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An Empirical Analysis of the Bank Lending Channel in Turkey*

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Abstract

This paper studies the role of banking sector in monetary policy transmission in Turkey covering the period 1988-2009. Specifically, we investigate the impact of monetary policy changes on banks' lending behavior. Given the changes in the policy stance and developments in the financial system following the implementation of structural reforms in the aftermath of the 2000-01 crisis, the analysis is further conducted for the two sub-periods: 1988-2001 and 2002-2009, to examine whether there is a change in the functioning of the credit channel. Based on bank-level data, empirical evidence suggests cross sectional heterogeneity in banks' response to monetary policy changes during 1988-2009. Regarding the results of the pre-crisis and post-crisis periods, we find that an operative bank lending channel existed in 1988-2001, however its impact became much stronger thereafter. Furthermore, there are significant differences in the distributional effects due to bank specific characteristics in the impact of monetary policy on credit supply between the two sub-periods. While the results indicate an operative bank lending channel due to earnings capability and asset quality in the first period, size, liquidity, capitalization, asset quality and managerial efficiency seem to make a difference in the lending responses of banks to monetary policy in 2002-2009.

JEL classification: C23; E44; E51; E52; G21

Keywords: Monetary policy: Transmission Mechanisms; Bank lending channel; Turkey; Panel Data

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1. Introduction

Understanding the transmission mechanism of monetary policy has been the subject of long-standing interest among economists. A relatively recent view of monetary transmission mechanism emerged as the 'credit view' in the light of information asymmetries and any other frictions in credit markets. The credit channel theories incorporate credit markets into the basic framework; such that loans are considered explicitly. In contrast to the money view, credit view assumes that bank loans are unique against other forms of debt, that is; bank loans and bonds are imperfect substitutes. The credit market is characterized by the frictions in the capital market like information asymmetries, agency costs, monitoring costs, transaction costs. These information asymmetries between lenders and borrowers in the intermediated credit market create a gap between the costs of external and internal funding, which is being known as the 'external finance premium'. According to the credit view, monetary policy have an effect not only on the interest rate, but also on the external finance premium, which will influence the investment and spending decisions of firms and households.

One of the sub-channels' of the credit channel, the bank lending focuses more narrowly on the impact of monetary policy on banks' willingness to provide loans. In this channel the central bank can affect the external finance premium by controlling the level of intermediated loans. Contractionary monetary policy, which decreases the deposits of banks, restricts the supply of loanable funds and lowers banks' ability to lend. As a result, bank dependent borrowers, whose external finance premium has increased, cannot raise funds from other sources and accordingly, reduce their investment and consumption expenditures.

Credit market imperfections are key to explain the unique role of financial intermediaries, particularly banks, to alternative financing methods and further, allow for the bank lending channel to be operative for the transmission of monetary policy shocks. Due to the imperfections in the credit markets, banks with different characteristics respond differently to monetary policy shocks since they have different abilities to raise external finance and shield their loan supply. Moreover, still because of these frictions, firms and households have a specific need for bank financing as opposed to alternative external

financing, so that any change in the size and/or composition of banks' balance sheet would have an impact on their investment and production decisions, hence on the real economy.

Along these lines, examining whether monetary policy shocks are transmitted differently by banks with different characteristics is equivalent to investigating whether there exists an operational bank lending channel of monetary transmission. In other words, banks have cross sectional differences that introduce heterogeneity in their loan supply sensitivity to monetary shocks. By using identification through heterogeneity, one can clearly evaluate bank responsiveness to monetary policy shocks and recognize loan fluctuations that emanate from supply changes, but unrelated to loan demand.[1]

This paper investigates the bank lending channel of monetary policy for the Turkish economy by specifically focusing on the role of banks in the monetary policy. There are few studies available that focus on the bank lending channel in Turkey and scarce empirical evidence on this issue shows conflicting results in terms of the effectiveness of this channel.[2] In order to shed light on the issue, this study analyzes differences in the response of banks with different characteristics at the micro level and accordingly, assesses the impact of transmission mechanism of monetary policy through the bank lending channel. In this framework, the study examines the lending behavior of banks operating in Turkey over the period 1988-2009. Moreover, recently Turkey has experienced changes in financial regulations which are expected to affect the bank lending channel. This paper would provide a framework for exploring questions of how these developments may have affected the bank lending channel of the monetary transmission mechanism.

This study presents three novelties with regard to the bank lending channel literature in Turkey. First, the analysis covers a larger time series period than all other studies on this issue. Second, starting in mid 1999- Turkish banking sector entered a novel era with the new regulatory agency and, hereafter it has undergone significant regulatory and structural changes in the aftermath of the 2001 financial crisis. Coupled with the developments in the macroeconomic fundamentals and shifts in the monetary and fiscal policy stance, a change in

[1] See, amongst others, Kashyap and Stein (2000), Kishan and Opiela (2000) for the US case and Ehrmann et. al (2003), Gambacorta (2005) for the Euro area.

[2] See studies examining the bank lending channel in Turkey by using panel data estimation techniques: Çavuşoğlu (2002), Aktaş (2006), Brooks (2007), Kuşakçıoğlu (2010), Aydın and Igan (2010).

the functioning of the credit channel is expectable. Thus, utilizing a larger time series periods provides us a laboratory in analyzing the loan supply response in the sense that 2000-2001 crisis constitute a possible structural break. Accordingly, the sample is divided into two periods as 1988-2001 and 2002-2009, and the model is estimated separately for each sub-period. So that it could be understood whether there exist any time varying characteristics of banks' lending behavior before and after the crisis along with the impact of amendments in the financial regulations on the credit channel. Finally, the study appeals to bank heterogeneity by using bank size and CAMEL type variables as a measure of financial health. CAMEL, which is a supervisory rating system based upon an evaluation of six critical components of bank safety and soundness, stands for capitalization, asset quality, management, earning capability, liquidity. While size, liquidity and capitalization are standard bank characteristics in the literature, a broader measure of financial soundness is used by employing asset quality, management, earnings as additional characteristics.

Based on this framework, the study utilizes dynamic panel data estimation technique, namely dynamic GMM, which specifies size, liquidity, capitalization, asset quality, earnings capability and management efficiency as indicators of bank-specific characteristics, in order to examine the response of banks' balance sheet variables to unexpected shocks for the period 1988-2009. By doing so, the study aims to show if there exists disproportionate lending responses of banks to monetary shocks, which is fundamental to making the case for the credit channel.

This paper is organized in five sections. Following the introduction, section 2 provides an overview of the recent developments in the Turkish economy and banking sector. Section 3 presents the econometric model to be estimated and describes the dataset. The results are discussed in Section 4. Finally, section 5 concludes.

2. Overview of the Recent Developments in the Turkish Economy and Banking Sector

Prior to the 2000-2001 financial crisis, Turkish economy witnessed two decades of chronically high levels of inflation accompanied with volatile economic growth. High public sector deficits and financial climate of fiscal dominance became a major characteristic of the

economy. Huge level of public involvement in the economy led to high real interest rates and low maturities. Added to these were large current account deficits and overvalued Turkish lira. Under these circumstances of macroeconomic instability, Turkish economy experienced successive financial crises in the recent past. Eventually, the economy has been in continuing progress since 2001, as a result of the change in macroeconomic practices of policymaking and a series of reforms.

1990s, which corresponded to the second phase of the Turkey's neoliberal reforms, was characterized by political instability and recurrent financial crisis. During that period, there were high fiscal deficits and in attempt to sustain the deficits, goverments adopted 'hot money' policy of high interest rates on government bonds and appreciation of Turkish lira to attract short term capital flows into the economy. In an environment of macroeconomic instability and weakly regulated financial system, growth of the economy became dependent on speculative short term capital inflows. (Öniş, 2009; Bakır and Öniş, 2010).

In this environment, the banking sector confronted problems stemming from the high public sector deficits, which were largely financed by short-term domestic borrowing, and led to high interest rates on goverment bonds. In line with this, private banks found financing public deficits profitable and consequently, they became vulnerable to changes in the interest rates as the share of government securities in their total assets rose substantially. Moreover, banks started to use the funds that they raised from abroad to purchase goverment securities, which in turn led to an increase in their foreign open positions. The real exchange rate started to appreciate since Central Bank slowed down the devaluation rate in the currency to make the financing of government bonds profitable for banks. As a result, in addition to the interest rate risks, banks were faced with the exchange rate risk as well (Femise Report, 2005). These accumulated risks in the banking sector and major policy errors in financing the deficit prepared the background for the deep banking and currency crisis in 1994. (Arın, 1999; Celasun, 1998).

