EQUITY RISK *PREMIA* ACROSS MAJOR INTERNATIONAL MARKETS*

*Isabel Marques Gameiro***

An important element in interpreting financial market prices is the identification of the risk *premia* they contain. Risk premium is defined as the additional compensation required by investors for holding a risky security. The analysis is, however, complicated due to the fact that neither the premium nor their main drivers are directly observable. In addition, the risk premium may vary over time according to the investors' perception of the underlying risk of the asset and their attitude towards risk. This means that the equity premium moves as uncertainty regarding corporate earnings prospects changes but also as investors change their risk appetite. In this article we analyse movements in equity risk *premia* in several major international stock markets, try to identify common influences across international markets and their association with a general shift in investors risk appetite. Once the common factor has been isolated we estimate country-specific influences on the equity risk *premia*. Finally, we assess the relative importance of the common and the country-specific components in explaining the behaviour of the equity risk *premia* since 1995, with a special focus on the current crisis.

The article is organised in four sections. The first section briefly describes the methodology used to estimate the equity risk *premia*, the data used and shows the derived indicators of the risk *premia*. In the second section, in the context of the Arbitrage Pricing Theory we try to evaluate the existence of a common influence on the risk *premia* across countries, using the principal component analysis. In section 3 we present estimates for the market-specific influences on the equity risk premium of each country. In section 4 we conclude.

1. THE EQUITY RISK PREMIUM

Modern asset pricing models are based on the assumption that people engage in asset transactions with the aim of optimally distributing consumption over time. People seek to equate the marginal benefit of consuming one more unit today to the marginal benefit of investing this unit in an asset and eventually selling it in order to consume the profits in the future. This gives rise to an arbitrage condition between the risk-adjusted expected rate of return of the asset and a risk-free interest rate so that the market value of a given asset is given by the present risk-adjusted discounted value of its expected income stream. We use a present value model, where the price of equity is related to expected future cash flows to derive the equity risk *premia*. Specifically we subtract the real risk-free interest from the real required return on equity implied in the model. Thus our measure of equity risk premium corresponds to what is called in the financial literature "excess return". Variables have been converted to real figures by subtracting inflation expectations for each economy. We used the three-stage dividend discount model developed by Fuller and Hsia (1984), which assumes three distinct phases of dividend growth[1]. In the initial phase (the first four years), and adopting a constant payout ratio, we assume that the dividend growth rate is equal to market analysts' earnings growth projections. In the second stage,

* The views expressed are those of the author and do not necessarily coincide with those of Banco de Portugal. The author thanks Sónia Costa, Carlos Robalo Marques and João Sousa for comments and suggestions.

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(1) Panigirtzolou and Scammel (2002) show that the three-stage dividend discount model tracks relatively well the level of equity prices in the UK and in the USA from early 90s to 2001

which is an interim period (assuming to last for eight years[2]) the dividend growth rate is assumed to linearly converge to the long term growth rate which is reached in the third stage and extends into the indefinite future. The long-term growth rate of real corporate earnings is assumed to be in line with estimates for trend potential growth. In this model the equilibrium price of a stock market index can be expressed as:

$$P_t = \frac{D_t \left[(1+g) + 8(g_t^a - g) \right]}{d_t - g} \quad (1)$$

Where P_t is the equity price index, D_t the current level of dividends, g is the expected long-run dividend growth rate, g_t^a is the market analysts' expected dividend growth rate over the next four years and d_t the discount rate which is calculated as a residual term. The equity risk premium is obtained by subtracting a real risk-free interest rate from the discount factor.

This approach has the advantages of being market driven and of providing an ex-ante measure of risk premium. Indeed, most of the available estimates of risk premium use historical data on equity and thus are ex-post measures. However, when interpreting the results it should be born in mind that this approach implies the assumption that market analysts' earnings forecasts are reasonable estimates and that the indexes are correctly priced.

1.1. Data

We use MSCI equity indices for the following markets in the period from January 1995 to October 2008: Australia, Austria, Belgium, Canada, China, Finland, France, Germany, Hong Kong, India, Ireland, Italy, Netherlands, Portugal, Singapore, Spain, Sweden, Switzerland, UK and USA. We use Institutional Broker's Estimate System (IBES) estimates for current dividend yields and IBES market analysts' earnings growth projections as proxies for dividend growth rates over the next four years. All these data are obtained from Thomson Reuters.

