How the European debt crisis is affecting U.S. volatility markets:

The investing landscape has been marked by a sustained level of uncertainty in recent months due primarily to the continued worsening of the European debt crisis. In a recent special report, *The Economist* summarized the current situation as follows:

> *"Just now the euro zone is caught in a dismal downward spiral. Fears about whether the governments in Greece, Portugal, Ireland, Spain and, most alarmingly, Italy will honour their €3 trillion ($4.2 trillion) or so of borrowing are wrecking European banks, which own their debt. Struggling banks undermine confidence and credit. Coming on top of fiscal austerity, this is bringing on recession, deepening fears that governments will be unable to pay back their debts, which further weakens the banks. And so the vice turns, down towards disaster."*

Given this backdrop, it is important that we understand the relationships between the European debt crisis and U.S. volatility markets so that we can better anticipate and manage the potential downside risk to our portfolio.

With this in mind, we explore the spreads between sovereign debt issued by the member nations of the EU and German bonds. Using monthly data from the ECB on 10-year bonds from 2001 to the present, we calculate monthly changes in the bond spreads and investigate how these changes relate to monthly changes in the VIX. The scatter plot in Figure 1 illustrates a fairly strong relationship between changes in European sovereign bond spreads and changes in U.S. volatility. For example, an extreme scenario where average bond spreads widen by 400 bps corresponds with a rise in the VIX of nearly 40%. While this analysis is relatively simple and the real relationship is non-linear, it corroborates our intuition and helps quantify potential changes in volatility as a result of continued deterioration in Europe.

In addition to exploring how volatility responds, we investigate the relationships between changes in bond spreads to changes in the volatility term structure and skew in Figures 2 and 3 located below.

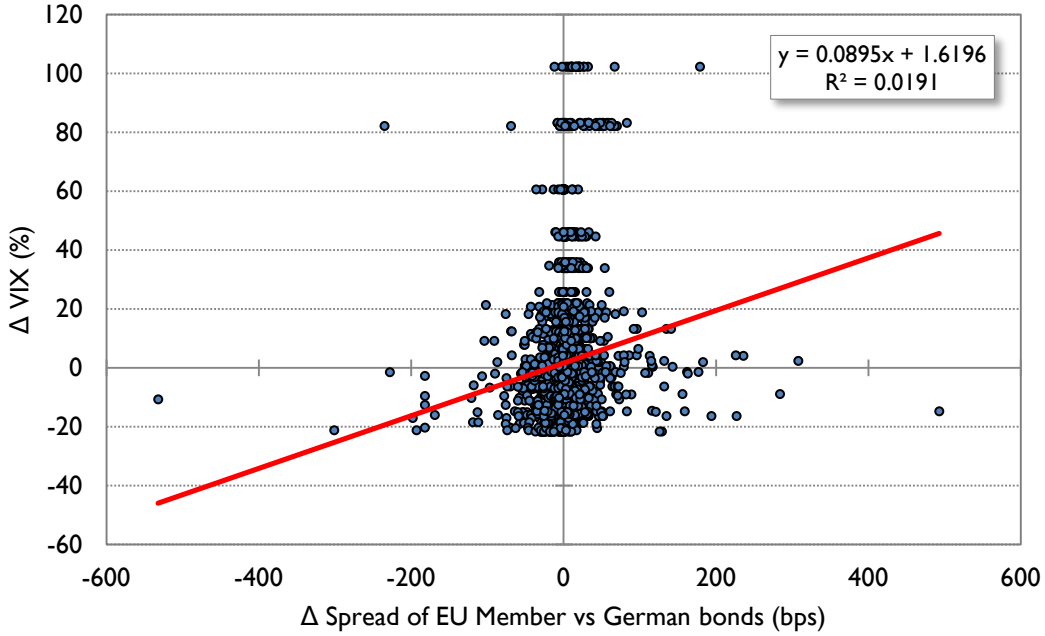

Figure 1: Changes in VIX versus changes in spread between EU Member and German bonds

