000359**	4.55E-07	22313.00**
	73-144	-0.002196**		-1.85E-07	7.92E-07^	-4.85E-08	1.82E-07	9.76E-10		-0.001055**	-4.48E-06	1064.908**
Integ. AD Model 2nd best	1-48	-1.43E-07	-8.43E-08**	-6.20E-08**	-1.47E-06*	3.20E-07**	-2.46E-07**	9.50E-08**	1.16E-08**	-0.000147**	1.14E-06	37052.41**
Integ. AD Model	49-72	-1.42E-05**	7.85E-07^	1.67E-07*	1.36E-07	-6.78E-06**	-7.80E-07**	3.32E-07**	4.84E-09^	-0.000782**	-9.13E-07	1339680.**
S-S Model 2nd best	73-96	-0.000935**		5.12E-07*				2.10E-08		-0.000208**	2.17E-06**	26143.60**
ICAPM Model	97-144			-3.94E-09						-0.000627**	-3.87E-06**	586.4712**

Seg. AD Model		γ^{w}	γ^{d}	γ^{i}	γ^{D}	γ^{λ}	γ^{e}	$\gamma^{w\text{-}div}$	$\gamma^{d\text{-}div}$	$\gamma^{i\text{-}div}$	$\gamma^{D\text{-}div}$	$\gamma^{\lambda\text{-}div}$
1-144	1-72	0.000814**	-0.028462**	-0.000554**	-0.002160**	9.16E-05**	-5.36E-06**	-0.000654**	-0.009837**	0.000243**	0.000403**	-1.66E-05**
	73-144	0.012186**	-0.010113**	0.051909^	-0.001401	0.005712*		-0.002132*	0.001642**	-0.008826	3.45E-05	-0.001614*
1-48		0.001578**	-0.041501**	-3.69E-05	0.000310**	5.45E-05**	-2.89E-06**	-0.000899**	-0.014444**	0.000251**	0.000140**	-9.25E-06**
49-72		-0.000714**	-0.002384	-0.001590**	-0.007098**	0.000166*	-1.03E-05**	-0.000163**	-0.000622	0.000227**	0.000931**	-3.13E-05**
73-96		0.015697**	-0.026524**	0.000812	0.014355	0.007221**		-0.002206**	0.004305**	0.005405	-0.000762	-0.000962**
97-144		0.010431*	-0.001907	0.077458^	-0.009279**	0.004958		-0.002095^	0.000310	-0.015942	0.000433	-0.001940
		$\gamma^{e\ div}$	$\gamma^{w\text{-}term}$	$\gamma^{d\text{-}term}$	$\gamma^{i\text{-}term}$	$\gamma^{D\text{-}term}$	$\gamma^{\lambda\ term}$	$\gamma^{e\ term}$	γ^{div}	γ^{term}	$\gamma_0^{Austria}$	$\gamma_0^{Belgium}$
1-144	1-72	2.49E-07	5.40E-08*	4.78E-06**	-1.99E-06**	-3.42E-07**	7.67E-08**	1.28E-08**	-0.000455**	3.47E-06**	-0.016469**	0.000867
	73-144		-3.15E-07	9.16E-07	-4.04E-06^	-8.51E-08	8.99E-08		-0.001270**	-6.37E-06^	-0.008242**	0.000390
1-48		-1.24E-07**	-8.47E-09*	6.99E-06**	1.73E-06**	-1.47E-07**	-6.49E-08**	1.78E-08**	-0.000242**	5.81E-06**	-0.016498**	
49-72		9.95E-07^	1.79E-07*	3.50E-07	-9.43E-06**	-7.33E-07**	3.60E-07**	2.58E-09	-0.000880**	-1.22E-06^	-0.016411**	0.000867
73-96			-1.47E-07	1.52E-06	-1.12E-05^	-3.65E-07*	2.66E-07		-0.000636**	-3.62E-07	-0.015907**	0.000951
97-144			-3.98E-07	6.12E-07	-4.51E-07	5.47E-08	2.01E-09		-0.001587*	-9.38E-06^	-0.004409*	0.000110
		$\gamma_0^{Finland}$	γ_0^{France}	$\gamma_0^{Germany}$	γ_0^{Greece}	γ_0^{Italy}	$\gamma_0^{Ireland}$	$\gamma_0^{Netherlands}$	$\gamma_0^{Portugal}$	γ_0^{Spain}	γ_0^{UK}	specific χ^2-stat
1-144	1-72	0.199706**	0.072766**	0.087297**		0.007915**		0.064566**	0.004990**	0.004669**	0.057682**	3685.314**
	73-144	0.002296	0.009649**	0.000421	-0.022621**	0.005426**	0.000160	-0.003693**	-0.004447**	0.001336	0.016175**	19.85155*
1-48		0.270442**	0.096912**	0.115394**				0.085836**			0.071509**	362624.6**
49-72		0.058234**	0.024475**	0.031103**		0.007915**		0.022027**	0.004990**	0.004669**	0.030026**	810.0149**
73-96		0.019849**	0.009209**	0.015542**		0.013869**		0.004502^	0.005903**	0.000172	0.021459**	134.4499**
97-144		-0.006480**	0.009868**	-0.007139**	-0.022621**	0.001204	0.000160	-0.007791**	-0.009622**	0.001918	0.013533**	11.16056

