ASR Composite ERP

Calculation and Relationship with Macro Variables

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ABSOLUTE STRATEGY RESEARCH

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- Calculation of Ex Ante ERP
- Relationship with Macro Variables
- ERP and subsequent returns

CALCULATION OF EX ANTE ERP

4 types of equity risk premium

- **Historical ERP** – What equities, in the past, have returned in excess of bills or bonds.
- **Required ERP -** The additional return over bonds that investors require in order to make further equity investments. Often found by surveys of investors and management.
- **Expected ERP -** What excess return equities are expected to provide over bonds. This is a forecast of equity returns, and so might rise during bubble periods.
- **Implied ERP** – The excess return over bonds implied by the current market price. Has to be estimated using models with assumptions about growth etc.

Dividend Discount Models for the Implied ERP

Model	Description	Formula	Comments
Gordon Growth	ERP is the dividend yield	d_1/p	Assumes LT Growth is risk Free Rate. Question whether to adjust d_1 for share buybacks
Damodaran DY	DY adjusted for analyst earnings forecasts	$P_t = \sum_{k=1}^{5} \frac{D_t(1+g_t)^k}{\rho_t^k} + \frac{D_{t+6}(1+g_t)^6}{(\rho_t - R_t^f)\rho_t^5}$	Damodaran method. Assumes constant payout ratio
Modified Damodaran	DY adjusted for analyst dividend forecasts	As above	Similar to above but not reliant on payout ratio assumption

Earnings Models for finding the Implied ERP

Model	Description	Formula	Comments
Yield gap 'Fed Model'	Earnings yield less risk free rate	$(e_1/p) - r_f$	Debatable if r_f should be nominal or real.
Trend earnings yield gap	Similar to above but based on trend earnings and using real bond yields	$(e_t/p) - rr_f$	Trend earnings based on history since 1973. Assumes constant trend growth.
10yr trend earnings yield gap	Similar to above but based on 10 year trend earnings and using real bond yields	$(e_{10t}/p) - rr_f$	Relaxes the assumption that trend growth is constant.

Residual Income Models for finding the Implied ERP

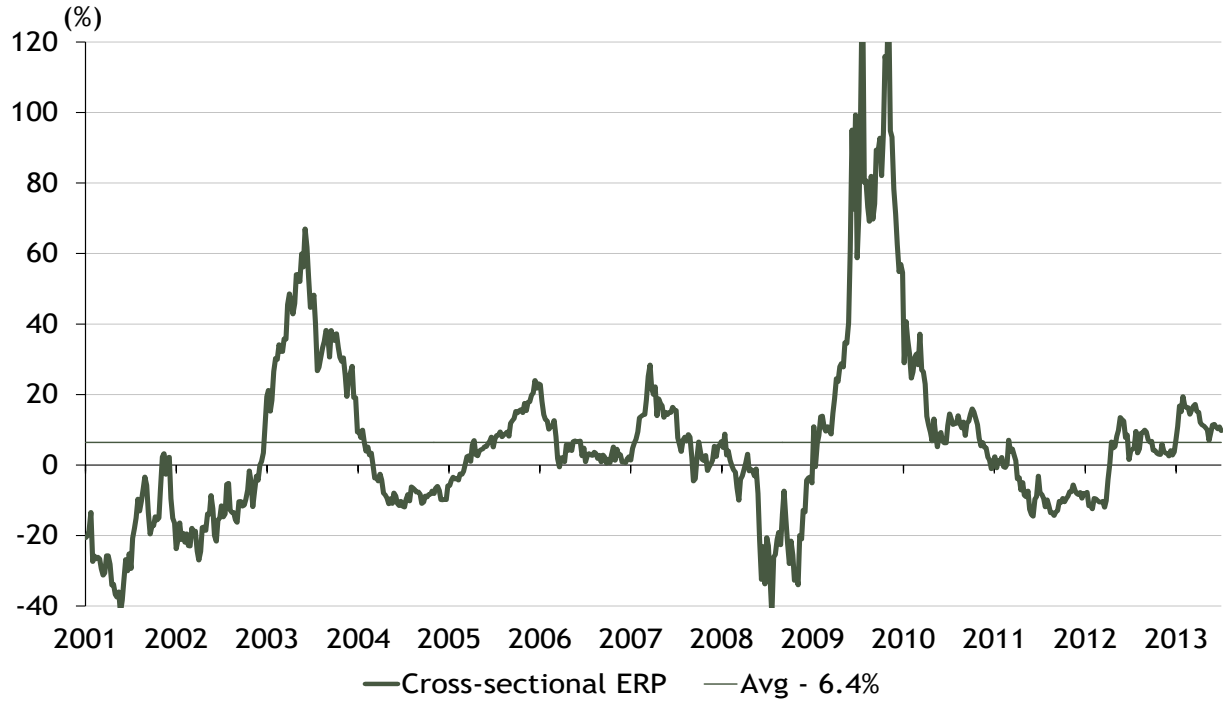
Model	Description	Formula	Comments
Residual income	Takes into account the need to retain earnings for growth	$ERP = \frac{ROE - r_f}{ROE \times PE}$	Assumes constant returns and growth rates.
1-stage DDM	Discount rate in Gordon Growth Model less risk free rate	$P = \frac{E_1(1 - g/ROE)}{(r_e - g)}$	ASR model uses ROE-COE of 3%
3 stage DCF	Discount rate in 3 stage DCF less risk free rate	$P = \frac{E_1(1 - g/ROE)}{(1 + r_e)} + \sum_{n=2}^{5} \frac{E_n(1 - g/ROE)}{(1 + r_e)^n} + \frac{E_6 \times (1 - g/ROE)}{(r_e - g)(1 + r_e)^5}$	ASR model using IBES estimates. ROE-COE is 3%.

Cross-sectional models

Alternative approach based on how individual stocks behave relative to each other. Basic model based on CAPM:

$$r_i = r_f + \beta_i \times ERP$$

So slope of a regression of stock performance vs stock beta should give the ERP



While the average is reasonable – 6.4% - this method gives a wide range of values. Attempts have been made to improve the model, for instance adding adjustments for size, valuation and other risk factors.

Results of models for US

ERP Estimate (%)	US Current	US Average
DY	1.9	2.1
DY including Buybacks	4.7	4.6
DDM with 3yrs earnings forecasts	2.3	2.9
DDM with 3yrs dividend forecasts	2.1	2.3
Forward EY	3.8	2.0
EY using LT trend earnings	4.6	3.2
EY using 10 yr trend earnings	5.1	3.4
RIM	3.7	3.4
1 stage DCF	3.4	2.7
3 Stage DCF	10.8	6.1
ASR Composite ERP	**3.7**	**3.1**

Average since 1988

Source: ASR Ltd, Thomson Reuters Datastream

Combining estimates to reduce model risk

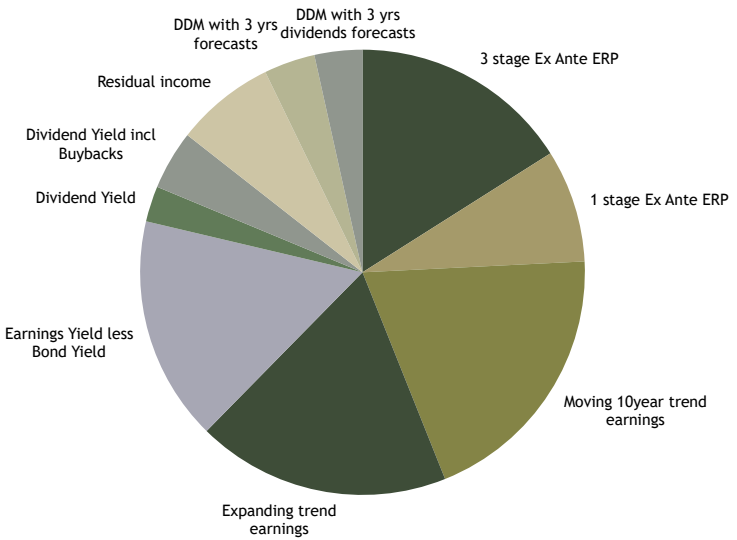
We can reduce the model risk by combining models.

But we need a method to combine them?

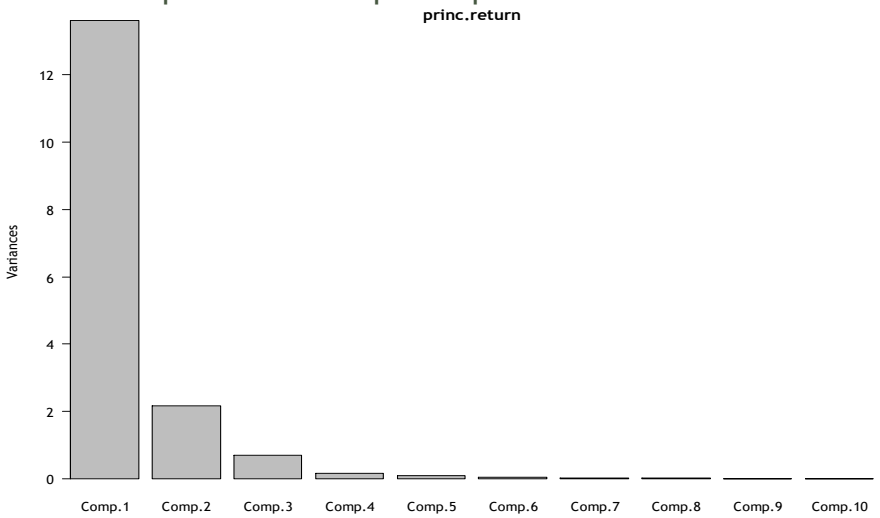
- Mean. Exposed to outliers
- Principal Component Analysis – take first component. Presumes that they are reasonably good models of the ERP.
- Median. Robust to outliers

Principal Component Analysis – first component dominates

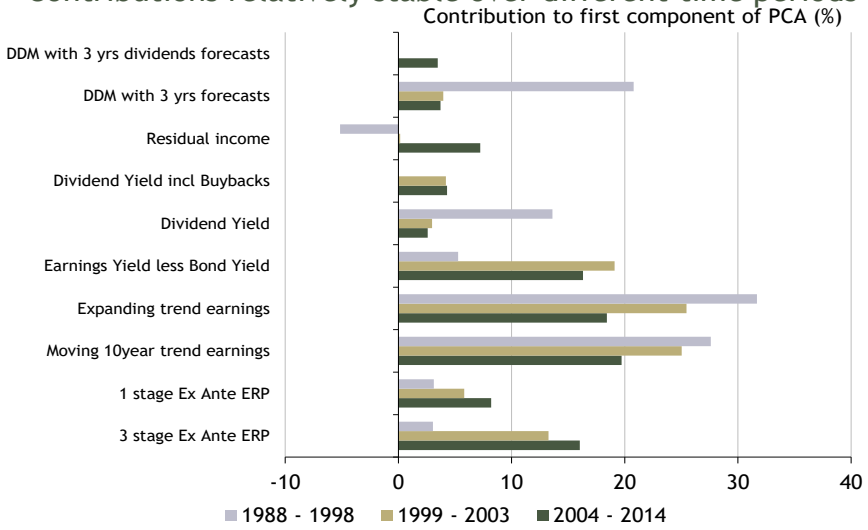
Contribution of each model to first component of PCA



1st Component of PCA picks up around 85% of variance



Contributions relatively stable over different time periods

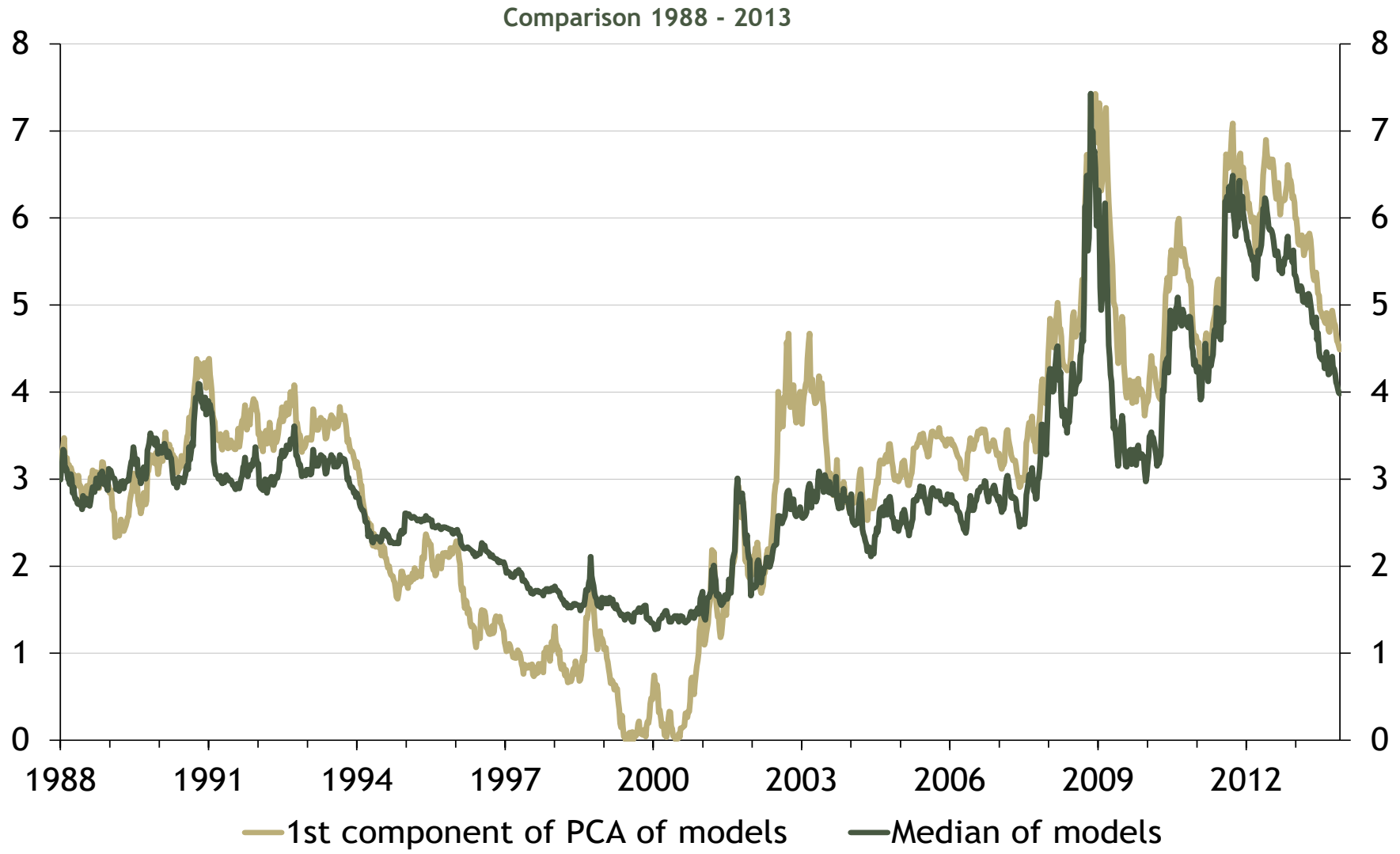


1st component is dominated by bond and equity price moves, Median less so could be picking up other variables

