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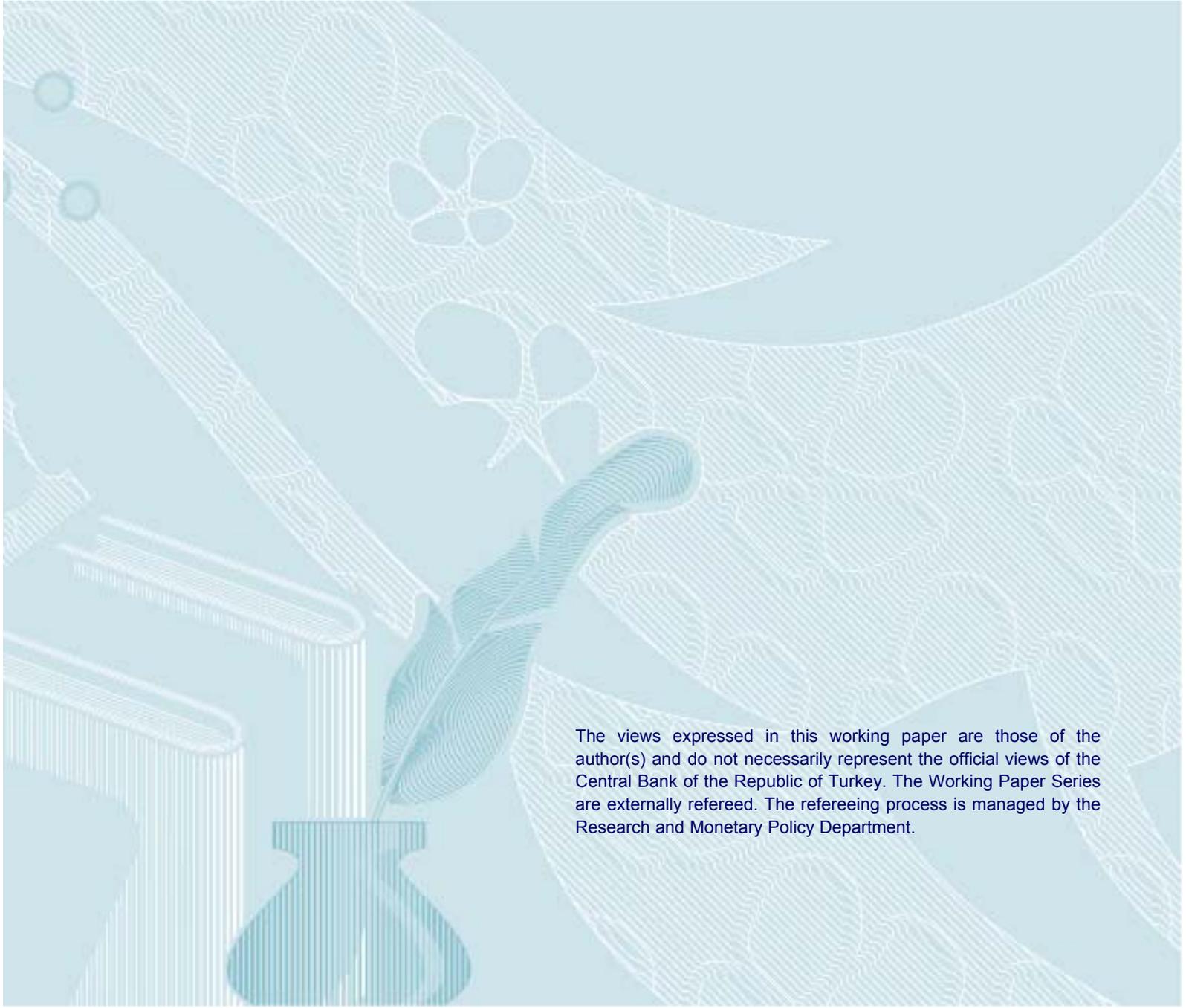
Aytül GANİOĞLU
Vuslat US

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Address:
Central Bank of the Republic of Turkey
Head Office
Research and Monetary Policy Department
İstiklal Caddesi No: 10
Ulus, 06100 Ankara, Turkey

Phone:
+90 312 507 54 02

Facsimile:
+90 312 507 57 33



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THE STRUCTURE OF THE TURKISH BANKING SECTOR BEFORE AND AFTER THE GLOBAL CRISIS

Aytül Ganioglu *

Vuslat US**

ABSTRACT

This paper tests the effects of global crisis on the structure of the Turkish banking sector using bank-level data during 2002Q4-2013Q3 period and employing random effects model. The selected dependent variables are financial ratios on capital adequacy, asset quality, liquidity, profitability, balance sheet and income-expenditure structure; while main determinants are bank-specific control variables on overdue loans, overhead costs, bank size and FX open position as well as dummy variables for bank age, bank listing and ownership. Other determinants include growth, inflation, policy rate, exchange rate and required reserves, which capture the effects of monetary policy and macroeconomic conditions on bank structure. Estimation results suggest that the structure of the Turkish banking sector has indeed changed after the global crisis. This result can be attributed to the increased significance of the monetary policy and changing macroeconomic conditions in the post-crisis period. Meanwhile, bank-specific determinants, which are important before the crisis, are found to have an even accentuated effect on the structure of Turkish banks in the aftermath of the global crisis. For refinement of these results, future research may elaborate on how ownership matters with respect to the changing structure of the Turkish banking sector and may analyze whether banks respond assymmetrically to the global crisis. Prospective studies may also examine the individual aspects of this changing structure. In this regard, profitability and bank lending behavior stand out as major issues to be explored further.

Keywords: Global crisis, Turkish banking sector, Random effects model, Monetary policy, Bank ownership, Profitability, Bank lending.

JEL Codes: C23, E44, E52, G01, G21.

