New Determinants of Sovereign Risk Premia: Identification through Asset Price Shocks, Credit Premia, and Financial Cycle Synchronization

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Motivation & Research Questions (1)

- Prior to 2009, sovereign credit risk for developed economies was virtually non-existent.

- The great recession has reignited the debate over the dynamics of sovereign credit risk in developed economies.

- Factors that played an important role to the European sovereign debt crisis, such as the relationship between sovereign spreads, financial (asset prices) and credit "boom and bust episodes", for which the existing literature remains scant.

Motivation & Research Questions (2)

- What factors contributed to the elevation of sovereign credit risk and what was the channel through which financial risks leaked into the public sector?

- Do asset price shocks, financial and credit fluctuations affect sovereign risk premia?

- Even though there is an extensive literature that studies sovereign spread dynamics, there is no consensus on the factors driving the changes on this variable.

Contribution

- There is no evidence of oil price and credit cycle synchronization and their transmission to sovereign credit risk.

- Studies on the European sovereign debt market focus on the role of the repo market and the effect of central bank interventions in bond yields (Corradin and Maddaloni, 2020; Boissel, Derrien, Örs, and Thesmar, 2017; Eser and Schwaab, 2016).

- Krugman (2008) synchronization between business cycles and credit cycles in a theoretical model: distressed banks become the channels via which shocks propagate to the international economy.

Contribution

- Similar theoretical models via which financial intermediaries experience distressed credit conditions introduced by Devereux and Yetman (2010), and Olivero (2010). In these models, credit and liquidity shocks are quantified as a fall in asset values which transmits to other international financial intermediaries and economies.

- Cetorelli and Goldberg (2012), Gianneti and Laeven (2012) find that following a negative liquidity shock, banks tend to rebalance their lending in favor of domestic borrowers. This in turn, can cause cross-border loan supply contraction which can trigger a lending shock which can give rise to a synchronization of credit busts across seemingly different countries.

Hypothesis

- The events of last decade call into question the importance of asset and oil price shocks as a significant source of macroeconomic fluctuations. Indeed, the economy has experienced two oil price booms and busts in the 2010s, with a magnitude comparable to the 2000s, yet all advanced economies have remained relatively stable.

- We suggest that a novel phase synchronization of the financial, and credit cycles took place in the US, prior to the financial crisis of 2008.
- The synchronization of the cycles increased the magnitude of the effect in the US economy, transmitted and affected the cost of public debt in Europe.

Investigation (1)

- To investigate this hypothesis, one must isolate macroeconomic fluctuations associated with exogenous changes in asset prices, in the financial cycle, and with changes related with the credit cycle in the US economy.

- We use equity prices and oil prices as the most reliable and broad assets which fluctuate based on demand and supply dynamics and represent broad economic conditions, in line with Claessens, Kose, and Terrones (2012), and with Blanchard and Galí (2009).

Investigation (2)

- Next, we capture phase synchronization of financial, and credit cycles by proposing a novel econometric procedure:
  - Oil price shocks episodes based on Blanchard and Gali (2009)
  - Equity price shocks similar to Claessens, Kose, and Terrones (2012)
  - Credit cycle based on Jordà, Schularick, and Taylor (2013). We innovate by distinguishing the cycle in two phases: expansionary and contractionary episodes

Investigation (3)

- We introduce a novel Markov Switching Vector Autoregression (MS-VAR) model – which is similar in spirit to Sims and Zha (2006) - as the key mechanism to capture the state of synchronization between the financial and the credit cycles during the great recession.

- Finally, we show how the effect transmits and affects sovereign credit risk in the European markets.

Data and Identification (1)

- Sovereign credit risk: Sovereign Debt, real GDP, budget balance for France, Germany, Greece, Italy, Ireland, Spain, Portugal, and the Netherlands from 2001-2019.

- Credit cycle: similar approach with Schularik and Taylor (2012) and Jordà, Schularik, and Taylor (2013), as credit which is above its mean. Long-term historical data on private debt supplied by U.S. banks, as a ratio over real GDP per capita, to show credit growth and credit contraction. The ratio of U.S. bank loans to U.S. GDP. Commercial and Industrial Loans, Real Estate Loans, and Household Loans (source: H8, Board of Governors of the Federal Reserve).

Data and Identification (2)

- Financial cycle: an episode involving a cumulative change in asset prices, the S&P 500 index and the crude oil price, which is above 50 percent, sustained for at least one quarter. S&P 500 and crude oil prices from Datastream. Same approach with Blanchard and Galí (2009), and Claessens, Kose, and Terrones (2012).

- We quantify the effect of financial (equities and oil price cycles) and credit cycles on the following macroeconomic aggregates: CPI Inflation from Datastream, Real GDP from Datastream, Inflation Expectations from the Survey of Professional Forecasters, and the Consumer Sentiment Index from the University of Michigan site.

The MS-VAR model (1)

- We introduce a novel Markov Switching Vector Autoregression (VAR) model to establish and capture the relationship and especially the phase synchronization of financial cycle and credit cycle

- The model allows for five regimes and builds on the work of Bianchi and Melosi (2017) which is an extension of the MS-VAR model proposed by Sims and Zha (2006).