According to the BAT (1994), financial sector was among the worst affected from the 1994 economic crisis. Accordingly, goverment took severe measures to recover the economy in the aftermath of the crisis. One of them was the introduction of the full deposit insurance system in which goverment provide full guarantee to all savings deposit holders. With this scheme, the goverment aimed to restore confidence in the banking sector. However, this system not only contributed to the development of an unhealthy banking sector with the emergence of adverse selection and moral hazard problems, but also distorted competition

between banks (Femise Report, 2005; Kibritçioğlu, 2005; BAT, 2008). On top of full insurance to deposits, other factors such as lax supervision of banks' actions combined with lack of measures for controlling banks' involvement in riskier projects and allowance to the entry of new depository banks into the system, further contributed to the excessive risk taking behavior of banks during that period.

Among the characteristics of this period was the distortions created by state banks, stemming from their highly politicized lending operations, combined with the lack of regulations to alleviate the special treatment of them against private banks. The goverments have used these banks for several noncommercial purposes such as, agricultural support, income redistribution and industrial, urban and physical infrastructure development, which caused banks to face the so-called 'duty losses', i.e.; unrecovered costs from duties carried out on behalf of goverment. As these losses were not compensated by the Treasury on time, public banks borrowed at very high interest rates with short maturities from the markets in order to fund their duty losses, which in turn, caused high interest rates on interbank borrowing and a contraction in liquidity of the banking sector (Celasun, 1998). Besides, connected lending was another factor that contributed to the unhealthy structure of the banking sector as most of the new domestic entry into the sector was from large industrial companies establishing their own banks. Moreover, excessive risk-taking behaviors of the banks went on, illegal activities of the banking sector increased, and the system was over-branched and over-staffed in the late 1990s (Kibritçioğlu, 2005). In sum, the sector was far away from risk management and good governance principles during that period.

In the late 1990s, macroeconomic instability and structural deficiencies of the financial system remained intact. Unsuccessful policies of the government in disinflating the economy and solving the problems of public sector imbalances, accompanied with political uncertainty continued. Fluctuations in the international markets and crisis in the emerging markets such as; Russia, Brazil, and East Asia, had significant adverse effects on Turkish economy, causing capital outflows and a slowdown in international trade. In addition to these factors, the existing economic problems, coupled with the two great earthquake disasters, led to a severe downturn in the economy (Altunbaş et.al., 2009).

In December 1999, government started a three-year exchange rate based stabilization program with IMF, which included important structural and institutional reforms. While central to the stabilization program were reducing inflation, solving public sector imbalances and fostering economic growth, a crawling-peg regime and a tight monetary and fiscal policy,

along with a variety of structural measures, were adopted to achieve these targets (Kibritçioğlu, 2005). The program entailed reform of the banking sector among its priorities as well. In 1999, goverment passed a new banking law with the aim of strengthening the banking sector, increasing supervision quality and bringing regulations closer to international standards. According to the new banking law, the Banking Regulation and Supervision Agency (BRSA) was established as an independent regulatory and supervisory body in the Turkish banking sector, whereas the Treasury and the Central Bank shared the bank regulatory and supervisory duties prior to the new law.[3] Hence, political influence removed from the supervision of banks. BRSA took over the management of the SDIF, which was under the authority of the Central Bank as well. Furthermore, the new law introduced higher limitations on single borrowers and related parties, tighter risk management and control, limitations on foreign exchange exposures, and new principles in the calculation of the capital adequacy ratio (Femise Report, 2005; Altunbaş et.al., 2009).[4]

Despite some achievements of the program in a short period of time, Turkish economy underwent two consecutive financial crisis; first in November 2000 and then in February 2001. In November 2000, Turkey experienced rapid financial outflows as a result of the extremely risky position of Demirbank, a medium-sized bank, with large amount of goverment securities in its portfolio (Kibritçioğlu, 2005). After that crisis, standing deterioration in economic conditions, combined with political distress, led to an enormous attack on the Turkish Lira in February 2001, which turned into a devastating currency crisis. After the crisis, the goverment decided to abandon the peg and started to apply floating exchange rate regime.

Following the crisis, the goverment adopted a new IMF-backed stabilization program, *Transition to a Strong Economy*, which targeted to restructure the economy and achieve lasting macroeconomic stability. The strong structural reforms, prudent fiscal and monetary policy backed by floating exchange rate regime and improved social dialogue were the main pillars of the program aimed to increase the resilience of the economy to withstand against external shocks, ensure timely debt repayments and fiscal discipline, prevent further

[3] Operation of the BRSA has been subject to several delays, such that it could not become fully functional until September 2000.

[4] According to the BAT, there were no internationally accepted banking principles, problems in the independent auditing process, differences from international accounting applications, lack of satisfactory transparency and competition, inefficiency in the decision processes of auditing and delays in the improvement of bank management quality, which all had adverse effect on the assessment of the banking sector (Altunbaş et. al., 2009).

devaluation, drop inflation, completion of the financial reforms and support the solvency of the banking sector (BAT, 2008; Altunbaş et.al.,2009).

An integral part of the program was the comprehensive Banking Sector Restructuring and Rehabilitation Program with the purpose of eliminating distortions in the financial system and developing a sound link between the real sector and banking sector. Furthermore, bringing the regulation and supervision of the Turkish banking sector closer to EU and international standards was another aim of the program as well. This program had four main pillars: (i) strengthening the private banks, (ii) operational and financial restructuring of state banks, (iii) resolving the intervened banks, which were transferred to SDIF, (iv) improving the regulatory and supervisory framework. While it is true that implementation of this program imposed substantial burden on the economy, which is estimated to be USD 50 billion, this restructuring program contribute to increase resiliency and supervision quality of the banking sector (Sayılgan and Yıldırım, 2009).

After initiation of the program, the banking sector has undergone a tremendous restructuring process and many weaknesses that were subsisted for long time have been overcome; in the sense that financially weak banks were either taken over by SDIF or merged with other banks, the financial and capital structure of banks were strengthened, state banks were collected under a joint management, and the duty loss practice of state-owned banks was ended. The Istanbul approach, which is a voluntary debt restructuring process, was introduced in January 2002 in order to accelerate the settlement of bad loans and relieve the pressure on banks' financial standing (Kibritçioğlu, 2005; Femise Report,2005). The management of the SDIF was separated from the administration of the BRSA in 2003. Furthermore, in July 2004, the full deposit insurance system, which had given rise to moral hazard problems and unequal conditions of operation among banks, was ended and instead, limited deposit guarantee system was put into effect. In June 2005, some updates in the banking act were approved to bring the banking regulatory framework more closely in line with the international standards. In November 2005, the supervisory system was further strengthened with the new regulations regarding foreign exchange exposures, capital adequacy, internal control and risk management, lending limits, conditions to be met by bank owners, bank ownership control in transfer of shares, consolidated and cross-border supervision of banks, accounting standards for financial disclosure purposes and prudential reporting and loan loss provisioning.

Overall, in the aftermath of the 2000-2001 crisis, Turkish economy has displayed outstanding economic performance. With the structural transformation process, impressive

improvements have been made by the contribution of successful macroeconomic practices of policymaking, political stability and favorable international environment. Economic growth showed a stable and high trend. After three decades of chronically high inflation environment, Turkey has seen inflation in single digits, which was mainly delivered by a combination of the strong commitment in inflation fighting of the newly independent central bank, along with the adoption of floating exchange rate regime and transition to inflation targeting regime. Attained fiscal discipline has brought a reduction in public sector debt and at the same time, public borrowing interest rate has declined, while its maturity structure has become longer. Significant fall in the interest rates, stronger demand for Turkish Lira, rise in foreign capital inflows, reduction in the risk perceptions of the economic actors, and improved confidence in the economy, can be listed as other positive developments during that period.