The risk-free interest rate is approximated by the 10-year government bond yield, whenever available. For China we take as reference a 5-year saving deposit rate and for Hong Kong and Singapore a three-month Treasury bill rate. These data are obtained from Thomson Reuters.

For inflation expectations we construct averages of consumer inflation monthly forecasts reported by Consensus Economics for all countries except Australia, China, Hong Kong, India and Singapore. For month m of a given year t, the inflation expectations $\Pi_{m,t}^e$ are defined as:

$$\Pi_{m,t}^e = \frac{(13-m)}{12} * \Pi_t^e + \frac{(m-1)}{12} * \Pi_{t+1}^e$$

For Australia, China, Hong Kong, India and Singapore we proxy inflation expectations by the observed year-on-year rate of change of consumer prices.

As regards estimates for growth in potential output for all countries but China, Hong Kong, India, Portugal and Singapore we use OECD estimates. For Portugal potential GDP growth rate is based on the results of Almeida and Felix (2006). For China and Hong Kong we use estimates by the World Bank, and for Singapore we use IMF estimates. Potential GDP growth rate estimates for India are based on the results of Ranjan *et al* (2007).

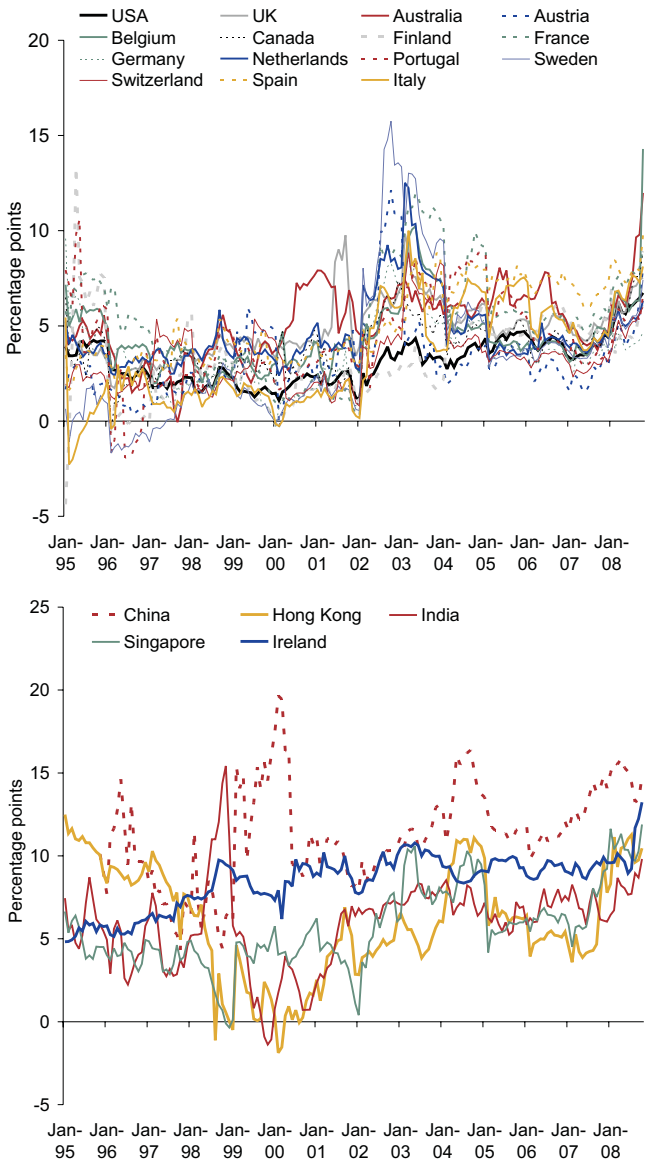
(2) The length of the transitions period is subjective. A eight years period is widely used in empirical applications (see for example Panigirtzolou and Scammel (2002) and ECB (2005)).

1.2. Results

Chart 1 plots the estimated measures of equity risk premium for twenty markets in the period from January 1995 to October 2008. A number of observations are worth making. First, there has been considerable variation over time in equity risk *premia* across markets. Second, there seems to be a co-movement of international equity risk *premia*, in the sense that markets tend to move up or down together. This is also evident from bivariate correlation coefficients for the equity risk premium across the twenty markets (see annex).

Chart 1

EQUITY RISK *PREMIA*



Source: Banco de Portugal calculations.