* Central Bank of the Republic of Turkey, Research and Monetary Policy Department. Phone: +90 (312) 5075473, e-mail: aytul.ganioglu@tcmb.gov.tr.

** Central Bank of the Republic of Turkey, Research and Monetary Policy Department. Phone: +90 (312) 5075423, e-mail: vuslat.us@tcmb.gov.tr. The authors would like to thank the anonymous referee for the useful suggestions and invaluable feedback. All views expressed in this paper are solely of the authors and do not represent the views of their affiliated institution. Usual caveats apply regarding errors and omissions.

1. INTRODUCTION

The global crisis in 2008 had major negative effects on all countries around the globe.¹ These negative effects included severe recessions across many countries and an episode of acute financial distress in international capital markets, along with the bail-out of banks by national governments accompanied by the threat of total collapse of large financial institutions.

Turkey was one of the hardest-hit countries by the crisis², yet Turkish banks were relatively less affected by the global crisis compared to their peers in advanced and other emerging market economies. The favorable position of the Turkish banking sector after the crisis was largely owed to the fact that a comprehensive reform package had already been implemented as part of the transition program for strengthening the Turkish economy, which was adopted subsequent to the financial crisis in 2001.³

The implementation of the reform package was successful as it was comprised of a renewed effort to eliminate structural weaknesses that had not been fully remedied by the disinflation program.⁴ More specifically, the banking sector reforms were based on a rather radical approach in dealing with major issues like financial restructuring of state banks, adoption of measures to facilitate the participation of private capital in the strengthening of private banking system, take-over of troubled banks by Savings Deposit Insurance Fund (SDIF) and taking measures for prudential regulation and supervision of

1 The global crisis in 2008 is considered to be the worst financial crisis since the Great Depression of the 1930s. The global crisis was preceded by the U.S. subprime mortgage crisis that was characterized by rising number of subprime mortgage delinquencies and foreclosures and the resulting decline of securities backed by mortgages. The subprime mortgage crisis became visible during 2007 and later resulted in the collapse of several major financial institutions in September 2008, causing significant disruption in the flow of credit to businesses and consumers and leading to the onset of a severe global recession.

2 Real GDP growth registered negative values for four consecutive quarters after the crisis and declined sharply by posting a year-on-year contraction of 15 percent during the first quarter of 2009 (Alp and Elekdağ, 2011).

3 Following the outbreak of the financial crisis in February 2001, which resulted in the collapse of the disinflation program that was conducted under the IMF conditionality, the Central Bank of the Republic of Turkey (CBRT) started to implement the transition program for strengthening the Turkish economy in May 2001 (Ertuğrul and Selçuk, 2001; Kibritçioğlu et al., 2002; Erçel, 1999; CBRT, 2001). The transition program was followed by the implicit inflation targeting regime that was put into effect in 2002. The CBRT began to conduct strict inflation targeting regime in 2006. However, in the last quarter of 2008, the CBRT faced challenges stemming from the global crisis that occurred in September 2008. Consequently, the CBRT promptly took anti-crisis measures, which were later withdrawn in April 2010. Finally, as of end-2010, the CBRT has adopted a new monetary policy framework, which departed from strict inflation targeting by the inclusion of financial stability as a supplementary objective to its primary goal of maintaining price stability (Başçı and Kara, 2011; Başçı et al., 2007; Kara, 2008, 2013).

4 For further information about reflections of the disinflation program on the Turkish banking sector, see İnan (2000a, 2000b, 2004) and Alper et al. (2001a, 2001b).

the banking sector.⁵ Accordingly, with the completion of the reform package, banking sector regulations, especially with regards to effective supervision and surveillance, were brought in line with international standards like Basel II^{6,7} and directives of the European Union (EU)⁸ (See the Appendix for further information about the banking sector reform).

5 Steps for improving regulation and supervision of the banking sector were already taken in 1999. Accordingly, the new banking law, Banks Act No. 4389, was enacted in order to both simplify supervision standards as well as bring these standards in line with EU directives, international practices and core principles stated by the Bank for International Settlements (BIS). In addition, the new law stipulated the establishment of the Banking Regulation and Supervision Agency (BRSA) as an independent entity with the mission “to safeguard the rights and benefits of depositors and to create the proper environment, in which banks and financial institutions can operate with market discipline in a healthy, efficient and globally competitive manner, thus contributing to the achievement of long-run economic growth and stability of the country.” Prior to enactment of Banks Act No. 4389, Board of Sworn Auditors under Treasury was responsible for on-site examination of banks; while the CBRT was in charge of off-site surveillance. However, after the enactment of the new law, the BRSA was assigned as the sole authority for the surveillance of banks. Yet, the BRSA could not be effective until August 2000 due to conflicts in the cabinet about the appointment of the BRSA board members. This prolonged appointment created an ambiguity about the authority in charge of surveillance, thereby imposing the banking sector to further weaknesses.

6 Basel II is the second of the Basel Accords, which are recommendations on banking laws and regulations issued by the Basel Committee on Banking Supervision. Meanwhile, Basel I was agreed in 1988 and adopted in 1993. The implementation of Basel I in Turkey was regulated in 1989 by Communiqué No. 6 related to Banks Act No. 3182. On the other hand, the purpose of Basel II, the principles of which were published in June 2004, was to establish an international standard that banking regulators could use on how much capital banks needed to put aside to overcome financial and operational risks. The Basel II framework was enforced in Turkey with the publication of the BRSA’s Regulation on Measurement and Evaluation of Capital Adequacy of Banks in the Official Gazette of 28 June 2012.