Since 2002, the bank- based financial system has benefited from the impressive performance in macroeconomic stabilization by increasing confidence in the sector. Turkish banking sector has experienced rapid growth performance following the restructuring program launched after the 2001 crisis. At the end of 20009, total assets of the banking system accounts for 88 percent of total assets of the institutions of the financial sector.[5]

As of end 2009, there are 45 banks in the banking sector, of which 32 are commercial banks and 13 are development and investment banks[6]. This fact reveals the prevalence of deposit banking in Turkish banking sector. While the share of 11 private banks in the Turkish banking sector total assets was 52 percent in 2009, the three state banks, namely Ziraat Bank, Halk Bank and Vakıfbank, retained a substantial share of 31 percent. In line with the changes in the ownership structures, i.e.; the increase in the number of foreign banks, the share of 17 deposit banks fully owned by foreigners rose to 14 percent in 2009 from only 5 percent in 2005. While the share of development and investment banks within total assets in the sector was 3 percent, the share of the Fund-controlled banks remained below 1 percent as of 2009.[7]

While the concentration in the banking sector regularly decreased in the period 1888-2000, many banks had to exit from the sector and the system shrank dramatically as a result of structural problems and the developments after the 2000 and 2001 crises. Accordingly the degree of concentration increased in 2000s compared to 1990s. If one takes Herfindahl-

[5] When CBRT's balance sheet and ISE total market capitalization are included, it is % 59 per cent in 2009.

[6] There are 4 participation banks operating in Turkey, as of 2009. However, they are not included in the analysis due to their different structure and their small share in the banking sector.

[7] During the 2000-2001 cirisis, the most significant decrase was in the number of medium-scale banks, while the number of large and small-scale banks did not show major change (BRSA, 2009).

Hirschman index (HHI), another measure of market concentration, as basis; it is seen that HHI was 913.3 in 2009, suggesting a relative competitive market structure in terms of total assets. However; it could be stated that system's concentration is relatively high, given that the share of the largest five banks in total bank assets was realized about 60 percent in 2009.

The capital adequacy ratio of the Turkish banking sector stood at high levels and was realized as 20.6 percent in 2009. The profitability indicators of the Turkish banking sector have followed a very fluctuating trend during the period 1988-2009. In 1990s, profitability ratios were very high; however, in general, they were not sustainable. In the 1988-2001 period, the average of return on assets (ROA) and return on equity (ROE) ratios were 2 percent and 23 percent, respectively. The ratios have been relatively stable since 2002 due to fall in inflation, improved economic stability, strengthening capital structure and increase in credit demand. As end of 2009, ROE and ROA were 18 percent and 2.4 percent respectively.

3. The Econometric Model and the Data

At first, in order to have a better understanding about the basis of the empirical analysis, we focus on the simplified version of the model for the bank lending channel which is developed by the Ehrmann et. al. (2001) in the spirit of the Bernanke-Blinder (1988) framework.

In particular, we assume that deposits are demanded for transactions motive and in equilibrium deposits *D* equal money *M*, and both depend on the monetary policy *(mp)* as follows:

$$D = M = -\delta(mp) + \vartheta \qquad (1)$$

where other factors that affect the deposit demand except the monetary policy are denoted by ϑ.

The demand for loans of bank *i* (L_i^d) is:

$$L_i^d = \varphi_1 y + \varphi_2 p - \varphi_3 r \qquad (2)$$

with *y* referring to real aggregate output, *p* to price level and *r* to loan interest rate.

The supply of loans of bank i (L_i^S) depends on the amount of deposits (hence, loanable funds) *D* available, interest rate on loans *r* and the monetary policy rate *mp*, which can be modelled as:

$$L_i^S = \varphi_4 D_i + \varphi_5 r + \varphi_6 mp \quad (3)$$

Here, the monetary policy stance has both direct and indirect effect on the loans supply function. While the direct effect arises due to the presence of opportunity cost for a bank that uses interbank markets to finance its loans, the indirect impact operates through the amount of deposits available, which depends negatively on the monetary policy rate.

Another assumption is that banks are not equally dependent on deposits as a source of financing, and this dependency is tied on their specific characteristics denoted by X_i:

$$\varphi_4 = \emptyset_0 - \emptyset_1 X_i \quad (4)$$

When we assume that loan market clears and use these equations, we can write the simplified loan supply model as:

$$L_i = ay + bp - c_0 mp + c_1 mpX_i + dX_i + const \quad (5)$$

A significant coefficient c_1 , which interacts the response of bank lending to monetary policy to bank specific characteristic, suggests the existence of a bank lending channel. The essential assumption being that interest elasticity of a banks' loan demand does not depend on bank characteristics, in other words φ_3 should be same across banks.

The empirical specification is a minor modification of the banks' loan supply function in (5) and designed to test whether banks with a different level of financial soundness react differently to monetary policy shocks. Thereby, we interact bank characteristics with the changes in the interest rate, which is the monetary policy indicator, to allow for the differential responses of bank lending to monetary policy shocks.

Instead of modelling level of loans, we model growth rate of bank lending and hence, estimate the model in first differences. This is due to the fact that banks react to a change in the monetary policy by adjusting the new loans. While it is true that the level of loans

approximates the stock of loans, the flow can be better approximated by the first difference (Ehrmann et al., 2001).

The empirical model is therefore expressed by the following equation:

$$\Delta\log(L_{i,t}) = \alpha_i + \sum_{j=1}^{l} \gamma_j \, \Delta\log(L_{i,t-j}) + \sum_{j=0}^{l} \beta_j \, \Delta MP_{t-j} + \sum_{j=0}^{l} \delta_j \, \Delta\log(GDP_{t-j}) + \sum_{j=0}^{l} \vartheta_j \, CPI_{t-j} + \mu X_{i,t-1} + \sum_{j=0}^{l} \theta_j \, X_{i,t-1} \Delta MP_{t-j} + \varepsilon_{i,t} \quad (6)$$

with $i = 1,\ldots, N$ and $t = 1,\ldots,T$ where N is the number of banks, T is the final year and l is the number of lags. L_{it} are the loans of bank i at time t to private nonbanking sectors. *MP* represents the monetary policy indicator, *GDP* denotes the real GDP and CPI is the inflation rate. Bank specific characteristics are given by X_i, which is a matrix of the components of the CAMEL ratios and size. The model further allows for fixed effects across banks, as indicated by the bank specific intercept α_i, which is included to control for other bank specific characteristics that differs across banks but remains constant over time.

In the above equation (6), the growth rate of bank lending, $\Delta\log(L)$, is regressed on changes in the interest rates, ΔMP, controlled by monetary authority, and on its interactions with the bank specific characteristics. As an indicator variable of monetary policy shocks, interest rate changes are used to capture the effect of monetary policy on bank lending. The bank specific characteristics are included and also interacted with the monetary policy indicator in order to identify the differential lending responses of banks with different balance sheet strength. Real GDP growth, $\Delta\log(GDP)$, is added as a control variable to the model to account loan demand movements and effects of macroeconomic developments on bank lending. With better economic conditions, the number of projects becoming profitable in terms of expected net present value increases, which in turn causes a rise in demand for credit (Kashyap et al.,1993). The inclusion of this variable is important since it isolates the monetary policy component of interest rate changes and allows us to truly capture the cyclical macroeconomic movements (Gambacorta, 2005).

As mentioned earlier, the main thrust of this paper is that the overall financial strength of a bank, together with its size, may be important for its ability to shield loan supply from policy induced deposit outflows. Accordingly, we use measures based on CAMEL ratings as a proxy for financial soundness. Indeed, we utilize the components of the CAMEL ratings system rather than using the CAMEL rating as a whole, in the sense that we compute the relevant ratios using data from banks' balance sheets and income statements and, then, include each of them separately as a separate explanatory variable in the regression equations. Accordingly we employ size, capitalization, assets quality, management efficiency, earnings capability and liquidity as bank-specific characteristics in our econometric model.