Table 1 shows the average equity risk premium for each country in the period under review. China and Ireland have the highest average equity risk premium (11 and 8 per cent, respectively), while the USA, Austria, Finland and Switzerland registered the lowest levels (close to 3 per cent). The equity risk premium in the other countries averaged around 3.5 to 6 per cent (4.3 per cent in the case of Portugal).

Table 1

EQUITY RISK PREMIUM: AVERAGE JANUARY 1995 TO OCTOBER 2008

(p.p.)

	1995-2008		1995-2008
Australia	5.1	Ireland	8.4
Austria	3.2	Italy	3.5
Belgium	4.4	Netherlands	4.6
Canada	3.9	Portugal	4.3
China	11.3	Singapore	5.7
Finland	3.3	Spain	5.2
France	5.2	Sweden	3.5
Germany	3.5	Switzerland	3.3
Hong Kong	6.0	United Kingdom	4.8
India	5.9	USA	3.1

Source: Banco de Portugal calculations.

2. COMMON FACTORS DRIVING EQUITY RISK *PREMIA*

We now try to understand the movements in equity excess returns across countries on the basis of the effect of common (international) factors and country-specific factors. To do this we resort to the Arbitrage Pricing Theory (APT),[3] which predicts that the rate of return of any security is a linear function of *K* factors. For the system of *N* assets:

$$\mu = \lambda_o + B\,\lambda_K \qquad (2)$$

Where μ is the (N×1) vector of expected returns, λ_o is the risk-free return, λ_K is a (K×1) vector of factor risk *premia* and *B* is a (N×K) matrix of factor sensitivities of the returns. The APT specifies neither the number of factors nor the identification of factors. We assume that the equity risk premium for each country can be decomposed into two components: a common factor which is driven by international forces that are common to the twenty markets considered and a country (market) specific factor:

$$\rho_{it} = a_i + \beta_i C_t + \alpha_i S_{it} + \varepsilon_{it} \qquad (3)$$

Where ρ_{it} refers to the equity risk premium of country *i* in period *t* (estimated in the section above); C_t is a set of common influences on the equity risk premium; S_{it} are specific factors; β_i and α_i are parameters that measure the sensitivity of country *i* equity risk premium to the common and country-specific influences factors respectively and ε_{it} are errors that cannot be accounted for in the model.

To identify the factors two type of approaches are typically used: statistical and theoretical (see Campbell *et al*, 1997). We follow a statistical approach namely the principal component analysis (PCA). The principal components are summary measures capturing the co-movements of a variety of indicators. Accordingly, PCA allows detecting common influences that might be driving equity risk *premia* across markets. If the series taken into consideration follow a common pattern, the first principal component should be able to explain most of their joint variation. Indeed, applying the PCA approach it is found

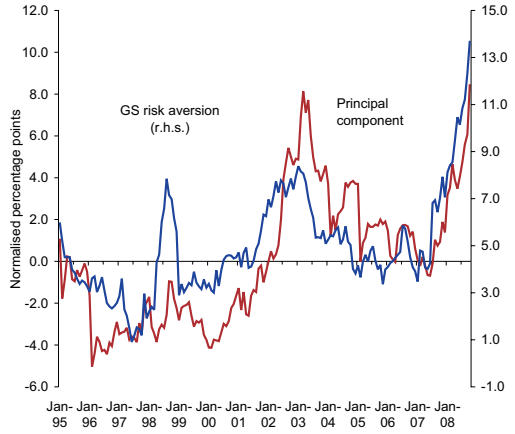
(3) The APT is an equilibrium model of asset pricing derived under the usual assumption of perfectly competitive and frictionless capital markets, see Ross (1976).

that there is one significant common factor that captures slightly more than 50 percent of the total variance of the equity risk premium across markets.[4] There can be different interpretations of the first principal component. Theory suggests that one of the factors that affect the risk premium is the change in risk appetite.[5] A low appetite for risk results in a higher cost of capital. Thus the first principal component of the equity premium might capture systemic changes in international investors risk appetite (like the Asian financial crisis in 1997, the bust of the dotcom bubble in 2002-2003 and the more recent subprime mortgage crisis). This would be in line with empirical results that find that the risk attitude from different equity markets has a significant common component, indicating that investors' sentiment transcends national boundaries (see, for example, Tarashev *et al* (2003) and Cappiello *et al* (2008)).

