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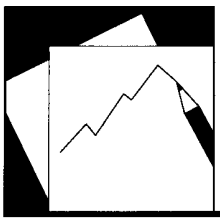

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The Bank Lending Channel of Monetary Transmission: Does It Work in Turkey?

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Does the Bank Lending Channel of Monetary Transmission Work in Turkey?

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Abstract

Does the bank lending channel of monetary transmission work in Turkey? Using the May-June 2006 financial turbulence as an exogenous shock that prompted a significant tightening of monetary policy, this paper examines the loan supply response of Turkey's banks, depending on their balance sheet characteristics. The empirical results indicate that banks can play a role in Turkey's monetary transmission mechanism. Specifically, bank liquidity is found to have a significant effect on loan supply in Turkey. This suggests that the effect of monetary policy in Turkey can be propagated by the banking sector, depending on its liquidity position.

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I. INTRODUCTION

Does the bank lending channel of monetary transmission work in Turkey? The bank lending (or "narrow credit") channel refers to the adverse effect of higher interest rates on bank loan *supply*, which may suppress economic activity if firms and consumers cannot replace completely the "missing" loans with other sources of credit.[2] This effect should be distinguished from the operation of the standard interest rate channel, which prompts a *demand*-driven decline in bank loans due to higher interest rates.

The overall impact of interest rates on economic activity in Turkey is highly uncertain (Central Bank of Turkey, 2006). The uncertainty arises mainly from the structural changes that Turkey has undergone since the 2001 crisis. (These include, among others, the introduction of a flexible exchange rate regime, the recapitalization of the banking sector, and the shift towards an inflation-targeting framework.) Hence, applying econometric techniques to the pre-crisis period is not very informative about how Turkey's monetary transmission works today. At the same time, the post-crisis period is not long enough to allow standard time-series methods to establish definitively how interest rates affect the real economy in the current environment. Nevertheless, a better understanding of Turkey's monetary transmission is important for conducting monetary policy effectively.

The question of whether there is a bank lending channel in Turkey has come into focus recently. In recent publications, the Central Bank of Turkey (CBT) mentions that this channel may have become more important for monetary transmission, as the banking sector has started to perform its intermediation role more effectively (Inflation Report I, 2006). Indeed, the view that the bank lending channel plays a role in Turkey is implicit in the CBT's expectation that the supply of bank credit would subside due to the higher short-term interest rates and liquidity withdrawal following the May-June turbulence (Inflation Report III, 2006). Nonetheless, empirical evidence in support of the view remains scarce.

Establishing the existence of a lending channel in any country is hard for two reasons. First, changes in interest rates usually occur in response to changes in economic conditions, which makes it difficult to recover from the data the pure effect of the interest rate change on economic activity. Second, all channels of monetary transmission tend to work at the same time, which complicates their separate identification. Following an interest rate increase, for instance, bank credit may decline due to either lower demand for loans (the interest rate channel and,

[2] Monetary policy operates through several other channels as well. The *interest rate* channel refers to the negative effect of higher (real) interest rates on consumption and investment. In an open economy like Turkey's, the *exchange rate* channel can also be important, as monetary policy can bring about changes in the level of the exchange rate and, consequently, inflation, trade volumes, and investment. The *balance sheet* (or broad credit) channel can operate through the effect of higher interest rates on asset prices that determine the value of collateral used by firms and consumers to obtain credit.

possibly, the balance sheet channel), or reduced supply of loans (the bank lending channel), or both.

Circumventing most identification problems, this paper addresses the question in the case of Turkey. Using the May–June 2006 financial turbulence as an exogenous shock that prompted a significant tightening of monetary policy, the paper examines the loan supply response of Turkey's banks, depending on their balance sheet characteristics. The key question is whether the effect of monetary policy in Turkey is amplified by the banking sector, depending on its financial position.

The rest of the paper is organized as follows. The next section outlines the theory on the bank lending channel and the existing empirical evidence from developed and emerging market countries, including Turkey. Section III describes the data and methodology used in this paper. Section IV presents the main findings and discusses some caveats. Section V concludes.

II. PREVIOUS LITERATURE

Theory suggests that two key conditions must be satisfied for the bank lending channel to operate. The *first* essential element is that banks should not be able to fully shield their loan portfolios from changes in monetary policy. The presumption is that banks cannot offset completely the decline in liquid funds (due to restrictive monetary policy) by resorting to alternative sources of funding without incurring additional costs. As a result, banks reduce their loan supply. The *second* crucial element is that there is a substantial group of borrowers, firms or consumers, that cannot insulate their spending from the reduction in bank credit. This, in turn, can depress real investment and consumption (Bernanke and Blinder, 1988; Bernanke and Gertler, 1995; Farinha and Marques, 2001). *The remainder of the paper examines whether the first (but not the second) condition holds in Turkey.*

On theoretical grounds, certain types of banks are expected to have loan supply that is more responsive to monetary shocks than others.