This table summarizes the results from the cross-section using the country portfolios, and reports the estimated risk premiums and their individual and joint significance of all the coefficients (χ^2-statistic) and the one of the coefficients of the specific country risks (specific χ^2-stat) from a selection of asset-pricing model specifications. The results are reported for the whole period (1-144) and the four subperiods (1-48, 49-72, 73-96 and 97-144 observations). The sample period is from January 1993 to December 04.
(^ significant at 10%, * at 5% and ** at 1% levels.)

Table 6: Cross-sectional estimates of risk premiums for country portfolios

Sector Portfolios			γ_0	γ^w	γ^d	γ^i	γ^D	γ^λ	γ^e	$\gamma^{w\cdot div}$	$\gamma^{d\cdot div}$	$\gamma^{i\cdot div}$	$\gamma^{D\cdot div}$
S-S Model	01-144	1-72	0.005696**	-0.000208**				0.000298**	4.34E-06**	-0.006592**			
		73-144	0.015145**	0.058763**				0.004022^		-0.018718**			
GLS Model	1-48		0.012057**	-0.000585**		0.000462**				-0.009345**		0.000862**	
Integ. GLS Model	49-72		0.009451**	-0.000158	-0.001441	0.000293**				-5.69E-05	-0.000378	5.38E-05**	
ICAPM Model	73-96		0.008945**	-0.001441**						-0.000149**			
Integ. GLS Model	97-144		0.012969**	0.108541**	-0.027552**	-0.752124**				-0.032281**	0.006266**	0.183065**	
			$\gamma^{\lambda\ div}$	$\gamma^{e\ div}$	$\gamma^{w\cdot term}$	$\gamma^{d\cdot term}$	$\gamma^{i\cdot term}$	$\gamma^{D\cdot term}$	$\gamma^{\lambda\ term}$	$\gamma^{e\ term}$	γ^{div}	γ^{term}	χ^2-statistic
S-S Model	01-144	1-72	9.92E-06**	-4.76E-08	1.58E-08				8.74E-08**	-4.31E-09**	-0.000363**	4.38E-06**	3633.532**
		73-144	-0.001772**		1.71E-08				-2.79E-07**		-0.001029**	-4.91E-06	1900.756**
GLS Model	1-48				-1.38E-07**		1.60E-05**				-0.000117**	7.87E-06**	111777.5**
Integ. GLS Model	49-72				8.79E-08**	4.87E-07	-1.23E-06**				-0.000166**	3.09E-06**	63733.79**
ICAPM Model	73-96				6.24E-07**						-0.000309**	-2.23E-08*	7063.285**
Integ. GLS Model	97-144				-2.56E-06**	2.32E-06**	-8.50E-06**				-0.003995**	-3.94E-05**	4058.055**

Integ. AD Model		γ_0	γ^w	γ^d	γ^i	γ^D	γ^λ	γ^e	$\gamma^{w\cdot div}$	$\gamma^{d\cdot div}$	$\gamma^{i\cdot div}$	$\gamma^{D\cdot div}$
1-144	1-72	0.025813**	0.001202**	-0.018448**	0.000117^	-0.000464**	5.28E-05**	1.11E-06*	-0.000548**	-0.006149**	0.000473**	1.65E-05
	73-144	0.015258**	0.070685**	-0.022966**	-0.832137**	-0.223216**	0.002072		-0.022796**	0.005625**	0.214671**	0.066774**
1-48		0.033800**	0.001844**	-0.026849**	-2.47E-05	-0.000257**	7.58E-05**	1.48E-06*	-0.000799**	-0.009011**	0.000691**	-3.40E-05*
49-72		0.009839**	-8.23E-05	-0.001647	0.000401**	-0.000876**	6.84E-06	3.66E-07	-4.62E-05	-0.000426	3.67E-05*	0.000118**
73-96		0.009992**	-0.001059**	-0.001109*	-0.000646**	-0.003641**	-0.000303		-0.000236**	0.000140**	9.08E-05*	0.000841**
97-144		0.017890**	0.106557**	-0.033894**	-1.247883**	-0.333004**	0.003260		-0.034075**	0.008368**	0.321961**	0.099741**
		$\gamma^{\lambda\ div}$	$\gamma^{e\ div}$	$\gamma^{w\cdot term}$	$\gamma^{d\cdot term}$	$\gamma^{i\cdot term}$	$\gamma^{D\cdot term}$	$\gamma^{\lambda\ term}$	$\gamma^{e\ term}$	γ^{div}	γ^{term}	χ^2-statistic
1-144	1-72	1.08E-06	9.61E-08*	3.23E-08	5.26E-06**	2.25E-06**	-1.21E-07**	4.63E-08**	1.04E-08**	-0.000144**	1.33E-07	4591.463**
	73-144	-0.000942		-2.27E-06**	2.02E-06**	-4.10E-05**	-2.44E-05**	-1.71E-06**		-0.006045**	-3.58E-05**	2278.507**
1-48		-5.31E-06**	8.13E-09	-7.08E-08**	7.59E-06**	4.10E-06**	-7.16E-08*	5.03E-08**	1.35E-08**	-0.000108**	-1.51E-06	21815.79**
49-72		1.39E-05**	2.72E-07**	2.39E-07*	5.91E-07	-1.44E-06**	-2.21E-07**	3.84E-08*	4.37E-09**	-0.000218**	3.41E-06**	402692.1**
73-96		7.13E-05		1.12E-06**	1.08E-08**	-2.12E-07*	-2.50E-07**	-6.01E-08**		-0.000445**	-8.12E-09	70678.09**
97-144		-0.001449		-3.97E-06**	3.02E-06**	-6.14E-05**	-3.65E-05**	-2.53E-06**		-0.008844**	-5.37E-05**	3505.013**