Chart 2 shows that there seems to be an association between the first principal component of equity risk premium and a risk aversion index calculated by Goldman Sachs.[6] They tend to move broadly together and the contemporaneous correlation is 0.7. Equity markets seemed to have weathered well the financial turbulence in August 1998 in the context of the LTCM and Russian crisis. In particular, while risk aversion measured by the GS index increased significantly, the rise in the international equity risk premium (proxied by the first principal component) was rather limited. However, in the period of high risk aversion that goes from end-2001 until March 2003 and which corresponds to the bust of the dotcom bubble and WorldCom accounting scandals, a significant increase in the international equity risk premium took place. Since the summer of 2007 risk aversion increased again to a very high level. Equity markets initially appear remarkably resilient.[7] However, the persistence of strains in the finan-

Chart 2

PRINCIPAL COMPONENT AND RISK AVERSION INDEX



Sources: Goldman Sachs and Banco de Portugal calculations.
Nota: The GS risk aversion index measures investors willingness to invest in risky assets as opposed to risk-free securities, building on the premises of a consumption capital asset pricing model. A higher value of the index implies higher risk aversion and, other things being equal, less willingness to allocate investments towards risky assets.

(4) The factor loadings on the first principal component are positive and similar in terms of magnitudes for all countries, except for the case of China and Hong Kong that have lower factor loadings.

(5) Risk appetite encompasses the notion of risk aversion, i.e, the subjective attitude of investors with regard to uncertainty, but is also influenced by the overall level of uncertainty about the fundamental factors that drive asset prices (see Gai and Vause, 2005).

(6) The Goldman Sacks risk aversion index is based on a standard consumption model of capital-asset pricing. The index is constructed using US data only: real per-capita consumption, yields on 3-month t-bills and returns on the S&P500 index (for details see Goldman Sachs, 2003 and European Central Bank, 2007).

(7) This could reflect the fact that non-financial firms entered the turmoil from a relatively strong financial position and also a lagged perception of the impact of the propagation shocks to an increasing number of financial markets segments, sectors of activity and countries.

cial system in combination with high commodity prices up to mid-2008 gave rise to perceptions of a worsening outlook for economic growth globally and for near-term prospects of corporate earnings, which fuelled an increase in the international equity risk premium for maximum levels. Presently, both indicators show a significant upward revision of risk to levels above the ones reached in the period following the bust of the dotcom bubble in 2002-2003.

The analysis above suggest that the first principal component of the equity risk *premia* is likely to capture changes in risk appetite in equity markets across the globe and therefore could be used as an additional measure of global change in risk appetite. This measure can be updated daily and has also the advantage of including data for several countries while most measures of investor's risk appetite, including the GS index, are based on US data only. [8]

3. MARKET-SPECIFIC FACTORS

After having identified a common component it is possible to isolate other factors in order to try to capture the potential country-specific influences on the equity risk premium. With this aim, we took the residuals of an OLS regression of each country equity risk premium in the first principal component (i.e. the international risk premium). Table 2 shows these results. The first principal component is statistically significant in explaining the equity risk premium for all countries, except Hong Kong and China, and the coefficients have the expected sign. In addition, the results indicate that the sensitivity of the equity risk premium to the international driving force is about 1 for Sweden and above 0.7 for France and Italy. On the other hand, the sensitivity of the equity risk premium to the international component is lower in the USA, Finland and Ireland (the coefficient associated with the first principal component is around 0.3). In Portugal, the sensitivity of the equity risk premium to the international risk premium is similar to the one observed in Germany and Spain (about 0.5). The R-square of the regressions sug-

Table 2

OLS REGRESSIONS OF THE EQUITY RISK PREMIUM IN THE PRINCIPAL COMPONENT

Regressions	Constant			Principal component			R-squared
	Coefficient	HACSE [(a)]	t- HACSE	Coefficient	HACSE [(a)]	t- HACSE	
(1) Australia	5.11	0.22	22.90	0.39	0.07	5.70	0.44
(2) Austria	3.24	0.25	12.90	0.38	0.10	3.82	0.34
(3) Belgium	4.43	0.15	28.60	0.45	0.06	7.75	0.64
(4) Canada	3.88	0.10	40.50	0.40	0.04	10.60	0.70
(5) China	11.27	0.46	24.50	0.27	0.14	1.86**	0.09
(6) Finland	3.27	0.28	11.70	0.32	0.09	3.76	0.21
(7) France	5.24	0.26	20.20	0.72	0.08	8.64	0.68
(8) Germany	3.53	0.17	20.70	0.47	0.06	7.84	0.64
(9) Hong Kong	5.99	0.53	11.30	0.31	0.17	1.86 **	0.09
(10) India	5.92	0.34	17.30	0.42	0.09	4.76	0.27
(11) Ireland	8.44	0.19	43.60	0.34	0.04	7.82	0.45
(12) Italy	3.47	0.22	16.00	0.71	0.05	14.90	0.72
(13) Netherlands	4.59	0.17	26.20	0.45	0.08	5.82	0.64
(14) Portugal	4.31	0.22	19.40	0.52	0.07	7.24	0.54
(15) Singapore	5.65	0.22	25.70	0.62	0.06	9.89	0.66
(16) Spain	5.16	0.20	26.10	0.49	0.06	8.04	0.62
(17) Sweden	3.46	0.29	12.00	1.00	0.12	8.51	0.75
(18) Switzerland	3.36	0.18	19.20	0.35	0.06	5.66	0.50
(19) United Kingdom	4.81	0.14	34.30	0.38	0.03	12.70	0.63
(20) USA	3.15	0.13	24.00	0.29	0.05	6.02	0.58