The MS-VAR Model (2)

where Y_t is a (n * 1) vector of data. Equation 3.1 denotes there are two lags in the MS-VAR.

The unobserved states ξ_t^{ϕ} and ξ_t^{Σ} control the regimes in place for the VAR coefficients and volatilities, respectively, in order to allow for heteroscedasticity. Regimes evolve according to two independent transition matrices.

$$Y_t = c_{\xi_t^{\phi}} + A_{\xi_t^{\phi},1} Y_{t-1} + A_{\xi_t^{\phi},2} Y_{t-2} + \Sigma_{\xi_t^{\Sigma}}^{1/2} w_t$$

$$\phi_{\xi_t^{\phi}} = [c_{\xi_t^{\phi}}, A_{\xi_t^{\phi},1}, A_{\xi_t^{\phi},2}], w_t \square N(0, I)$$

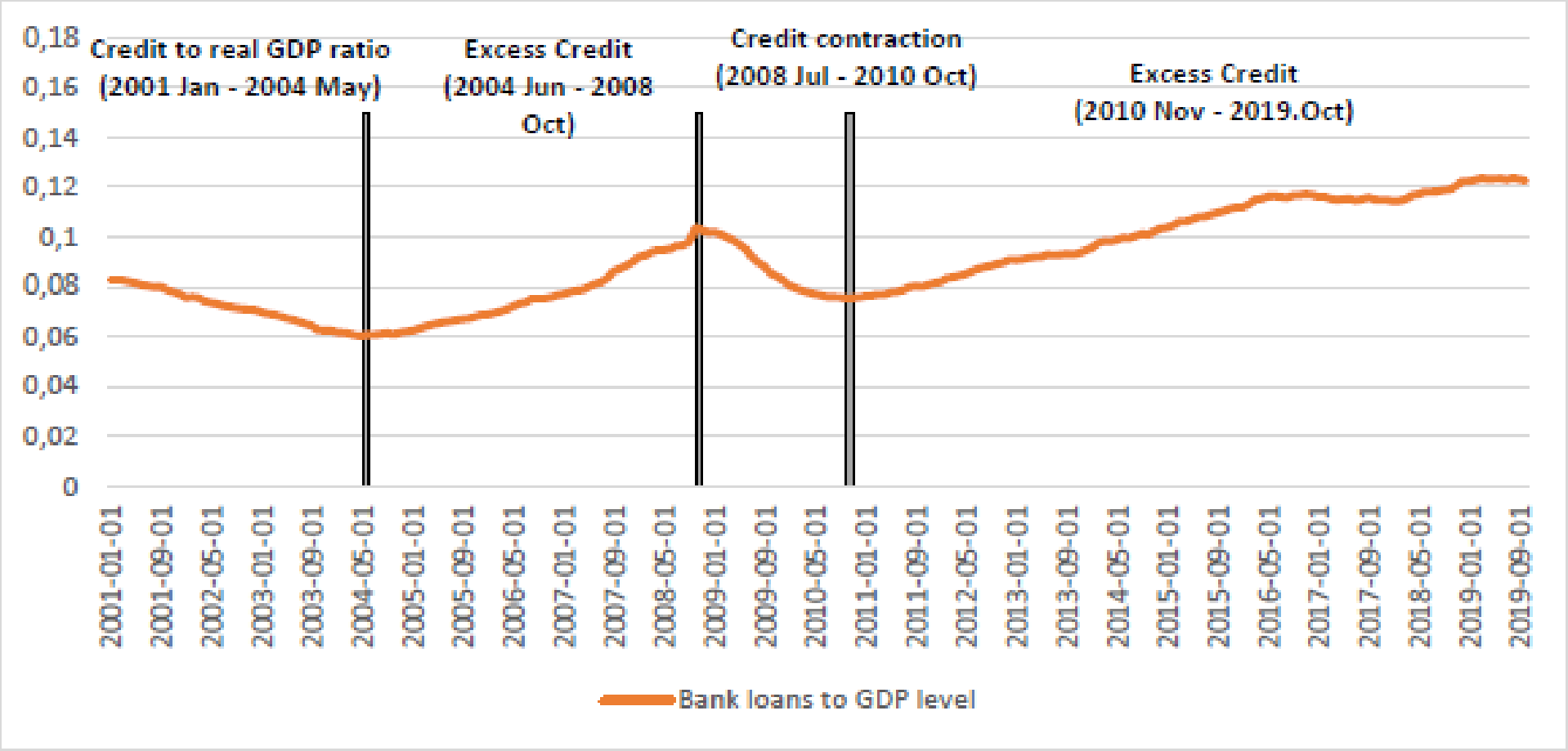
The MS-VAR Model (3)

- To characterize uncertainty of parameter values, the Gibbs sampling algorithm is employed based on the most likely regime indicated by the smoothed probabilities. With Gibbs sampling algorithm and the posterior mode of the coefficients we can compute the conditional steady states of the variables.

- Finally, we compute the impulse response functions (IRFs) to examine the interrelationships among the variables.