Size. As small banks may find it more difficult to raise external funds in times of monetary tightening, they are expected to suffer disproportionately. As a consequence, they may be forced to reduce their lending relatively more than large banks (Kashyap and Stein, 1995, 2000).

Liquidity. As more liquid banks can draw down on their liquid assets to shield their loan portfolios, they are less likely to cut back on lending in the face of monetary tightening. Also, the response of small bank lending could be particularly sensitive to holdings of liquid assets (Kashyap and Stein, 2000; Ashcraft, 2001).

Capitalization. Lending of highly-leveraged banks is expected to be more responsive to monetary policy than lending of well-capitalized banks (Kishan and Opiela, 2000). Following an interest rate increase, bank capital can decline, as the cost of financing rises but the remuneration of banks' assets is mostly unchanged (due to a maturity mismatch). In some circumstances (i.e., if it is close to the minimum capital requirement), a bank may have to

reduce its supply of loans, given that raising equity can be costly. Moreover, even well-capitalized banks may adjust their loan portfolios in expectation of having difficulty meeting regulatory capital requirements in the future (Van den Heuvel, 2001).

The estimation methods used in most previous empirical studies fall into two broad categories. The *first strategy* relies on aggregate data. It usually involves examining the reaction of bank loans, deposits and bonds to monetary policy shocks, using impulse response functions from a vector-autoregression (VAR) model. This setup, however, does not allow the identification of supply and demand effects on credit growth. Therefore, the evidence obtained using this approach is typically treated as suggestive only. The *second strategy* uses bank-level data. It attempts to identify shifts in loan supply from shifts in loan demand. The presumption is that certain bank characteristics determine the degree to which banks respond to monetary policy shocks. The panel regression model usually specifies loan growth for each bank as a function of its lagged values, aggregate variables (GDP growth, short-term interest rate change, and inflation) and bank-specific characteristics (size, liquidity and capitalization). A key identifying assumption is that the reaction of loan demand is homogeneous across banks. Nonetheless, this empirical approach does not address the issue that the change in monetary policy may not be exogenous, which makes it hard to identify the true effect of higher interest rates on loan supply.

In most countries, the empirical evidence in support of a bank lending channel is mixed.

In the United States, Kashyap and Stein (2000) find that small and illiquid banks are more responsive to monetary policy actions. Kishan and Opiela (2000) establish that small banks with low-capital base tend to contract their lending during monetary contractions by more than other banks. Ashcraft (2006) argues that though bank loans are special for small firms, they are not special enough to make the lending channel important for monetary transmission in the United States.

In the euro area, results vary across time and countries. In a case study, Favero, Gavazzi and Flabbi (1999) find no evidence for the bank lending channel following the tightening of monetary conditions in 1992 in France, Germany, Italy and Spain. Subsequent studies for the same countries, however, show that liquidity has a significant effect on loan supply, while capitalization and size don't matter. Liquidity appears to be an important factor in determining the effects of monetary policy in most countries, except Finland and Portugal (Erhmann, et al., 2001). Bank size is found to make a difference in Greece (Brissimis, Kamberoglou, and Simigiannis, 2001) and the Netherlands and Spain (Pizzaro-Barcelo, 2004). In addition, loan supply of well-capitalized banks is less responsive to monetary policy shock in the Netherlands and Portugal (Erhmann, et al., 2001).

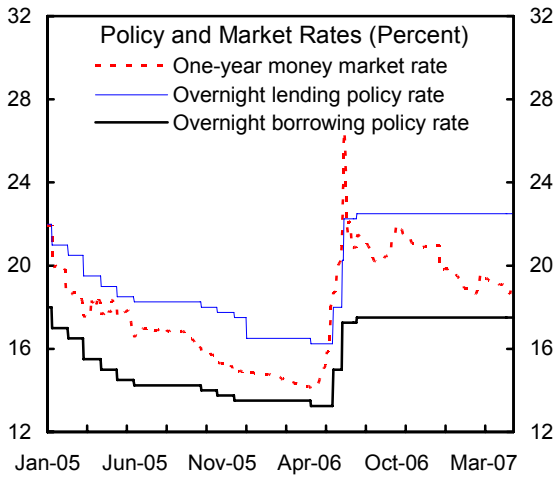
In emerging market countries, there is more support for the bank lending channel. Liquidity is found to insulate loan supply from interest rate shocks in the Baltic countries, though bank size and capitalization don't appear to be important factors (Juks, 2004; Kohler, Hommel and Grote, 2005). Liquidity and capitalization matter in Poland (Havrylchyk and Jurzyk, 2003; Chmielewski, 2005) and Ukraine (Golodniuk, 2006). The same two variables are found to be significant in the Czech Republic, though not during all periods (Pruteanu, 2004). In Hungary

and Chile, all characteristics play a role (Horvath, Kreko and Naszodi, 2005; Alfaro, Franken, Garcia and Jara, 2003).