Notes: (a) Heteroscedasticity and autocorrelation-consistent standard errors. ** Not different from zero at 5% significance level.

(8) For other measures of investors' risk appetite see for example European Central Bank (2007), Diebold (2008) and González-Hermosillo (2008).

gest that the international equity risk premium can account for a sizable part – between 50 and 75 per cent - of the variation of the risk premium in most of the countries considered. In the regressions, the constant captures the mean of the risk premium. Differences between the constants among the countries considered are likely to be related to country-level factors such as corporate governance, accounting standards, legal environments and enforcement and sector composition of the stock market indices/equity market depth (Witmer, 2008).

Charts 3 to 22 plot the equity risk premium (minus the constant, in equation) for each country and the country-specific influence (which include the errors, ε_{it} from equation (3)),[9] that allows the examination of the relative importance of the common and market specific factors for the movements in the deviations from mean of the equity risk *premia*.

In Hong Kong and China and, to a lesser extent, in Austria, Finland and India the equity risk premium developments in the period under review seem to have been mainly driven by country-specific influences. While it is not the purpose of this article to investigate the reasons behind this outcome, the results for China and India might reflect the fact that, at least for part of the sample, these stock markets are less internationally integrated. In the case of Finland, it should be mentioned that Nokia accounts for about a third of the market capitalization of the Helsinki Stock Exchange (OMX Helsinki) as of 2007.

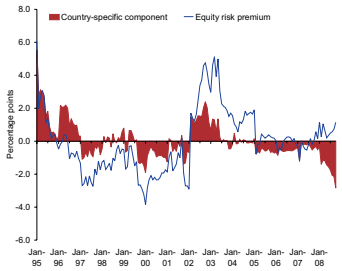
In the period from 1996 to the end of 2001, the common/international component seems to have had a negative contribution to the equity risk *premia* across the globe. It is worth noting that this period was characterised by a high "appetite for risk" by investors, the so-called "Irrational Exuberance" period (see Shiller, 2000). In contrast, the significant rise in equity risk *premia* in 2002 and 2003 was in general determined by the international component.

Focusing on the more recent period of financial turmoil (since June 2007), there has been a global rise in equity risk *premia*, which in the case of the USA, Australia, Belgium, Canada, Ireland, Singapore and Spain jumped to maximums for the period considered. For the USA the results suggest that the country-specific factor was the dominant influence explaining the increase in the equity risk premium until recently (Chart 5). This is not too surprising since the current financial turmoil was originated in the USA subprime mortgage market which quickly spread to other segments of financial markets and in parallel with the housing market correction depressed the growth outlook in the USA. It is interesting to note that the country-specific component started to have a positive contribution to the equity risk premium in the USA in 2005, when the housing correction started. As the time as passed and the negative macroeconomic impact of the crisis spread to a wider number of sectors of activity and countries, the influence of the international component in the US equity risk premium became more significant. Indeed, the international component might be capturing the global decline in risk appetite but also other common effects like downward revisions of growth expectations across the globe. Country-specific factors have also had a significant positive contribution to the recent rise in the equity risk *premia* in Australia, Canada and Singapore, countries that have also experienced significant increases in house prices over the past decade[10](Charts 7, 10 and 17). As for the US, the influence of the international component in the equity risk premium of these countries turned relatively more significant in the last few months. In contrast, in all Western European countries the rise in the equity risk *premia* was mainly determined by the international component. In several of these countries – like Germany, Portugal, France, the Netherlands and Sweden – the country-specific component has been having a negative contribution to the risk premium. In fact, in these countries the equity risk *premia* are still significantly below the peaks reached in 2002-2003. In the other European countries considered, in particular in the UK, Austria, Belgium, Finland, Ireland, Italy, Spain and Switzerland, the country-specific component

(9) $\alpha_i S_{it} + \varepsilon_{it}$.
(10) See IMF (2008a) and IMF (2008b).