Credit Cycles

Figure 3. Credit cycles



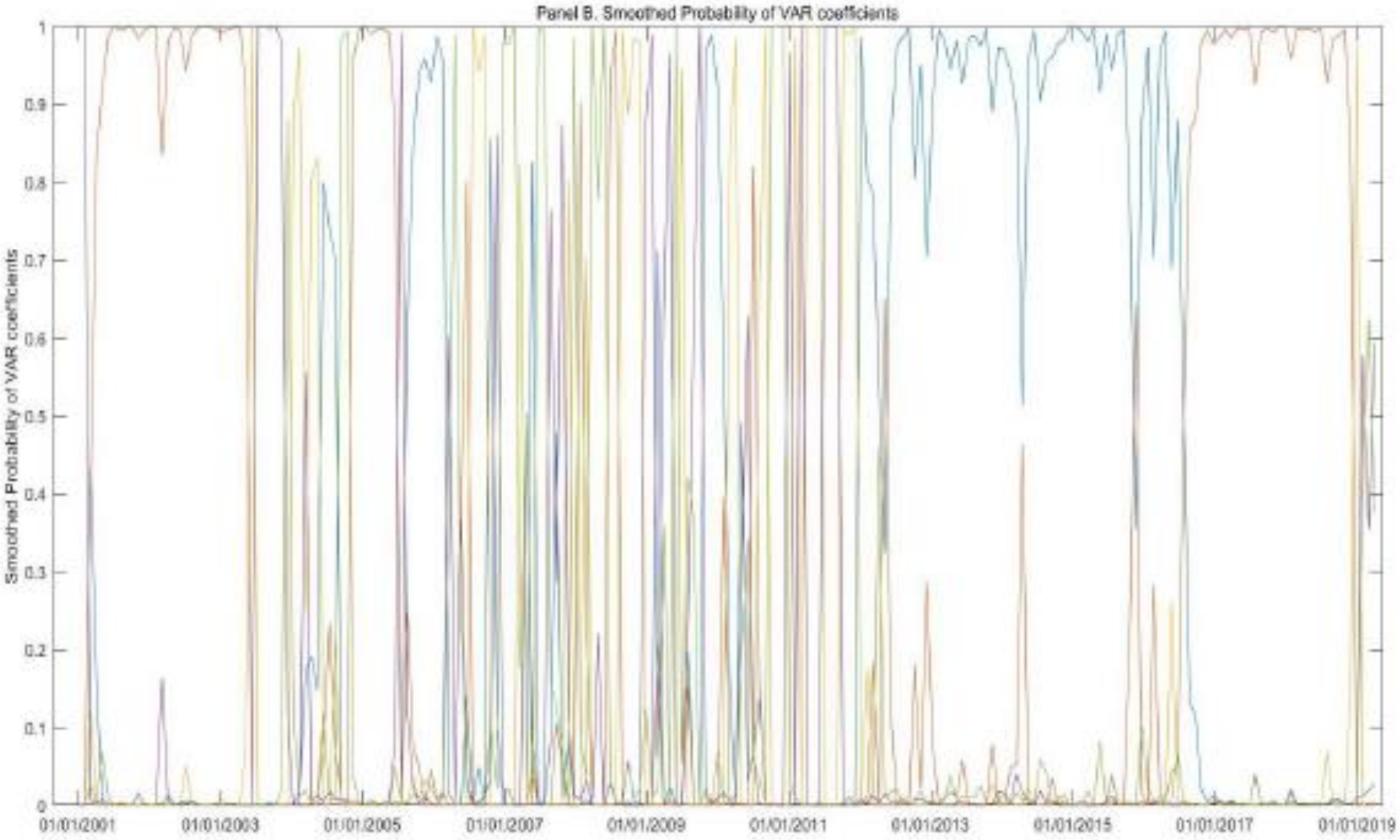
Financial and Credit Cycles (1)

- First financial cycle (2001-2008, 90 months) is synchronized with the first credit cycle (2004-2008, 49 months). During this cycle, the oil price increased by 352 percent, while excess credit was 63 percent. In all three financial cycles, the increase in oil price exceeded 100 percent and are of similar magnitude. Accordingly, the two credit cycles are of similar magnitude, with excess credit being 63 percent and 52 percent for the first and the second credit cycle, respectively. Similarly, the three financial cycles have been associated with identical macroeconomic performance.

Financial and Credit Cycles (2)

- During the first cycle the average GDP growth per year was 2.5 percent, during the second cycle the output expanded on average by 2.1 percent per year, and during the third cycle by 2.4 percent per year. However, in spite of the relatively similar magnitude, the end of the first financial cycle was associated with very different macroeconomic performance (i.e. output contracted by 4.8 percent), compared with the end of the second and the third cycles where output expanded by about 2.2 percent after the end of each financial cycle.

5 Regimes – Identification (1)



5 Regimes – Identification (2)

- Regime 1: oil and stock prices are moving slightly upwards, while credit does not expand above its mean.

- Regime 2 appears two times in the data sample: between 2004-2008 it captures the high frequency relation between the financial cycle and the credit cycle. In this state, both cycles are synchronized and experience a boom episode. The output expands by 7 percent in total, the average CPI inflation is about 3 percent, and there is a slight increase in inflation expectations by about 0.6 percent. And then between November 2010 – September 2011.

