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Responsiveness of monetary policy to financial stress in Turkey☆

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ABSTRACT

The objective of this paper is to investigate whether the Central Bank of Turkey (CBRT) was responsive to financial stress or not during the period 2005m1–2015m10. The study is unique in the sense that CBRT's monetary policy reaction function is augmented with a distinctive financial stress index, i.e. the composite index of systemic stress (CISS). The index pays special attention to the systemic risk component of financial markets by taking into account the cross-correlations between financial market segments. The responsiveness of the CBRT to financial stress is measured by a generic policy interest rate, comprising of the overnight rate, BIST interbank rate and weighted average funding rate. CBRT has publicly announced the change in its policy framework as a response to heightened financial stability concerns after the third quarter of 2010. This study aims to look whether the CBRT's response to financial systemic stress has really changed or not after 2010 by carrying out a subsample regression analysis. The results are further crosschecked with rolling window and interaction dummy regression analysis. The empirical results collected from these econometric exercises indicate that the CBRT's monetary policy was leaning more against financial stress after mid-2010 compared to the previous period.

1. Introduction and literature review

The unprecedented economic recession in the aftermath of the global financial crisis revealed how important it is that central banks step in at an early stage to control for financial risks and mitigate the effects of financial crisis on the economy. Since then, serious academic work has been initiated in terms of monitoring and predicting financial instability, also how early warning mechanisms against financial imbalances should be in place for a timely intervention It is now well understood that, when financial imbalances are left unattended, the accumulation, persistence and unfolding of financial imbalances might gradually lead to a collapse in real economic activity (Hakkio and Keaton, 2009; Brave and Butters, 2011a, 2011b; Cardarelli et al., 2011; Oet et al., 2011; Lo Duca and Peltonen, 2013).

In this context, the notion of modifying the monetary policy strategy of central banks in order to ensure that simultaneously maintaining price and financial stability has lately become a popular discussion among central bankers and academics. Before the global financial crisis, central banks were more inclined to embrace the 'clean after burst' view of financial stability, implying that central banks should disregard financial issues largely and focus solely on price stability. The main argument of this view was that sustaining price stability would be enough to secure both sustainable economic growth and stable financial markets. Central banks need to intervene only if there is a financial crisis and help to clean the markets afterwards. The opposite standpoint of this view is formed by the 'lean against the wind' approach, suggesting that the central bank and monetary policy should be more proactive in containing financial risks and preventing financial crises (Borio, 2009, 2011; White, 2009; Smets, 2013).

As a reflection of these discussions after the global financial crisis, many researchers started to take a closer look into the relationship between monetary policy, real economic activity and financial stress. Bauducco et al. (2008) shows in a DSGE model that monetary policy is sensitive to credit risk. According to the study, when financial instability affects output and inflation with a lag and the central bank has privileged information about credit risk, monetary policy that responds instantly to increased credit risk can trade off more output and inflation instability today for a faster return to the trend than a policy that follows the simple Taylor (1993) rule with only the contemporaneous output gap and

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Bulir and Cihak (2008) address the question whether and how stabilization policies react to financial sector vulnerability. They formulate a testable model of why monetary authorities may decide to conduct loose monetary policy in the face of financial sector vulnerability. Using cross-country panel data estimation, they find support for the hypothesis of deliberately lower policy interest rates when the financial sector appears unstable. This finding is in line with the clean after burst view of central banking.

Castro (2007) analyses whether a forward-looking monetary policy reaction function can be augmented with a financial conditions index containing information from some asset prices and financial variables. This approach is very similar to the exercise carried out in our paper. The results indicate that the monetary behavior of the ECB and Bank of England is best described by a nonlinear rule, but the behavior of the FED can be well described by a linear Taylor (1993) rule. The evidence also suggests that only the ECB is reacting to financial conditions.

In a similar way, Baxa et al. (2011) examine whether and how selected central banks responded to episodes of financial stress over the last three decades. They employ a new monetary-policy rule estimation methodology which allows for time-varying response coefficients and corrects for endogeneity. Their findings are in support of Castro (2007) and suggest that central banks often change policy rates, mainly decreasing them in the face of high financial stress. However, the size of the policy response varies substantially over time as well as across countries, with the 2008–2009 financial crises being the period of the most severe and generalized response. With regard to the specific components of financial stress, most central banks seemed to respond to stock-market stress and bank stress, while exchange-rate stress is found to drive the reaction of central banks only in more open economies.