Chart 3

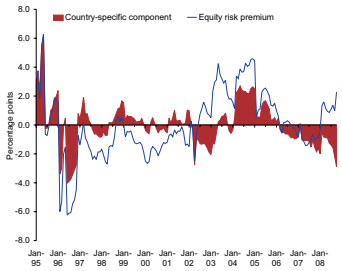
GERMANY



Source: Banco de Portugal calculations.

Chart 4

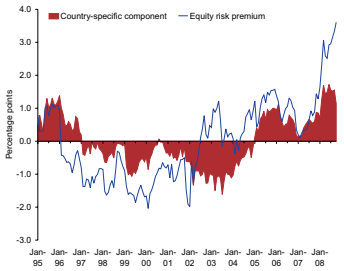
PORTUGAL



Source: Banco de Portugal calculations.

Chart 5

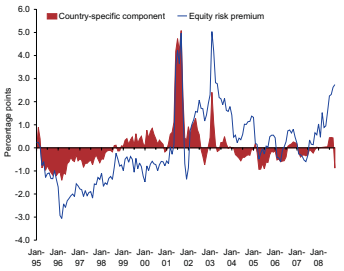
USA



Source: Banco de Portugal calculations.

Chart 6

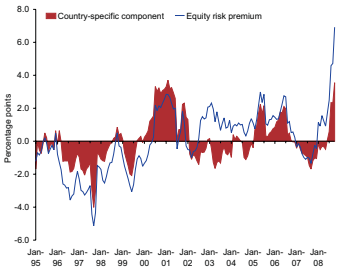
UNITED KINGDOM



Source: Banco de Portugal calculations.

Chart 7

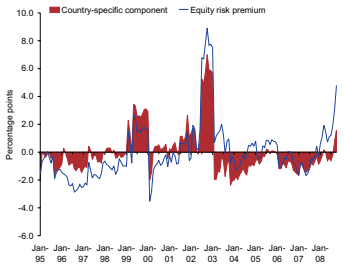
AUSTRALIA



Source: Banco de Portugal calculations.

Chart 8

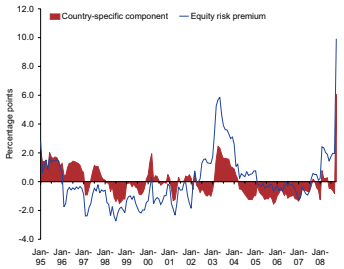
AUSTRIA



Source: Banco de Portugal calculations.

Chart 9

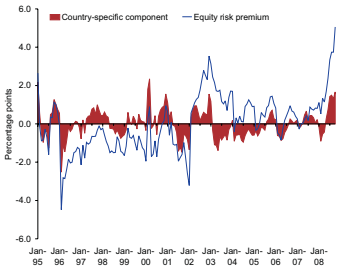
BELGIUM



Source: Banco de Portugal calculations.

Chart 10

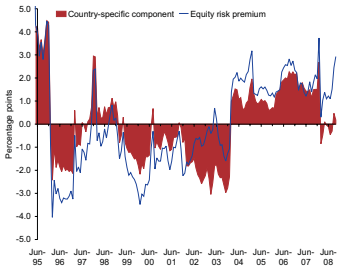
CANADA



Source: Banco de Portugal calculations.

Chart 11

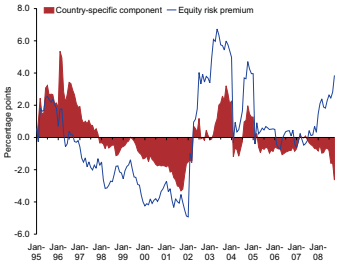
FINLAND



Source: Banco de Portugal calculations.

Chart 12

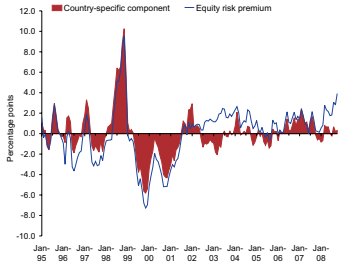
FRANCE



Source: Banco de Portugal calculations.