5 Regimes – Identification (3)

- Regime 3: associated with recessions, since it captures the bulk of the dynamics during the Great Recession, the bust of the financial and credit boom cycles, reported in Regime 2. For example, in this state, oil price slumps by more than 70 percent, while credit contracts by more than 35 percent. A large contraction in actual GDP by more than 3.2 percent, and a decline of similar magnitude (3.6 percent) is observed for inflation expectations. A lasting fall of inflation which sunk at about 0.5 percent.

- Regime 2 appears again after regime 3: captures a new financial cycle and the beginning of a new credit cycle which is under development until the end of our data sample in September 2019.

5 Regimes – Identification (4)

- Regime 4: captures the end of the financial cycle, since we experience a new oil price bust with a decline of about 69 percent. However, in Regime 4, the magnitude of the effect from the bust of the financial cycle is much smaller compared with the effect from the bust of the cycle in Regime 3. Particularly, output continues to expand with an average rate of 2.2 percent per year.

- These findings support our hypothesis that the effect of asset price shocks in the macroeconomy was stronger in Regime 2 because, it was synchronized with excess credit.

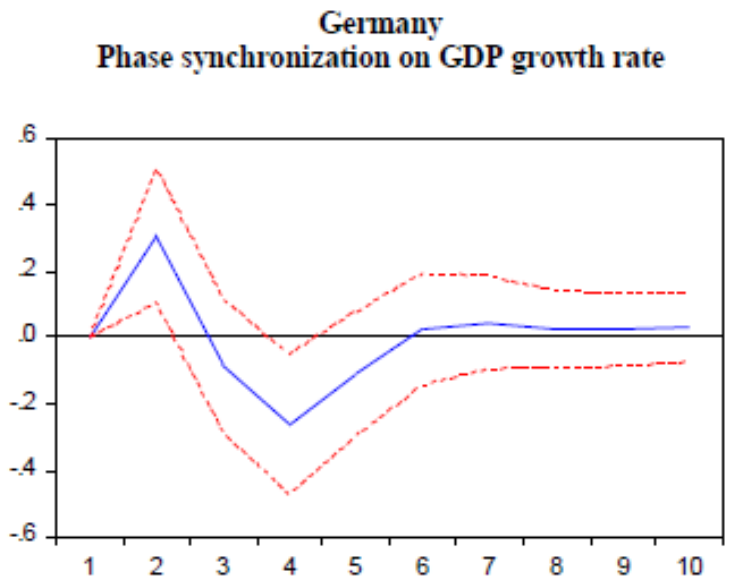
5 Regimes – Identification (5)

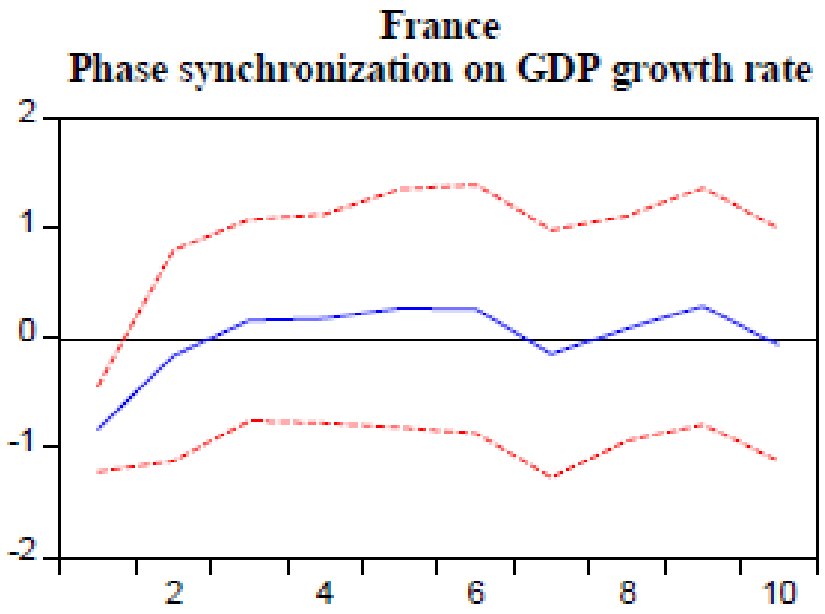
- Regime 5: captures a new financial cycle, with an increase of 107 percent in the price of oil through out that Regime. Credit continues to deviate above its mean, indicating that we continue to experience excess credit. Output expands on average by 2.4 percent per year, the average inflation rate is 1.9 percent, and the inflation expectations are slightly positive.