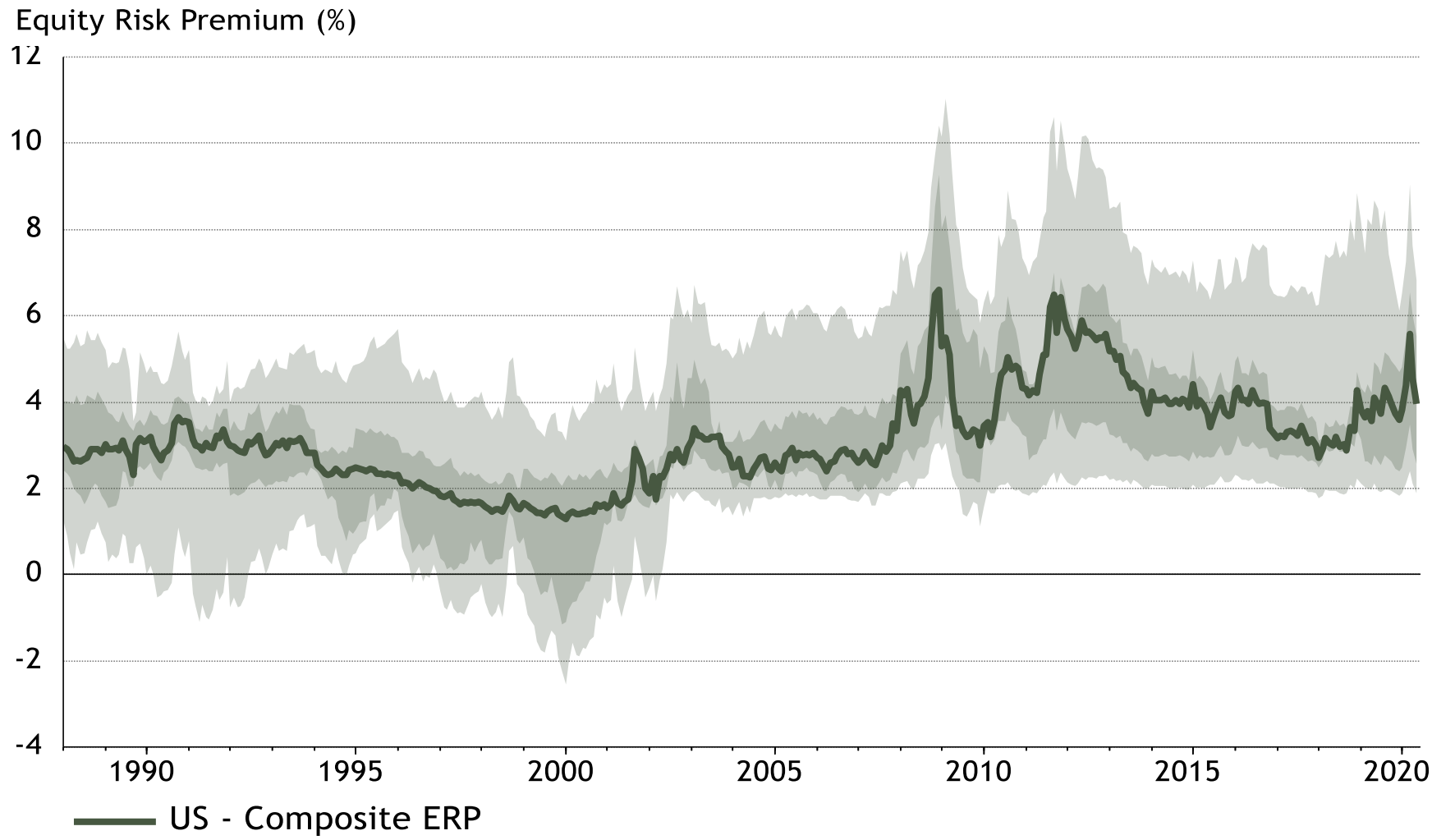
	3mth changes		12mth changes	
Correlations	PCA	Median	PCA	Median
PCA 1st Component		0.86		0.86
Median	0.86		0.86	
Equity Market	-0.68	-0.61	-0.66	-0.51
Equity / Bonds	**-0.85**	**-0.73**	**-0.82**	**-0.64**
BY/EY	-0.77	-0.62	-0.75	-0.59

As of May 2014

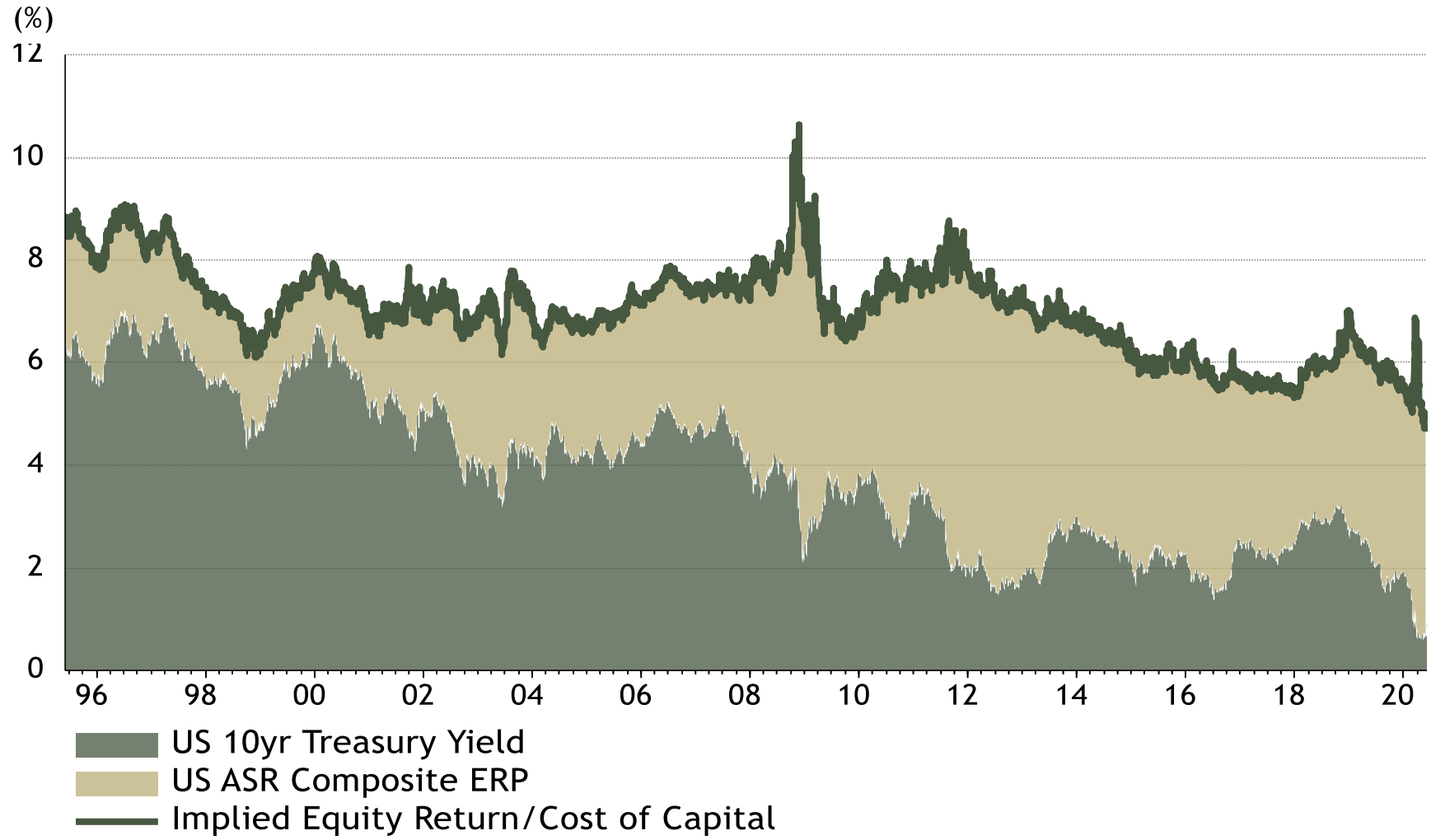
US Composite ERP – Median vs 1st Component of PCA