In Turkey, the empirical evidence on the bank lending channel is scarce. To our knowledge, existing studies cover the pre-crisis period only. Using annual bank-level data, Cavusoglu (2002) finds no evidence in support of a bank lending channel during the 1988─99 period. Based on a different empirical approach, however, Sengonul and Thorbecke (2005) establish that liquidity had an effect on bank supply during the 1997─99 period.

III. Methodology and Data

In a nutshell, our methodology involves exploiting the variation in loan supply across banks following the May─June turbulence. The retrenchment of investors' risk appetite triggered a sell-off of emerging market assets. Though Turkey's financial markets suffered disproportionately, it is reasonable to assume that the May-June turmoil was an exogenous event. In the aftermath of the turbulence, the CBT increased the policy interest rate by 425 basis points and started to actively withdraw liquidity from the system through deposit auctions. This contraction of monetary policy can be viewed as a large, exogenous and persistent shock. Under the assumption that the decline in loan demand was uniform across banks, the variation in banks' responses is used to identify shifts in loan supply.



Sources: Central Bank of Turkey; and Bloomberg.

A "difference-in-difference" approach is adopted to test whether a bank lending channel could be operational in Turkey. The more restrictive monetary policy is assumed to affect loan supply between June and September. Therefore, for each bank and loan type, the loan growth rate is computed as the percentage change from June (before the shock) to September (after the shock). To eliminate any bank-specific effects, the loan growth rate between March and June is subtracted from the June-September growth rate.[3]

Three alternative specifications of the model are estimated. In the first case, the differenced loan growth rates are regressed on bank-specific variables (size, liquidity, and capitalization) as of end-June. In the second case, the same dependent variable is regressed on the *change* in all bank-specific characteristic between end-June and end-March. In the third case, the difference loan growth rates are regressed only on the *change* in the liquidity and capitalization variables

[3] There was little change in policy interest rates during the period.

between end-June and end-March. In other words, the corresponding regression equations take the form:

$$\Delta\Delta l_i^{(s,j),(j,m)} \equiv \Delta l_i^{(s,j)} - \Delta l_i^{(j,m)} = \beta_o + \beta_1 Size_i^j + \beta_2 Liq_i^j + \beta_3 Cap_i^j + \varepsilon_i \quad (1)$$

$$\Delta\Delta l_i^{(s,j),(j,m)} \equiv \Delta l_i^{(s,j)} - \Delta l_i^{(j,m)} = \beta_o + \beta_1 \Delta Size_i^{(j,m)} + \beta_2 \Delta Liq_i^{(j,m)} + \beta_3 \Delta Cap_i^{(j,m)} + \varepsilon_i \quad (2)$$

$$\Delta\Delta l_i^{(s,j),(j,m)} \equiv \Delta l_i^{(s,j)} - \Delta l_i^{(j,m)} = \beta_o + \beta_2 \Delta Liq_i^{(j,m)} + \beta_3 \Delta Cap_i^{(j,m)} + \varepsilon_i \quad (3)$$

where $\Delta l_i^{(s,j)}$ is the percentage change in loans for bank *i* in the period from June to September; $\Delta l_i^{(j,m)}$ is the percentage change in loans for bank *i* in the period from March to June; $\Delta\Delta l_i^{(s,j),(j,m)}$ is the difference between the previous two variables; Liq_i^j is the liquidity ratio of bank *i* as of end-June; $\Delta Liq_i^{(j,m)}$ is the change in liquidity ratios of bank *i* from end-March to end-June; and other variables are defined similarly.

Bank-level balance sheet data are used to construct the variables needed for the empirical analysis. The sample covers all 33 deposit-taking banks in Turkey. The quarterly data are available from the Banks Association of Turkey. For each bank, the dataset contains information on the total loan amount provided by the each bank (as well as the split between short- and medium-term lending and domestic and foreign currency lending). The balance sheet data also allow us to construct the explanatory variables used in the analysis. Size is defined as the logarithm of total bank assets. Liquidity is the ratio of liquid holdings to total assets. Capitalization is defined as the ratio of shareholders' equity to total assets. Additional dummy variables are constructed for ownership status (state, foreign, private) and stock market participation (listed, unlisted).

