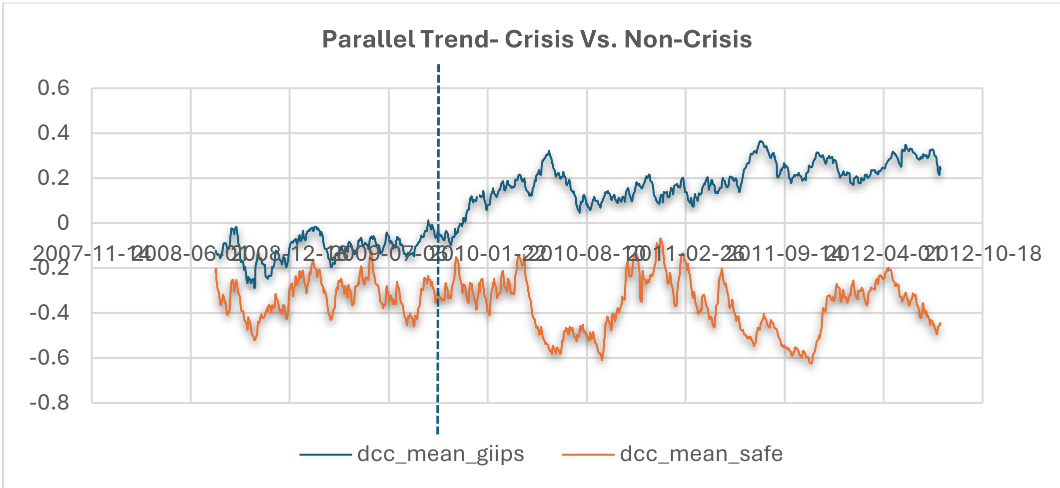
European Sovereign Credit Crisis- Difference-in-difference Test

To assess the causal impact of sovereign credit shocks on domestic stock–bond return correlations, we conduct a Difference-in-Differences (DiD) analysis. We consider the European Sovereign Debt Crisis as an exogenous shock, with November 5, 2009, identified as the intervention date, corresponding to the declaration of Greece's sovereign debt issues and budget deficit. The treatment group comprises five countries significantly affected by the crisis: Greece, Ireland, Italy, Portugal, and Spain (GIIPS). As the control group, we select three countries, the United States, Germany, and France, which were relatively insulated from the crisis's direct effects. We estimate dynamic Difference-in-Differences models using a panel EGLS framework with cross-sectional SUR and AR(2) lags to compare the evolution of dynamic conditional correlations (DCC) between bond and stock returns across the two groups before and after the shock. The findings support the hypothesis that the sovereign credit shock led to a significantly stronger positive co-movement between bond and stock markets in treated countries relative to control countries, causing contagion in crisis-affected countries.

To validate the key identifying assumption of the DiD framework, we examine the pre-treatment mean dynamic conditional correlation (DCC) trends for GIIPS (treatment group) and safe-haven countries (control group). As seen in the chart before the shock, both series exhibit stable and reasonably parallel trajectories with no obvious divergence in slope or pattern, despite differing average levels. This supports the parallel trends assumption, suggesting that, in the absence of the shock, both groups would have continued to evolve similarly in terms of bond–stock return co-movements. Thus, the observed divergence in DCC behavior after the shock likely reflects a causal impact of the sovereign credit crisis on the treatment group rather than pre-existing trend differences.

Figure1: Parallel Trend- Crisis Vs. Non-Crisis



To validate the parallel trends assumption of the Difference-in-Differences (DiD) framework, we conduct a placebo test by assigning a fictitious treatment date prior to the actual shock. This placebo test helps examine whether there were any significant differences in the trajectory of bond–stock return correlations between treated and control countries before the actual sovereign credit crisis, which would violate the assumption of parallel pre-trends. We assumed the fictitious treatment date as 1st May, 2009. The DiD effect in the placebo period is statistically insignificant, indicating no differential shift in bond–stock return correlation between treated and control groups prior to the actual policy shock. This supports the parallel trends assumption and strengthens the causal interpretation of the original DiD estimates, that sovereign credit shock affected the DCC of the control group, causing contagion in domestic financial markets in GIIPS countries.