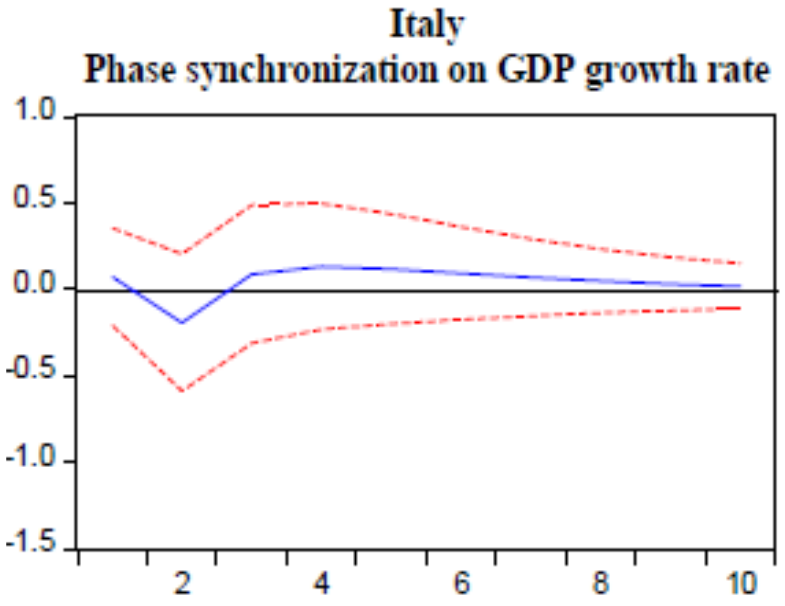
Impulse Response Functions (IRFs)

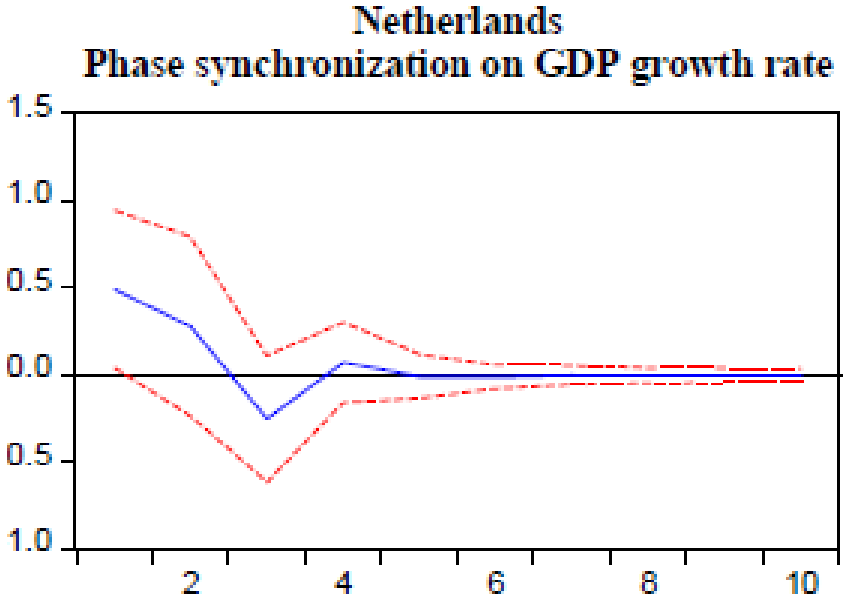
- Further evidence that, the synchronization of financial and credit cycles is the key mechanism behind the deterioration of the macroeconomic aggregates in Regime 3 and transmits to the European Sovereign credit risk: the key phase synchronization of financial and credit cycles, that takes place in Regime 2 explains the magnitude of their effects in the macroeconomic dynamics over time and across the 5 Regimes. To highlight the importance of phase synchronization, we perform Gaussian shocks to capture the dynamics of the data through all 5 Regimes.