This table summarizes results from the cross-section using the sector and size-book portfolios, and reports the estimated risk premiums and their individual and joint significance (χ^2-statistic) from a selection of asset-pricing model specifications. The results are reported for the whole period (1-144) and the four subperiods (1-48, 49-72, 73-96 and 97-144 observations). The sample period is from January 1993 to December 04.
(^ significant at 10%, * at 5% and ** at 1% levels.)

Table 7: Cross-sectional estimates of risk premiums for sector and size-book portfolios

Size-Book Portfolios			γ_0	γ^{w}	γ^{d}	γ^{i}	γ^{D}	γ^{λ}	γ^{e}	$\gamma^{w\cdot div}$	$\gamma^{d\cdot div}$	$\gamma^{i\cdot div}$	$\gamma^{D\cdot div}$
AD Model	1-144	1-72	0.013773**	-0.000649**		-0.000317*	-0.000456^	0.000338**	-1.64E-06*	-0.006148**		0.000629**	0.000181**
		73-144	0.009556**	-0.043021**		-0.727267**	0.044287	0.055414**		0.010334**		0.221091**	-0.008919
GLS Model	1-48		0.025047**	-0.001460**		0.000446**				-0.008461**		0.001152**	
ICAPM Model	49-72		0.014336**	-0.000925**						-0.000865*			
AD Model	73-96		0.004464**	0.001864**		-0.000981	-0.000913**	0.000267**		-0.000534**		-0.000311	-0.001084**
Integ. S-S Model	97-144		0.009763**	-0.041233**	0.023773**			0.058131**		0.009945**	-0.007803**		
			$\gamma^{\lambda\ div}$	$\gamma^{e\ div}$	$\gamma^{w\cdot term}$	$\gamma^{d\cdot term}$	$\gamma^{i\cdot term}$	$\gamma^{D\cdot term}$	$\gamma^{\lambda\ term}$	$\gamma^{e\ term}$	γ^{div}	γ^{term}	χ^2–statistic
AD Model	1-144	1-72	-7.65E-06**	-1.34E-07	1.62E-07**		-6.91E-06**	-6.37E-08*	1.42E-07**	-9.22E-09**	-0.000513**	1.10E-05**	8147.697**
		73-144	-0.014061**		2.26E-06**		-3.58E-05*	-1.49E-05**	1.60E-06**		-0.002831**	-3.99E-05**	366.9661**
GLS Model	1-48				-6.78E-09		-2.02E-06**				-4.80E-06	1.49E-05**	658943.4**
ICAPM Model	49-72				4.64E-07**						-0.000382**	2.72E-06**	10575.16**
AD Model	73-96		3.16E-05**		7.92E-07**		-4.54E-06**	6.79E-07*	-5.89E-08**		-0.000536**	8.15E-08**	39004.56**
Integ. S-S Model	97-144		-0.014056**		5.77E-08	1.86E-06**			2.67E-06**		-0.006740**	-1.54E-05	1477.428**