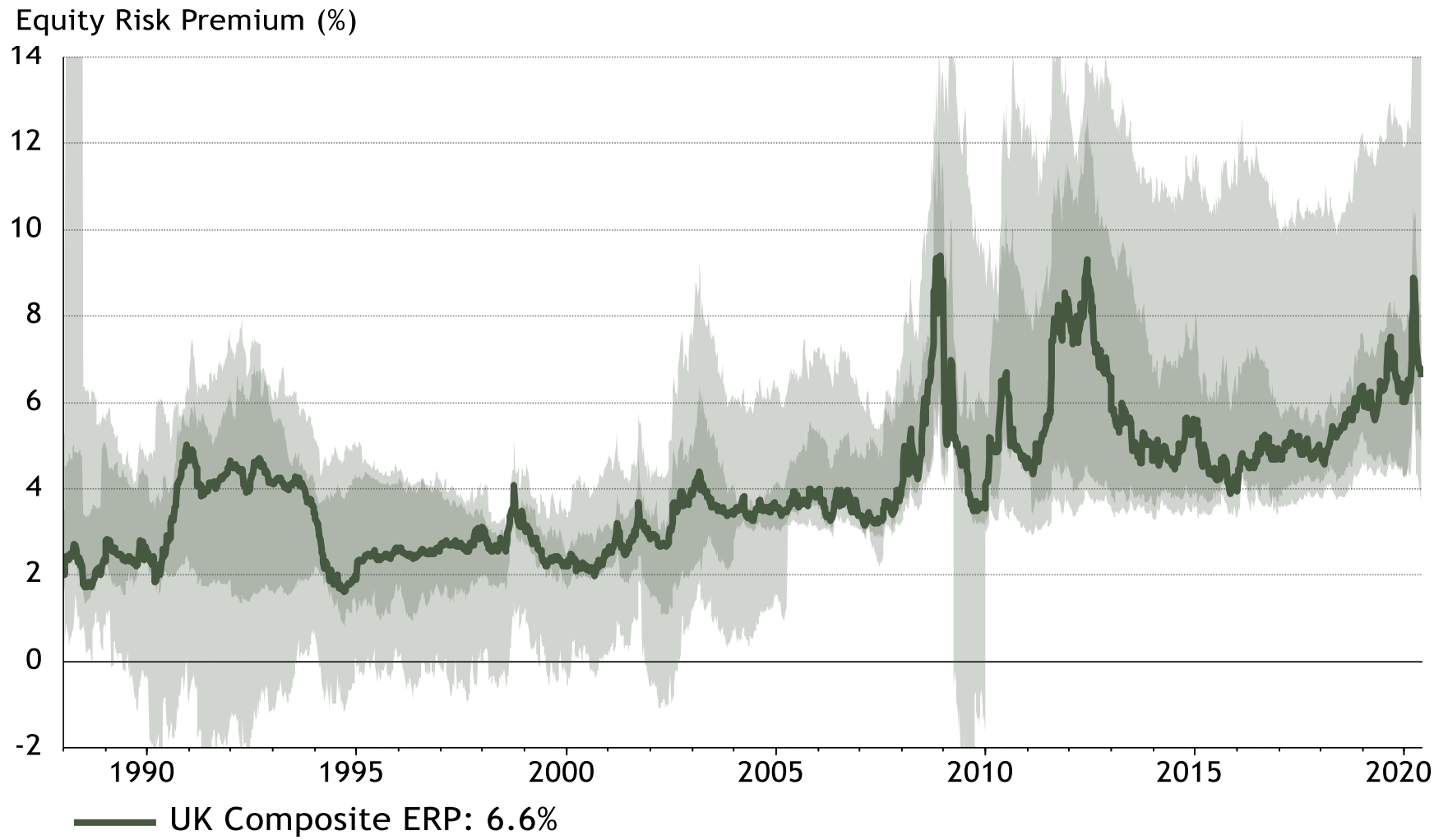
US Equity Risk Premium



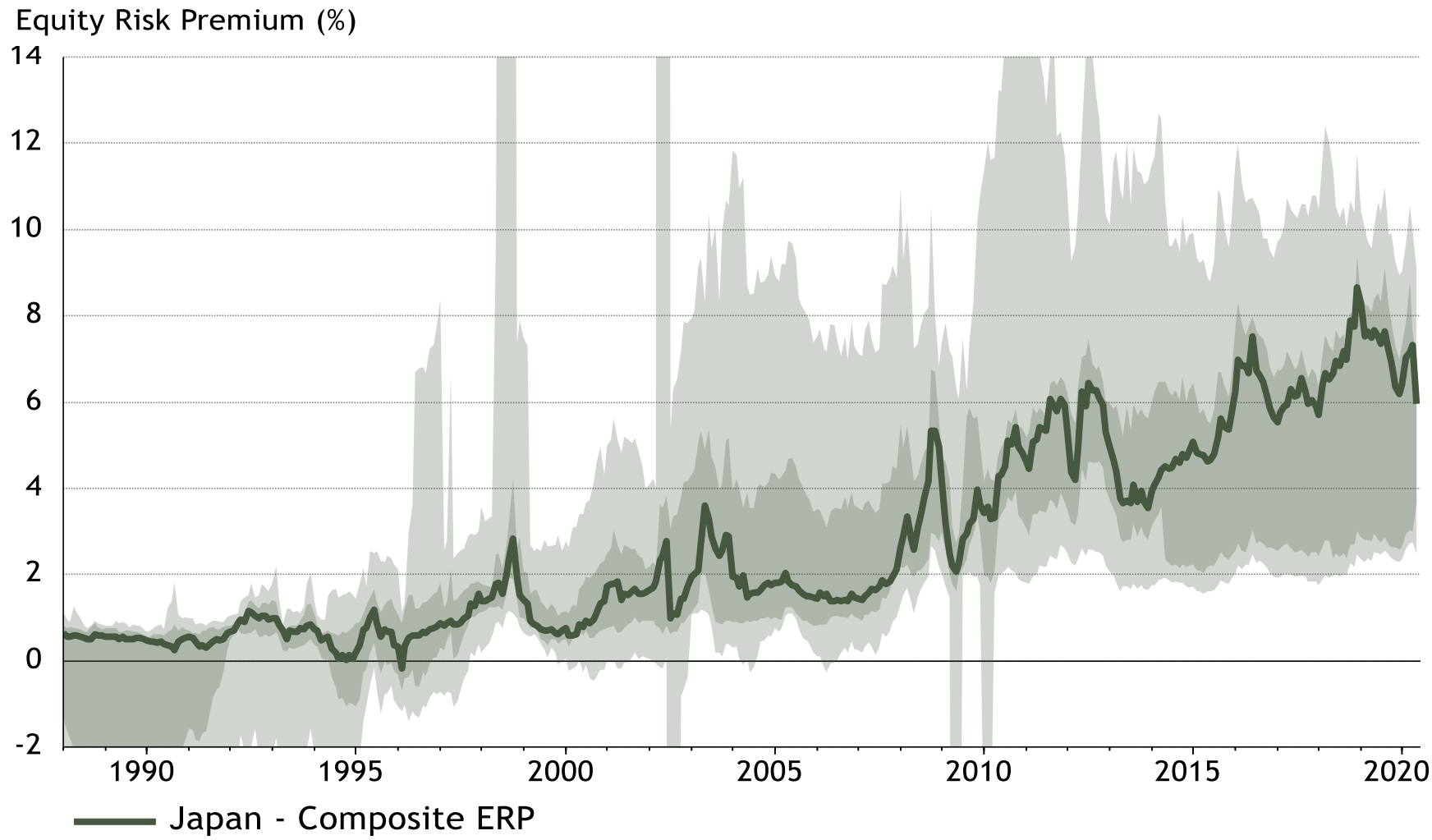
US Implied Equity Return



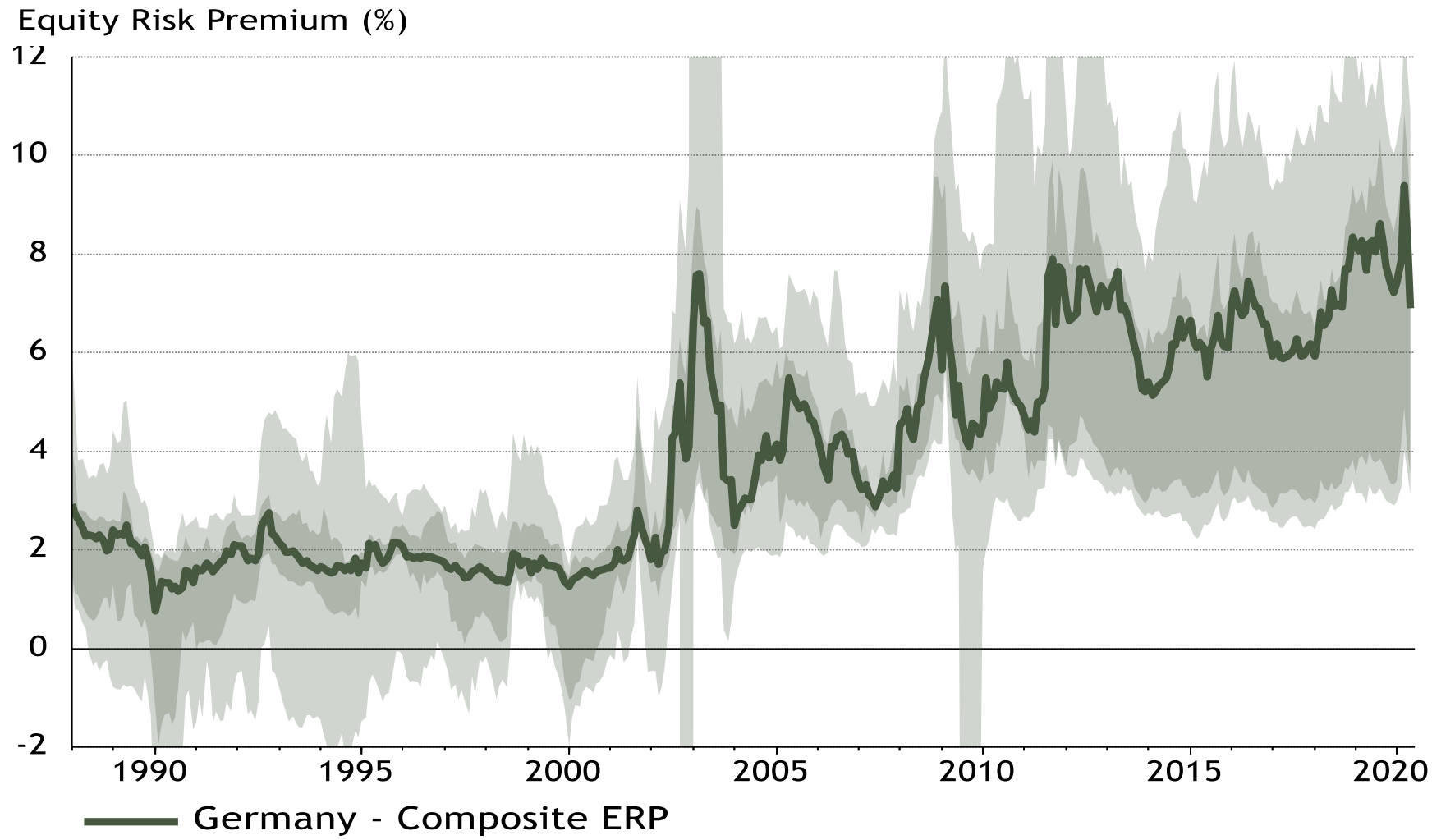
Equity Risk premium for UK



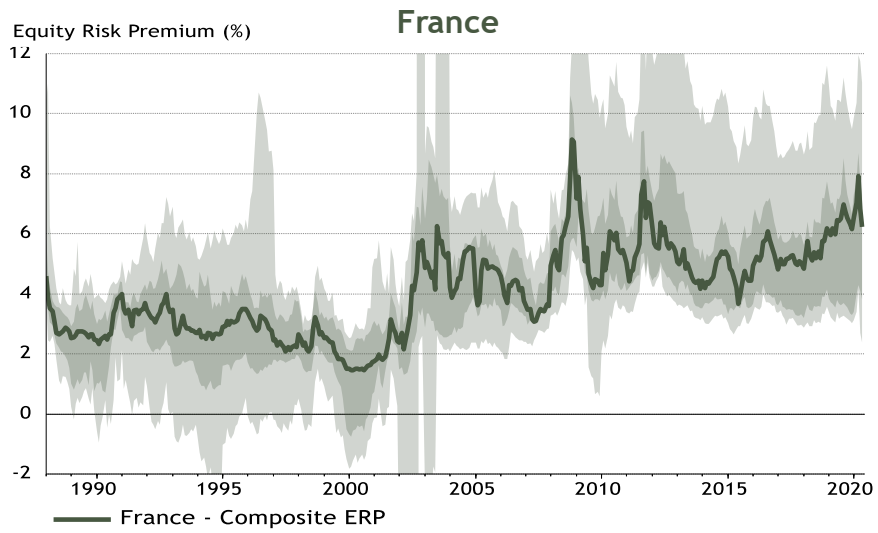
Equity risk premium for Japan

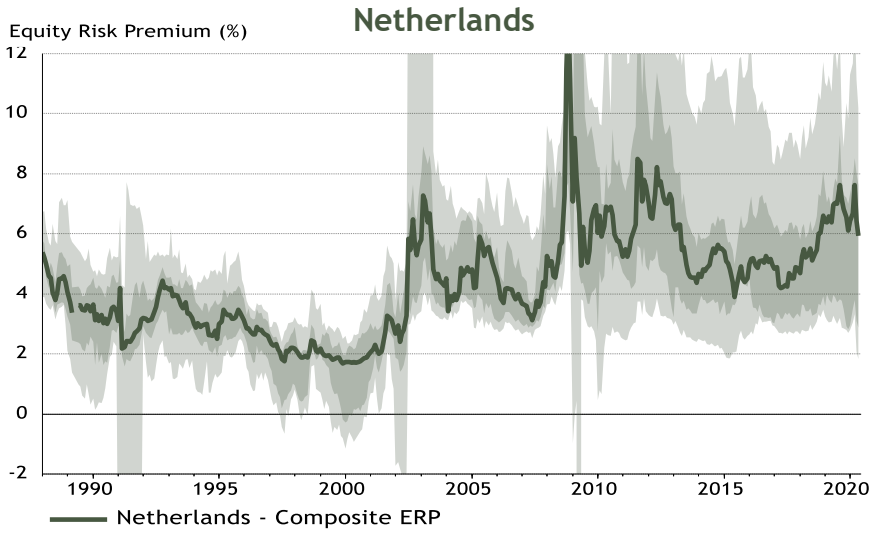


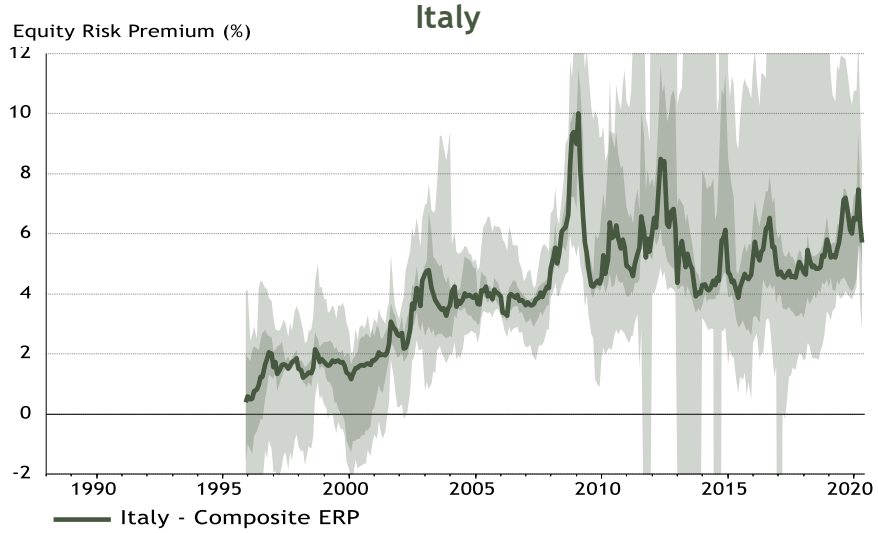
ERP for Germany

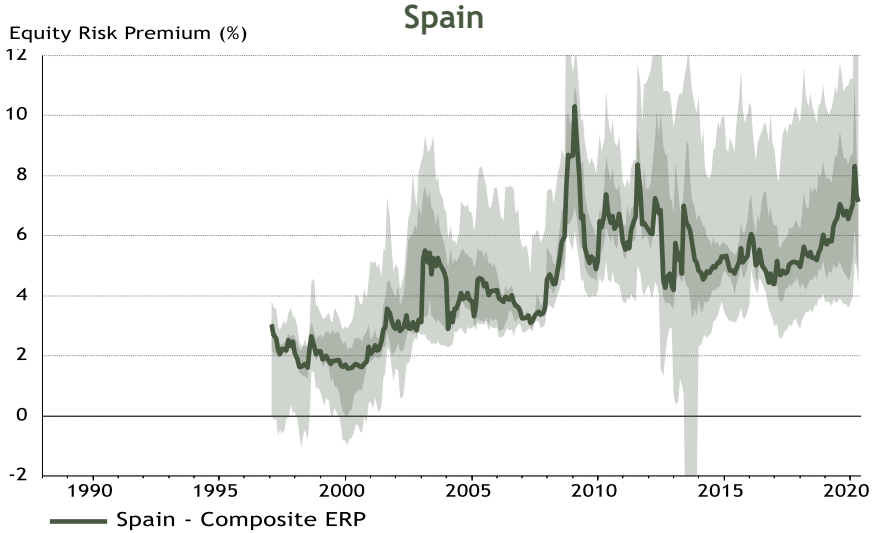


ERP for European markets









Risk free rate for Eurozone?