Phase Synchronization Effect

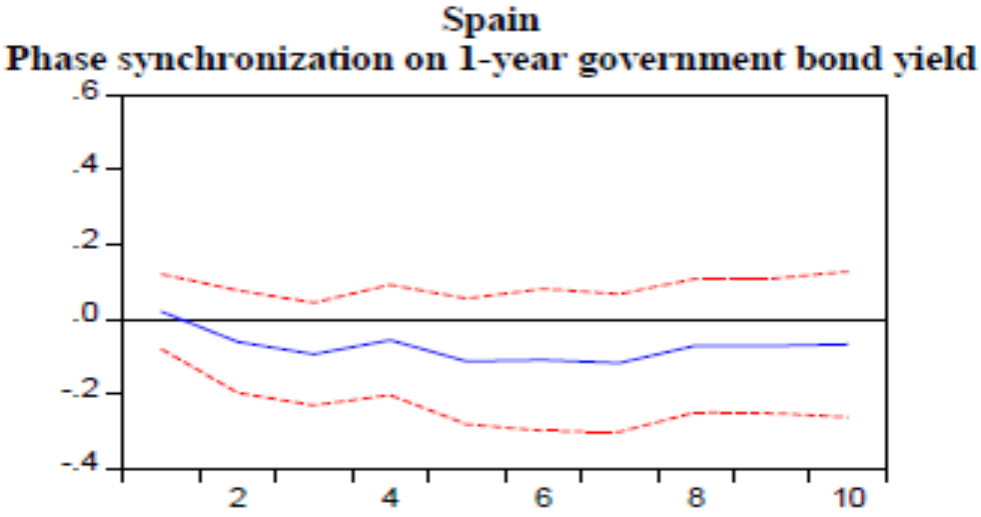


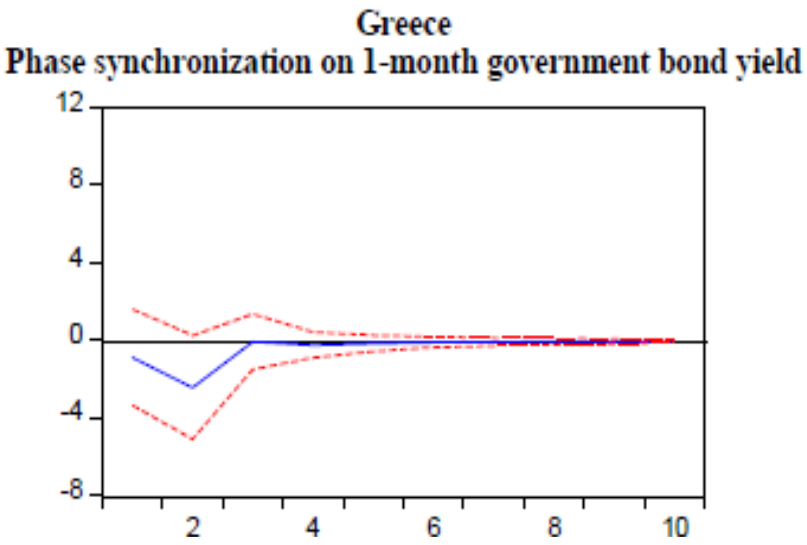


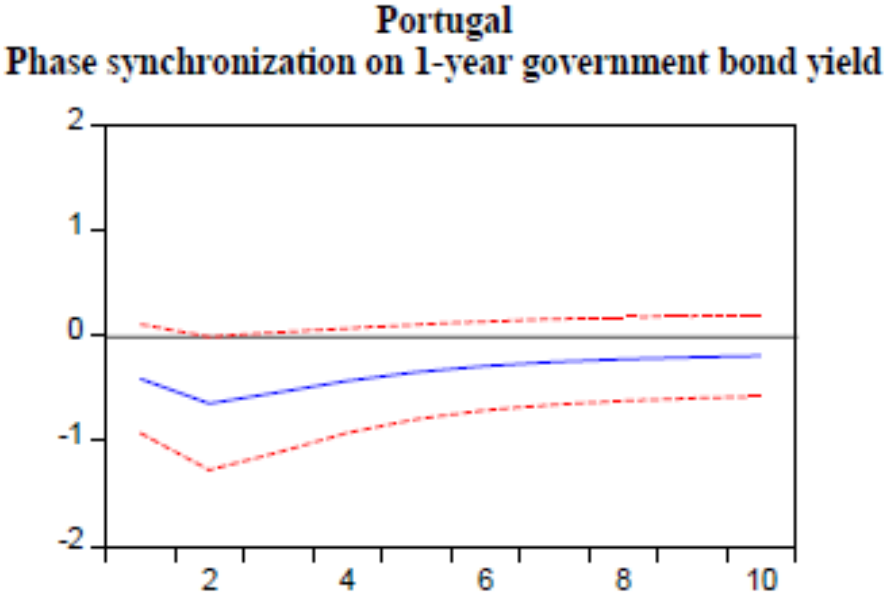


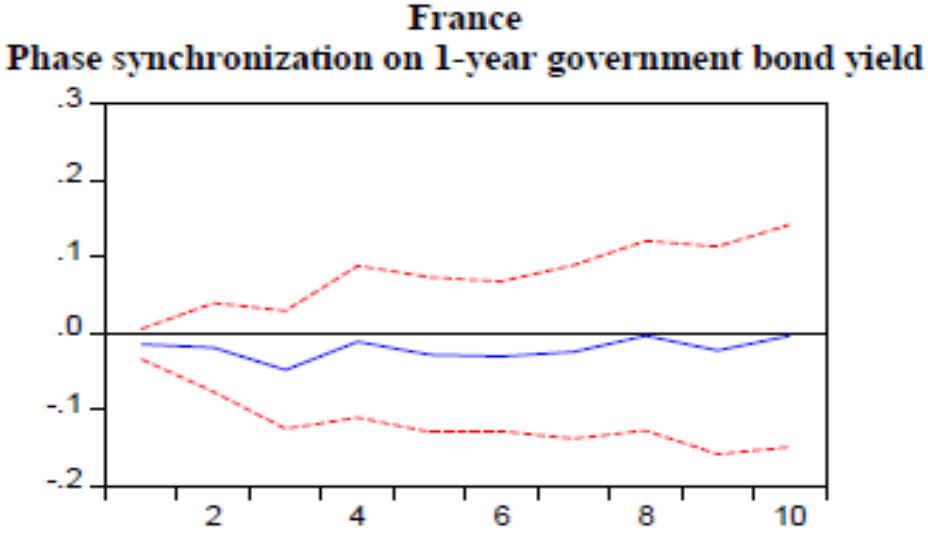