Integ. AD Model		γ_0	γ^{w}	γ^{d}	γ^{i}	γ^{D}	γ^{λ}	γ^{e}	$\gamma^{w\cdot div}$	$\gamma^{d\cdot div}$	$\gamma^{i\cdot div}$	$\gamma^{D\cdot div}$
1-144	1-72	0.027417**	0.000411**	-0.024436**	-0.000164	-0.000549*	8.29E-05**	-1.63E-06**	-0.001236**	-0.008468**	0.000163**	0.000168**
	73-144	0.010332**	-0.034557**	0.012076**	-0.521471**	0.039463	0.042376**		0.008429**	-0.004349**	0.148670**	-0.001434
1-48		0.032702**	0.001130**	-0.035633**	-0.000104**	0.000538**	0.000202**	-1.45E-06**	-0.001508**	-0.012420**	6.48E-05**	2.10E-05**
49-72		0.016849**	-0.001028**	-0.002042	-0.000285	-0.002722**	-0.000155**	-1.99E-06^	-0.000692**	-0.000564	0.000359**	0.000463**
73-96		0.004511**	0.001879**	-0.000739**	-0.002090	-0.001409**	0.000243**		-0.000551**	0.000124**	-0.000338	-0.001272**
97-144		0.013243**	-0.052775**	0.018483**	-0.781162**	0.059899	0.063442**		0.012919**	-0.006586**	0.223174**	-0.001515
		$\gamma^{\lambda\ div}$	$\gamma^{e\ div}$	$\gamma^{w\cdot term}$	$\gamma^{d\cdot term}$	$\gamma^{i\cdot term}$	$\gamma^{D\cdot term}$	$\gamma^{\lambda\ term}$	$\gamma^{e\ term}$	γ^{div}	γ^{term}	χ^2–statistic
1-144	1-72	-3.10E-06**	8.58E-08	1.57E-07**	2.50E-06**	-1.29E-06**	-1.29E-07**	-2.17E-08*	1.06E-08**	-0.000356**	9.02E-06**	61795.78**
	73-144	-0.010254**		1.67E-06*	9.23E-07**	-2.58E-05^	-1.23E-05*	7.17E-07**		-0.004640**	-4.21E-05**	292.4324**
1-48		-1.39E-06**	-1.32E-07*	1.28E-08**	3.67E-06**	8.64E-07**	-2.31E-07**	-6.44E-08**	2.13E-08**	-0.000339**	1.19E-05**	2057588.**
49-72		-6.52E-06**	5.21E-07**	4.46E-07**	1.65E-07	-5.59E-06**	7.34E-08^	6.39E-08**	-1.08E-08**	-0.000391**	3.25E-06**	403694.6**
73-96		3.03E-05**		6.99E-07**	-2.52E-08**	-4.36E-06**	8.38E-07^	-5.93E-08**		-0.000516**	1.05E-07**	78969.78**
97-144		-0.015396**		2.15E-06^	1.40E-06**	-3.65E-05	-1.89E-05**	1.11E-06**		-0.006701**	-6.33E-05**	1790.951**

Table 7 (continued)

Country Portfolios	Period	% Variance Explained		Likelihood Ratio Test				H_0: E(e)=0
		Static	Conditional	Static	Conditional	Other Models		
Integrated AD Model 2nd best	1-144	-8.408	-4.686			3188.79**(int) 4491.98**(gls) 4648.91**(ss) 4667.44**(ad)	3496.99**(i_int) 3625.86**(i_gls) 4676.39**(i_ss)	13.64270
Integrated AD Model 2nd best	1-48	-59.897	-46.230			1671.78**(int) 1657.34**(gls) 1667.29**(ss) 1669.83**(ad)	1738.32**(i_int) 814.22**(i_gls) 1655.40**(i_ss)	3.421191
Integrated AD Model	49-72	0.221	0.108	68.46**	31.32*	61.21**(int) 44.96**(gls) 214.85**(ss) 2.19(ad)	92.29**(i_int) 77.73**(i_gls) 226.14**(i_ss)	21.45984*
S-S Model 2nd best	73-96	-0.574	-0.573			8.25*(int)		11.68339
ICAPM Model	97-144	0.013	0.007	7.63	3.81			15.23264
Segmented AD Model	1-144	-199.7523	-120.3306					35.66389**
	1-48	0.93658	0.953819	794.30**	885.66**	749.39** (ad-d)		13.76334*
	49-72	0.196091	0.047621	52.38**	11.71			20.48065*
	73-96	0.013815	0.013741	3.34	3.32	2.27 (ad-d)		9.64717
	97-144	0.011794	0.005215	6.83	3.01	11.28 (ad-d)		12.38717