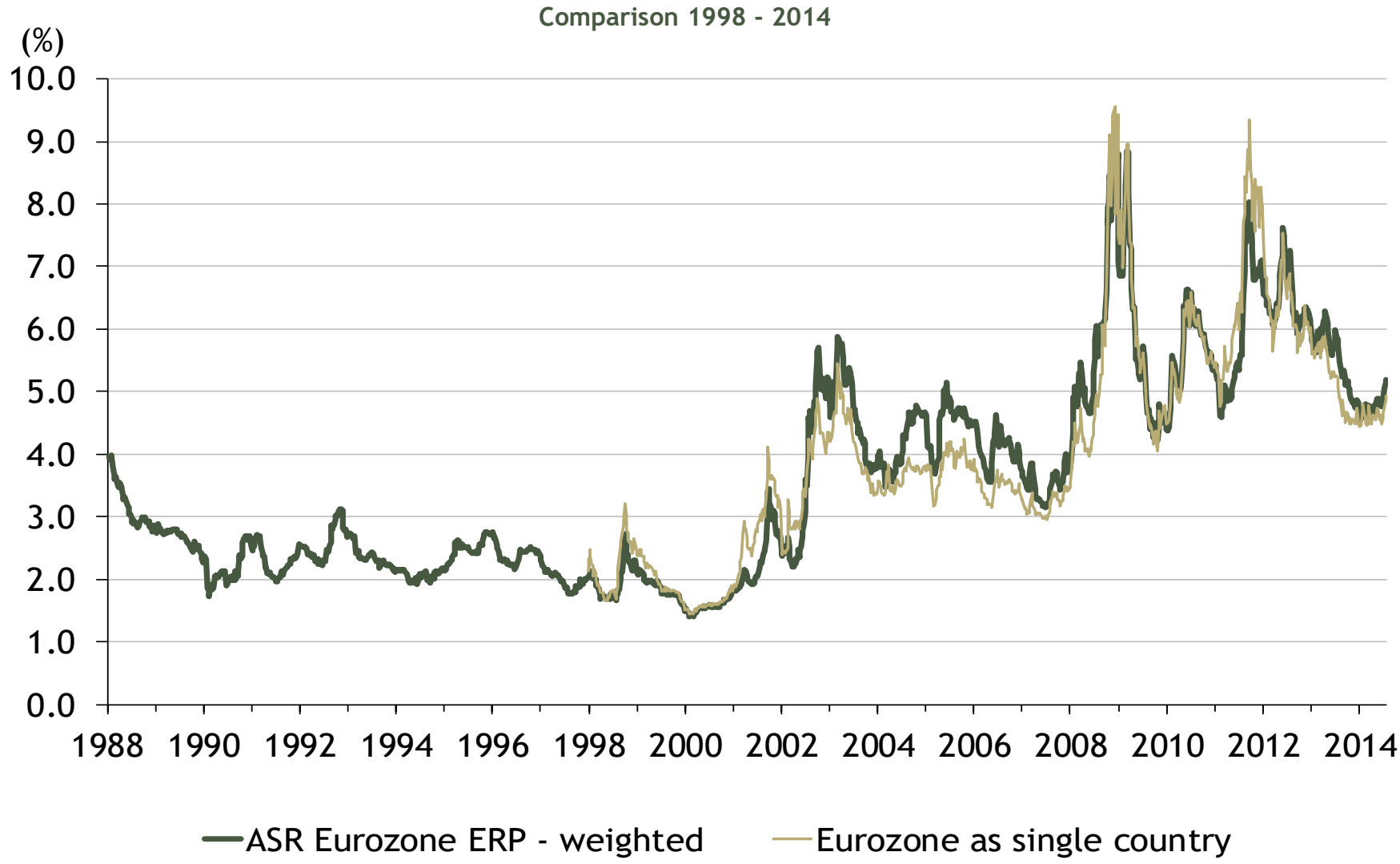
Estimating ERP for Eurozone as a single entity requires a risk free rate:

$$ERP = R_m - R_f$$

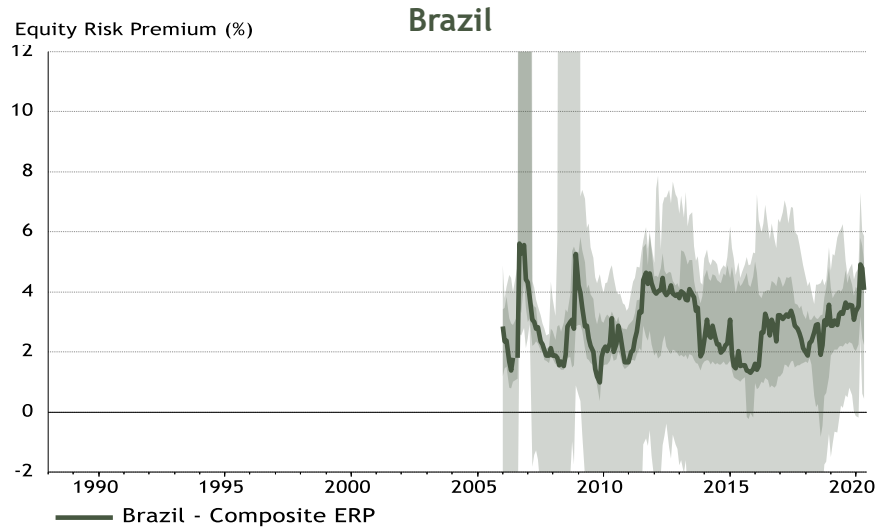
What is R_f for the Eurozone?

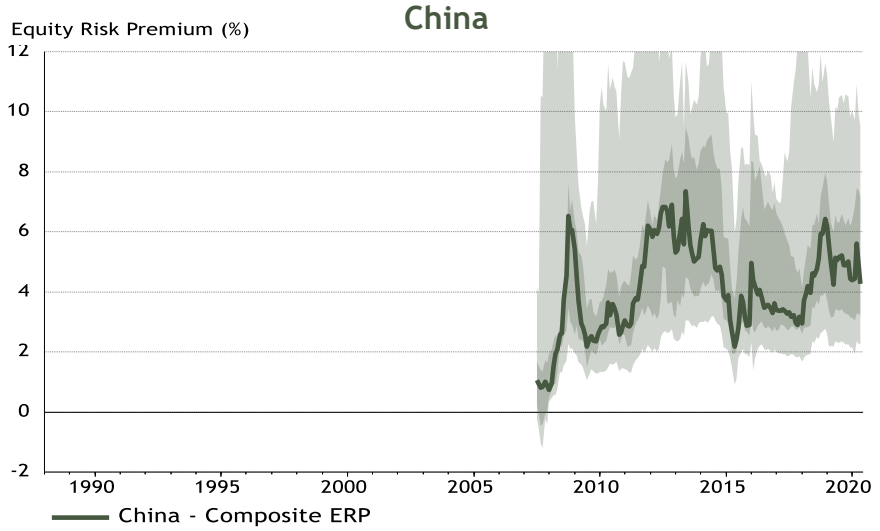
- Deposits at ECB
- Weighted average of national government debt
- Lowest yields in Eurozone

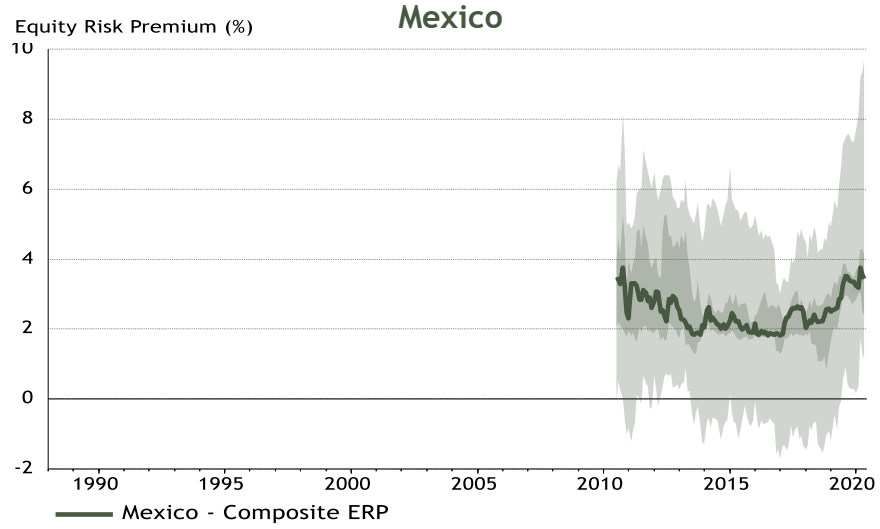
Eurozone ERP as an aggregate and as a single entity