7 The recently experienced global crisis demonstrated that Basel II, the current capital regulation, is inadequate to prevent a panic in the financial sector. Many of the banks that were rescued by governments appeared to be already in compliance with the minimum capital requirements imposed by Basel 2. On the other hand, the current literature shows that stronger capital continues to play an important role on the ensuing debate over how to strengthen regulation (Viñals et al., 2010; Demirgüç-Kunt and Detragiache, 2011; Caprio et al., 2010; Demirgüç-Kunt and Serven, 2010; Merrouche and Nier, 2010). Hence, a consensus was built around formation of a new set of capital standards, Basel III, with the goal of making capital requirements more stringent. Accordingly, in July 2010, the Basel Committee agreed to introduce a Tier 1 leverage ratio of 3 percent on a trial basis. In September 2010, the Basel Committee formulated stronger risk-adjusted capital requirements, according to which the common equity ratio would increase from 2 to 4.5 percent, with an additional counter-cyclical buffer of 0-2.5 percent at the discretion of country supervisors. In addition, the Basel Committee also agreed to oblige banks to hold a capital conservation buffer of an additional 2.5 percent of common equity, bringing the total to 7 percent. Furthermore, the Basel Committee decided to increase the Tier 1 capital requirement from 4 percent to 6 percent, while keeping the total risk-adjusted capital requirement unchanged at the existing 8 percent level. The Basel Committee agreed for all changes to be phased in gradually, with the transition to be completed by 2019. As for Turkey, the preliminary studies for Basel III implementation have started in 2010 and the accord is planned to be incorporated into the national legislation and applied by the BRSA in concordance with the timetable set by the Basel Committee.

8 The first EU banking directive was Directive 77/780/EEC, which was followed by several other directives in the subsequent years. In 2000, the previous EU banking directives were repealed by the issue of Consolidated Banking Directive (2000/12/EC). In the meantime, Capital Adequacy Directive (93/6/EEC) was enacted in order to provide compliance of EU legislation with Basel I Accord. However, on 14 July 2004, the European Commission (EC) proposed the amendment of the Consolidated Banking Directive (2000/12/EC) and the Capital Adequacy Directive (93/6/EEC) in order to introduce a new capital requirements framework for banks and investment firms. On 19 June 2006, the EC announced the adoption of new Capital Requirements Directive that set out rules to apply Basel II in EU with the aim to ensure compatibility of Basel II into EU legislation and make Basel II tailored to reflect specific features of EU

Even though, the implementation of the reform package helped to safeguard Turkish banks from the adverse effects of the global crisis, a question still remains as to whether the structure of the Turkish banking sector has changed in the meantime. A similar question was tackled for other countries in various cross-country and single-country studies (Pomerleano, 2009; Şafaklı and Eyyam, 2012; Ashamu and Abiola, 2012; Ganić, 2012).⁹

As for the Turkish economy, there are couple studies that sought to answer the same question (Yörükoğlu and Atasoy, 2010; Erdem, 2010; Aras, 2010; Uygur, 2010). However, these studies give an overall perspective about the effect of global crisis on the banking sector, without placing a special emphasis on the role of bank-specific, macroeconomic or policy-related conditions.

Hence, this gap establishes the main motivation of this paper to test the effects of the global crisis on the structure of the Turkish banking sector. In doing so, the pioneering work by Demirgüç-Kunt and Huizinga (1999) constitutes the empirical basis for this study. Other important works by De Haas and van Lelyveld (2006), Dietrich and Wanzenried (2011) and Alper et al. (2001a) also provide inspiration to this work.

By following the methodologies of these earlier studies, this paper, therefore, aims to contribute to the existing literature on the Turkish banking sector¹⁰ by analyzing whether the structure of Turkish banks has changed in the aftermath of the global crisis. In what follows, the effects of bank-specific factors and the new macroeconomic environment in the post-crisis period are taken into account in analyzing this changing structure.

However, unlike previous studies that mostly concentrate on profitability measures such as return on assets, return on equity or net interest margin, this study

financial markets. On 16 September 2009, the Council and the European Parliament officially adopted Directive 2009/111/EC, which is, together with Directives 2009/27/EC and 2009/83/EC, part of the second legislative package aimed at ensuring financial soundness of banks and investment firms. On 24 November 2010, the Council and the European Parliament officially adopted Directive 2010/76/EU on capital requirements for trading book and for re-securitizations and the supervisory review of remuneration policies. On 20 July 2011, the Commission adopted a legislative package to strengthen the regulation of the banking sector. The proposal replaced the current Capital Requirements Directives (2006/48 and 2006/49). The new directive, which transposed the new global standards on bank capital (commonly known as the Basel III agreement) into the EU legal framework, entered into force on 17 July 2013.

⁹ Another strand of literature concentrates on the regulation, prudential and supervision aspects of the effect of global crisis on the banking sector. Demirgüç-Kunt et al. (2013), Beltratti and Stulz (2012), Berger and Bouwman (2013), Anginer et al. (2012) and Cihak et al. (2012) are important works along this line.

¹⁰ Previous studies analyzing the banking sector in Turkey are Alper et al. (2001a, 2001b), Van Rijckeghem (1999), Metin-Özcan and Kafalı (2007), Alper and Öniş (2004), Steinherr et al. (2004) and Akçay (2003).

adopts a more comprehensive approach by utilizing a wider range of dependent variables. Accordingly, not only profitability, but also capital adequacy, asset quality, liquidity, balance sheet and income-expenditure structure of the Turkish banking sector are evaluated using some major financial ratios.

The organization of the paper is as follows: The next section provides brief information about the determinants of the changing structure of Turkish banks. This includes the incentive for the selection of dependent variables that characterize the Turkish banking sector and the relevant independent variables that are considered to underlie the change in the structure. This is succeeded by the description of data as well as a discussion on their summary statistics for having a quick snapshot of Turkish banks. The subsequent section introduces econometric methodology, which is followed by empirical results. Finally, the last section concludes this paper. The Appendix provides information regarding the restructuring of the Turkish banking sector after the 2001 crisis, and also presents tables for the empirical analysis.