An endogeneity problem could arise since CAMEL type ratios are based on balance sheet data and if these variables are strongly correlated with each other, it would be difficult to figure out which balance sheet position causes the other. In order to avoid this endogeneity bias, bank specific explanatory variables enter the model with one lagged value. Furthermore, all bank specific characteristics are normalized with respect to their average across all banks in their respective samples, so that they sum up to zero over all observations. This implies that the averages of the interaction terms are zero and the coefficients β_j can be roughly interpreted as the average monetary policy effect on lending of an average bank. On the other hand, in the case of size variable, normalization is not over the whole period, but with respect to the mean of each single period, in order to remove unwanted trends in size (Ehrmann et al., 2001).

Under this framework, the empirical analysis in this paper utilizes annual bank-level and related macroeconomics data covering the period from 1988 to 2009. The sample period starts from 1988, since the balance sheet banking data is available from 1988 onwards. We try to cover the whole period in which consistent data for balance sheet information is available to capture the changes in the lending behavior in two eras of Turkish financial architecture.

We build an unbalanced panel dataset[8], which includes deposit banks, investment and development banks operating in Turkey during the period 1988-2009.[9] Some difficulties

[8] Table A.1. in the Appendix shows the list of banks in the sample and further, provides some information on acquisitions, mergers and exits occurred during the period under consideration.

[9] Since investment and development banks do not take deposits and have a different funding structure than commercial banks, they do not exactly fall into the theoretical discussion regarding the bank lending channel.

emerged when dealing with this dataset. First, accounting and reporting standards have undergone some changes during the period under consideration, which can create inconsistency in the time series of this data set. While this can be a potential limitation of the analysis, we believe that it does not affect our results dramatically. Second difficulty concerns the treatment of data regarding mergers and acquisitions, and outliers in order to maintain consistent panel data set. Under the sample period, a number of banks either merged to or acquired by other banks. Besides, there has been a decline in the number of banks due to failures as a result of restructuring process during decade. For the analysis, we include those banks that had been subject to mergers and acquisitions or failures in order to minimize the so-called survivalship bias. Moreover, we discard any bank year observation with credit growth higher than 200 percent in order to eliminate the impact of mergers and acquisitions in line with Aydın and Igan (2010). Furthermore; we discard those banks from the sample which existed for less than five years during the period under consideration. Finally, we apply an outlier rule to the variables of interest, which allows us to drop observations which contain extreme values.

Other than the bank-level data, we use macro variables, which are collected from the *International Financial Statistics* and *World Economic Outlook* publications of the IMF. The challenge in choosing best measure of monetary policy stance in Turkey is that monetary policy conduct has undergone several changes during the period analyzed here. During the 1990s, Turkish monetary policy can be characterized by a pegged exchange rate regime, in which the exchange rate was the main policy instrument to control inflation. In the aftermath of the 2000-2001 financial crises, monetary authorities adopt inflation targeting program and introduce flexible exchange rate regime as a part of the structural transformation process. More specifically, the transition to inflation targeting began in 2002 with an implicit inflation targeting program and completed by 2006 when the monetary policy conduct incorporates the practice of a fully fledged inflation targeting regime. With this policy shift, an explicit inflation objective takes place of targeting the domestic monetary aggregates. This policy framework, in which interest rates are adjusted in response to deviations of inflation from a targeted path, puts the Central Bank of Turkey's short term interest rates to be in the forefront of monetary policy (Başçı et.al., 2007).

However; we still include them into our analysis because although not very large, they extend considerable amount of credit in the system, being important competitors of deposit banks in that sense. Furthermore, their inclusion is favorable for the strength of econometric analysis as they increase degrees of freedom. Nevertheless, the model is estimated separately for the deposit banks as well.

When we look at the preceding literature regarding the choice of monetary policy variable, Bernanke and Blinder (1992) support the short term interest rate under the control of central bank as a good measure of monetary policy shocks. Accordingly, most empirical studies on US use Fed Fund rates as the monetary variable, while others on European economies and emerging countries utilize central bank repo rates or short-term money market rates, irrespective whether countries conduct inflation targeting regime (Juurikkala et.al,2011). As a result, we use the money market interest rate as the main monetary policy indicator in our analysis in line with much of the previous literature and consistent with the Turkish monetary policy.

Except for the monetary policy indicator, the other macro variables employed in the analysis are the real GDP growth for output growth and average CPI series for inflation. Figure A.1 in the Appendix A illustrates time series of the macro variables.

The bank specific characteristics, which are utilized in our econometric model, can be stated as follows: SIZE, the log of total assets (size), CAP, shareholders' equity to total assets ratio (capitalization), QUAL, loans under follow-up to total loans ratio (asset quality), MANG, real net income to number of branches ratio (management efficiency), EARN, net profit to total assets ratio (earnings capability), LIQ, liquid assets over total assets (liquidity).

Table 1 provides summary statistics of these ratios for the whole data set under the period analyzed. Summary statistics of the regressors are further reported for the two sub-periods 1988-2001 and 2002-2009 in Table 2.[10]

Table 1. Descriptive Statistics for the period 1988-2009

Regressors	Observations	Mean	Standard Deviation
SIZE	1241	3.785	3.651
CAP	1208	13.708	12.884
LIQ	1211	42.662	19.270
EARN	1229	2.710	5.500
QUAL	1222	12.341	40.860
MANG	1204	0.047	0.105

[10]Tables summarize the data after corrupt observations are controlled for.

Table 2. Descriptive Statistics for the periods 1988-2001 and 2002-2009

1988-2001

Regressors	Observations	Mean	Standard Deviation
SIZE	904	2.452	3.121
CAP	892	11.443	11.083
LIQ	889	43.704	18.970
EARN	894	3.020	5.853
QUAL	885	11.364	36.711
MANG	875	0.048	0.104

2002-2009

Regressors	Observations	Mean	Standard Deviation
SIZE	337	7.360	2.330
CAP	316	20.100	15.270
LIQ	322	39.790	19.820
EARN	335	1.883	4.314
QUAL	337	14.904	50.122
MANG	329	0.044	0.107

4. Estimation Results and Discussion

To assess the role of banks in the monetary policy transmission in Turkey for the period 1988-2009, we estimate the equation (6) by using the generalized methods of moments for dynamic panel data put forward by Arellano and Bond (1991).[11] In the presence of bank-specific fixed effects and possible endogeneity of regressors, GMM estimators would provide efficiency and consistency given that the model is not subject to second-order serial correlation and chosen instruments are valid. The key results of the study[12] are reported in Table 3**,** which presents the estimated long-run coefficients, their standard errors and the mis-specification test for the regressions. The analysis is conducted both for the whole period 1988-2009, and for the sub-periods 1988-2001 and 2002-2009. The estimation results of each

[11] We also consider two-step estimation in system GMM; however estimates of our model in difference GMM have a better fit in terms of coefficients significance and provide better statistical diagnostics. Furthermore, Difference-Sargan test statistics rejects the validity of the additional moment conditions used in the system GMM estimations.

[12] All empirical analyses in this study are done with STATA version 10.

period are presented in each column in the table. While covering the whole period may fail to capture unique dynamics of the pre and post-crisis periods, we still conduct our analysis for the period 1988-2009 for a preliminary insight into whether the growth of bank loans responds to monetary policy changes.

Table 3. Regression Results

Dependent variable; annual growth rate of lending (ΔLt)	(I) Sample period 1988-2009		(II) Sample period 1988-2001		(III) Sample period 2002-2009	
	Coefficient	**S.E**	**Coefficient**	**S.E**	**Coefficient**	**S.E**
MP	-0.125***	0.019	-0.232***	0.023	-0.375**	0.203
GDP	0.209***	0.087	3.529***	0.126	1.344***	0.582
CPI	-0.422***	0.495	-2.025***	0.179	-0.528	0.136
SIZE	-12.406***	0.709	-11.711***	0.559	-12.335***	4.191
CAP	0.543**	0.29	1.745***	0.215	0.324**	0.229
LIQ	1.094***	0.052	1.364***	0.135	0.625***	0.125
EARN	0.177	0.436	0.558***	0.236	-1.629***	0.299
QUAL	0.495***	0.038	0.434***	0.028	0.443***	0.165
MANG	8.52	25.82	14.682	34.8	274.445***	48.5
SIZE *MP	0.061***	0.005	-0.02***	0.009	0.134***	0.042
CAP*MP	-0.004**	0.002	0.003	0.002	0.124***	0.011
LIQ*MP	-0.001	0.001	-0.009***	0.001	0.021***	0.007
EARN*MP	0.002	0.101	0.016***	0.007	0.024	0.037
QUAL*MP	0.004***	0.001	0.006***	0.001	0.017***	0.007
MANG*MP	0.266	0.668	0.048	0.563	10.21***	3.01
Number of observations	854		586		197	
Sargan test (p-value)	0.917		0.865		0.228	
AR (1), AR (2) (p-value)	0.008	0.275	0.00	0.929	0.008	0.140