Sector Portfolios	Period	% Variance Explained		Likelihood Ratio Test				H_0: E(e)=0
		Static	Conditional	Static	Conditional	Other Models		
S-S Model	1-144	-53.509	-22.683			1696.04**(int)		10.64531
GLS Model	1-48	-1483.480	-1957.988			19.58**(int)		8.885005
Integ. GLS Model	49-72	-2.353	0.352		104.27**	67.09**(int)	58.69**(gls)	4.754261
ICAPM	73-96	-0.903	-0.876					7.396189
Integ. GLS	97-144	0.010	0.011	5.01	5.37	0.37(int)	0.70(gls)	14.38407
Integrated AD Model	1-144	-2857.354	-1240.905					18.67377*
	1-48	-85855.630	-113299.400			232.48**(i_int)	265.57**(i_gls)	19.93714*
	49-72	-3.156	0.197		52.78**	15.60(int) 7.20(gls)	7.94(ss) 34.03**(ad)	11.86278
	73-96	-2.892	-2.836					9.813851
	97-144	0.003	0.004	1.55	1.91	0.18(ad)		9.595884

Size-Book Portfolios	Period	% Variance Explained		Likelihood Ratio Test				H_0: E(e)=0
		Static	Conditional	Static	Conditional	Other Models		
AD Model	01-144	-11.149	-1.041			4376.28**(gls)		15.78720^
GLS Model	1-48	-49.833	-58.540			65.18**(int)		18.18799*
ICAPM	49-72	-2.685	0.569		181.81**			5.147670
AD Model	73-96	0.008	0.006	1.74		2.02(int) 1.92(gls) 2.09(ss)	1.92(int_d) 1.88(gls-d) 1.95(ss-d)	13.37841
Integ. S-S Model	97-144	0.027	0.027	11.77	3.97	9.13(int)	4.91(ss)	15.79736^
Integrated AD Model	01-144	-27464.840	-4612.939					12.80719
	1-48	-74054.380	-86739.150			105.46**(i_int)	97.30**(i_gls)	20.32435*
	49-72	-808.697	-93.691			15.60(i_int)	12.31(i_gls) 7.19(i_ss)	9.518000
	73-96	0.008	0.006	1.74		2.02(int) 1.92(gls) 2.09(ss)	1.92(i_int) 1.88(i_gls) 1.95(i_ss)	13.37841
	97-144	0.027	0.026	11.67	11.66	9.04(int) 6.18(gls) 4.81(ss)	5.57(i_int) 7.59(i_gls)	18.93408*

This table report the results of several tests made to measure the relative performance of the nine/eight alternative models. The statistics are as follows: the percentage of variance explained over the static and conditional benchmark models, the likelihood ratio tests (we write the null between parentheses) and the χ^2 statistic testing that all the residuals are equal among them and equal to zero. The results are reported for the whole period (1-144) and the four subperiods (1-48, 49-72, 73-96 and 97-144 observations). The sample period is from January 1993 to December 04.
(^ significant at 10%, * at 5% and ** at 1% levels.)

Table 8: Performance tests

Panel B: Regressions for structural changes in the beta risk of country portfolios

	Average Beta Risk Series					
	β^w	β^d	β^i	β^D	β^λ	β^e
C	0.9833**	-0.586838	-1.108749	0.082325	-1.149833	-356.7045
F2	-0.112747	1.53396^	0.513459	-0.024878	1.16602	-118.9609
F3	-0.180024	1.244622	1.049683	-0.184926	0.363419	
F4	-0.33614	0.565721	1.07532	-0.111164	-0.14957	
S(-1)	0.15297^	-0.040295	0.026433	0.024366	0.047308	-0.066927
EXM	0.240476	-0.783003	0.029024	-0.317409	2.403357	177.595
SMB	-0.839755	1.256904	-0.019076	-1.03614*	-0.80345^	-369.3065
HML	-0.563027	1.310641	-0.000485	-0.77486^	0.231339	-692.7279
DIV	-0.328889	2.617415	0.08044	-0.100166	4.4514**	2465.68^
TERM	159.7348	201.66	-15.33292	86.63351	771.97**	133104.9
R_w^2 Adj	0.06529	-0.010749	0.010183	0.051438	-0.017805	-0.043459
R^2 Adj	0.043777	-0.022998	-0.052557	-0.055914	-0.051351	-0.046242

Panel A: Regressions for structural changes in specific country risks

	Average-γ_0	Lowest-γ_0	Highest-γ_0
C	0.01836*	0.01026*	0.02421*
F2	-0.0275**	-0.0143**	-0.0368**
F3	-0.0284**	-0.0140**	-0.0389**
F4	-0.0295**	-0.01311*	-0.0393**
S(-1)	0.8262**	0.8169**	0.8592**
EXM	0.009973	0.00491	0.02574^
SMB	0.013761	0.0062	0.022202
HML	0.014478	0.004897	0.024607
DIV	0.0382**	0.012934	0.05298*
TERM	-4.4419**	-2.9868**	-7.3197**
R_w^2 Adj	0.870917	0.694412	0.903764
R^2 Adj	0.978679	0.970453	0.977999

Panel B (continued)