2. DETERMINANTS OF THE CHANGING STRUCTURE OF TURKISH BANKS

After the brief introduction in the first section, this section describes both the dependent and the independent variables that are selected for the analysis.

2.1. Dependent Variables

In order to analyze whether the structure of the Turkish banking sector has changed in the aftermath of the global crisis, some bank-specific dependent variables are chosen to represent capital adequacy, asset quality, liquidity, profitability, balance sheet and income-expenditure structure of the banking sector. More specifically, the selected dependent variables are basically some financial ratios, which are measured in line with international banking codes and standards that are discussed in the previous section.

Accordingly, the ratio of shareholders' equity to total assets captures capital adequacy. The asset quality of the Turkish banking sector is assessed by the ratio of total loans and receivables to total assets; while the ratio of liquid assets to total assets stands for liquidity. Profitability is measured by return on assets and return on equity, which are the ratio of net profits to total assets and the ratio of net profits to total shareholders'

equity, respectively. The ratio of deposits to total assets represents the balance sheet structure of Turkish banks. Finally, the income-expenditure structure of the Turkish banking sector is evaluated by net interest margin, which is the ratio of net interest income to total assets.

2.2. Independent Variables

The independent variables, which are discussed below, include factors pertaining to bank-specific as well as macroeconomic and policy-related conditions.

2.2.1. Bank-Specific Determinants

The independent variables that are chosen for analyzing the changing structure of the Turkish banking sector are some bank-specific variables that represent asset quality, balance sheet and income-expenditure structure of the banking sector. In addition, the effects of bank size, ownership, bank age and bank listing at the stock exchange are incorporated by the use of dummy variables.

Asset quality is a significant determinant of the changing structure of the Turkish banking sector. In this sense, the ratio of overdue loans to total loans, which measures credit quality, is used as an important indicator in order to assess asset quality. Accordingly, a higher ratio implies lower credit quality and lower profitability.¹¹

The balance sheet structure of a bank is another significant determinant of whether the structure of the Turkish banking sector has changed in the aftermath of the global crisis. In this regard, the ratio of FX assets to FX liabilities, which denotes FX open position¹², is selected as one of the major determinants of the changing structure of a bank as it signifies potential risk for a currency mismatch.¹³

¹¹ Models linking credit risk to economic activity are not new in the literature. Theoretical papers on business cycle models, which introduce financial sector, typically find a relation between asset quality and economic activity. The classical literature studying interactions between macroeconomic environment and financial fundamentals goes back to models developed by King and Plosser (1984), Bernanke and Gertler (1989), Kiyotaki and Moore (1997) and Bernanke et al. (1998).

¹² Kaplan (2002) provides an excellent survey on risks associated with FX open position of banks in Turkey. The author provides definitions on various forms of FX open positions, which are individually monitored by regulatory authorities.

¹³ Ranciere et al. (2010) discuss that currency mismatch can expose an emerging economy to systemic risk through banking sector balance sheet vulnerabilities. The authors also show that currency mismatch has been one of the key vulnerabilities leading to crises in emerging economies. More specifically, in case

The income-expenditure structure is also an important determinant in evaluating the effect of global crisis on the changing structure of Turkish banks. Accordingly, as shown by Demirgüç-Kunt and Huizinga (1999), overhead costs, which denote the income-expenditure structure, are considered to be crucial to the understanding of the effect of operating efficiency on bank performance. In this respect, the ratio of other operating expenses to total assets is used to represent overhead costs.

As for bank size, which is commonly measured as the ratio of total assets to GDP¹⁴, Smirlock (1985) finds strong evidence that a growing bank size is positively related to profitability through economies of scale. In other words, according to the author, compared to smaller banks, larger banks have a better chance of diversifying their products and loans. This advantage reduces risk, thereby increasing operational efficiency and profitability of larger banks.¹⁵

Bank ownership, i.e. whether a bank is state-owned, privately-owned or foreign-owned, is also another important determinant of whether the structure of Turkish banks has changed in the aftermath of the global crisis. Claessens et al. (2001) analyze the effect of foreign presence on the banking sector and find that an increased share of foreign banks implies lower profitability for domestic banks.¹⁶ Meanwhile, Micco et al. (2007) and Iannotta et al. (2007) also find strong empirical evidence that ownership affects bank performance.

foreign exchange borrowers cannot hedge against exchange rate risk, an abrupt devaluation results in a large share of foreign currency loans to be non-paid and the number of overdue loans to increase substantially. This can dramatically affect the banking sector capital and raise systemic risk issues for the economy.

¹⁴ The size of a bank can also be measured using dummy variables that categorize banks by their asset size. Accordingly, banks can be classified as small-sized, medium-sized, large-sized, etc. for certain asset size ranges (Alper et al., 2001a; Dietrich and Wanzenried, 2011). However, in this analysis, bank size is measured using asset to GDP ratio since using a single dummy variable may fail to represent the size of some banks due to intensive mergers and acquisitions during the analyzed period that cause these banks to increase in size and switch to another size category.

¹⁵ On the other hand, Lin and Zhang (2009), Stiroh and Rumble (2006) as well as Pasiouras and Kosmidou (2007) show that banks that have become extremely large might display a negative relationship between their size and profitability. This inverse relation may be attributed to agency costs, bureaucratic processes and other costs related to managing extremely large firms.

¹⁶ The foreign ownership of a bank matters even depending on whether the bank is a take-over or a greenfield foreign bank. De Haas and Naaborg (2005a, 2005b) find that many local banks that have been taken over by foreign banks remain relatively independent from the parent bank for quite some time concerning the local management, risk management and the financing of the subsidiary bank. On the other hand, most greenfield banks are more closely integrated with the parent bank concerning these issues.

