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Effectiveness of monetary and macroprudential shocks on consumer credit growth and volatility in Turkey

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ABSTRACT

This paper proposes a panel VAR model to uncover the effect of monetary policy and macroprudential tightening probability on general purpose loans, housing loans, vehicle loans, credit cards and their respective volatilities in Turkey. To conduct our analysis, first, we compare a number of stochastic volatility models using our loan and credit card series in a formal Bayesian model comparison exercise, in order to determine the best volatility model for our series. Second we disclose the latent probability of macroprudential tightening from the binary information of policy episodes, using an instrumental variable probit model estimated by conditional maximum likelihood with heteroscedasticity robust standard errors. Lastly we estimate the dynamic impact of monetary policy and macroprudential measures using a panel VAR, incorporating the latent probability of tightening episodes, credit growth, industrial production growth, loan rates, inflation and credit growth volatilities into the endogenous system of equations. We conclude that macroprudential tightening is effective in dampening credit growth, credit growth volatility and reducing consumer price inflation. Besides, this effect is more prominent when macroprudential tools are administered in coordination with monetary policy.

1. Introduction

After the global financial crisis macroprudential tools are seen as useful policies to reduce financial imbalances. The global crisis reminded us that financial stability has a macroprudential or systemic dimension that should not be ignored.[1] In addition to that, global crisis helps us understand the importance of global build-up of systemic-risk and financial imbalances whose sudden unfurling turned out to have severe global macroeconomic consequences. Recent global crisis also highlighted the need to go beyond microprudential approach to macro based financial regulation and supervision. The policy stance is concentrating notably on the usage, implementation and effectiveness of macroprudential tools as well as their impact on macroeconomic outcomes and their relationship with monetary policy.

The implementation of macroprudential policies for financial stability raises a number of challenges. One important challenge is that little is known about their effects as it is difficult to quantify the effectiveness of these measures, especially when macroprudential actions involve multitude of instruments. These instruments are taken at infrequent intervals and they are in use for a very short time span only making traditional regression analysis difficult. Accordingly, in the wake of the financial crisis, macroprudential policy has attracted considerable attention among researchers and policy makers and the literature on the usage, implementation and the effectiveness of macroprudential policies now is growing very fast.

Turkey faced rapid credit growth after the 2001 crisis, which was a local crisis, with recovering economic fundamentals afterwards. Institutions respond to this crisis with several structural reforms agenda that has fiscal, monetary and prudential dimensions. Rapid credit growth after 2001 crisis is accompanied with tight regulations and supervision within the banking system. In this respect, most of the prudential policies in Turkey are enforced through the banking system till 2011. For example, banks

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[1] See Galati and Moessner (2017), Cerutti et al. (2017) and Cakir (2017) for a conceptual framework of macroprudential design.

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were not allowed to have currency mismatches, foreign currency loans to consumers were prohibited, and there were restrictions on foreign currency lending to non-financial firms. Tight restrictions were introduced on distributing bank dividends, new bank entry and branch openings. During this regulatory period the Banking Regulation and Supervision Agency (BRSA) in Turkey enforced significantly higher minimum capital adequacy and liquidity coverage ratios than required by international standards. Against the high volatility in capital flows during the post-global crisis period, which materialized with the quantitative easing policies of advanced economies, Turkey has taken more steps towards implementing explicit macroprudential policies after 2011. Accordingly, the Central Bank of the Republic of Turkey (CBRT) reshaped the inflation targeting framework by incorporating financial stability as an additional objective.[2]

With this paper we aim to offer a mixture of methodologies to correctly measure the effects of monetary and macroprudential policies in Turkey especially on consumer credit market, i.e. credit growth and credit growth volatility. In this framework, first we start with estimating the volatility for credit data employing various stochastic volatility models. Second, we use binary macroprudential policy indicators, acknowledging their endogenous nature, i.e. a macroprudential tightening is an endogenous response to a previous heating in credit markets and we employ instrumental variable probit model to uncover the latent propensity to macroprudential tightening from the observed binary policy data. We estimate the instrumental variable probit model by conditional maximum likelihood with heteroscedasticity robust standard errors. Lastly, we apply panel VAR of Love and Zicchino (2006) to uncover the effect of monetary and macroprudential polices effectively used in Turkey.