Chart 13

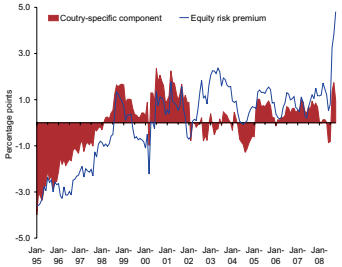
INDIA



Source: Banco de Portugal calculations.

Chart 14

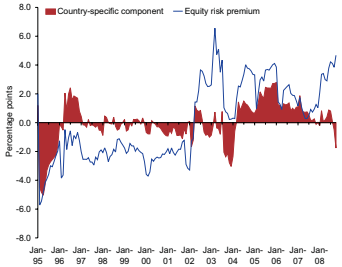
IRELAND



Source: Banco de Portugal calculations.

Chart 15

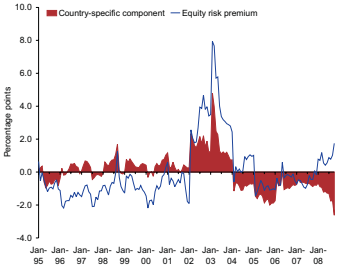
ITALY



Source: Banco de Portugal calculations.

Chart 16

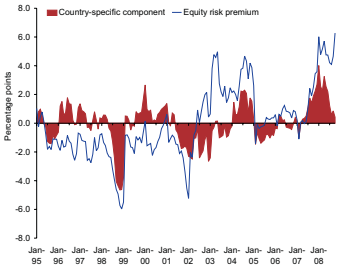
NETHERLANDS



Source: Banco de Portugal calculations.

Chart 17

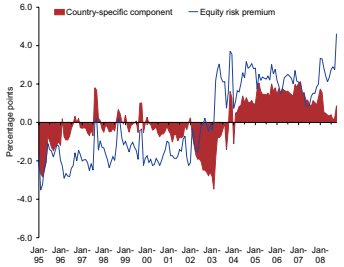
SINGAPORE



Source: Banco de Portugal calculations.

Chart 18

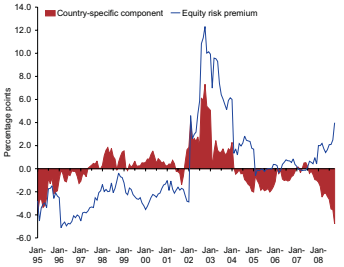
SPAIN



Source: Banco de Portugal calculations.

Chart 19

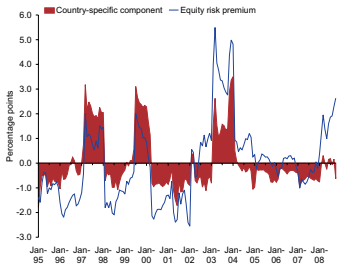
SWEDEN



Source: Banco de Portugal calculations.

Chart 20

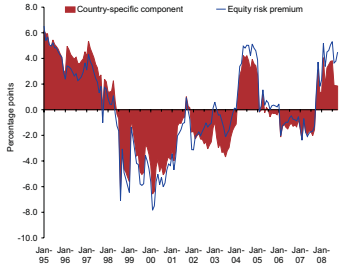
SWITZERLAND



Source: Banco de Portugal calculations.

Chart 21

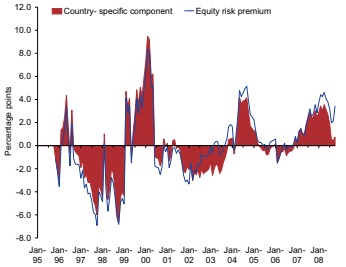
HONG KONG



Source: Banco de Portugal calculations.

Chart 22

CHINA



Source: Banco de Portugal calculations.

has had a minor positive contribution to the increase in equity risk *premia*. However, it should be noted that in the last few months the country-specific component contributed significantly to the abrupt rise in the equity risk premium in Belgium and Ireland.

4. CONCLUSIONS

This article presents estimates of the equity risk premium for major international markets in the period from January 1995 to October 2008. Equity risk *premia* vary significantly over time and appear positively correlated across countries. This suggests the presence of a common influence. However, the equity risk premium also appears to have an important country-specific component that varies across countries.

