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## The equity-like behaviour of sovereign bonds

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### ABSTRACT

Using a rich dataset of high frequency historical information from 2004 to 2013 we study the determinants of European sovereign bond returns over calm and crisis periods. We find that the sign of the equity beta crucially depends on country risk. In low risk countries, government bonds represent a natural hedge against equity risk as the equity beta is negative regardless of market conditions. On the other hand, government bonds of high risk countries lose their “safe-asset” status and exhibit more equity-like behaviour during the sovereign debt crisis, with positive and strongly significant co-movements relative to the stock market. Our estimates indicate that the equity beta switches from negative to positive when a sovereign’s credit spread rises above 2%. We find that the decoupling of the government bond market between high risk and low risk countries implies that indiscriminate portfolio diversification does not pay. Instead, “prudent diversification” appears to offer superior risk adjusted returns in periods of sovereign stress and through the economic cycle.

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### 1. Introduction

Common distinctions between “safe” and “risky” assets have been called into question following the Great Recession that affected global markets after 2007. The abnormally high credit spreads observed for a number of government securities in developed economies, previously considered virtually riskless, mark a paradigm shift in investors’ perceptions with profound implications for pricing, hedging and portfolio allocation strategies. The 2010–13 European sovereign debt crisis offers the perfect setting to analyse the determinants of government bond returns and to study how the importance of these determinants changes over time. Specifically, an equity risk factor has long been used in the finance literature to explain government bond returns (Fama and French, 1993). It is well documented that, in crisis periods, government bonds and stocks exhibit negative co-movements, which result in a negative beta for the equity risk factor. When uncertainty is high, investors migrate away from stock markets and buy government bonds which are perceived to be safer (Connolly et al., 2005). However, with higher levels of sovereign default risk this flight-to-safety behaviour is no longer justified.

We contribute to the literature in a number of ways. First, so far researchers have focused on a macro narrative to explain sign changes in stock-bond correlation over time (Campbell et al., 2017; David and Veronesi, 2013; Burkhardt and Hasseltoft, 2012; Ermolov, 2015; Song, 2016). We offer another interpretative angle and conclude that stock-bond co-movements

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respond to the level of sovereign credit risk. This measure complements the existing macro-interpretation as the level of sovereign risk can be seen as a synthesis of the factors that affect the sovereign's macroeconomic profile (Gapen et al., 2008; Gray et al., 2007). However, we show that this measure can prove more effective than key macro-variables at capturing the switch in sign of stock-bond correlations observed during the sovereign crisis. It could also prove particularly useful in countries where readily available macro-indicators are few. Fig. 1 gives a stylized description of our findings. We observe that the correlation between stock and government bond returns becomes positive for high risk countries at the start of the sovereign debt crisis. This suggests that bonds issued by governments with a poor credit profile behave more like equities rather than safe assets when economic conditions deteriorate. Specifically, we find that the critical threshold for the stock-bond correlation to switch sign occurs when sovereign credit spreads go beyond 2%.

Campbell et al. (2015) provide further insights into stock-bond covariation and suggest that the monetary policy stance, in addition to macro-economic shocks, can be a contributing factor in the US market. However, interest rate policy cannot be a driving factor of the sign switch of stock-bond correlation within the Eurozone. This is because all the countries in the Eurozone are subject to the same central bank decisions, while the sign switch only occurs in a sub-group of these countries, that is, those with high sovereign risk. Hau and Lai (2016) point out that a common monetary policy in the Eurozone can still generate different asset allocation incentives in member countries due to differences in real rates. This is because of divergence in local inflation among Eurozone countries. When we control for local inflation levels we still find that sovereign risk is an important factor to explain stock-bond co-movements in high risk countries.

Further, in response to the crisis, the European Central Bank (ECB) has used unconventional monetary policy measures (quantitative easing or QE) to boost government bond markets via direct bond purchases (Eser and Schwaab, 2016). QE would often lead to a positive stock market reaction. The resulting upward pressure in both stock and bond prices could contribute to positive stock-bond correlation. The evidence, however, rules out this explanation. Instead of observing positive stock and bond market returns in high risk countries during the first part of the sovereign crisis when stock-bond correlation turns positive, we see mostly negative returns in both markets.

Our sovereign risk argument finds indirect support in the findings of Weigel and Gemmill (2006) who observe a positive relationship between stock markets and the distance to default of emerging economies. The implication is that in the countries with relatively high risk in their sample (Argentina, Brazil, Venezuela and Mexico) an increase in country risk and government bond yields leads to a fall in stocks. This generates a positive stock-bond relationship. Similar findings are obtained from a larger sample of emerging economies by Longstaff et al. (2011). An explanation of this positive relationship could come from the sovereign ceiling channel described by Almeida et al. (2017) whereby sovereign rating downgrades, resulting in lower bond prices, generate a deterioration of credit quality across the private sector (i.e. lower stock prices).<sup>1</sup> A similar impact on stock and bond prices would also be reached when it is the private sector that produces negative spillovers on the government's creditworthiness. For instance, higher corporate default can bring about lower tax revenue and onerous bailout packages that can have serious consequences for public finances and sovereign default risk.<sup>2</sup> Acharya et al. (2014) illustrate this point in the context of the Great Recession and bank bailouts.

As a second contribution, our work documents a departure from the findings of earlier research that suggest positive stock-bond correlation to be associated with periods of stagflation, i.e. when inflation is countercyclical (Burkhardt and Hasseltoft, 2012; Campbell et al., 2017; Song, 2016). However, during the sovereign crisis, high risk European countries, whose government bonds exhibited positive equity betas, were characterised by a procyclical inflation scenario with low growth and low inflation.

Our third contribution is an analysis of the portfolio allocation implications of our findings. The decoupling of the European sovereign bond market between high risk and low risk countries implies that sovereign bonds cannot be regarded as a homogenous asset class. As high risk sovereign bonds behave more like equities they no longer represent a hedge against stock market risk, no longer receive flight-to-safety funds, and their use for diversification purposes is profoundly altered. When looking at risk adjusted returns we reach the conclusion that indiscriminate diversification does not pay. It is best to diversify across low risk countries, with bond investments, equity investments or a mixture of the two. The upshot is that "prudent diversification" is a winning strategy both during crises and through the business cycle. Specifically, we observe that bonds from low risk countries appear to outperform all other portfolios considered across the crisis periods. This is due to particularly good risk adjusted returns during the subprime (2007–2009) and the first phase of the sovereign crisis (2010–2011) as they benefited from a flight-to-safety. However, low risk stocks appear to be the best through-the-cycle investment in risk adjusted terms. Given these findings, it is not surprising that a "pension fund" strategy, which diversifies across low risk stocks and low risk bonds, generates good Sharpe ratios both over the crisis periods and through the cycle.

Our fourth contribution is to show how the importance of credit and liquidity determinants varies across Euro-zone countries and between calm and crisis periods. We observe that market liquidity risk becomes statistically significant during the

<sup>1</sup> The positive relationship between the level of credit risk and the level of stock-bond correlation was also observed in the US corporate bond market. Blume et al. (1991) report a strong positive correlation between S&P500 stocks and high-yield corporate bonds (.52) during the 1980s. Investment grade and sovereign bonds are also positively correlated with stocks in that period but to a lower degree (0.37 and 0.34 respectively). Reilly et al. (2009) show that, after the start of the new millennium, US investment grade corporate bonds become negatively related to the stock market. On the other hand, high yield corporate bonds remain positively related with the stock market throughout the sample period (1986–2009), an indication that these securities have consistently shown an "equity component" (Fridson, 1994).

<sup>2</sup> We thank the referee for making this point.

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