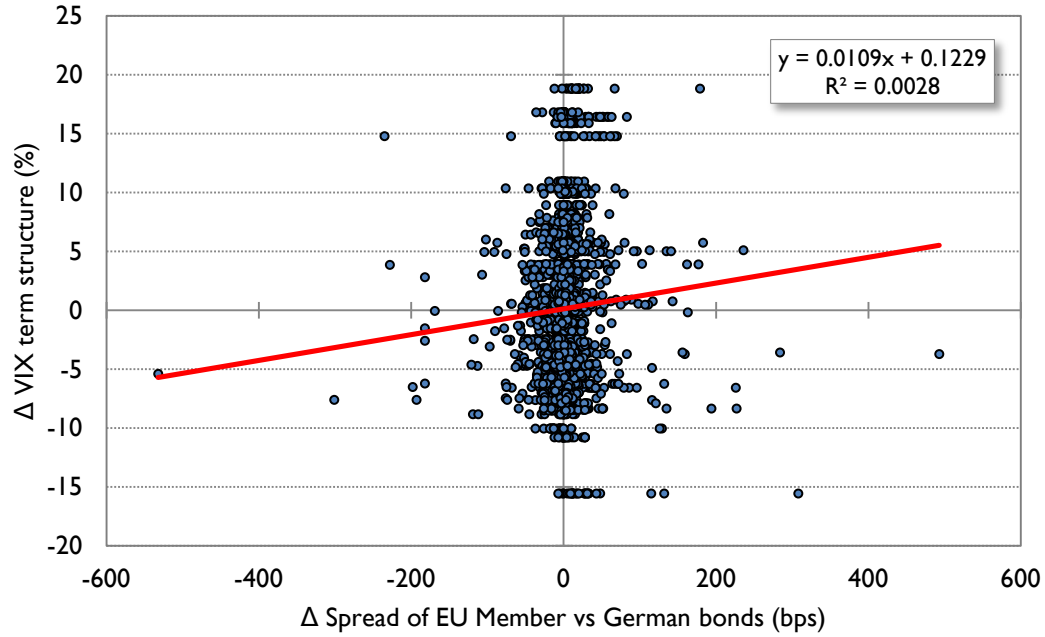

Figure 2: Changes in VIX term structure versus changes in spread between EU Member and German bonds

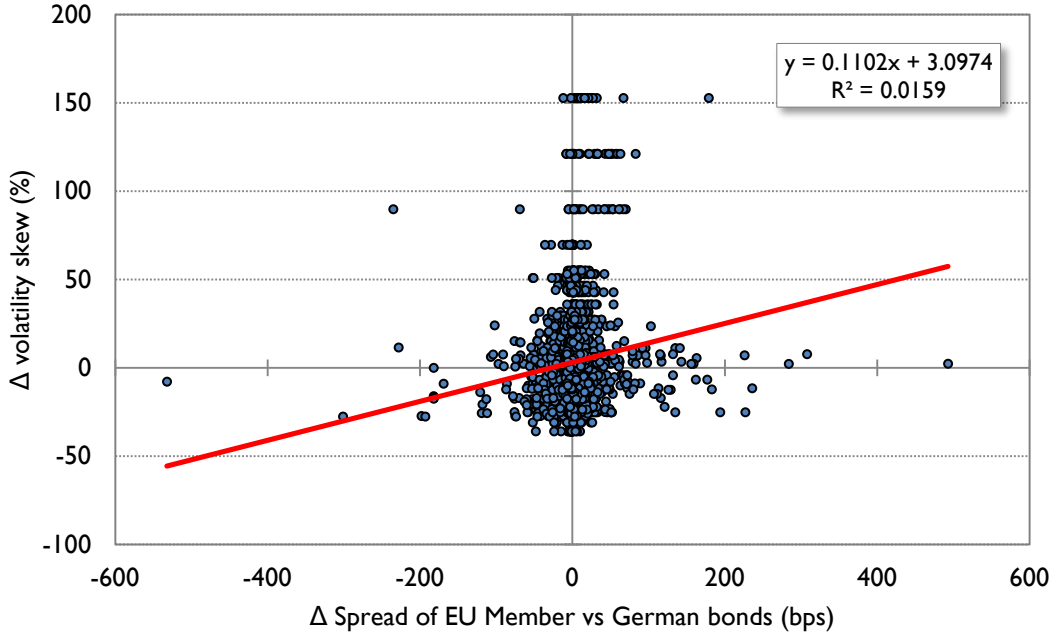

Figure 3: Changes in volatility skew versus changes in spread between EU Member and German bonds

These figures also support our intuition and indicate how the volatility term structure tends to invert and how the volatility skew tends to steepen as bond spreads widen.