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The real effects of financial stress in the Eurozone ☆

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ABSTRACT

This paper examines the real effects of financial stress in the Euro-zone, using two identification strategies based on a Bayesian Structural VAR and a Sign-Restriction VAR. As expansionary monetary policy has been blamed to have fuelled asset price bubble, it is important to assess the macroeconomic impact of both a financial stress shock and a monetary policy shock. We find that unexpected variation in financial stress conditions plays an important role in explaining output fluctuations and, therefore, demands an aggressive response by the monetary authority to stabilize output. This, in turn, indicates a preference shift from inflation targeting. We also show that a monetary policy contraction strongly deteriorates financial stress conditions. As a result, rapid credit growth due to a long period of low interest rates possibly contributed to an increase in asset prices and encouraged unsustainable demand growth as observed in the recent financial crisis.

1. Introduction

The most recent financial crisis, which began in the US in the summer of 2007 with the bursting of the sub-prime mortgage market, unleashed a full-blown systemic crisis with global risk aversion dramatically increasing and asset markets across countries and regions plunging, in particular, after the collapse of Lehman Brothers in September 2008. Stock markets tumbled in all regions, large fiscal stimulus packages were implemented posing enormous challenges to long-run fiscal sustainability, while at the same time spreads on sovereign debt widened and currency markets came under pressure. Even market economies with sound macroeconomic and financial preconditions built-up over the previous years were strongly affected.

The initial contagion from the US to international financial markets quickly morphed into real sector problems and revealed the strength of the linkages between the financial system, the housing sector, the banking sector and the credit market. Such a rapid spillover from the financial to the real sector, whereby many countries saw their domestic industrial production, investment rates and, more generally, their GDP growth rate plunging, suggests that the nexus between monetary stability and financial stability may be strong (Castro, 2010; Granville & Mallick, 2009; Sousa, 2010a, 2010b) and that financial stress conditions can have an important impact on domestic demand and the likelihood of "boom-bust" episodes and expansion and contraction ending (Castro, 2011).

Moreover, in the wake of the financial crisis, policy priority has apparently shifted towards stabilizing the financial system and aiding economic recovery rather than targeting inflation. Financial stability has become an important explicit goal for Central banks. As monetary policies are primarily designed to promote price stability, there could be exogenous financial stress shocks due to systemic risks in the financial system that could cause financial stress, which in turn can dampen macroeconomic activity. Putting it differently, while long-run monetary neutrality is a key building block of mainstream business cycle research (Aksoy & León-Ledesma, 2005), financial stress shocks due to build up of monetary bubbles may have an effect on the real economy. In fact, as we have seen in the recent financial crisis of 2007–2009, the crisis or the imbalances in financial markets reflected in an unexpected financial stress shock did have a noticeable impact on macroeconomic activity, suggesting that the monetary bubble before the current crisis has possibly led to a non-neutrality outcome. Moreover, in the past economic recoveries, the decision to tighten monetary policy was mainly based on the inflationary pressures coming from the strength of aggregate demand. In contrast, the current exit strategy includes an additional feature linked with the threat that financial stress may be still too high in which case the removal of special lending programs and liquidity facilities and the return to a more restrictive monetary policy might weaken the sustainability of economic growth.

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The turmoil in financial markets has, therefore, renewed this debate on the potential spill-over effects from the financial sector to the real economy. In this context, this paper contributes to this discussion by providing new evidence on the linkages between financial and monetary policy shocks, as financial innovations can obscure the relationship between monetary policy and real activity. The importance of shocks that originate directly in the financial sector has recently been explored (Jermann & Quadrini, 2012). Notably, the authors show that financial shocks were responsible for the tightening of firms' credit conditions that led to the economic downturns of 1990–1991 and 2001 and the 2008–2009 recession. In addition, Quadrini (2011) shows that financial frictions are crucial for improving our understanding of the dynamics of the macroeconomy.

Therefore, we aim at assessing the impact of a financial stress shock alongside other macroeconomic shocks in the Eurozone. A financial stress shock is designed here as an innovation in the Financial Stress Index, which we build using country-level information on financial stress conditions following the work of Cardarelli, Elekdag, and Lall (2011). More specifically, the Financial Stress Index tracks periods when the financial system is under strain and its ability to intermediate impaired. Extreme values in this Financial Stress Index (FSI) indicate financial crises.

Therefore, we set up a Vector Auto-Regressive (VAR) model with 6 key macroeconomic variables: the interest rate (that is, the policy rate); a set of macroeconomic variables that adjust to the shock with a lag (real GDP, inflation rate, and the commodity price); and a set of variables that react contemporaneously to the policy shock (the growth rate of the monetary aggregate, and the Financial Stress Index) with the goal of identifying the macroeconomic effects of a shock to monetary policy and a shock to financial stress conditions, focusing on the Eurozone as a monetary union.