Phase Synchronization Effect on Sovereign Credit Cost

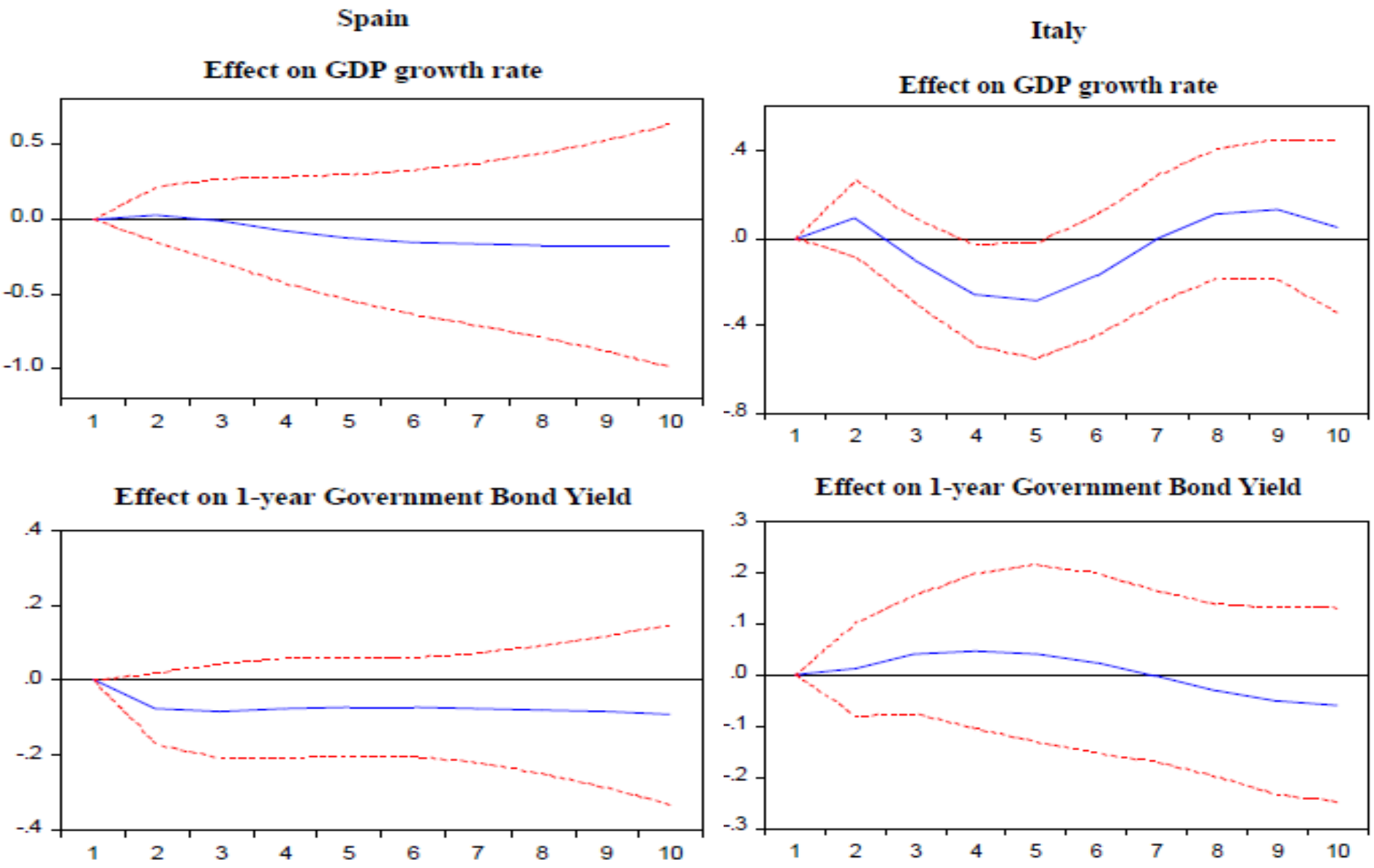








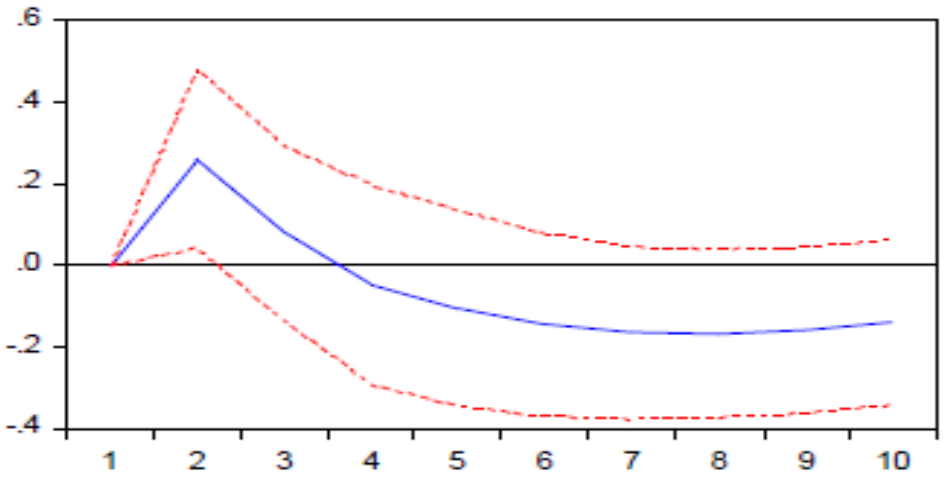
Robustness Tests: Phase Synchronization Effect