In the context of an Arbitrage Pricing Theory model and using a statistical approach, we find that one significant common factor captures slightly more than 50 percent of the total variance of the equity risk premium across markets. There seems to be an association between this principal component and a widely used risk aversion index calculated by Goldman Sachs, suggesting that our measure might capture systemic changes in international investors risk appetite. Our measure can be updated daily and includes data for several countries while most measures of investor's risk appetite, like the GS index, are based on USA data only. The principal component is statistically significant in explaining the equity risk premium for all countries, except Hong Kong and China. The sensitivity of the equity risk premium to the common/international driving force is higher in Sweden, and to a lesser extent, in France and Italy and lower in USA, Finland and Ireland.

In the more recent period of financial turmoil, although equity markets first appeared remarkably resilient, as the credit turmoil intensified and it became apparent that was starting to hurt the real economy, the equity premium across markets jumped reaching peaks in some countries, such as the USA, Australia, Belgium, Canada, Ireland, Singapore and Spain. Until recently the country-specific factor was the dominant influence in the rise in the US equity risk premium. This should be related to the fact the current financial turmoil was triggered by problems in the US which eventually turned into a credit crisis. However, more recently, in the context of the propagation of shocks to a wider number of sectors of activity and countries, the influence of the international component to the rise in the US equity risk premium became more significant. Country-specific factors have also had a significant positive contribution to the recent rise in the equity risk premium in Australia, Canada and Singapore but like in the US the influence of the international component in the equity risk premium of these countries turned relatively more significant in the last few months. In most Western European countries the rise in equity risk *premia* was almost totally determined by the international component. In Germany, Portugal, France, the Netherlands and Sweden the country-specific component has been having a negative contribution to the risk premium. In these countries the equity risk *premia* are still significantly below the peaks reached in 2002-2003.

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Annex

BIVARIATE CORRELATIONS BETWEEN EQUITY RISK *PREMIA*

	Australia	Austria	Belgium	Canada	China	Finland	France	Germany	Hong Kong	India	Ireland	Italy	Nether lands	Portugal	Singapore	Spain	Sweden	Switzerland	United Kingdom	USA
Australia	1.00																			
Austria	0.42	1.00																		
Belgium	0.48	0.41	1.00																	
Canada	0.59	0.59	0.72	1.00																
China	0.24	0.12**	0.26	0.27	1.00															
Finland	0.47	0.10**	0.27	0.51	0.12**	1.00														
France	0.32	0.39	0.79	0.68	0.22	0.37	1.00													
Germany	0.41	0.57	0.72	0.68	0.14**	0.34	0.87	1.00												
Hong Kong	0.00**	-0.04**	0.33	0.22	0.11*	0.35	0.49	0.30	1.00											
India	0.28	0.14**	0.33	0.34	-0.13**	0.52	0.46	0.50	0.25	1.00										
Ireland	0.78	0.52	0.50	0.66	0.19	0.49	0.37	0.50	-0.16	0.43	1.00									
Italy	0.58	0.46	0.64	0.75	0.32	0.62	0.77	0.78	0.41	0.49	0.63	1.00								
Netherlands	0.42	0.62	0.73	0.68	0.06**	0.14**	0.73	0.85	0.06**	0.37	0.57	0.60	1.00							
Portugal	0.57	0.39	0.54	0.60	0.22	0.59	0.60	0.61	0.25	0.49	0.61	0.70	0.56	1.00						
Singapore	0.50	0.34	0.71	0.72	0.58	0.50	0.72	0.62	0.50	0.21	0.50	0.76	0.55	0.57	1.00					
Spain	0.56	0.24	0.56	0.66	0.38	0.74	0.65	0.55	0.36	0.49	0.65	0.85	0.39	0.71	0.74	1.00				
Sweden	0.52	0.72	0.72	0.79	0.14*	0.31	0.76	0.88	0.08**	0.45	0.67	0.72	0.91	0.65	0.60	0.56	1.00			
Switzerland	0.24	0.37	0.70	0.63	0.24	0.21	0.70	0.55	0.22	0.18	0.41	0.54	0.67	0.56	0.62	0.55	0.65	1.00		
United Kingdom	0.62	0.55	0.65	0.66	0.23	0.34	0.52	0.67	0.07**	0.39	0.77	0.65	0.74	0.63	0.57	0.55	0.74	0.52	1.00	
USA	0.62	0.29	0.61	0.71	0.31	0.70	0.66	0.56	0.51	0.47	0.54	0.82	0.35	0.54	0.74	0.81	0.48	0.40	0.50	1.00

** Correlation coefficients not different from zero at 5% significance level.
Source: Banco de Portugal calculations.