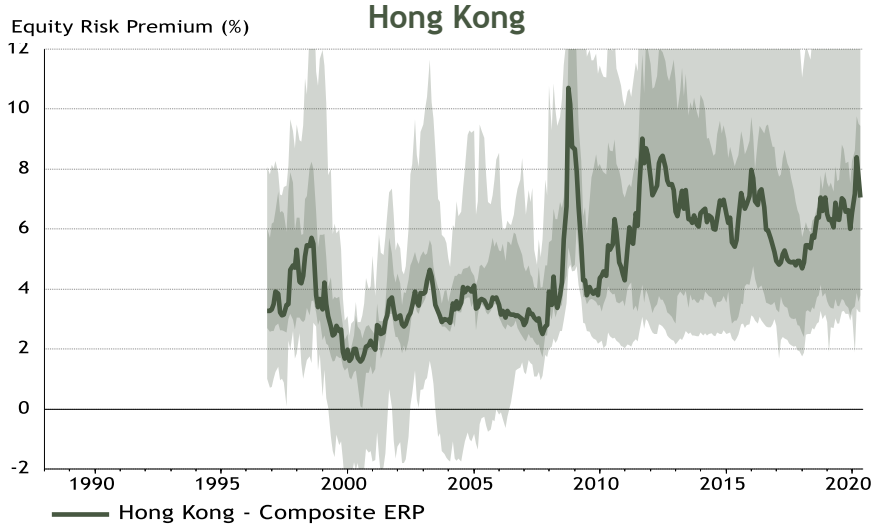


ERP for Emerging Markets and Hong Kong

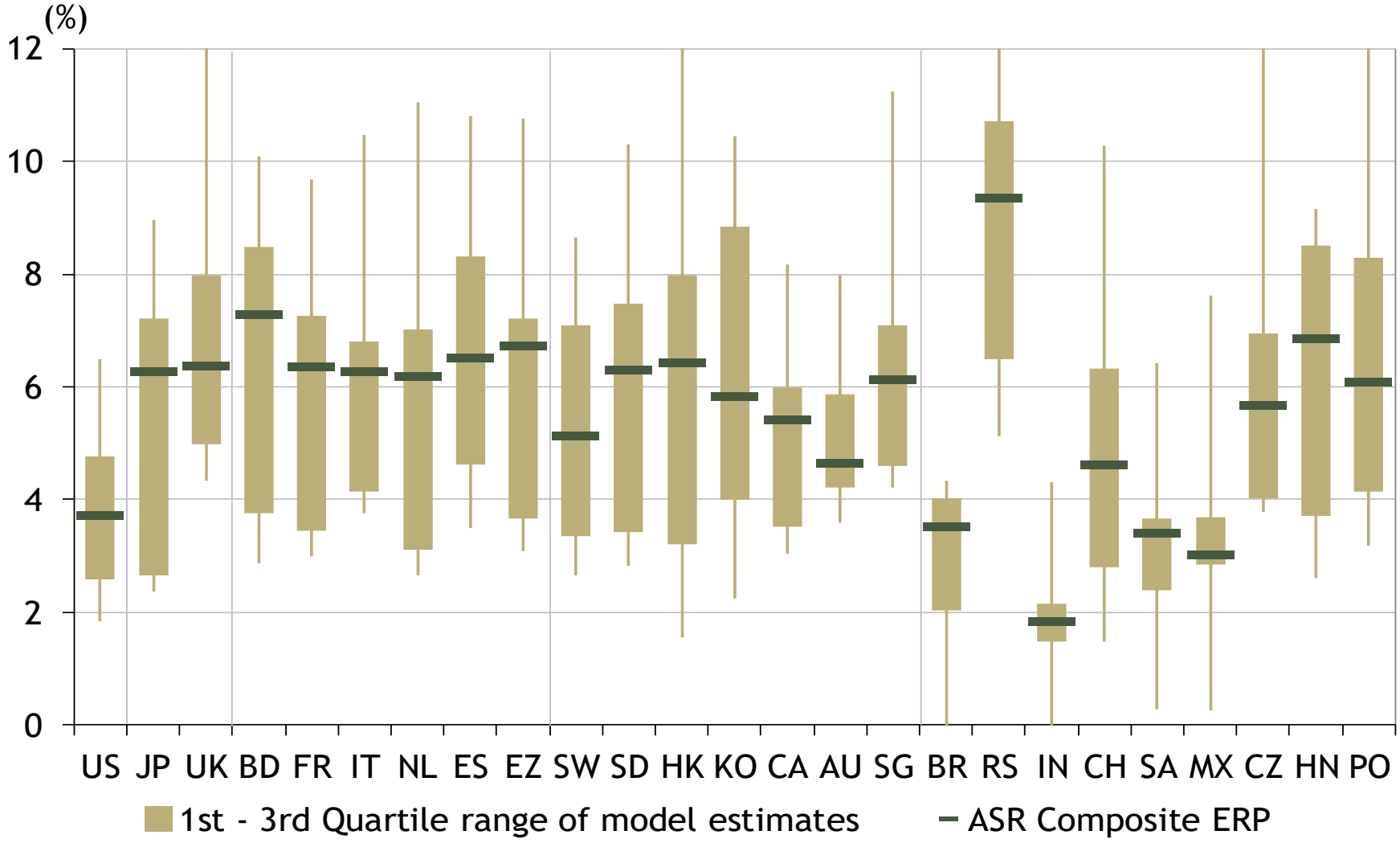




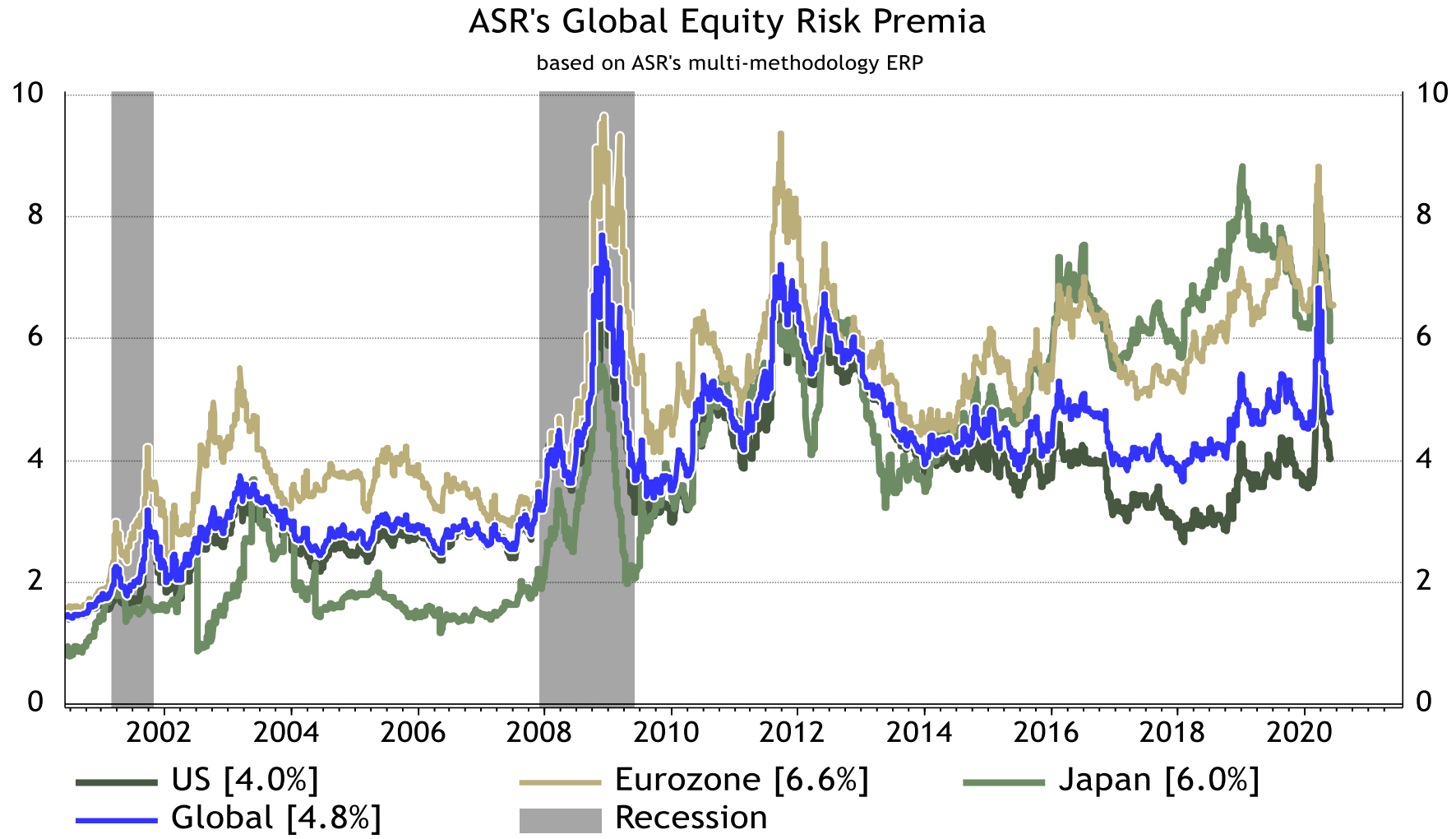




ASR Composite ERP – current levels

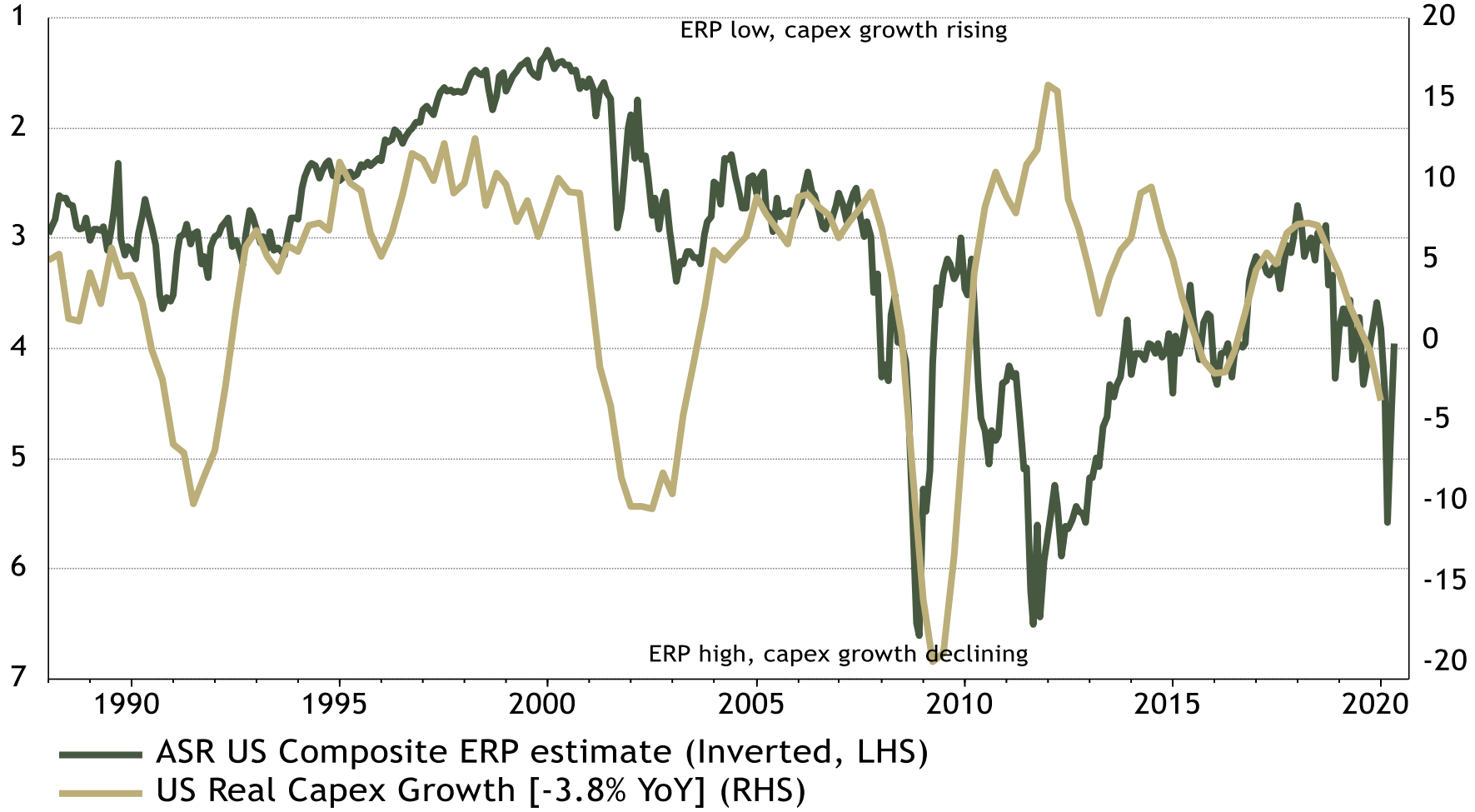


Global ERP weighted by equity market

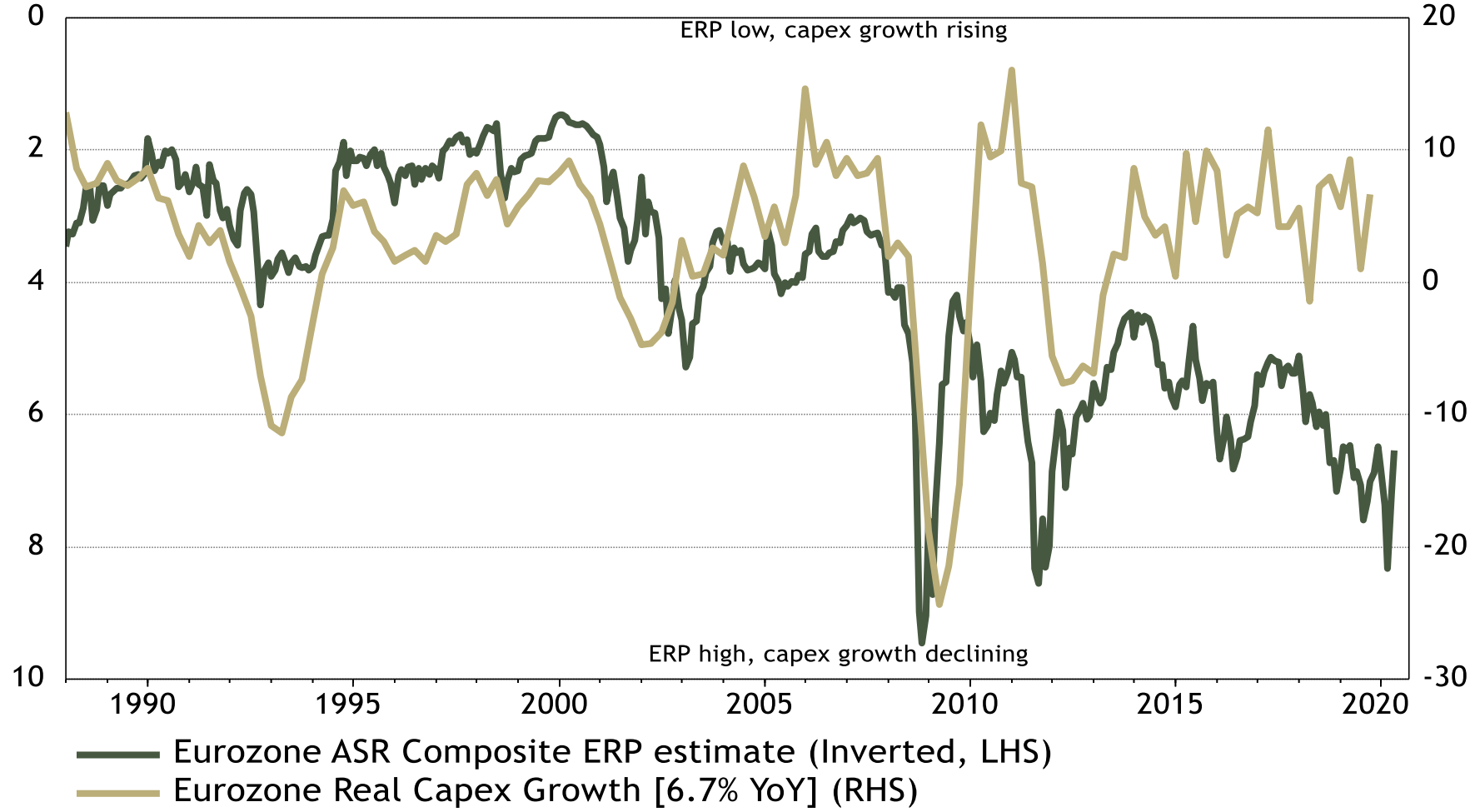


RELATIONSHIP OF ERP TO MACRO VARIABLES

US ASR Composite ERP vs US Real Capex Growth

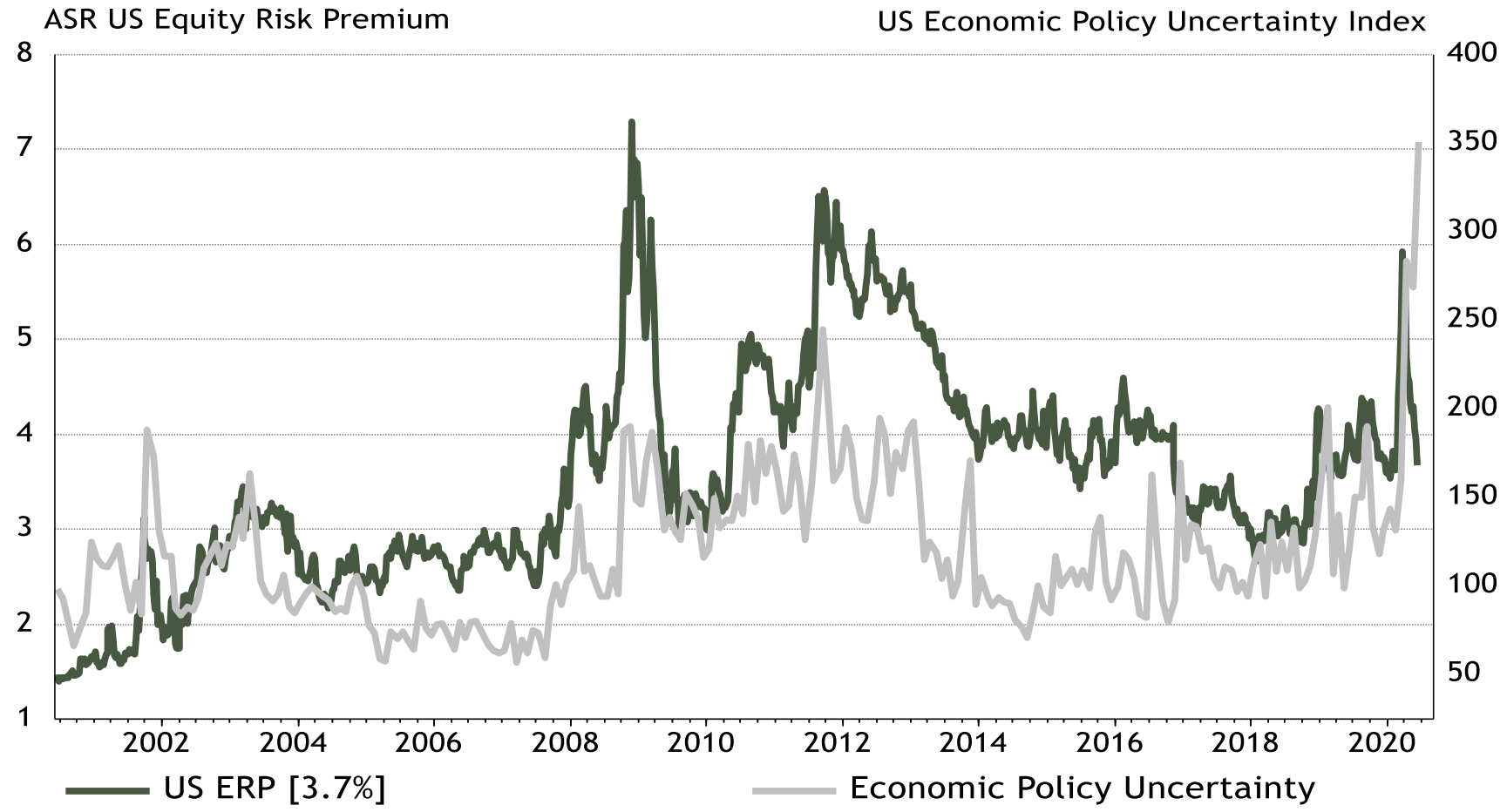


Eurozone ASR Composite ERP vs Eurozone Real Capex Growth



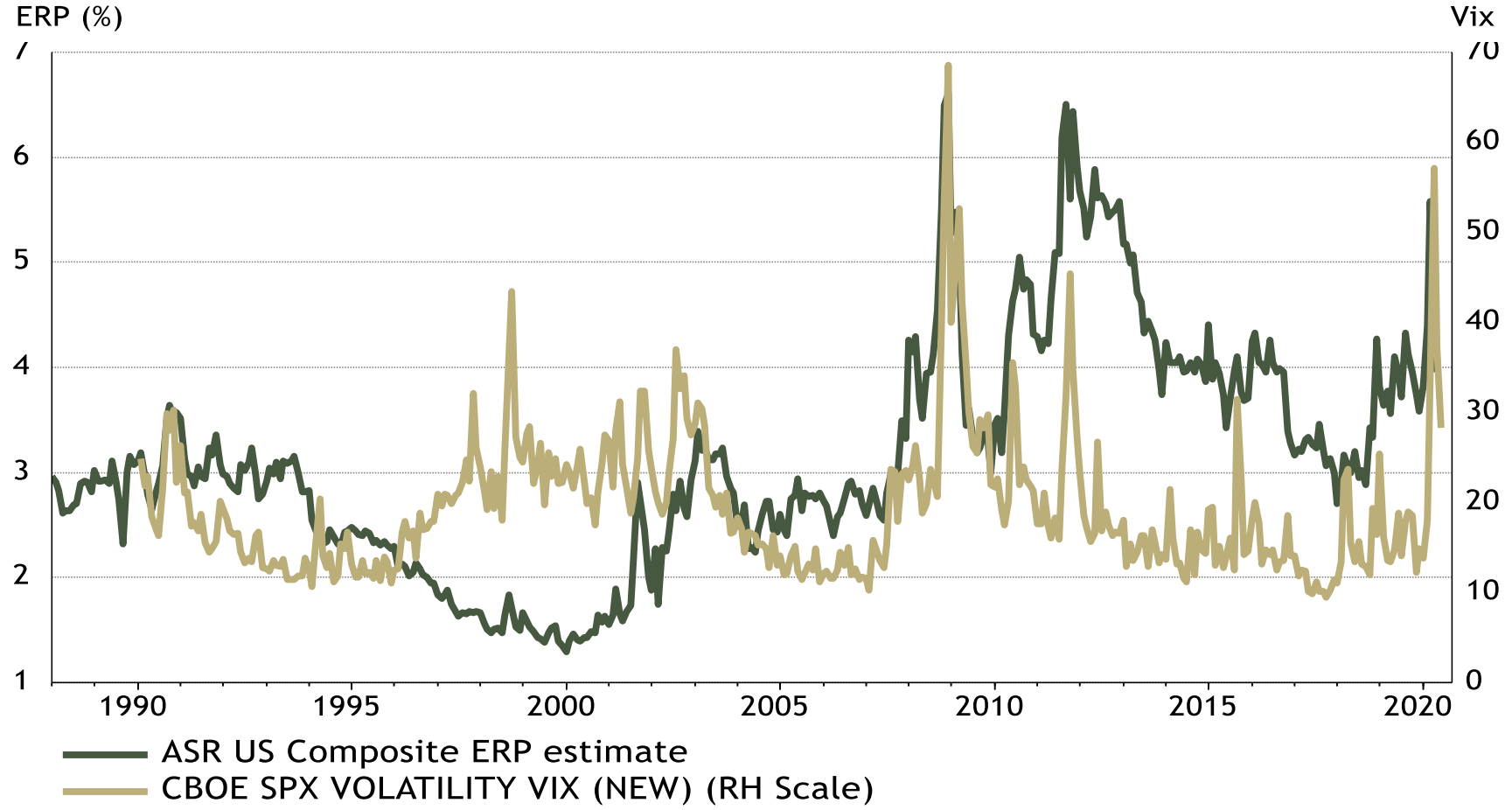
US ERP and US Policy Uncertainty

ERP is driven by Risk appetite, which could be affected by policy uncertainty. Difficult to measure but Economic Policy Uncertainty