Monetary policy can operate through both an interest rate and liquidity channel. A liquidity measure is included along with interest rate and FSI, as it is a key variable measuring financial stability. Monetary policy decisions to improve liquidity conditions can be unsuccessful, if decreasing interest rate to raise liquidity results in higher inflation, the so-called *paradox of credibility*. So it is the liquidity channel that must be identified and should be monitored to detect signs of instability. This requires estimating the effect of monetary or more recent quantitative easing technique to explore whether easing liquidity conditions can generate any inflationary pressure at a time of depressed real sector, along with uncovering the effect of financial stress shocks.

The broad concern of monetary policy in Eurozone is to maintain price stability. Any analysis of monetary policy behavior should include both interest rates and money growth in the empirical exercise, as well as the inflation rate. The consideration of commodity prices in the VAR is explained by the need for eliminating the price puzzle by the inclusion of such forward looking variable that captures expected inflation.

We contribute to the literature in two important respects: (i) we look explicitly at the real effect of financial stress shocks; and (ii) we use different identification strategies to jointly identify monetary and financial stress shocks as both could have implications for monetary liquidity in the system and, hence, liquidity crises may spill over to other macroeconomic variables.

We identify the monetary policy and the financial stress shocks using modern estimation techniques, namely, the Bayesian Structural Vector Auto-Regression (B-SVAR) and the Sign-Restrictions VAR and, thereby, account for the uncertainty about the impulse–response functions. We, therefore, identify simultaneously and uniquely contractionary monetary policy shocks and an adverse financial stress shock to examine their real effects. We provide evidence that a financial stress shock plays a dominant role in explaining output fluctuations relative to monetary policy shocks.

We show that a monetary policy contraction: (i) strongly deteriorates financial stress conditions; (ii) has a negative effect on output; (iii) leads to a quick fall in the commodity price, but the aggregate price level exhibits strong persistence; and (iv) produces a small liquidity effect. As for the shock to financial stress conditions, it: (i) has a contractionary effect on output; (ii) negatively impacts on the commodity price and the inflation rate; and (iii) generates a strong fall in the interest rate. The contractionary output effect associated with the shock to financial stress is in line with the recent evidence for the US that also uncovers a substantial fall in output as a result of a rise in uncertainty (Bloom, 2009; Cover, 2011).

In addition, we find that episodes of an increase in financial stress demand a strong response by the monetary authority, namely, via the adoption of expansionary policies. It is evident from our results that the interest rate channel seems to have changed in the post-euro period, while the asset market channel (the financial stress effects of monetary policy) does appear more important. This means low inflation could exist alongside bubbles in house or stock markets. For example, lower interest rates could push loans, reduce the bank deposit–loan ratio and increase probabilities of turmoil events in financial markets.

Finally, the empirical results suggest that variation in financial stress conditions is largely unexpected. Nevertheless, our framework seems to capture pretty well the developments of the 2008–2009 financial turmoil. In particular, they highlight the importance of adopting a vigilant posture towards financial stress conditions, as well as the urgency of macro-prudential risk management.

The rest of the paper is organized as follows. Section 2 presents the estimation methodologies and Section 3 describes the data. Section 4 discusses the empirical results. Finally, Section 5 concludes with the main findings of the paper and the policy implications.

2. Estimation methodology

2.1. The recursive SVAR framework

We estimate the following Structural VAR (SVAR)

$$\underbrace{\Gamma(L)}_{n\times n}\underbrace{X_t}_{n\times 1} = \Gamma_0 X_t + \Gamma_1 X_{t-1} + \ldots = c + \varepsilon_t \tag{1}$$

$$v_t = \Gamma_0^{-1}\varepsilon_t, \tag{2}$$

where $\varepsilon_t|X_s,\ \ s<t\sim N\left(\underline{0},\Lambda\right)$, $\Gamma(L)$ is a matrix valued polynomial in positive powers of the lag operator L, n is the number of variables in the system, ε_t is the fundamental economic shocks that span the space of innovations to X_t, and v_t is the VAR innovation.

Monetary policy can be characterized as

$$i_t = f(\Omega_t) + \varepsilon_t^i \tag{3}$$

where, i_t is the Central Bank rate, f is a linear function, Ω_t is the information set, and ε_t^i is the interest rate shock.

We consider a recursive identification scheme and assume that the variables in X_t can be separated into 3 groups: (i) a subset of n_1 variables, X_{1t}, which do not respond contemporaneously to the monetary policy shock; (ii) a subset of n_2 variables, X_{2t}, that respond contemporaneously to it; and (iii) the policy instrument in the form of the Central Bank rate, i_t.

As in Christiano, Eichenbaum, and Evans (2005), the recursive assumptions can be summarized by $X_t = [X_{1t}, i_t, X_{2t}]'$ and

$$\Gamma_0 = \begin{bmatrix} \underbrace{\gamma_{11}}_{n_1\times n_1} & \underbrace{0}_{n_1\times 1} & \underbrace{0}_{n_1\times n_2} \\ \underbrace{\gamma_{21}}_{1\times n_1} & \underbrace{\gamma_{22}}_{1\times 1} & \underbrace{0}_{1\times n_2} \\ \underbrace{\gamma_{31}}_{n_2\times n_1} & \underbrace{\gamma_{32}}_{n_2\times 1} & \underbrace{\gamma_{33}}_{n_2\times n_2} \end{bmatrix}. \tag{4}$$