IV. MAIN FINDINGS

The main findings of this paper can be summarized as follows.

First, *liquidity* has a significant effect on loan supply in Turkey. The positive coefficient of the liquidity variable in all regressions suggests that less liquid banks are more likely to reduce their lending than more liquid banks.

Second*, capitalization* does not have a significant effect on bank loan supply. The coefficient of the capitalization variable is insignificant in two of the specifications and statistically significant only at a 10 percent level in the third. (This could be because our capitalization measure is not an appropriate proxy, given that it is not risk-adjusted.)

Third, the impact of *bank size* is not robust. The coefficient of the size variable is insignificant in one of the specifications and significant (with the wrong sign) in another. [4]

These results provide partial evidence that the bank lending channel of monetary transmission operates in Turkey. In line with previous findings for other emerging market countries, we establish that more liquid banks are less responsive to monetary shocks than less liquid ones. This illustrates that, in addition to loan demand, loan supply is also affected by the tightening of monetary policy. Therefore, one key condition for the bank lending channel to operate is satisfied.

Table. Regression Results

	(1)	(2)	(3)
Liquidity	0.325 (0.158)**	-	-
Capitalization	0.554 (0.326)	-	-
Size	-0.028 (0.018)	-	-
Change in liquidity	-	1.772 (0.571)***	1.224 (0.636)*
Change in capitalization	-	0.286 (0.702)	1.556 (0.849)*
Change in size	-	-0.656 (0.162)***	-
Constant	-0.052 (0.200)	-0.139 (0.031)***	-0.107 (0.041)**
Number of observations	31	31	31

Notes:

1. The dependent variable is the difference between the June-September and the March-June growth rates in total bank loans.

2. Estimation is done using least absolute deviations method.

3. Standard errors are reported in parentheses, * significant at 10 percent level and ** significant at 5 percent level, and *** at 1 percent level.

4. Liquidity is defined as the sumof cash, Central Bank, other financial institutions securities, trading government securities and government securities available for sale, divided by total bank assets. 5. Capitalization is the ratio of shareholders' equity to bank assets.

[4] The coefficients of the ownership and stock participation variables are also not statistically significant across specifications.

The findings are subject to several important caveats. *First*, the overall levels of liquidity and capitalization in Turkey's banking system are still very high in most banks. As such, the estimated effect of liquidity and capitalization on bank lending may not be constant over time. Given the downward trend in liquidity and capitalization at the aggregate level, however, the impact of these variables is most likely to be higher in the future than currently estimated. *Second*, the identifying assumption that all banks face the same loan demand shock could potentially lead to biased results. It is unlikely, however, that banks with lower liquidity have customers whose loan demand is more responsive to interest rate shocks. Therefore, the positive effect of liquidity on loan supply is likely to hold even if the assumption does not hold perfectly. *Third*, the sharp movements in the exchange rate during the May–June turbulence could be an additional factor that affected banks' loan supply.[5]

Our analysis does not prove conclusively that the bank lending channel plays an important monetary transmission role in Turkey. Recall that for this channel to have an impact on real activity, firms and consumers should not be able to substitute completely the loss of bank credit with other sources of finance. Whether this condition is satisfied in Turkey remains an open question. On the one hand, empirical evidence suggests that (large) Turkish firms depend heavily on bank finance (Aydin, et al., 2006). On the other hand, Turkey's economy is still largely cash-based, particularly on the consumer side, suggesting that bank credit may not be as an important source of finance as personal savings and informal (intra-household) borrowing. Therefore, the issue is left for further research.

V. CONCLUSION

This paper suggests that banks do play a role in Turkey's monetary transmission mechanism. In particular, the effect of monetary policy in Turkey can be propagated by the banking sector, depending on its liquidity position. For example, the overall impact of a 100 basis point increase in the policy rate on the real economy may be smaller if banks had very strong liquidity positions. (This is because banks would be less likely to cut back on their loan supply in this case.) Therefore, the overall level and distribution of liquidity across banks should be monitored closely. While incorporating explicitly a bank lending channel in the CBT model is premature, the information on the banking sector could be used as an input to form judgment about the likely impact of future interest rate changes on the economy.

[5] It is worth noting, however, that the June and September balance sheet data are valued at similar exchange rates ($/TRY=1.57 in June and 1.50 in September).

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