Milas and Naraidoo (2011) investigate how ECB sets interest rates in the context of both linear and nonlinear policy reaction functions. It contributes to the current debate on central banks having additional objectives over and above inflation and output. Three findings emerge: First, the ECB takes financial conditions into account when setting interest rates. Second, amongst Taylor (1993) rule models, linear and nonlinear models are empirically indistinguishable within sample and model specifications with real-time data provide the best description of in-sample BoE interest rate setting behavior. Third, the 2007–2009 financial crisis witnesses a shift from inflation targeting to output stabilization and a shift, from an asymmetric policy response to financial conditions at high inflation rates, to a more symmetric response irrespectively of the state of inflation.

Martin and Milas (2013) investigate the monetary policy reaction of the BoE for the period 1992–2010 and found that until 2007, the monetary policy can be explained by the original Taylor (1993) Rule. However, a fracture occurred in the subsequent period and the monetary policy regime of the BoE shifted to crisis regime. Since 2007, the monetary policy response to inflation weakens, while the reaction to the output gap has reduced significantly. To explain the structural break in the monetary policy regime, the examination period is created as the weighted average of “financial crisis regime” and “crisis-free regime” periods. These weights reflect the possibility of the occurrence of a financial crisis. In this sense, the crisis-free regime refers to the original Taylor (1993) Rule, while the financial crisis regime indicates a period of low response to output gap, insensitivity to inflation rate and severe financial stress. In this context, even if the actual inflation rate was above the target inflation rate after 2007, contrastingly, financial stress led to a sharp lowering of policy rates in the UK.

To my knowledge, this paper is the first to augment the CBRT policy reaction function with a distinctive financial stress index, i.e. the composite index of systemic stress (CISS), and investigate CBRT's responsiveness to financial stress for Turkey. This exercise is important for two reasons: First, after mid-2010 the CBRT has announced a new policy framework in which it gears up its financial stability role. Therefore, it is reasonable to assume that, since then, it started to pay attention to systemic financial shocks. As financial stress evolves into a systemic crisis it becomes a bigger threat to macroeconomic stability, meaning that CBRT's primary concern, price stability, would be endangered fundamentally. Hence, financial stability has become a goal for monetary policy after 2010 in Turkey (Kara and Başçı, 2011).

Second, the CISS is financial stress index that measures the stress in financial markets in a more complex and comprehensive way other than standard financial stress indicators. In the CISS method, the co-movement of stress in the money, bond, equity, banking and forex submarkets are taken into account by considering the cross-correlations. Thus, compared to an unweighted standard financial stress index, in the CISS method financial stress becomes systemically high when stress level is high in all of the five submarkets and low in reverse situations. This gives the CISS a horizontal perspective in terms of a systemic stress index. The vertical property of the CISS comes from its relationship with real economic activity. The relationship is taken into account by weighting the submarkets according to the relationship between all submarket stress levels with the Turkish industrial production index. The submarket stress level that has a stronger relation with industrial production is considered to have larger weight in the final aggregation of the Turkish CISS (For more detailed information see Section 2 and Çamlıca and Güneş (2016)).

2. Methodology

In this section, the data used in the estimation model is described in detail. Thereafter, the results of the unit root tests are introduced to the reader. Finally, the specification of the model and the estimation method is outlined.

2.1. Data

Monthly data is used covering the period 2005m1–2015m11. All data are taken from the EVDS database and the expectations survey of CBRT. The data generation process for all the time series is carried out as the following:

- ➢ Ex-post Inflation Rate and Inflation Expectations: Ex-post inflation rate is calculated with the following formula: $INF_{expost} = 100^{*}(\log(CPI_t)\text{-}\log(CPI_{\ t\text{-}12})$. One year ahead inflation expectations obtained from the survey is incorporated into the model as appropriate average estimates based on market forecasts ($INF_{forecast}$).
- ➢ Output Gap: We follow Belke and Polleit (2007) and employ the Hodrick-Prescott filter to seasonally adjusted monthly industrial production index using the following formula: $Y_{gap} = 100^{*}$(HP-filter $(\log(IP_t))$).[1]
- ➢ Policy Rate: For the period 2005m1–2010m12, Turkish Lira overnight interest rate (ON) is used as a proxy for the CBRT policy interest rate. For the later period of 2011m1–2015m11, we follow Mahir Binici, Hakan Kara, Pınar Özlü (2016) and generated the policy rate proxy as a generic policy rate calculated by taking the 40% of average funding rate and 60% of BIST interbank rate. Real interest rate is assumed to be constant in

[1] Output gap is a discussion in the Taylor rule literature as a result of the difficulties arising from estimating the output gap in a correct way. For a detailed discussion see Orphanides and Wieland (2012).

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