group calculates an index. Re-assuring that there is a good relationship between the two, but there has been some divergence recently.



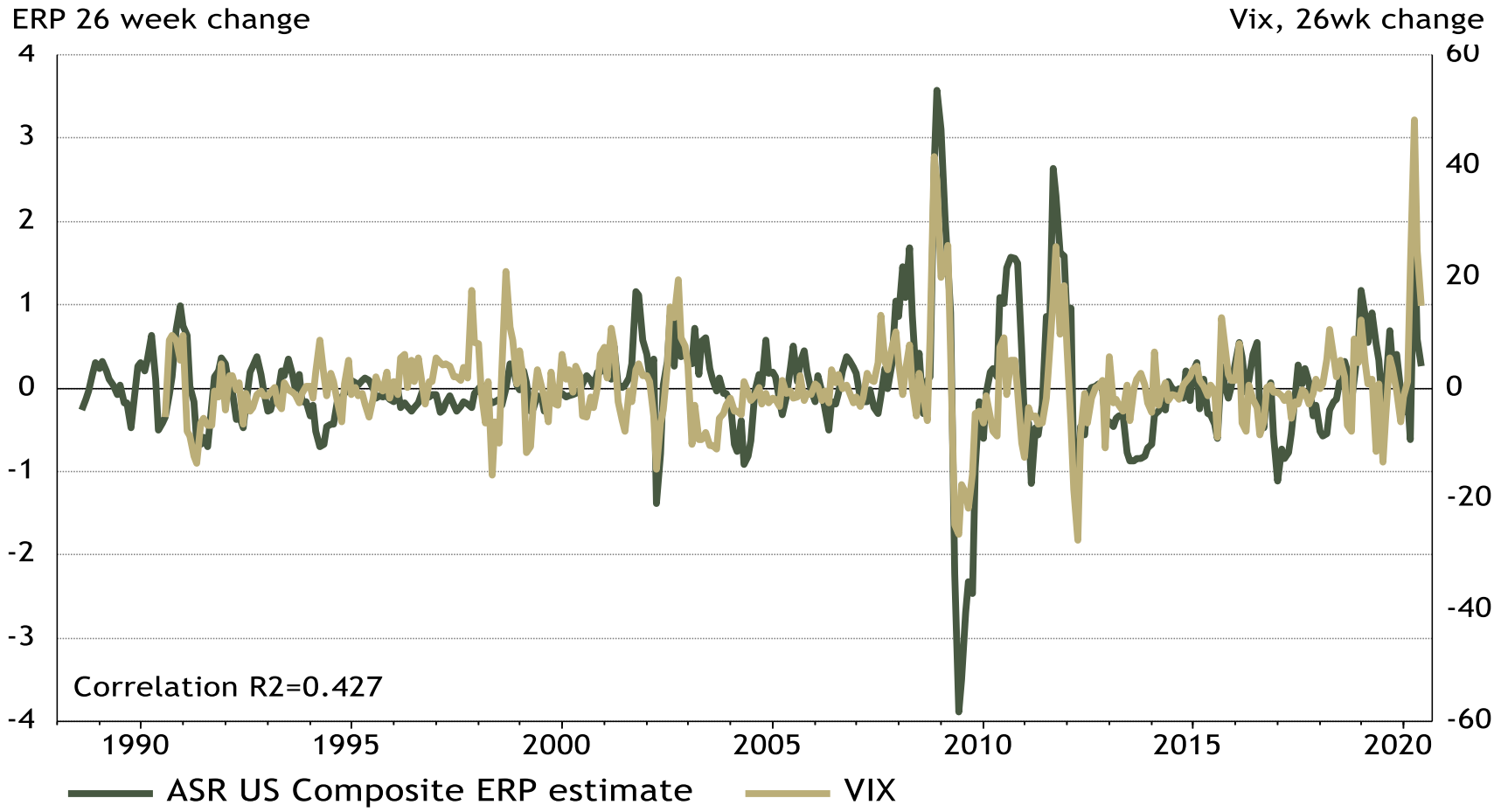
ERP and Volatility (VIX) - Levels

However, there is only a limited relationship between another measure of uncertainty: the VIX. Here there is a weak relationship. Some of the spikes in the VIX are not reflected in changes to the ERP. Also the high current ERP not reflected in VIX. So the trend level ERP is not really driven by short term stock movements.



Changes in ERP and Volatility (VIX)

There is a stronger relationship between changes in the VIX and the ERP, but arguably this is just picking up a common factor, changes in equity prices.