Bank listing at the stock exchange is significant for examining the effect of the global crisis on the structure of the Turkish banking sector as well.¹⁷ More specifically, listed banks are assumed to face greater pressure for being profitable from their shareholders, financial analysts and the financial markets in general. Yet, as discussed in Dietrich and Wanzenried (2011), listed banks have to meet reporting and other requirements, which create additional costs. Given the mixed evidence on the impact of bank listing, the overall effect should be empirically determined.

Finally, the age of a bank is another significant variable in analyzing the changing structure of the Turkish banking sector. Dietrich and Wanzenried (2011) report that older banks are expected to be more profitable due to their longer period of service, during which they can build up a good reputation. Hence, bank age is viewed to have an effect on bank structure.

2.2.2. Macroeconomic and Policy-Related Determinants

In analyzing whether the structure of the Turkish banking sector has changed in the aftermath of the global crisis, the effects of macroeconomic as well as policy-related factors are also considered. In this regard, real GDP growth, inflation, policy rate and exchange rate gauge the effects of macroeconomic conditions as well as the monetary policy.¹⁸ Meanwhile, required reserves are also evaluated to be an important factor that

¹⁷ Bank listing at the stock exchange is viewed to be a potentially important factor especially for the Turkish banking sector as the initial public offerings (IPOs) of 3 banks, the listings of which took place in 2004Q3, 2005Q4 and 2007Q2, respectively, were marked as one of the biggest IPOs of the country. More specifically, Denizbank's IPO in 2004 was perceived as a landmark event in Turkey's capital markets, which had been lackluster for some time after the financial crisis in 2001. This was followed by Vakıfbank's IPO in 2005, which was recorded as one of the biggest listings in the emerging market banking sector in 2005 and also represented the second-largest-ever financial institution and government IPO in the emerging markets of Central and Eastern Europe, Middle East, Africa and Latin America. Finally, Halkbank's IPO in 2007 was noted as the biggest IPO in Turkey since 2000 and the third biggest share sale in Europe in 2007.

¹⁸ After the adoption of financial stability as a supplementary objective at end-2010, the CBRT devised a new monetary policy mix, which entailed the use of multiple tools. More specifically, the new monetary policy mix was comprised of an interest rate corridor that was set between overnight borrowing and lending rates; the weekly repo rate, which was announced as the policy rate; and required reserves. Together with the use of funding strategy and other macroprudential tools as complementary instruments, the policy mix aimed at maintaining price stability and financial stability via containing the distortionary effects of capital flows on exchange rate and credit growth. Meanwhile, in view of the increased importance of maintaining financial stability after the global crisis, the CBRT placed heavy emphasis on credit growth as a significant element of its policy design. Hence, starting from 2013, the CBRT has drawn special attention to achieving a robust and sustainable credit growth rate and assessed that an annual credit growth rate of 15 percent, the reference value, would imply a significant boost in credit impulse and acceleration in economic activity (Kara et al., 2013; Kara and Tiryaki; 2013). In the meantime, in coordination with the CBRT to slow down credit growth, the BRSA also took a series of measures in 2011. But these measures were more in the form

can reflect the effect of changes in reserve requirement ratios, which have been effectively used as a macro prudential and a monetary policy tool in the post-crisis period.¹⁹

More specifically, real GDP growth is expected to have a positive effect on the structure of the banking sector given the evidence by Demirgüç-Kunt and Huizinga (1999), Bikker and Hu (2002) and Athanasoglou et al. (2008) that report a positive link between economic growth and financial sector profitability.

Inflation, which is another important macroeconomic determinant, is considered to have a boosting effect on bank profitability. More specifically, Hanson and Rocha (1986) find a positive correlation between interest margins and inflation. Similarly, Demirgüç-Kunt and Huizinga (1999) observe that higher inflation is associated with higher interest margins and profitability.

Policy rate is also viewed to be a significant variable that is assumed to capture the effect of monetary policy on the structure of the banking sector. Policy rate influences banking sector via bank lending channel, which theorizes that changes in monetary policy affect credit that are extended through commercial banks. Accordingly, monetary policy actions may affect supply of loanable funds available to banks, and consequently, the total amount of loans they can make (Kashyap and Stein, 1995; Bernanke and Blinder, 1988; Mishkin, 1996).

The change in exchange rate is also another important indicator for capturing the impact of macroeconomic conditions on bank structure. Seminal works by Demirgüç-

of a moral suasion and failed to prevent rising of credit growth beyond the CBRT's reference value. On the other hand, in October 2013, the BRSA adopted further measures, which helped to decelerate credit and especially consumer loan growth (IMF, 2012; OECD; 2014).

¹⁹ In the post-crisis period, the CBRT started to actively use reserve requirements as an important component of its monetary policy. Reserve requirement ratios were also employed as part of the new monetary policy mix, which was adopted in late 2010 (Başçı and Kara, 2011). Accordingly, in order to ease liquidity management and smooth the functioning of capital markets, TL and FX reserve requirement ratios were changed when deemed necessary. Furthermore, in September 2011, the CBRT granted commercial banks the option to hold a fraction of their required reserves for their Turkish lira liabilities in foreign currency. Later on, the size of the option was increased and its scope was widened to encompass gold as a means of meeting TL reserve requirements. Finally, this option was formalized as the reserve options mechanism (ROM), the option to hold Turkish lira reserves in foreign currency and gold, as an additional and unique tool in 2012, in order to support the FX reserve management of the banking system and to safeguard the economy against the adverse effects of excess capital flow volatility (Alper et al., 2013; Küçükşaraç and Özel, 2012; Oduncu et al., 2013).

Kunt and Detragiache (1998), Choi et al. (1992) and Chamberlain et al. (1997) find strong negative correlation between bank profitability and exchange rate exposure.

Finally, required reserves are also viewed to be crucial to the understanding of the changing structure of the Turkish banking sector after the global crisis. Demirgüç-Kunt and Huizinga (1999) state that reserve requirements are an implicit tax on banks if, as is usual, official reserves are remunerated at less than market rates. Rose and Rose (1979) as well as Gilbert and Rasche (1980) also examine the impact of reserve requirements on bank profitability and find that reserve requirements generally reduce the profitability of a bank.