The literature on the effectiveness of macroprudential policy tools is still in its infancy. In recent years, however, increasing efforts have been made to fill this gap. This paper complements other studies on the effectiveness of macroprudential policies. Different from the existing literature on the effects of macroprudential tools, our main contribution is analyzing this effect by exploiting the endogenous nature of these tools and analyzing the transmission from a possible shock to these polices to credit growth and credit growth volatility. This is the first study in the literature that discusses the importance of the effect of such policies on the second moment of credits.

The empirical literature on macroprudential policies has broadly followed two approaches in assessing the effects of macroprudential tools: reduced-form regression analysis conducted using cross country panel regressions and reduced-form regression analysis based on microdata.[3] Cross-country panel data studies can do a relatively good job of controlling for global and local factors, by including a host of global variables in the regressions as well as fixed effects to capture unobserved heterogeneity. Such control variables often include global variables, such as the VIX, and macroeconomic variables to control for local factors. The literature also makes use of information on various policy actions as an independent variable to explain asset price movements and credit growth in a time-series or dynamic panel regression framework.[4] Each method, i.e. reduced form regression analysis using cross-country panel regression or microdata has both advantages and disadvantages. However, it is important to address the main problem, that is the endogenous nature of the macroprudential policies.

A key issue in both the academic literature and the policy debate is how the macroprudential policy interacts with monetary policy, i.e. should monetary policy be regarded as a complement or even a substitute for macroprudential policy for restraining a potential credit boom? Both the theoretical literature and the empirical literature gives different answers to this question. Yet, most of the papers offer an optimal cooperation between two sets of instruments. Collard et al. (2017) and Svensson (2017) claim that the optimal monetary policy alone is not efficient enough for financial instability and illustrates the optimal conditions for the complementarity conditions of monetary and macroprudential policies together to serve as the first line of defense against financial instability. Brunnermeier and Sannikov (2016) show that welfare is significantly improved by a combination of macroprudential policy and monetary policy. Within this framework our results highlight that - using information for consumer loans over the period of 2006–2017 monetary policy and macroprudential policy are complements and the existence of macroprudential policies besides monetary policy increases the effectiveness of these tools. We manifest these results for the consumer credit market, i.e. credit cards, general purpose loans, housing loans and vehicle loans.

The results should be interpreted with the following interpretations in mind. First limitation is related to the tightening periods related to the macroprudential policies. The policy measure used for the estimations reflect the direction of the policy action, but not the strength of the action. When we estimate the macroprudential tightening probability, we use a binary variable for the tightening periods and for certain periods more than one policy action is taken or for some other periods the intensity of the action taken is higher than the other periods in question, which might cause some measurement errors. Measurement error related to the intensity of the macroprudential policy actions are commonly mentioned in the literature, therefore one must be wary of the binding effect of this measurement error which is likely to weaken the estimated effect of macroprudential policies.[5] A second limitation is related to the difficulty in completely encountering the potential endogeneity of macroprudential policies. To alleviate such concerns we use a probit model with instrumental variables to extract the macroprudential tightening probability and a GMM estimation within panel VAR, which employs additional dynamic instruments in the empirical framework.

Our paper is related to a large body of literature on the effectiveness of macroprudential tools, but there are few papers that are particularly related to this study. Tillmann (2015) proposes a VAR augmented by qualitative variables (Qual VAR) to estimate the effects macroprudential tightening on the housing market of Korea and conclude that macroprudential tightening is effective in dampening credit growth and reducing the appreciation of house prices. Tovar Mora et al. (2012) examine the role of reserve requirements and other macroprudential instruments with cross-country evidence on how they influence real private bank credit growth and their results show that these instruments have a moderate and transitory effect and play a complementary role to monetary policy. Greenwood-Nimmo and Tarassow (2016) examine the implications of monetary shocks and macroprudential shocks for aggregate financial fragility using a sign restricted VAR with US data and they suggest that combined

[2] Kara (2016a) and Kara (2016b) for detailed information about Turkey's experience with macroprudential polices.

[3] See Aiyar et al. (2014), Akinci and Olmstead-Rumsey (2018), Erdem et al. (2017), Fendoğlu (2017), Bruno et al. (2017), Jiménez et al. (2017), Dell'Ariccia et al. (2017) and Altunbas et al. (2018).

[4] See Lim, Costa, Columba, Kongsamut, Otani, Saiyid, Wezel, and Wu (Lim et al.), Galati and Moessner (2013), Claessens (2015),Cerutti et al. (2017) and Kahou and Lehar (2017) for an overview and the use of macroprudential policies.

[5] See Fendoğlu (2017) for a similar argument.

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