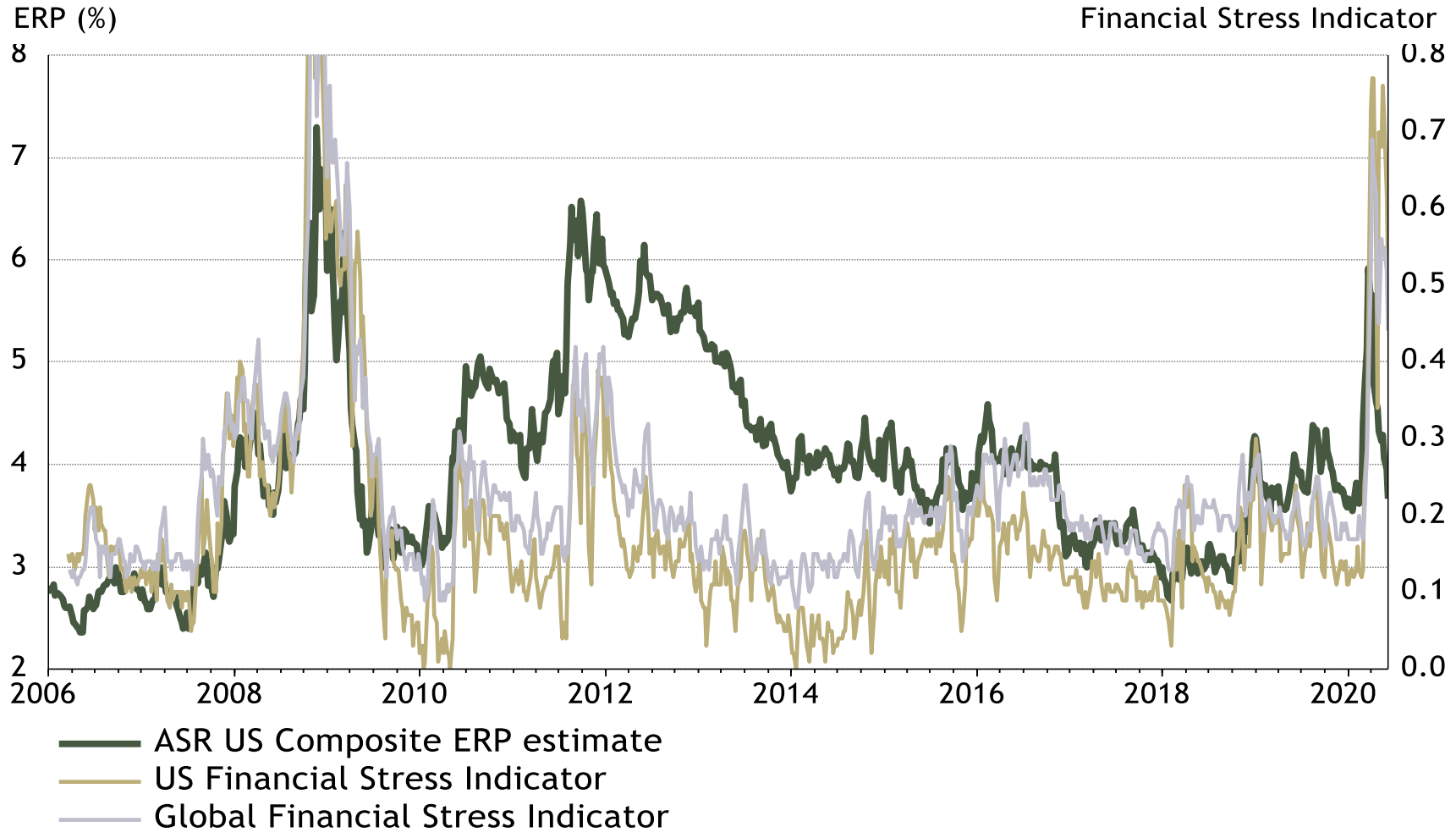


ERP and Corporate Bond Spread

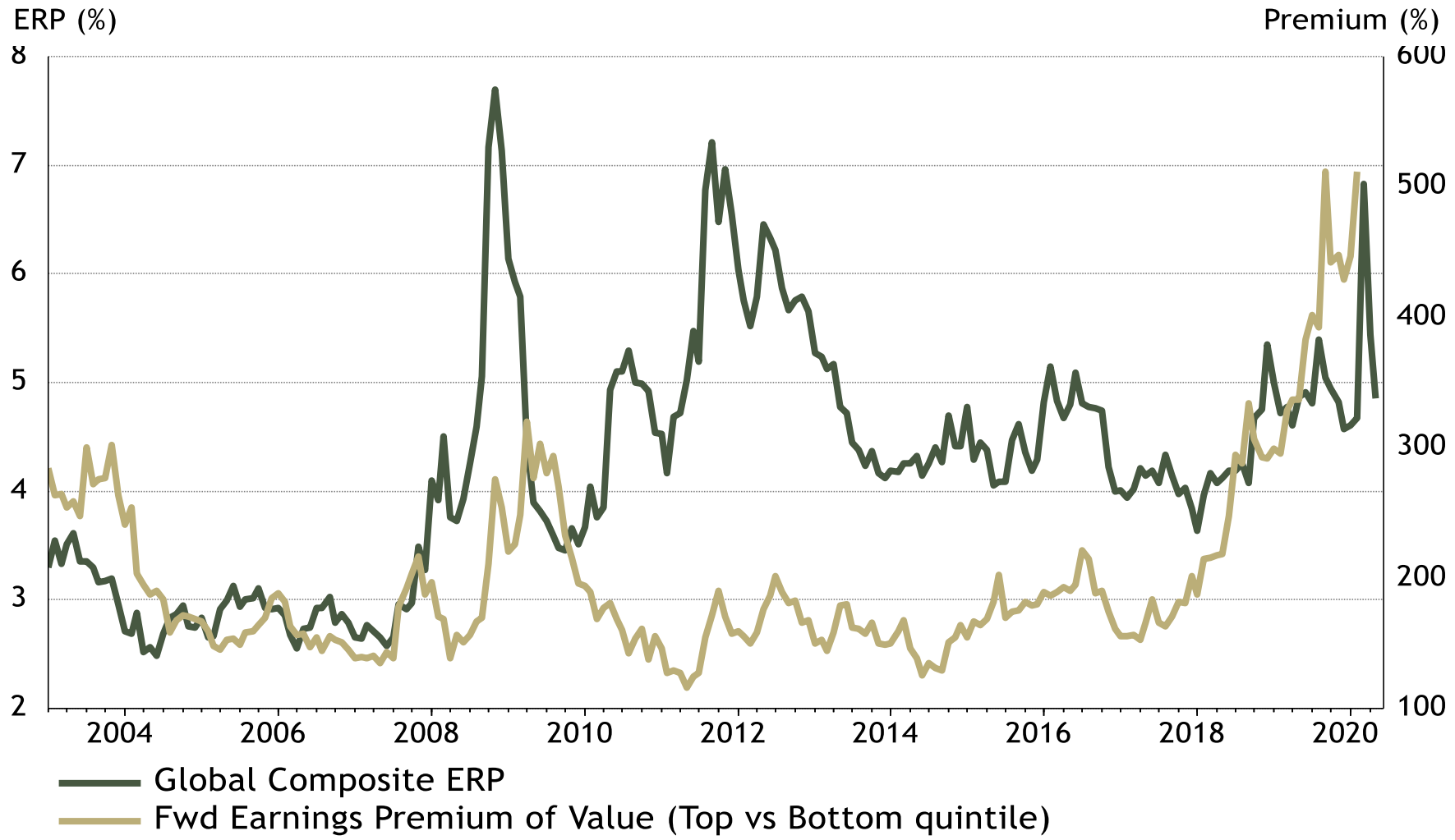
There is a good relationship between ERP and corporate bond spreads as a percentage of yield. Shows part of the ERP is a reward for taking default risk.

ERP and Financial Stress

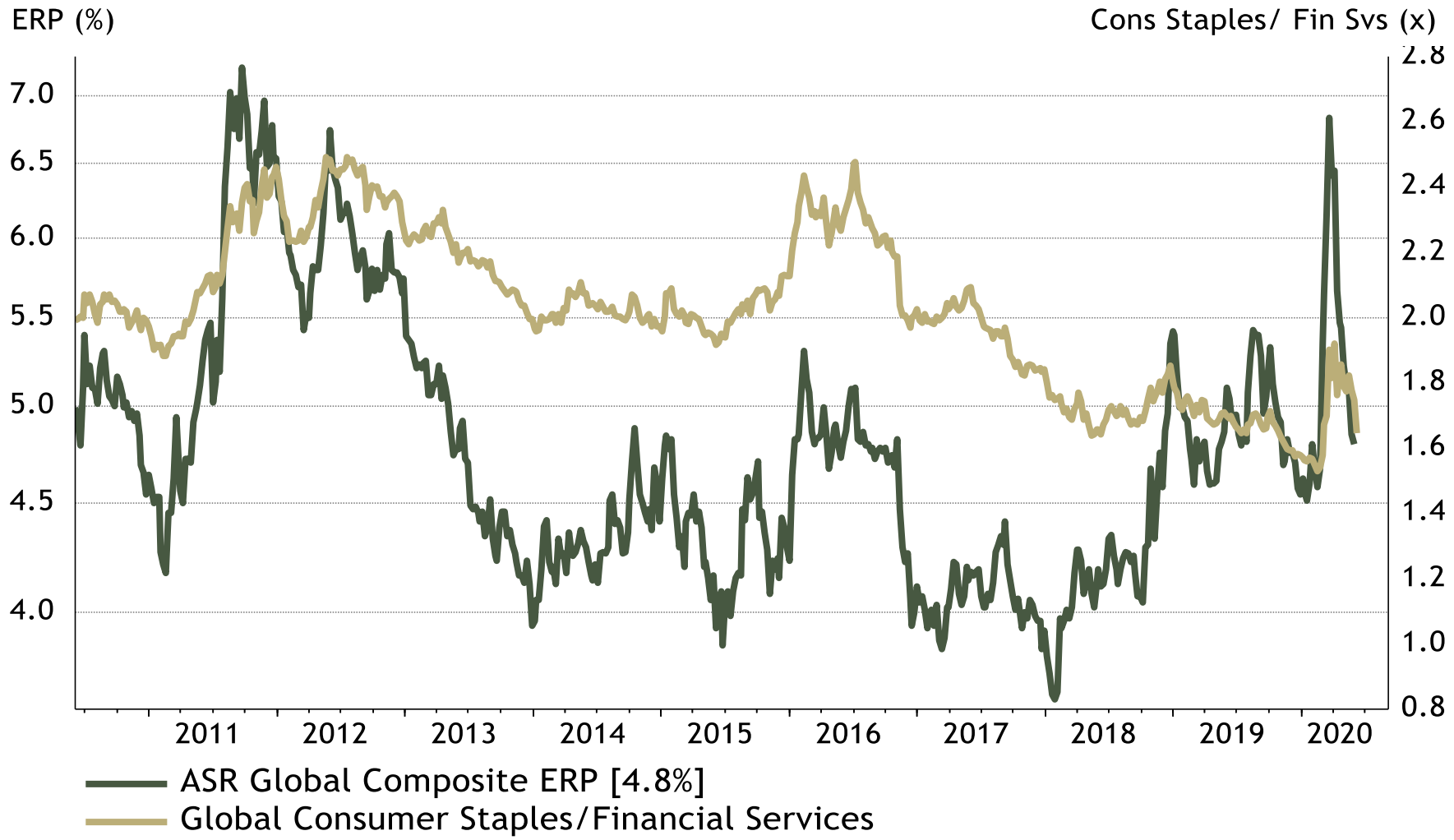
If ERP related to credit risk then it should be related to Financial Stress. Fit is good during crisis, less so elsewhere (such as during the Enron episode). Also the ERP has remained high recently even though the Financial Stress indicator is low.