3. DATA AND DESCRIPTIVE STATISTICS

After discussing dependent and independent variables in the previous section, this section presents data and descriptive statistics.

3.1. Data

The bank-specific data are based on the quarterly balance sheet items of the deposit banks in Turkey for the period between 2002Q4-2013Q3.²⁰ The database covers 21 deposit banks, which yield a balanced panel of 924 observations.²¹ All banks are categorized according to ownership as state, private and foreign. Accordingly, of these 21 banks, 3 of them are state banks; 10 of them are private banks; and 8 of them are foreign banks.²²

Definitions of the variables are as follows: EQUITY/ASSETS is the ratio of shareholders' equity to total assets; LOANS/ASSETS is the ratio of total loans and receivables to total assets; LIQASSETS/ASSETS is the ratio of liquid assets to total assets; PROFITS/ASSETS is ratio of net profits (loss) to total assets; PROFITS/EQUITY is the ratio of net profits (loss) to total shareholders' equity; DEPOSITS/ASSETS is the

²⁰ Bank-specific data are obtained from Banks Association of Turkey (BAT) at www.tbb.org.tr. The macroeconomic data are obtained from the electronic data dissemination system of the CBRT at <http://evds.tcmb.gov.tr/>.

²¹ The analysis covers only deposit banks, and hence, excludes participation banks as well as development and investment banks. The analysis also excludes deposit banks, which were taken over by SDIF or founded during the period of analysis. Moreover, the analysis leaves out banks with a status change from development and investment bank to deposit bank.

²² The ownership decision is based on the BAT's categorization for ownership as of the end of the analyzed period. Accordingly, a bank is classified as state bank if more than 50 percent of its shares are owned by state. Similarly, a bank is classified as private or foreign if more than 50 percent of its shares are in private or foreign hands, respectively. The analysis only includes foreign banks founded in Turkey; while foreign banks having branches in Turkey are excluded from the analysis.

ratio of deposits to total assets; NII/ASSETS is the ratio of net interest income to total assets; ODL/LOANS is the ratio of overdue loans to total loans and receivables; OTHEREXP/ASSETS is the ratio of other operating expenses to total assets; FXASSETS/FXLIABILITIES is the ratio of FX assets to FX liabilities; ASSETS/GDP is the ratio of total assets to GDP. GDP indicates the year-on-year growth rate of the real GDP in logs; INFLATION is the year-on-year change in the consumer price index in logs; EXCHANGE is the quarter-on-quarter change in the USD/TL exchange rate in logs; and POLICYRATE is the CBRT policy rate.²³ TLRESERVES/ASSETS is the ratio of Turkish lira reserves to total assets and FXRESERVES/ASSETS is the ratio of FX reserves to total assets.²⁴

The ownership dummies are DSTATE, DPRIVATE and DFOREIGN for state, private and foreign banks, respectively.²⁵ The dummy variable for whether a bank is listed at the Borsa Istanbul (BIST) is DBIST.²⁶ Finally, the dummy variables for bank age are D1800s, DEARLY1900s, D1980s and D1990s, which represent banks founded in 1800s, early 1900s (between 1924 and 1953), 1980s (between 1977 and 1987) and 1990s, respectively.²⁷

²³ The main policy instrument of the CBRT during 2002-2010 was overnight repo rate at the BIST Repo and Reverse Repo Market. However, as part of the normalization process during the exit from the global crisis, the CBRT has opted for a technical adjustment in policy rates starting from May 2010. Finally, as of end-2010, the CBRT has utilized a new monetary policy mix that included additional policy tools for pursuing multiple objectives (Başçı and Kara, 2011; Kara, 2013, Alper et al., 2013; Küçükşaraç and Özel, 2012). Consequently, an interest rate corridor was set for overnight borrowing and lending rates and 1-week repo rate was announced as the policy rate. Moreover, the CBRT conducted an active liquidity management policy, which adjusted market policy rates without changing the policy rate. In fact, in view of a possible deterioration in the pricing behavior and inflation expectations, the CBRT has delivered an additional monetary tightening as of end-2011 without resorting to a change in the policy rate (CBRT, 2012; Akçelik et al., 2012). The additional monetary tightening was implemented occasionally and ended in January 2014 (CBRT, 2014). Hence, in order to account for the additional monetary tightening, the policy rate in the analysis is substituted by the 1-week repo rate during 2010Q2-2011Q4 and replaced by the average funding rate from 2012Q1 and onwards.

²⁴ The data for required reserves is approximated by data on cash and balances with the CBRT.

²⁵ Given that the number of state banks is the lowest in the ownership category, DSTATE is selected as the reference dummy variable. Hence, the coefficients of ownership dummies should be interpreted relative to state banks.

²⁶ The number of currently listed commercial banks at the BIST is 12, with 9 of them being listed at the stock exchange over the entire analyzed period; while the initial public offerings of the other 3 banks took place in 2004Q3, 2005Q4 and 2007Q2, respectively.

²⁷ The number of banks founded in 1800s is 1; while the number of banks founded in early 1900s, 1980s and 1990s is 8, 6 and 6, respectively. Given that the number of banks founded in 1800s is the lowest in the bank age category, D1800s is selected as the reference dummy variable. Hence, the coefficients of the dummy variables for bank age should be interpreted relative to the oldest bank.

