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### **The role of financial frictions during the crisis: An estimated DSGE model**

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The financial crisis that began in 2008 has drawn attention to the close interaction between financial and credit markets on the one hand, and the real economy on the other.

This paper investigates to what extent financial transmission channels, by amplifying the business cycle, accounted for the output collapse in the US during the recent crisis. To this end, I have built on the Smets and Wouters model (2003, 2007) by adding financial frictions as modelled in Bernanke, Gertler and Gilchrist (1996, 1999).

To estimate the parameters of the model and the stochastic processes governing the structural shocks in the US economy, I have used the same set of shocks and macroeconomic series featured in the Smets and Wouters model (2003), together with an additional shock (i.e. the spread shock) and a financial variable (i.e. the corporate spread). I estimated the model on US quarterly data from 1967 to 2012 using Bayesian methods. The analysis considered two alternative specifications of the model, with and without financial frictions. Both specifications were then estimated on the whole sample including the global crisis (1967:Q1-2012:Q4) and on a shorter "pre-crisis" sample (up to 2007:Q2).

The main results of the paper can be summarised as follows.

First, the estimation shows that financial frictions are a fairly important feature in normal times, but they become crucial during crises. In addition, parameter estimates suggest that, during the ongoing crisis, lenders have become more sensitive to deterioration of corporate balance sheets, and have reacted by raising the external finance premium for high-risk corporate firms.

Second, the estimation shows that, during the recession that started in 2007-2008, disturbances which originated in the corporate spread have gained relevance and have partially replaced the role of traditional demand shocks in driving macroeconomic fluctuations. Moreover, the direction of the spread shock reversed course sharply in 2007, having a significantly expansionary effect on output during the period 2004-2006 and then accounting for the economic slowdown in 2008.

Third, the Smets and Wouters model extended with financial frictions is able to identify the shocks that are responsible for the financial crisis and the key sources of economic fluctuations. In this respect, the estimated model is able to replicate the observed series and accounts well for the events that started with the subprime crisis in the summer of 2007 and subsequently triggered the global financial crisis. The co-existence of a peak in the external finance premium and in the spread shock on the one hand, and the deepening of the recession on the other hand, supports the argument that financing conditions have played an important role in shaping the business cycle, especially during the financial crisis.

Overall, the results from this paper are not at odds with those found in models with the banking sector. In fact, by affecting entrepreneurs' borrowing costs, the spread shock examined in this paper has a similar impact to a financial shock that affects demand for credit and is suitable for capturing the impact of financial tightening on firms' borrowing capacity. Thus, even without explicitly modelling the banking sector, the model is able to capture macroeconomic dynamics such as the expansion and collapse of economic activity over the last few decades. This is a remarkable finding from the model, which highlights how the Smets and Wouters model with financial frictions yields results similar to those obtained in larger-scale models, although with the advantage of remaining more tractable.