	Lowest Beta Risk Series						Highest Beta Risk Series					
	β^w	β^d	β^i	β^D	β^λ	β^e	β^w	β^d	β^i	β^D	β^λ	β^e
C	0.4196**	0.3868**	-0.0236**	0.0582**	0.5021**	21.598**	1.195251	-5.00302*	-2.667193	-0.190685	-5.099440	-905.9574
F2	0.098049	0.4217**	0.0163**	-0.0278**	-0.117023	-6.63478*	-0.144358	4.87783^	0.804873	0.053070	3.797826	-240.3577
F3	0.148138	0.4898**	0.0167**	-0.0204**	0.028810		-0.482187	3.116751	2.539348	-0.622797	0.166790	
F4	0.182664	0.6366**	0.0157**	-0.0254**	0.084922		-1.239967	-0.115843	2.635715	-0.336246	-2.008842	
S(-1)	0.097571	-0.135836	0.065174	0.0671**	0.2171**	-0.069650	0.118195	0.008359	0.051247	0.022113	0.004190	-0.053998
EXM	-0.132728	-0.316006	0.010203	0.005631	-0.102196	-7.03335^	-0.195229	-4.236186	0.060766	-1.302281	10.65577	758.9277
SMB	-0.239925	0.021230	-3.88E-05	-0.014826	-0.205338	-10.70289	0.555092	2.623865	-0.073257	-3.89095*	-5.412357	-1300.676
HML	-0.351145	-0.115563	0.002399	-0.007368	-0.306142	2.720244	0.347665	2.822825	-0.022440	-2.855805	-0.789165	-1113.171
DIV	-0.450704	-1.236892	0.016302	-0.1304**	-1.2524**	-67.0569^	2.012660	17.4071*	0.080873	1.009358	19.79117	6049.79^
TERM	-67.75073	41.00723	-0.278541	-2.038116	16.85877	-1847.663	587.8268	1331.667	-52.0517^	339.6970	2382.564	323910.3
R_w^2 Adj	0.050591	0.314690	0.139004	0.536040	0.274981	0.242063	0.035093	0.011285	-0.008073	0.033682	-0.012633	-0.055767
R^2 Adj	0.048748	0.319819	0.104973	0.424330	-1.286187	0.045323	-0.032808	-0.039454	-0.057961	-0.040195	-0.072886	-0.054430

This table presents the coefficients and the weighted (Adj. R_w^2) and unweighted (Adj. R^2) adjusted R^2 from the regressions of the series of specific country risks and the conditional beta risks on the economics variables. C, F1, F2, F3 denote the constant and three dummies, S(-1) the own series lagged by one month and EXM, …, DIV and TERM the economic series lagged by one month. Panel A shows the results for the three specific country risks, Panel B shows the results for the series of beta risks for all factor risks using country portfolios and Panels C and D show the results for the domestic, UK inflation, excluding-UK inflation and common exchange rate risks using sector and size-book portfolios respectively. The sample period is from January 1993 to December 04.

(^ significant at 10%, * at 5% and ** at 1% levels.)

Table 9: Analysis of the structural change in the specific country risks and the beta risks

Panel C: Regressions for structural changes in the beta risk of sector portfolios

	Average Beta Risk Series				Lowest Beta Risk Series				Highest Beta Risk Series			
	β^d	β^i	β^D	β^λ	β^d	β^i	β^D	β^λ	β^d	β^i	β^D	β^λ
C	14.66844	-0.727783	0.094136	-2.031595	0.268352*	-0.017085**	0.037767**	0.080559	37.60882	-2.058849	0.305392	-4.914399
F2	-15.18054	0.443748	0.510944^	4.833529*	0.290949*	0.001120	-0.012593	-0.361863**	-43.16214	1.181195	1.404294^	14.93107**
F3	-15.03486	0.617431	0.268816	3.796288*	0.278383*	0.002921	-0.018743^	-0.386834**	-42.61786	1.768301	0.659688	11.58576*
F4	-14.91227	0.648527	0.112762	2.999403^	0.235744	0.002827	-0.027231*	-0.577838**	-42.03215	1.869785	0.184950	9.409309*
S(-1)	-0.026145	-0.009005	0.05425	-0.035707	0.088677	0.228784**	0.133249*	0.200405**	-0.008189	-0.014383	0.098924	-0.047444
EXM	-2.158269	0.046693	-0.056719	0.408184	0.112084	0.009495	-0.032160*	0.031062	-4.349749	0.096591	-0.143573	0.523531
SMB	-0.922355	-0.000802	-0.019196	0.037502	0.189364	0.007132	0.014633	0.139419	-1.388140	-0.001611	-0.028494	-0.172170
HML	-1.326241	0.018087	-0.042579	0.252508	0.280355	0.009926	0.043474	0.413474	-1.479979	0.042384	-0.121603	-0.144862
DIV	3.809553	0.188813**	-0.699593**	-2.492960^	-0.334513	0.036952*	-0.079654^	1.819735**	20.36945*	0.437283**	-1.516935**	-14.2233**
TERM	405.8991	-4.844754	16.00773	722.8065**	91.07666	-3.730210*	1.717307	61.00754^	-279.6597	3.390460	18.75989**	2230.919**
R_w^2 Adj	-0.02339	0.04268	0.188399	0.108425	0.039218	0.288747	0.442556	0.255116	0.006265	0.039242	0.260357	0.268012
R^2 Adj	-0.051738	-0.05476	-0.032198	-0.078265	0.036615	-0.070927	0.174544	-0.335144	-0.052791	-0.054188	-0.026188	-0.082418

