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Uncertainty shocks, banking frictions and economic activity



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ABSTRACT

In this paper we investigate the effects of uncertainty shocks on economic activity in the euro area by using a Dynamic Stochastic General Equilibrium (DSGE) model with heterogeneous agents and a stylized banking sector. We show that frictions in credit supply amplify the effects of uncertainty shocks on economic activity. This amplification channel stems mainly from the stickiness in bank loan rates. This stickiness reduces the effectiveness in the transmission mechanism of monetary policy.

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1. Introduction

The macroeconomic effects of uncertainty on economic activity is a prevalent topic in both economic policy and academic research. Policy makers and economists have repeatedly claimed that high macroeconomic uncertainty among investors hinders economic recovery. While there has been a rapidly growing literature on the macroeconomic effects of uncertainty shocks, led by the seminal paper by Bloom (2009), there has been relatively little research on the effects of uncertainty shocks under financial frictions. In particular, the existing literature has not yet explained the relationship between uncertainty shocks and frictional banking markets. This paper tries to fill this gap by investigating the effects of uncertainty shocks when banks operate in monopolistic competition and there is an imperfect pass-through of the central bank's policy rate to the loan rate. The importance of monopolistic competition in the banking sector has been extensively documented in the microeconomic literature (see for instance, Degryse and Ongena, 2007). In addition, there is vast empirical evidence on the imperfect pass-through of the monetary policy rate to the retail loan rates (see for instance: (Kobayashi, 2008; Gerali et al., 2010; Paries et al., 2011; Gambacorta and Signoretti, 2014)). In fact, the loan rates to non-financial corporations in the euro area exhibit a much more persistent behaviour than the short-term money market rates (Fig. 1).

The relationship between macroeconomic uncertainty shocks and economic activity is widely analyzed in academic research. Economic theory provides a comprehensive framework in which higher uncertainty affects economic activity through irreversible investments, convex marginal revenues and precautionary savings (Leland, 1968; Hartman, 1976; Bernanke, 1983; Abel, 1983; Kimball, 1990). While almost all academic research papers find significant negative effects of uncertainty shocks on key economic variables in a partial equilibrium setup, the effects in a general equilibrium are more

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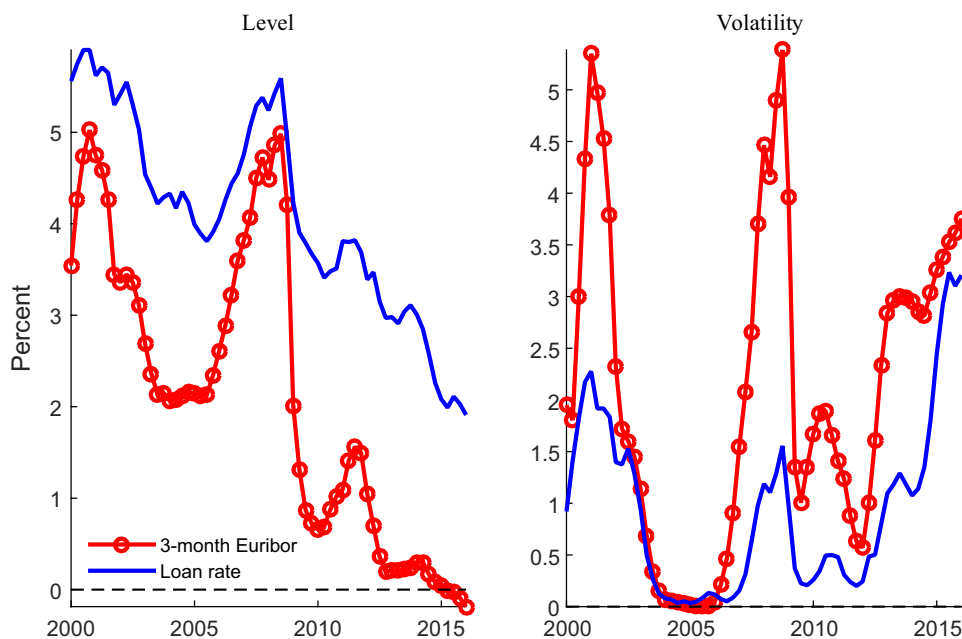