Note: * Significance level of 10%

** Significance level of 5%

*** Significance level of 1%

The first column presents the estimated coefficients of the baseline model for the whole period 1988-2009. The response of growth rate of bank loans to a monetary policy shock has the expected negative sign. The significant coefficient of real GDP indicates that the change in economic activity have a positive effect on bank lending. The coefficient of inflation is significant, but has negative sign, which is contrary to our apriori expectations. Except earnings capability and management efficiency, we find significant linear relationship

between bank characteristics and the growth rate of loans in this period. While capitalization, liquidity and asset quality seem to influence bank lending positively, size impinges negatively on growth rate of loans. As regards with the distributive effects of monetary policy on bank lending, we detect size and asset quality to be the sources of asymmetric response of banks to monetary policy stance, since the interaction coefficients of these characteristics with the changes in the interest rate is positive and significant. The coefficient of interaction between capital and changes in monetary policy has statistical significance, but the direction of the relationship is opposite of what we expected according to the bank lending channel literature.

The second and third columns summarize the results of estimating the baseline model for sub-period 1988-2001 and sub-period 2002-2009 respectively. Our results reveal considerable differences in terms of magnitude and direction of coefficients between the two-sub periods, which indicate that there are major differences in the reactions of different types of banks to monetary policy shocks. However, it should be noted that we cannot quantify the effects of monetary tightening on the lending of banks with different characteristics by using these point estimates; we can just utilize them to compare such effects between the two periods.

First of all, the estimation outcomes suggest a significant linear negative relationship between monetary policy changes and loan growth in both periods. So consistent with the bank lending channel, a tightening of monetary policy leads to an expected decrease in the growth rate of loans. When we compare the long run effect of monetary policy on the average bank between the two periods, we see that the magnitude of the estimate of β is larger for the period 2002-2009. In particular, for the first period, the estimated coefficient implies that a 1 per cent increase in the interest rate leads to a decrease in the growth of loans by 0.23 per cent, whereas, the corresponding estimate implies a decline in loan growth by 0.37 per cent for the second period. Therefore, our results suggest a considerably stronger impact of monetary policy changes on the growth rate of loans for the 2002-2009 period, which is confirms our prior expectations.

This stronger influence of the monetary policy in the second period has several concurrent explanations. After the financial crisis of 2000-2001, there have been a number of significant regulatory and structural changes in the Turkish banking sector. One may expect that the deregulation of the financial system might lessen the sensitivity of banks' lending responses to policy changes and hence, reduce the scope of an operational bank lending

channel. Since it is the opposite for Turkish case, we expect to see an increase in the scope of the bank lending channel in the second era due to increased regulation.

First of all, following the deep financial crisis of 2000-2001, the effectiveness of monetary policy has increased as a result of the change in monetary policy regime and improvements in the economic fundamentals. Not only transition to the inflation targeting and the introduction of the floating exchange rate regime, but also weakened fiscal dominance, diminished dollarization and reduced exchange rate pass-through to prices have enhanced the effectiveness of monetary policy. The new of role of interest rates as a policy tool, coupled with a more responsive aggregate demand to real interest rates have brought about an increase in the effectiveness of monetary policy (Başçı et.al.,2007).

Furthermore, the post-crisis era was a turning point for the Turkish banking sector with the ongoing radical structural transformation process. During the 1990s, Turkey adopted a 'hot money' policy of high real interest rates for treasury bills and domestic currency appreciation to attract short-term capital to finance the high public sector deficit. Under these circumstances, the banking sector concentrated more on government deficit funding through large, open foreign positions which provide lucrative profits to them. Both public and private banks channelled their funds mainly to the government debt instead of corporate lending and this domestic debt finance policy dynamics has led to the dominance of public debt instruments over the financial market (Bakır and Öniş, 2010). Besides putting fiscal pressure on the money markets, fiscal dominance also constraints the implementation of an independent monetary policy. As a result, the heavy reliance of domestic borrowing associated with the absence of an effective monetary policy have caused the crowding out of private investment by government public debt (Çavuşoğlu, 2002; Bakır and Öniş, 2010). Moreover, Turkish banking sector was associated with a high degree of politicization of bank lending and regulation, which resulted in poor supervision and regulation of the sector during this period (Bakır and Öniş, 2010). In sum, banks focused to finance the state in an environment of macroeconomic instability and underdeveloped regulatory and supervisory infrastructure during the first period which explains the weaker transmission of monetary policy to bank lending.

However, these conditions have alleviated in the post-crisis era with the launch of the comprehensive economic programme. During the second period, not only were reforms aimed at restructuring banking and public sector going on, but the banks also started to operate in the new regulatory environment with the establishment of Banking Regulation and Supervision

Agency (BRSA). This structural transformation process, which involved measures aimed at restructuring state banks and putting pressure on banks for recapitalization, led to an increase in the profitability of banks and reduced the fragility of the sector in terms of its ability to withstand the shocks. These remarkable developments in the banking sector, coupled with a decline in real interest rates, inflation and budget deficits, caused an increase the supply of loanable funds. As a result, banks have started to perform their intermediation role more effectively, as they focus more on the provision of credit to households and firms, rather than to finance government expenditures, in the aftermath of the 2000-2001 financial crisis.

The results show that the effects of real GDP on lending have the intuitively expected positive sign in both periods. Hence, bank lending moves in the same way with macroeconomic trends. However, regarding the difference between the two sub-periods in the impact of macroeconomic conditions on the growth rate of loans, we find a stronger influence of GDP growth in the first period unexpectedly. This might be in line with the explained structural change in the sector. As the banking sector become more operative and move toward its role as a financial intermediary in 2002-2009 period the sectors' lending behaviour become more supply oriented than demand driven, thus the coefficient of GDP is smaller in this period. However, in the 90s the sectors' main role was to finance government deficits which explains the larger coefficient of the GDP variable.

As regards the impact of the inflation rate between the two periods, it has a significant coefficient only in the first period, but with a negative sign. This could stem from the chronically high inflation rates and hence, higher uncertainty prevailing during the 1988-2001 period.

The estimation results are meant to show several features of the loan supply of response of Turkish banks, depending on their balance sheet characteristics. In addition to analyzing how financial strength of banks help banks to mitigate the effects of monetary policy shocks, we also examine the direct relationships between bank strength and lending activity in order understand the importance of banks characteristics for the transmission of monetary policy, i.e. whether they matter for bank lending or not. The outcomes not only reveal the key differences in terms of magnitude and significance of the relationships between growth rate of loans and the bank characteristics, but also of the distributive effects of the monetary policy on the bank lending due to these varying bank characteristics between the two sub-periods.

Based on our estimation results, there exists a significant linear negative relationship between bank size and growth rate of loans, which is of similar magnitude, in both sub-periods. This negative coefficient suggests that small banks lend more. This could stem from the presence of relationship lending, where there are strong lending relationship between small banks and small firms. In that case, small banks shelter their clients better from the effects of adverse shocks. As regards the distributive effects of monetary policy, results show a significant interaction coefficient but of opposite sign for the two sub-periods; namely, it has a negative sign for the first period and positive for the second. This means that in the first period, the larger the bank, the stronger its lending reacts to monetary policy shocks and in the second period, the smaller the bank, the more its loan supply was affected by the event of monetary policy changes. In the period 1988-2001, the interaction of bank size with monetary policy has incorrect sign, suggesting that monetary policy does have a greater impact on the lending of large banks. This is contrary to the expected result in the bank lending channel literature, and it could be interpreted as that bank size is not relevant in capturing the monetary policy effects on bank lending for that period. On the other hand , the positive coefficient of the interaction term in the second period is consistent with the lending channel story, which presumes that lending volume of larger banks are less sensitive to monetary policy conditions than that of smaller banks, i.e. large banks buffer to monetary policy shocks. Therefore, it could be concluded that there exist cross-sectional differences in the response of lending to monetary policy shocks resulting from differences bank size in the 2002-2009 period.