Panel D: Regressions for structural changes in the beta risk of size-book portfolios

	Average Beta Risk Series				Lowest Beta Risk Series				Highest Beta Risk Series			
	β^d	β^i	β^D	β^λ	β^d	β^i	β^D	β^λ	β^d	β^i	β^D	β^λ
C	26.20959	-0.86133	-0.025329	-2.226241	0.415060**	-0.016660^	-0.036299	0.027342	58.82334	-2.092654	0.170957	-6.037211
F2	-57.34820^	0.837565	0.195045	3.596036*	0.345082**	0.000452	0.053134^	-0.122545	-154.7505^	2.082345	0.076163	10.10534*
F3	-25.3837	0.818022	0.046259	2.593963^	0.429969**	0.001343	0.054937^	-0.292950	-60.00028	2.018716	-0.391441	7.227231^
F4	-25.31836	0.814337	0.182555	2.659088^	0.559184**	-0.007737	0.041304	-0.175546	-60.44258	2.019733	-0.001188	7.225803^
S(-1)	-0.022778	-0.00364	0.020081	0.172190*	0.181647*	0.220674*	0.213208**	0.205930**	-0.014566	-0.009335	0.032561	0.140313
EXM	0.319512	0.028007	-0.028903	0.314265	0.383627	0.001351	0.003789	0.066290	0.582348	0.042263	-0.027259	0.290608
SMB	-0.118696	0.012194	-0.030054	-0.081725	0.006590	0.011965	-0.002744	-0.411260	0.219274	0.011906	-0.036624	0.279670
HML	-0.199165	0.021679	-0.030832	-0.025193	0.133697	0.016090	-0.016970	-0.687415	0.802345	0.026711	-0.046210	0.555862
DIV	0.312767	0.103994*	-0.562045**	-0.16437	-1.473891*	0.052022*	-0.065338	1.334193^	9.385015^	0.161184*	-0.621251**	-2.400328
TERM	208.5028	-5.888687	1.602381	-20.45437	74.28236	0.241883	2.129883	18.26292	204.4233	-8.479553	-20.48250	139.0444
R_w^2 Adj	-0.02834	0.025808	0.08875	0.028891	0.134753	0.216618	0.282474	0.322051	0.005506	0.046420	0.043166	0.046674
R^2 Adj	-0.039014	-0.05051	-0.074382	0.015162	0.176656	-0.158781	-0.131687	-0.086903	-0.036434	-0.049069	-0.062981	-0.012116

Table 9 (continued)

Panel A: Regressions for structural changes in the risk premiums of country portfolios

	γ^w	γ^d	γ^i	γ^D	γ^λ	γ^e
C	0.000613^	-0.008151	-0.00025^	-9.48E-05	1.16E-05	-4.28E-06
F2	-0.000511*	-0.00025	-0.000172	-0.0038**	9.80E-06	-5.93E-06^
F3	0.006775*	-0.018205*	-0.001818	-0.001353	0.00299*	
F4	0.004247	-0.003034	0.061141	-0.004219	0.001169	
S(-1)	0.611171**	0.335553**	0.8589**	0.4276**	0.7641**	0.060686
EXM	-0.003490*	0.012667	0.000207	-0.000201	0.000329	3.04E-05^
SMB	0.001586	0.042994*	-6.08E-05	0.00243*	0.000151	-6.34E-06
HML	0.000869	0.021206	-0.000808	0.001163	-0.000315	-1.78E-05
DIV	-0.001596	0.035024	0.00049	0.001732	0.000111	1.60E-05
TERM	-0.180541	-0.74023	0.2101**	0.068127	-0.007464	0.0021
EB(-1)	9.28E-05^	9.15E-05	2.66E-05**	-5.63E-05*	-7.58E-07^	-1.28E-09
R_w^2 Adj	0.572752	0.220367	0.676097	0.327828	0.627202	0.077361
R^2 Adj	0.624476	0.422628	0.826744	-0.050328	0.778813	0.251235

Panel B: Regressions for structural changes in the risk premiums of sector portfolios