ERP and spread between Growth and Value

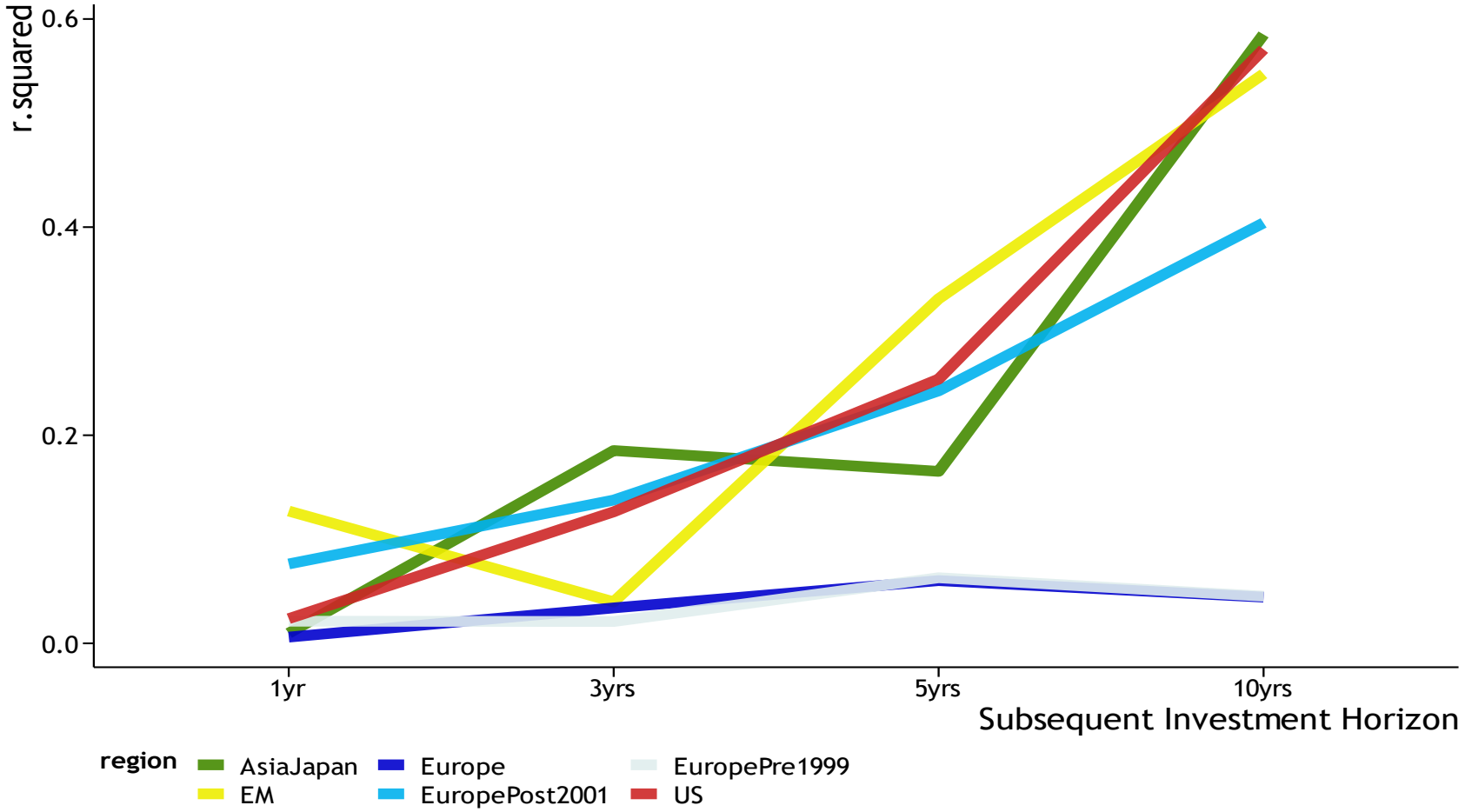


ERP and Global Consumer Staples/Financial Services

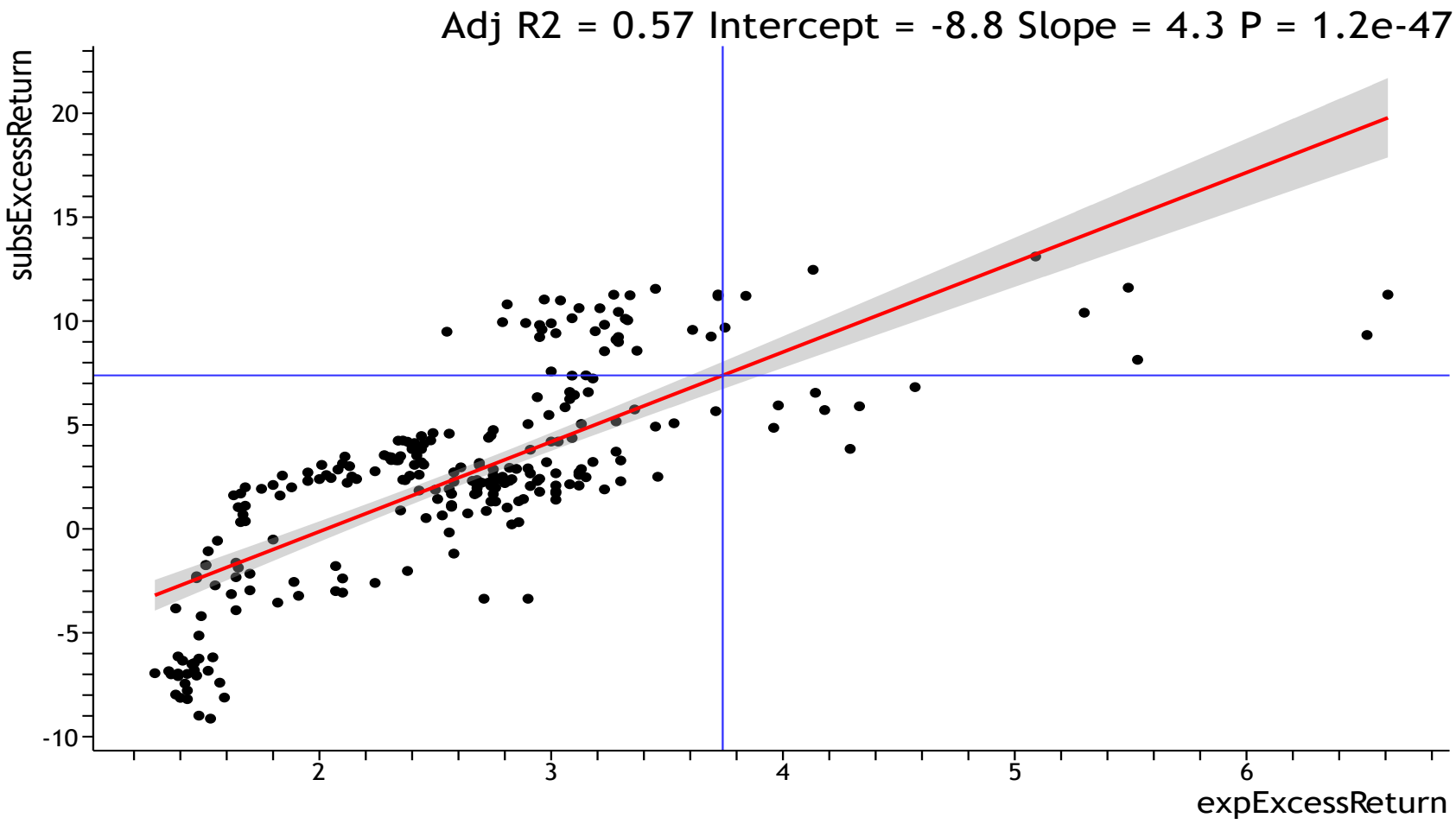


RELATIONSHIP BETWEEN ERP AND SUBSEQUENT EQUITY RETURNS

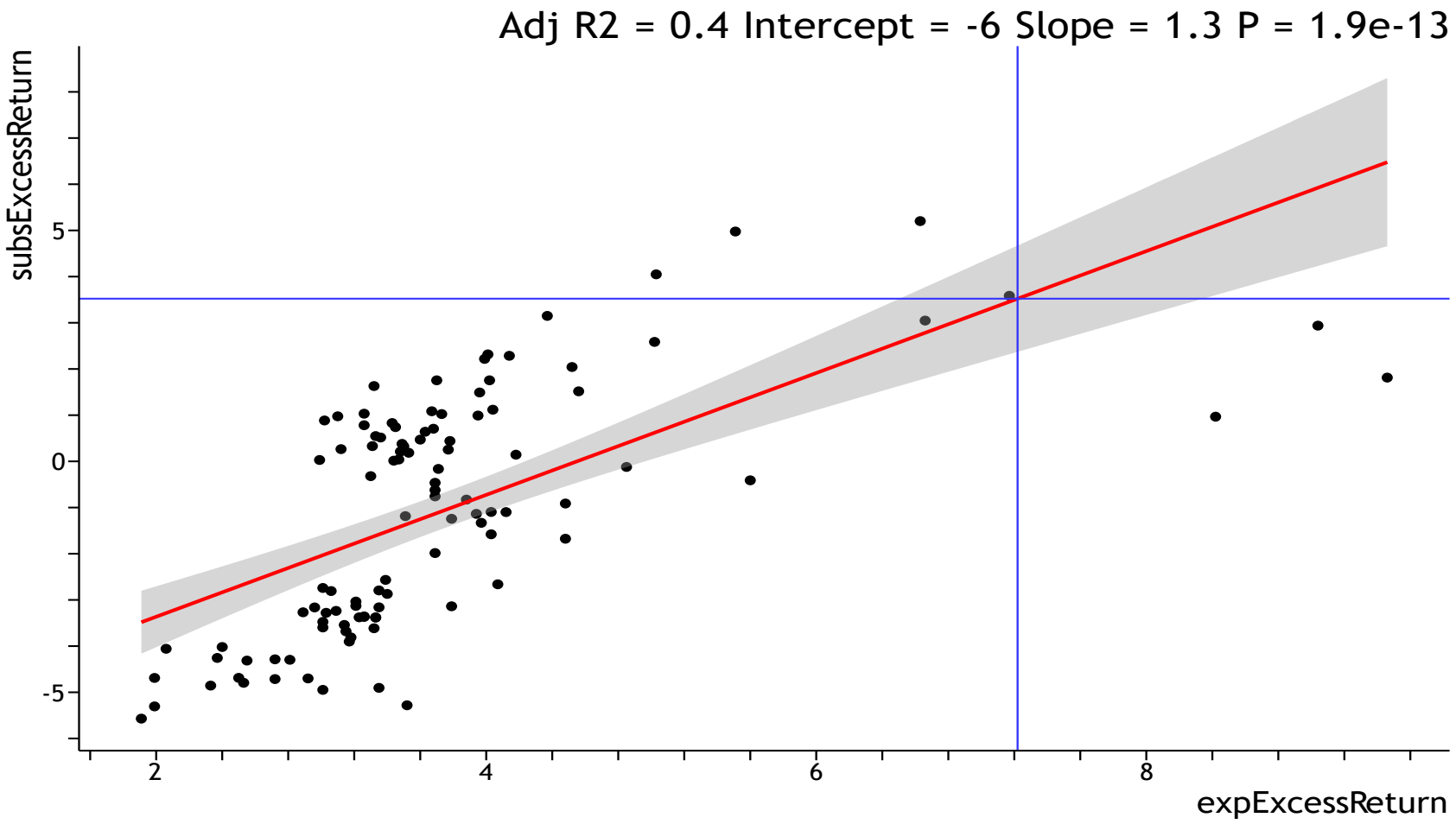
Predictive Power of ERP Increases with Investment Horizon



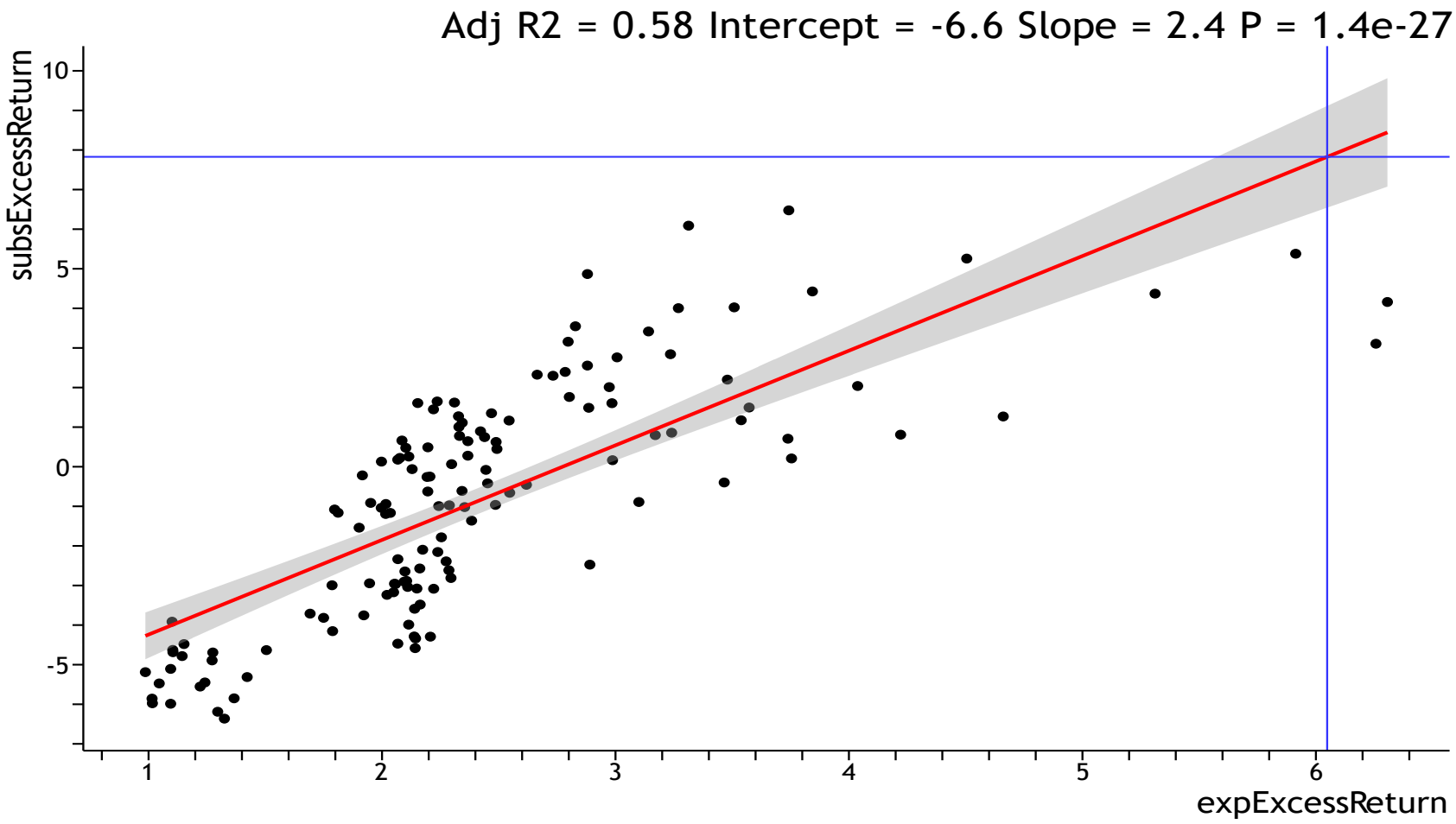
US: ERP vs Excess Equity Returns (Subseq. 10 yr ann)



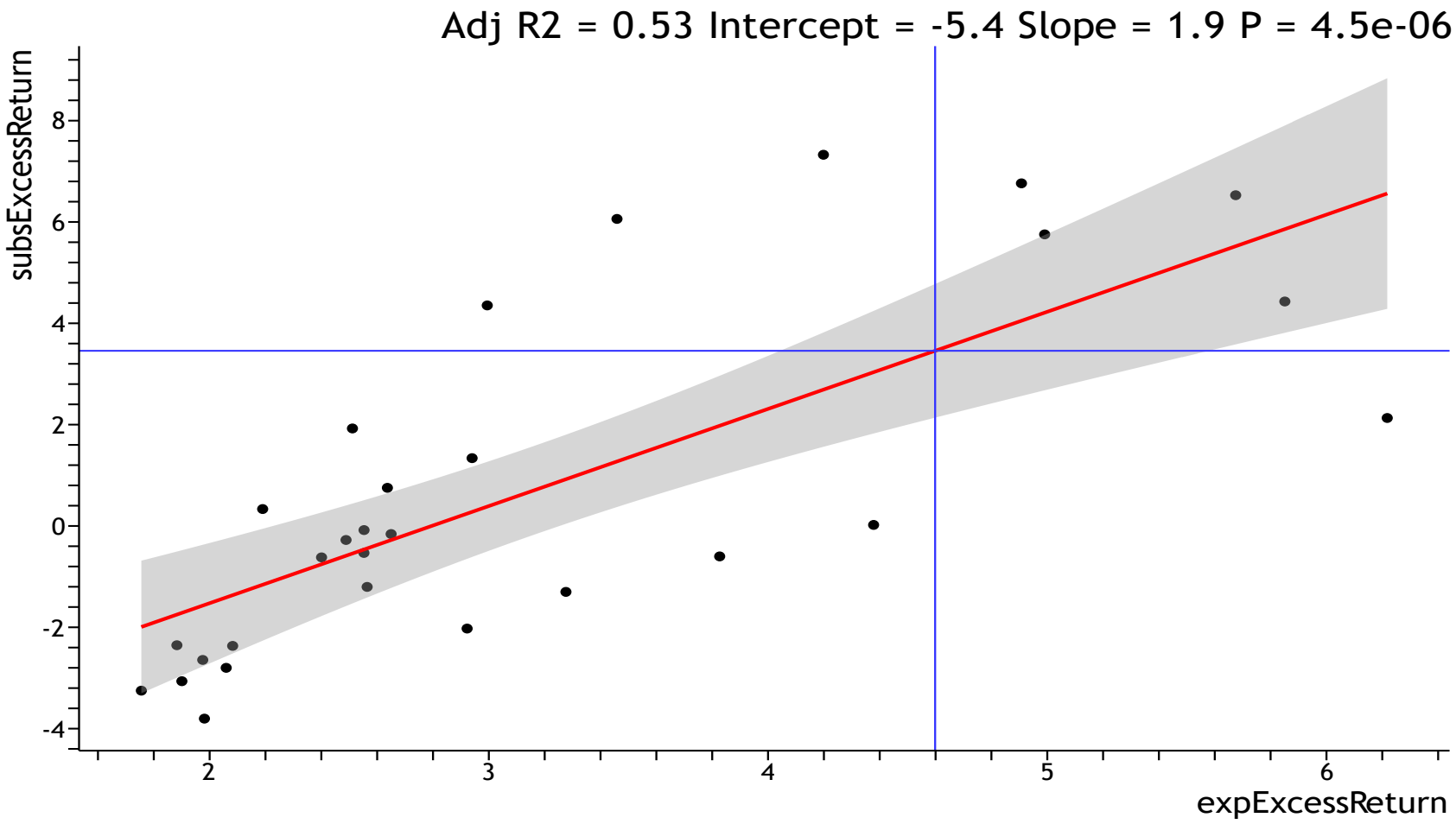
Europe: ERP vs Excess Equity Returns (Subseq. 10 yr ann)



AsiaJapan: ERP vs Excess Equity Returns (Subseq. 10 yr ann)



EM: ERP vs Excess Equity Returns (Subseq. 10 yr ann)



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