Concerning the relationship between capitalization and the growth rate of loans, the estimation outcomes reveal that capitalization has explanatory power in both periods. The degree of capitalization has a supportive effect on the lending of banks, especially for the first period, where the coefficient has a surprisingly higher magnitude than that of the second period. On the other hand, capitalization affects the banks' reaction to a monetary policy impulse only in the second period due to the positive and significant coefficient of the interaction term. This result is consistent with theoretical predictions of the bank lending channel literature, since bank capital provides a signal about banks' creditworthiness and less capitalised banks, which would be perceived as riskier by the borrowers, suffer a higher degree of asymmetric information problems in the credit markets and are less able to shield their loan supply in the wake of changes in the interest rates. Accordingly, banks with high capitalization ratios are less likely to cut back their loan supply in response to a change in

monetary policy stance. This finding indicates the presence of a bank lending channel of monetary policy operating through banks' degree of capitalization in the post-crisis period. On the contrary, the interaction coefficient turns out to be insignificant, suggesting no evidence on the distributional effects of monetary policy due to capitalization in the first period. This could be explained by the undercapitalization of Turkish banking sector prior to the 2000-2001 financial crisis. Moreover, one of the conditions for bank capital to have an impact on lending is that breaking the minimum capital requirement should be costly and accordingly, banks tend to limit the risk of future capital inadequacy (Van den Heuvel, 2002; Gambacorta and Ibanez, 2011). This does not seem to hold in Turkey for the first period, as banks do not comply with the limit of capital adequacy regulations and as a result, capital constraints do not restrict their lending supply. However, in the second period this does not apply, since banks have improved their capital structures as a result of implementation of the Bank Capital Strengthening Programme, which required banks to reach 8 per cent capital adequacy ratio. Therefore; our results regarding capitalization, which suggest a change in the way bank loans respond to changes in monetary policy stance between the 1988-2001 and 2002-2009 periods, is relevant; since different regulatory requirements coupled with the change in enforcement of them have altered the effective capital constraint in the post-crisis era.

In both sub-periods, the coefficients on the liquidity ratio are positive and significant; suggesting that highly liquid banks are more likely to expand their supply of loans than less liquid banks, which is in line with the standard expectations of the bank lending channel literature. However, liquidity is found to have a stronger effect on loan supply during the 1988-2001 period, which is explicable by the decline in the liquid assets of the banking sector following the restructuring process. Banks could avert from liquidity and interest rate risk by holding higher liquid assets in their asset portfolio, which, in turn, enable them to provide new loanable funds at lower cost. In line with the increased confidence in the economy and improvements in sources of funding, banks have decreased liquid assets in their portfolio during the post-crisis era. This fact also signals the increase in the liquidity risk in the second period compared to 1988-2001 period. While interaction between liquidity and monetary policy indicator is statistically significant in both periods, it turns out to be unexpectedly negative in the pre-crisis period. This finding could result from the risk aversion motive of banks during that period. In this case, banks choose to hold higher level of securities not to serve as buffer stocks to cushion the adverse effects of interest rate shocks, but to protect

themselves against a greater risk. On the other hand, for the second period, positive significant coefficient of the interaction term suggest buffer stocking behaviour, in the sense that banks with high holdings of liquid assets could shield their loan supply in the wake of monetary tightening simply by drawing dawn their cash and security stocks. This means that less liquid are less able to shield their loan portfolio and more likely to reduce their lending in response to the interest rate shock, which points to an operative bank lending channel in the 2002-2009.

The estimations show a significant linear effect of earnings capacity on the growth rate of loans in both periods, but the direction of the relationship is the opposite of what we have expected in the second period. The coefficient estimate of earnings in the first period suggests that this measure of financial strength has a positive impact on the lending of banks. On the other hand, the coefficient estimate is negative and significant in the second period. This could stem from the fact that banks may have preferred to shift from traditional loan activities to different businesses such as commission and fee based activities for income generation during the post-crisis period. The increase in non-lending operations and non-interest income activities provide banks with additional sources of revenue and as a result, the importance of the traditional loan market as a source of income has lessened. This diversification in banks' earnings is a relevant factor in influencing banks' ability to supply credit in the second period. Regarding with the distributive effects of monetary policy, the outcomes of the estimations reveal that earnings make a difference among banks in their reaction to monetary policy shocks only in the first period. Banks with higher earnings potential and higher franchise value are less likely to suffer from asymmetric information problems in the credit market, so we expect those banks to be less prone to monetary policy. Consistent with this expectation, positive and significant coefficient in this sub-period indicates that financially strong banks with high earnings ratios display weaker loan adjustment in the wake of interest rate changes. However; we fail to find such a significant impact in the period 2002-2009, although the sign of the coefficient of interaction term is as expected.

The coefficients characterizing the linear relationship between asset quality and the growth rate of loans are significant and have correct positive sign for the two periods. They are as of same magnitude in the two periods as well. According to estimation results, asset quality seems to have an impact on lending reaction to monetary conditions in both periods, but with a slight more intensity in the second period. Since banks' asset quality is perceived as an indicator of default possibility by the market, the positive coefficient of the interaction of this characteristic with the monetary policy reveals that banks with better loan portfolios have

a better ability to raise external funds and, in turn, shield their loan supply following a monetary tightening. In other words, banks with high asset quality portfolios are less prone to the effects of policy shocks in both sub-periods.

Based on our estimation results, only in the post-crisis area do managerial quality affect the growth rate of bank loans and explain the effect of monetary policy on lending. Management quality is not an important factor in the first period, since both the coefficients of management and its interaction with monetary policy lacks statistical significance although the signs are as expected. This result is not surprising given the poor governance structure of the banking sector before the initiation of the banking restructuring programme. Underdeveloped regulatory and supervisory frameworks and a high degree of politicization of bank lending can be argued as the defining characteristics of the Turkish banking sector prior to 2000-2001 crisis. The sector suffered from moral hazards problems created by the poor regulatory and supervisory infrastructure, inadequately efficient audit activity, corporate governance failures and the full coverage deposit insurance system during that period. State banks' decision making is highly motivated by political factors, such as subsidizing political constituencies and agriculture sector, which caused the so-called 'duty losses'. Moreover, public banks did not have to comply with many of the regulations applied to private banks and did not have to provide reserves for bad loans, which caused further distortion in the sector.

On the other hand, in such a highly politicized bank lending environment, private banks displayed another kind of rent seeking behaviour. As an overwhelming majority of commercial banks were owned by families or industrial groups owned by families, they directed a considerable amount of their funds toward their companies as a result of the lax connected lending rules (Bredenkamp et.al., 2009; Bakır and Öniş, 2010). This politicization process combined with the weak regulatory supervision and legal framework resulted in poor risk management mechanisms and corporate governance practices of the banking sector. However, with the establishment of the Bank Regulation and Supervision Agency and initiation of the banking restructuring programme the sector has underwent through a great deal of rehabilitation and recovery and as a result, banking environment has improved significantly and started to operate in a strong regulatory framework in the post-crisis period. During this period, not only new corporate governance principles are introduced, but also full deposits insurance system is replaced by the limited coverage insurance system. Therefore; our estimation results regarding the management quality is relevant when these improvements are taken into account.

For the 2002-2009 period, the significant linear positive relationship between management efficiency and growth rate of loans implies that financially sound banks with high managerial quality can manage risks of new lending and re-allocate more funds to provision of credit in the next period. As regards the distributive effects of monetary policy, the positive interaction term in the post-crisis period reveals that banks with high managerial quality suffer from less information friction in the financial markets, face a lower cost in raising external funds accordingly, and do not have to restrain their lending following monetary policy tightening. This provides evidence for the existence of the bank lending channel operating through management quality in this period. However, the results regarding the managerial ability should be viewed with more caution, since the standard errors for the parameters are slightly large, which could stem from the indicator we used for management component.