	γ^w	γ^d	γ^i	γ^D	γ^λ	γ^e
C	0.000415	-0.005612	0.000428	-0.000282	0.000125*	3.91E-06
F2	-0.000362	0.012847**	-0.000132	-0.000328	-0.000146**	-5.00E-06**
F3	-0.000616	0.013847**	-0.000305	-0.001895**	-0.000345^	
F4	0.038474**	0.002555	-0.252719	-0.184373*	0.002217	
S(-1)	0.675389**	0.671099**	0.863677**	0.466716**	0.349070**	-0.095662
EXM	0.00026	0.005914	0.000549	-0.004084*	7.01E-05	9.53E-07
SMB	-0.001122	0.001057	-0.000826	0.000215	9.09E-05	5.26E-06
HML	-0.001697	0.007799	0.001302	0.002584	-0.000118	4.72E-06
DIV	-0.000609	-0.0329	-0.001358	0.000806	4.17E-05	4.08E-06
TERM	0.258695	1.020831	-0.276456*	0.053851	-0.074515**	-0.002781**
EB(-1)	4.42E-05	-1.34E-05	-0.000121**	-0.000124*	-1.57E-06^	-7.40E-11
R_w^2 Adj	0.751794	0.648294	0.580075	0.402412	0.269817	0.193919
R^2 Adj	0.816282	0.765027	0.92264	0.67325	0.057997	-0.091951

Panel C: Regressions for structural changes in the risk premiums of size-book portfolios

	γ^w	γ^d	γ^i	γ^D	γ^λ	γ^e
C	0.000229	-0.010660**	0.000224^	0.000148	6.93E-05	1.93E-07
F2	-0.000390^	0.014965**	-0.000343	-0.001067^	-0.000139*	-8.74E-07
F3	0.000353	0.015146**	-0.001899	-0.000586	-2.06E-05	
F4	-0.010632	0.023530**	-0.275572	0.007415	0.016347	
S(-1)	0.828940**	0.662726**	0.686536**	0.710782**	0.773536**	0.480121**
EXM	-0.001487	0.006462*	0.000343	0.000518	2.90E-05	-7.64E-06
SMB	0.000527	0.001424	-0.000464	0.00014	2.64E-05	-6.05E-07
HML	0.003059	0.007262	0.001092	0.002007	0.000206	-7.96E-07
DIV	-0.000482	-0.018229	-0.000487	-0.000312	8.64E-05	-1.40E-06
TERM	0.031308	0.708612	-0.200771**	0.036557	-0.03239	-0.000691
EB(-1)	-1.53E-05	1.03E-06	-2.27E-05**	-8.14E-06	-4.34E-07	-1.47E-11
R_w^2 Adj	0.85389	0.755348	0.406838	0.562943	0.747994	0.159537
R^2 Adj	0.754925	0.832054	0.699031	0.411721	0.793669	0.545804

Panel D: 6 and 12-month-ahead forecast error variance decompositions of domestic risk premium

6-month-ahead		SD	γ^w	γ^d	γ^i	γ^D	γ^λ	γ^e
Country Portfolios	1-72	0.01102	0.48	98.19	0.19	0.62	0.32	0.19
	73-144	0.02058	0.35	85.18	5.26	1.47	7.74	
Sector Portfolios	1-72	0.01008	0.60	94.41	0.06	1.79	1.17	1.96
	73-144	0.03888	1.75	64.02	10.09	1.77	22.37	
Size-Book Portfolios	1-72	0.00825	1.30	97.14	0.70	0.32	0.10	0.45
	73-144	0.01697	0.55	98.49	0.68	0.02	0.26	
12-month-ahead		**SD**	γ^w	γ^d	γ^i	γ^D	γ^λ	γ^e
Country Portfolios	1-72	0.01102	0.48	98.17	0.21	0.62	0.32	0.19
	73-144	0.02107	0.75	81.32	6.95	1.42	9.56	
Sector Portfolios	1-72	0.01009	0.60	94.37	0.06	1.79	1.22	1.96
	73-144	0.04132	2.06	57.81	12.74	3.34	24.05	
Size-Book Portfolios	1-72	0.00825	1.30	97.10	0.70	0.33	0.10	0.46
	73-144	0.01704	0.85	98.07	0.69	0.11	0.28	

Panels A, B and C of the table present the coefficients and the weighted (Adj. R_w^2) and unweighted (Adj. R^2) adjusted R^2 from the regressions of the series of the conditional risks premiums on the lagged beta and the economics variables. C, F1, F2, F3 denote the constant, three dummies, S(-1) the own series lagged by one month, EXM, …, DIV and TERM the economic series lagged by one month, and EB(-1) the corresponding residuals of conditional average beta risk series lagged by one month. Panel D presents the forecast error variance decomposition of orthogonalized domestic risk premiums of 6 and 12 month ahead. The sample period is from January 1993 to December 04.
(^ significant at 10%, * at 5% and ** at 1% levels.)

Table 10: Analysis of the structural and relative changes in the risk premiums