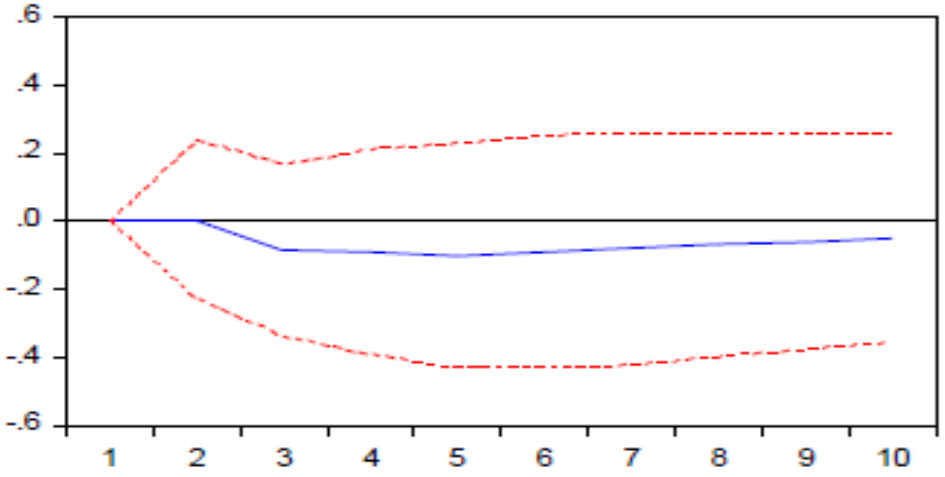
Robustness Tests: Phase Synchronization Effect

Portugal

Effect on GDP growth rate

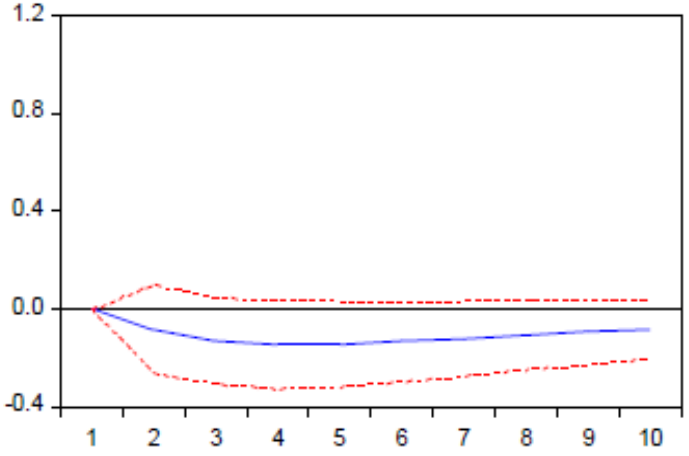


Effect on 1-year Government Bond Yield

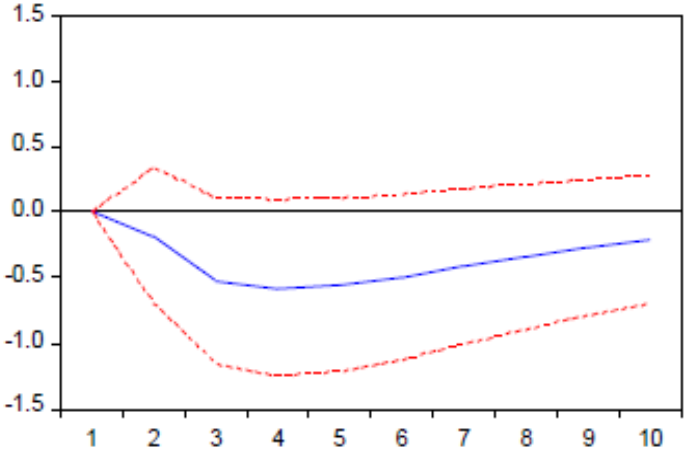


Greece

Effect on GDP growth rate



Effect on 1-year Government Bond yield



Conclusion – Policy Implications (1)

- Asset price shock episodes take place every decade, however the magnitude of their effect is significantly different.

- Even though the magnitude has been similar across episodes, in the 2008 episode there was a "boom and bust cycle" of very different nature: a phase synchronization between the financial cycle and the credit cycle that significantly amplified the impact of asset price shocks in the economy.

Conclusion – Policy Implications (2)

- Phase synchronization elevates volatility and hence, changes the limits of arbitrage. Portfolio managers can change the composition of their portfolios and hedge volatility generated by phase synchronization.

- Since the effect of asset price shocks change over time and become smaller in the macroeconomic activity, monetary policy makers can respond less aggressively to abrupt changes in asset prices.

- Macroprudential policy makers might wish to use oil price fluctuations as a signal for tightening (or loosening) the time-varying loan- to-value ratios.

Q&A

THANK YOU