3.2. Descriptive Statistics

Tables A1-A2 in the Appendix report the descriptive statistics for selected bank-specific variables, also including their mean values by years and ownership. Accordingly, some striking facts can be highlighted as follows:

➤ The ratio of shareholders' equity to total assets declines throughout the analyzed period. On average, private and foreign banks hold a larger proportion of their total assets in shareholders' equity than state banks. The global crisis causes private banks to significantly increase their shareholders' equity to total assets; while foreign banks experience a less noticeable rise. In the meantime, state banks keep their holdings of shareholders' equity to total assets virtually unchanged. In general, state banks maintain a more stable level of shareholders' equity to total assets; whereas private banks' shareholders' equity to total assets ratio is declining. As for foreign banks, this ratio is also declining; however, at a fluctuating pace.

➤ The ratio of total loans and receivables to total assets increases remarkably over the period of analysis. This increase is reversed momentarily during the global crisis, causing loans to total assets to register a decline, which is followed by a steady rise afterwards. In general, foreign banks have a significantly higher share of loans in total assets than other banks. However, starting from 2011, state and private banks seem to be the main driver of growth in loans to total assets. More specifically, during the global crisis, foreign banks experience a temporary decline in their loans to total assets ratio, which follows a rather volatile upward course afterwards. On the other hand, private banks, which also experience a short-lived decline in their loans to total assets ratio during the global crisis, settle on a steady uptrend later on. As for state banks with nearly unchanged share of loans in total assets during the global crisis, the growth of loans to total assets is even more dramatic in the post-crisis period.

➤ The ratio of liquid assets to total assets is almost stable across the overall banking sector. In general, state banks hold lower liquid assets than other banks; while private banks prefer more liquidity. During the global crisis, state banks are relatively less liquid; whereas foreign banks raise their liquid assets to total assets ratio. In the meantime, private banks are relatively stable with regard to their holdings of liquid assets in proportion to their total assets. In the post-crisis period, state and private banks become relatively less liquid and foreign banks are comparatively more liquid.

➤ The ratio of net profits to total assets is quite volatile over the analyzed period. More specifically, in 2003, net profits to total assets display a sharp decline, which is followed by a gradual recovery in the succeeding years. Meanwhile, the global crisis leaves the ratio almost unchanged. In fact, net profits to total assets remain nearly constant until 2011, which is marked by a significant drop. In the last 3-year period, net profits to total assets follow a more volatile, yet a lower course compared to earlier periods. In general, state banks seem to be the main driver of the banking sector profitability, earning a considerably higher return on their assets than other banks. Meanwhile, private banks, the least profitable bank category prior to the global crisis, are more profitable than foreign banks in the aftermath of the global crisis.

➤ The ratio of net profits to total shareholders' equity follows a declining course throughout the period of analysis. State banks earn remarkably higher return on equity than other banks. During the global crisis, the ratio of net profits to total shareholders' equity increases for state banks and decreases for private banks. Meanwhile, this ratio is almost unchanged for foreign banks during the same period. All ownership categories have lower return on equity in the post-crisis period; while profits of private and foreign banks follow a volatile course as well.

➤ The ratio of deposits to total assets declines during the analyzed period for the overall banking sector. State banks have a notably larger portion of their assets in deposits than private and particularly foreign banks, which hold a lower share of deposits to total assets than the overall banking sector. The global crisis causes a significant and ongoing decline in the ratio of deposits to total assets for state banks, which otherwise has an increasing share of deposits to total assets. As for other banks, the ratio of deposits to total assets displays a rise, which is rather temporary for private, but relatively more permanent for foreign banks.

➤ The ratio of net interest income to total assets displays a gradual fall over the analyzed period. In general, foreign banks have slightly higher net interest margin than other banks; while the ratio of net interest income to total assets is quite comparable for state and private banks. The global crisis causes the net interest margin to increase slightly for state banks; whereas private and foreign banks experience a minor fall. The net interest margin declines for all ownership categories in the post-crisis period, especially in 2013.

➤ The ratio of overdue loans to total loans and receivables declines markedly throughout the period of analysis. This decline is even more remarkable for state banks. In fact, having recorded extraordinarily high levels in the beginning of the analysis, state banks end up with the lowest overdue loans to total loans and receivables ratio across the overall banking sector. The global crisis instigates a temporary reversal in the declining course of overdue loans to total loans and receivables, causing the ratio to register a sharp increase. However, the banking sector recovers quickly, with the ratio of overdue loans to total loans and receivables resuming a downward trend after the crisis.

➤ The ratio of other expenses to total assets follows a gradually declining course over the analyzed period. In general, overhead costs are remarkably lower for state banks and particularly higher for foreign banks. Furthermore, the ratio of other expenses to total assets remains virtually unchanged for all ownership categories in the post-crisis period.

➤ The ratio of FX assets to FX liabilities is declining for the overall banking sector during the period of analysis. In general, FX assets to FX liabilities are considerably higher for state banks and relatively lower for foreign banks. In addition, the ratio of FX assets to FX liabilities is almost stable for state banks and private banks; whereas for foreign banks, this ratio declines dramatically over the analyzed period. The global crisis causes both state and foreign banks to significantly raise their FX assets in proportion to their FX liabilities; whereas private banks reduce their holdings initially, but experience a surge afterwards.

➤ Bank size as measured by the ratio of total assets to GDP is increasing for the overall banking sector throughout the analyzed period. Overall, state banks have a remarkably higher asset size; while that of foreign banks is significantly lower. The global crisis affects the banking sector positively in terms of bank size, by raising the ratio of total assets to GDP for all ownership categories.

➤ The ratio of TL reserves to total assets is declining for the overall banking sector over the period of analysis. In general, state banks hold a significantly higher amount of TL reserves in proportion to their total assets than other banks; while foreign and private banks are comparable on average. However, the global crisis reduces the ratio of TL reserves to total assets notably for all banks, especially for state banks.

➤ The ratio of FX reserves to total assets is also declining throughout the analyzed period. In general, state banks hold a lower amount of FX reserves in proportion to their total assets than other banks. The global crisis causes all ownership categories to experience a slight decline, which is followed by a more striking fall afterwards.