As a robustness check, we estimate an alternative specification where all macro variables are replaced by a complete set of time dummies. We include one lag of the loan growth, contemporaneous and one lag for all other variables. The coefficients of the interaction terms between monetary policy and bank specific characteristics are similar in both models, so we do not report those estimation results. Since the estimated coefficients in the model with time dummies do not change very much, it could be concluded that our model captures time effects quite well and this provides further support for the results of our baseline model. Furthermore, we estimate the model just for the deposit banks, since they are more directly related to the theoretical discussion regarding the bank lending channel. Still the results do not vary drastically, thus we do not report the results for brevity.

5. Conclusion

This paper investigates the role of banks in the monetary transmission mechanism in Turkey for the 1988-2009 period, by exploring how bank specific characteristics affect banks' loan supply and their ability to raise external finance and insulate that supply from the effects of monetary policy shocks. Given the regime change in the financial system following the implementation of structural reforms and shift to inflation targeting regime in the aftermath of the 2000-2001 crisis, the analysis is further conducted for the two sub-periods: 1988-2001 and 2002-2009.

Building on micro level data on the Turkish banking system covering the period 1988-2009, the study examines whether monetary policy shocks are transmitted differently by banks with different characteristics by utilizing dynamic panel data estimation technique, namely dynamic GMM. We find cross-sectional heterogeneity in banks' response to monetary policy changes, when size, liquidity, capitalization, asset quality, earnings capability and management efficiency are specified as indicators of bank-specific characteristics in our specification. Thus, our results suggest the hypothesis that the bank lending channel exists in Turkey in the 1988-2009 period.

Regarding the results of the pre-crisis and post-crisis periods, we find significant differences in the distributional effects due to bank specific characteristics in the impact of monetary policy on banks' credit supply between the two sub-periods. Empirical evidence indicates that an operative bank lending channel existed in the pre-crisis period of 1988-2001, however its impact became much stronger in the post-crisis era following the transformation process in the economy. The shift to a new monetary policy regime, followed by an increase in the effectiveness of monetary policy, combined with the development of the banking sector in a new regulatory environment and growing macroeconomic stability could account for the increase in the financial intermediation of banks during the 2002-2009 period. While the results point out an operative bank lending channel due to earnings capability and assets quality in the first period, size, liquidity, capitalization, asset quality and managerial efficiency seem to make a difference in the lending responses of banks to monetary policy for the period 2002-2009. These findings have important policy implications for the conduct of monetary policy in Turkey.

APPENDIX

Table A.1. Banks in the Dataset

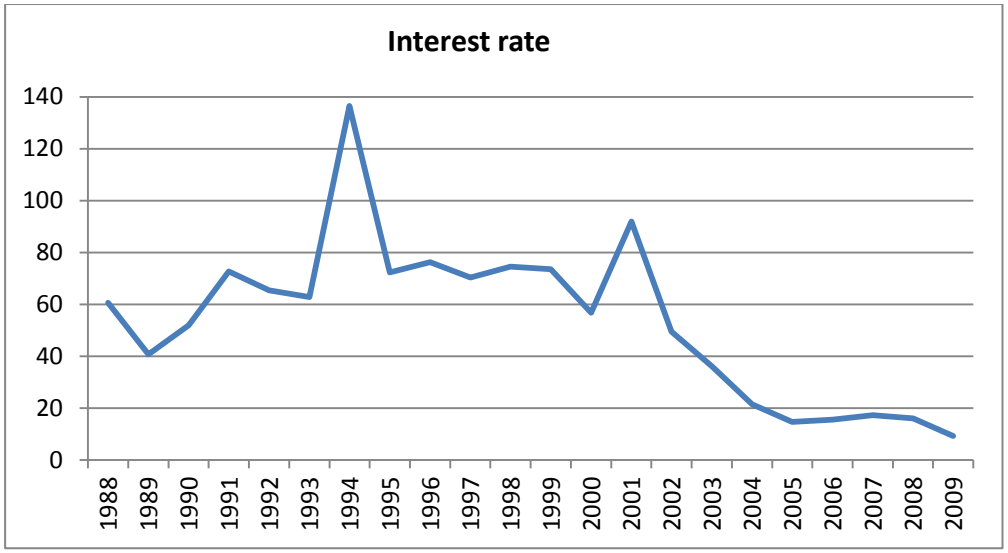
Name of the Bank	Type	Ownership category	
Adabank A.Ş.	Deposit	Domestic private	
Ak Uluslararası Bankası A.Ş.	Deposit	Foreign subsidiary	Acquired by Akbank T.A.Ş in 2005
Akbank T.A.Ş.	Deposit	Domestic private	
Aktif Yatırım Bankası A.Ş.	Development and Investment	Domestic private	
Alternatif BankA.Ş	Deposit	Domestic private	
Anadolubank A.Ş	Deposit	Domestic private	
Arap Türk Bankası A.Ş.	Deposit	Foreign subsidiary	
Bank Mellat	Deposit	Foreign branch	
Bank Kapital Türk T.A.Ş.	Deposit	Domestic private	Merged under the name Sümerbank A.Ş. and dissolved in 2001
Bank Pozitif Kredi ve Kalkınma Bankası	Development and Investment	Foreign subsidiary	
Birleşik Fon Bankası A.Ş.	Deposit	Domestic public	
Birleşik Türk Körfez Bankası A.Ş.	Deposit	Domestic private	Merged under the name Osmanlı Bankası A.Ş. in 2001.
Birleşik Yatırım Bankası	Development and Investment	Domestic private	Dissolved in 1999
Citibank A.Ş.	Deposit	Foreign subsidiary	
Credit Agricole Yatırım Bankası Türk A.Ş.	Development and Investment	Foreign subsidiary	
Credit Lyonnais S.A.	Deposit	Foreign branch	Acquired by Credit Agricole Indosuez Türk Bank A.Ş. (Credit Agricole Yatırım Bankası Türk A.Ş.) in 2004
Demirbank T.A.Ş.	Deposit	Domestic private	Acquired by HSBC Bank A.Ş. in 2001
Denizbank A.Ş.	Deposit	Foreign subsidiary	
Deutsche Bank A.Ş.	Deposit	Foreign subsidiary	
Diler Yatırım Bankası	Development and Investment	Domestic private	
Ege Giyim Sanayicileri Bankası A.Ş.	Deposit	Domestic private	Dissolved in 2002
Egebank A.Ş.	Deposit	Domestic private	Merged under the name Sümerbank A.Ş. and dissolved in 2001
Eskişehir Bankası T.A.Ş	Deposit	Domestic private	Merged under the name Etibank A.Ş. and dissolved in 2001
Etibank A.Ş.	Deposit	Domestic private	Dissolved in 2001
Eurobank Tekfen A.Ş.	Deposit	Foreign subsidiary	
Fiba Bank A.Ş.	Deposit	Domestic private	Acquired by Finans Bank A.Ş. in 2003