Fig. 1. Level and volatility of 5-year loan rate and 3-month Euribor. Notes: Interest rate volatilities are estimated using a GARCH(1,1) model.

disputed. While [Bachmann and Bayer \(2013\)](#) claim there are no significant effects of uncertainty shocks in general equilibrium, [Basu and Bundick \(2014\)](#) claim that there are, given that prices are sticky and the central bank is constrained by the zero lower bound. [Born and Pfeifer \(2014\)](#) analyze the contribution of monetary and fiscal policy uncertainty shocks in the United States during the Great Recession. They show that while policy uncertainty can be found in the data, it is unlikely to have played a large role in driving business cycle fluctuations. They find even smaller effects of uncertainty shocks to total factor productivity (TFP). [Leduc and Liu \(2015\)](#) study the macroeconomic effects of uncertainty shocks in a DSGE model with labor search frictions and sticky prices. They show that uncertainty shocks act like aggregate demand shocks as they increase unemployment and reduce inflation.

While there is a broad literature on the effects of uncertainty shocks, few researchers have analyzed their impact under financial frictions. [Gilchrist et al. \(2014\)](#) show, both empirically and theoretically, how time-varying uncertainty interacts with financial market frictions in dampening economic fluctuations. Using a standard bond-contracting framework, they find that an increase in uncertainty is beneficial to equity holders while it is costly for bond holders, since uncertainty shocks lead to an increase in the cost of capital and ultimately to declining investment. In addition, decreasing credit supply hinders efficient capital reallocation which leads to a further decrease in TFP. [Christiano et al. \(2014\)](#) apply a DSGE model incorporating the financial accelerator mechanism originally proposed by [Bernanke et al. \(1999\)](#) (BGG) and estimate it for the U.S. economy. They find that risk shocks (i.e., changes in the volatility of cross-sectional idiosyncratic uncertainty) play an important role for shaping U.S. business cycles. While [Christiano et al. \(2014\)](#) exclusively consider idiosyncratic uncertainty shocks, [Balke et al. \(2013\)](#) also investigate the effects of macroeconomic uncertainty shocks under credit frictions. Using a model with agency costs, they show that the financial accelerator amplifies the contractionary effects under price stickiness. In equal measure, [Cesa-Bianchi and Fernandez-Corugedo \(2014\)](#) show that credit frictions amplify the negative impact of uncertainty shocks on output, investment and consumption. In addition, they find that micro uncertainty shocks seem to be quantitatively more important than macro uncertainty shocks.

This strand of literature using DSGE models based on the financial accelerator mechanism focuses only on frictions that characterize the demand side of the financial sector. In this paper, in contrast, we show that supply side constraints in the financial sector also play an important role in amplifying the effects of uncertainty shocks. Accounting for sticky retail interest rates determines an imperfect pass-through of the central bank interest rate to the private sector. The transmission mechanism of the monetary policy is hence weakened and less effective in offsetting the dampening effects of the uncertainty shock. Our paper is most closely related to [Basu and Bundick \(2014\)](#); [Christiano et al. \(2014\)](#), and [Balke et al. \(2013\)](#). While [Basu and Bundick \(2014\)](#) use a standard New Keynesian model to show the effects of aggregate uncertainty, we assume that entrepreneurs are credit constrained and that lending is implemented through an imperfectly competitive banking sector.

Our contribution is threefold: first, we provide an empirical motivation for the study of uncertainty shocks. Therefore, we estimate a small Vector Autoregressive (VAR) model and show that higher uncertainty reduces main macroeconomic aggregates in the euro area. We show that the imperfect pass-through of the monetary policy rate to the loan rates is an important empirical feature for the transmission of uncertainty shocks. Second, we analyze the effects of uncertainty shocks on business cycle fluctuations using a Dynamic Stochastic General Equilibrium (DSGE) model which incorporates nominal rigidities and financial frictions. We build a multi-sector model featuring credit frictions and borrowing constraints for entrepreneurs as in [Iacoviello \(2005\)](#) and price rigidities as in

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