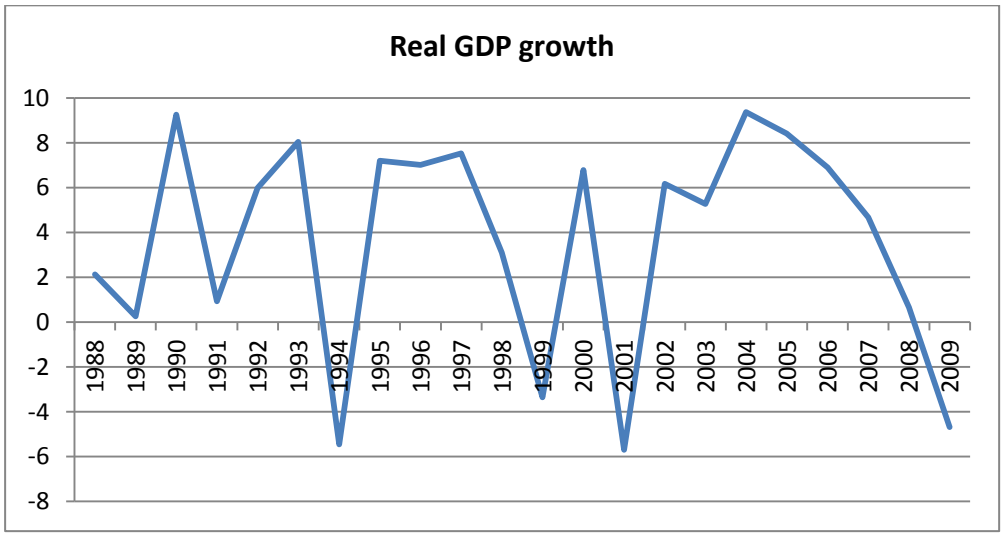
Name of the Bank	Type	Ownership category	
Finans Bank A.Ş.	Deposit	Foreign subsidiary	
Fortis Bank A.Ş.	Deposit	Foreign subsidiary	
GSD Yatırım Bankası A.Ş.	Development and Investment	Domestic private	
Habib Bank Limited	Deposit	Foreign branch	
HSBC Bank A.Ş.	Deposit	Foreign subsidiary	
İktisat Bankası T.A.Ş.	Deposit	Domestic private	Transferred to Bayındırbank A.Ş. (Birleşik Fon Bankası) in 2002
İller Bankası	Development and Investment	Domestic public	
İMKB Takas ve Saklama Bankası A.Ş.	Development and Investment	Domestic private	
ING Bank A.Ş.	Deposit	Foreign subsidiary	
ING Bank N.V.	Deposit	Foreign branch	Dissolved in 2003
İnterbank A.Ş.	Deposit	Domestic private	Merged under the name Etibank A.Ş. and dissolved in 2001
JPMorgan Chase Bank N.A.	Deposit	Foreign branch	
Kentbank A.Ş.	Deposit	Domestic private	Transferred to Bayındırbank A.Ş. (Birleşik Fon Bankası) in 2002
Kıbrıs Kredi Bankası Ltd.	Deposit	Foreign branch	Dissolved in 2000
Koçbank A.Ş.	Deposit	Domestic private	Acquired by Yapı ve Kredi Bankası A.Ş. in 2006
Marmara Bankası A.Ş.	Deposit	Domestic private	Dissolved in 1994
Merrill Lynch Yatırım Bank A.Ş.	Development and Investment	Foreign subsidiary	
Milennium Bank A.Ş.	Deposit	Foreign subsidiary	
Milli Aydın Bankası T.A.Ş.	Deposit	Domestic private	Acquired by Denizbank A.Ş. in 2002
Nurol Yatırım Bankası A.Ş.	Development and Investment	Domestic private	
Osmanlı Bankası A.Ş.	Deposit	Foreign subsidiary	Acquired by Türkiye Garanti Bankası A.Ş. in 2001
Pamukbank T.A.Ş.	Deposit	Domestic public	Acquired by Türkiye Halk Bankası A.Ş. in 2004
Park Yatırım Bankası A.Ş.	Development and Investment	Domestic private	Dissolved in 2000
Sınai Yatırım Bankası A.Ş.	Development and Investment	Domestic private	Acquired by Türkiye Sınai Kalkınma Bankası in 2002
Societe Generale (SA)	Deposit	Foreign branch	
Sümerbank A.Ş.	Deposit	Domestic private	Merged under the name Oyak Bank A.Ş.(ING Bank A.Ş.) and dissolved in 2002
Şekerbank T.A.Ş	Deposit	Domestic private	
Taib Yatırım Bank A.Ş.	Development and Investment	Foreign subsidiary	
Tekfen Yatırım ve Finansman Bankası A.Ş.	Development and	Domestic private	Acquired by Bank Ekspres A.Ş.(Eurobank Tekfen A.Ş.) in 2001

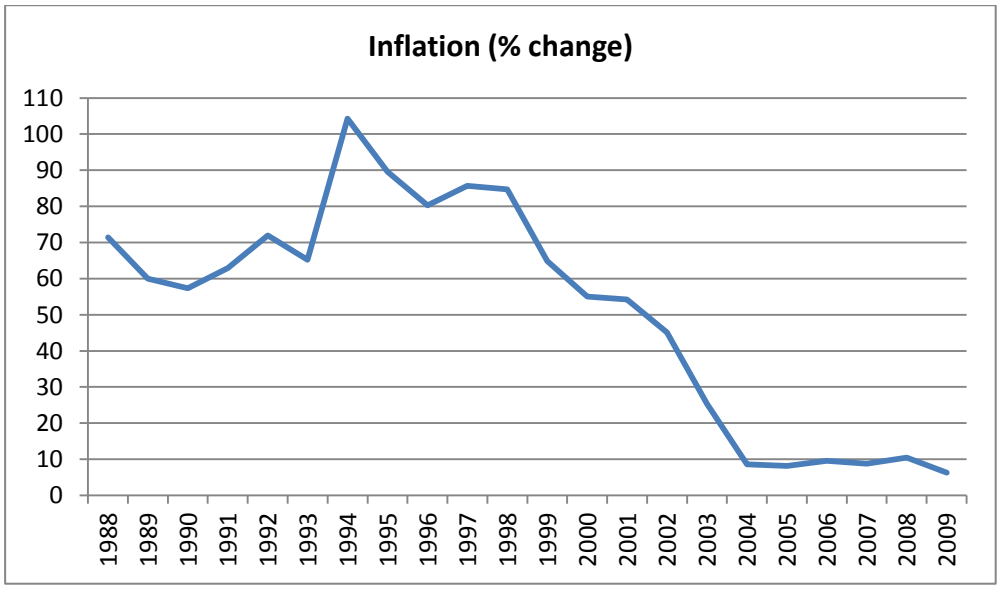
Name of the Bank	Type	Ownership category	
	Investment		
Tekstil Bankası A.Ş	Deposit	Domestic private	
The Royal Bank of Scotland N.V.	Deposit	Foreign branch	
Toprakbank A.Ş.	Deposit	Domestic private	Transferred to Bayındırbank A.Ş. (Birleşik Fon Bankası A.Ş.) in 2002
Turkish Bank A.Ş	Deposit	Domestic private	
Turkland Bank A.Ş.	Deposit	Foreign subsidiary	
Türk Ekonomi Bankası A.Ş.	Deposit	Domestic private	
Türk Eximbank	Development and Investment	Domestic public	
Türk Ticaret Bankası A.Ş.	Deposit	Domestic private	Dissolved in 2002
Türkiye Cumhuriyeti Ziraat Bankası A.Ş.	Deposit	Domestic public	
Türkiye Emlak Bankası A.Ş.	Deposit	Domestic public	Acquired by Türkiye Halk Bankası A.Ş. in 2001
Türkiye Garanti Bankası A.Ş.	Deposit	Domestic private	
Türkiye Halk Bankası A.Ş.	Deposit	Domestic public	
Türkiye İmar Bankası T.A.Ş.	Deposit	Domestic private	Dissolved in 2003
Türkiye İş Bankası A.Ş.	Deposit	Domestic private	
Türkiye İthalat ve İhracat Bankası A.Ş.	Deposit	Domestic private	Dissolved in 1994
Türkiye Kalkınma Bankası A.Ş.	Development and Investment	Domestic public	
Türkiye Sınai Kalkınma Bankası A.Ş.	Development and Investment	Domestic private	
Türkiye Turizm Yatırım ve Dış Ticaret Bankası A.Ş.	Deposit	Domestic private	Dissolved in 1994
Türkiye Tütüncüler Bankası Yaşarbank A.Ş.	Deposit	Domestic private	Merged under the name Sümerbank A.Ş. and dissolved in 2001
Türkiye Vakıflar Bankası T.A.O.	Deposit	Domestic public	
Ulusal Bank T.A.Ş.	Deposit	Foreign subsidiary	Merged under the name Sümerbank A.Ş. and dissolved in 2001
Unicredit Banca di Roma S.p.A.	Deposit	Foreign branch	Dissolved in 2008
Yapı ve Kredi Bankası A.Ş.	Deposit	Domestic private	
Yurt Ticaret ve Kredi Bankası A.Ş. (Yurtbank)	Deposit	Domestic private	Merged under the name Sümerbank A.Ş. and dissolved in 2001
WestLB AG	Deposit	Foreign branch	

Note: The table is based on author's gathering of information on the records provided as of 27 December 2010 by the Banks Association of Turkey. The statute of many banks has been subject to some changes during the period analyzed and these are not reported in the table for the sake of brevity. Accordingly, the ownership category reports the current status for the banks operating as end of 2009, while it is based on the status at time of the exit for the closed banks.

Figure A.1 Time series of Macro Variables







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