4. ECONOMETRIC METHODOLOGY

Given the evidence provided by descriptive statistics on the course of selected financial ratios in the previous section, panel data estimation analysis is conducted in this section in order to analyze the determinants of the changing structure of the Turkish banking sector in the aftermath of the global crisis.

Accordingly, the use of generalized method of moments (GMM) approach is considered as an initial step.²⁸ However, as discussed in Woolridge (2001), the GMM approach may result in a finite-sample bias when applied to a small sample. Furthermore, Ahn et al. (2001) argue that the usual exogeneity assumptions lead to many more moment conditions than standard estimators use and result in some or all of the moment conditions to be redundant in the GMM estimation. In fact, the authors discuss that the set of non-redundant moment conditions can sometimes be too large that the finite sample properties of the GMM estimator utilizing the full set of moment conditions may be poor.

Alternatively, fixed effects model is considered in order to estimate bank-specific effects. However, as discussed in Johnston and DiNardo (1997), the fixed effects estimator is robust to the omission of any relevant time-invariant regressors. Accordingly, a fixed effects model cannot include time-invariant explanatory variables, as also stated by Unite and Sullivan (2003).

Meanwhile, the random effects model takes into account the association between these time-invariant variables and the dependent variable. In fact, a comparison of random effects and the fixed effects model through Hausman test²⁹ and further

²⁸ The panel data estimation could have been conducted using pooled ordinary least squares (OLS), assuming that a common error structure applies to all banks. Yet, as discussed in De Haas and van Lelyveld (2006), treating banks as homogeneous entities is too strong a restriction.

²⁹ Hausman (1978) proposed a chi-squared statistic based on the Wald criterion $W = \chi^2[K] = [b - \hat{\beta}]' \hat{\Sigma}^{-1} [b - \hat{\beta}]$, where b is the vector of slope estimates in the fixed effects model; $\hat{\beta}$ is the vector of slope estimates in the random effects model; and $\hat{\Sigma}$ is the difference in the estimated covariance matrices of the slope estimates with the individual dummy variables of the fixed effects model and the estimated covariance matrix in the random effects model, excluding the constant term.

implementing the Breusch-Pagan Lagrangian multiplier (LM) test³⁰ indicates that the hypothesis that the individual effects do not correlate with other regressors in the random effects model cannot be rejected³¹ and random effects are necessary.

Hence, given that the fixed effects estimates are not efficient relative to the random effects estimates, the less restrictive random effects model is accepted. Therefore, all (unobservable) factors that influence individual bank behavior; but which are not captured by regressors, are assumed to be summarized by a random error term.

Accordingly, using generalized least squares (GLS)³², a random effects model is applied to the following specification, which can be summarized as:

$$Y_{it} = \alpha + \beta_1 Bank_{it} + \beta_2 Macro_{it} + U_i + \varepsilon_{it}$$

where Y_{it} is the dependent variable of bank i at time t ; $Bank_{it}$ is the matrix of bank-specific independent variables for bank i at time t ; $Macro_{it}$ is the matrix of macroeconomic and policy-related independent variables for bank i at time t ; α is the intercept term; and β_1 and β_2 are the corresponding coefficient vectors. U_i is the unobserved bank-specific random effect and ε_{it} is the idiosyncratic error term, both following i.i.d. processes with mean 0 and variances σ_u^2 and σ_ε^2 , respectively. The subscripts i and t range from 1 to N and 1 to T , correspondingly, where N is the number of banks and T is the number of periods in the dataset.

The above specification is estimated separately for all dependent variables using the overall sample. Afterwards, all the regressions are re-run by splitting up the sample as the pre-crisis and the post-crisis periods, thereby aiming to view and analyze how the structure of the Turkish banking sector has changed after the global crisis. Accordingly,

³⁰ The LM test for random effects of Breusch and Pagan (1980) can be interpreted as a Wald test of the distance from zero of the first derivative vector of the log likelihood function (the score vector) of the unrestricted model evaluated at the restricted maximum likelihood estimates.

³¹ Under random effects model, the individual effects are treated as random unobservable variables, which are uncorrelated with all of the regressors. Under this assumption, the coefficients can be consistently and efficiently estimated by GLS (Balestra and Nerlove, 1966). In contrast, when the equation constant is treated as nuisance parameter, the regression equation reduces to the fixed effects model. A simple treatment of the fixed effects model is to remove the effects by the (within) transformation of the model to deviations from individual means.

³² As discussed in Baltagi (2013), random effects model is estimated by GLS when the variance structure is known. However, the random effects model is estimated by the feasible generalized least squares (FGLS), when there is a heteroscedastic error structure or a certain degree of correlation between the observations.

the pre-crisis and the post-crisis periods cover 2002Q4-2008Q3 and 2008Q4-2013Q3, respectively.³³ All the equations contain a constant term.³⁴

5. EMPIRICAL RESULTS

Tables A3-A5 in the Appendix present results of the panel regression analysis for the overall sample as well as for the pre-crisis and post-crisis periods. In each table, the first regression seeks to find the determinants of shareholders' equity in total assets; while the remaining six regressions try to obtain the determining factors for the ratio of total loans and receivables to total assets, the ratio of liquid assets to total assets, return on assets, return on equity, the ratio of deposits to total assets, and finally, the net interest margin respectively.

Given the regression results, main findings with regards to capital adequacy, asset quality, liquidity, profitability, balance sheet and income-expenditure structure are summarized below.

5.1. Capital Adequacy

The capital adequacy as measured by the shareholders' equity in total assets is affected positively by overdue loans to total loans and receivables after the global crisis. This finding may be attributed to the effect of regulatory compliance for well-capitalization of banks. Hence, higher overdue loans result in higher equity.

The coefficient of overhead costs is also positive and highly significant both before and after the global crisis. Similarly, this may be owed to the effect of regulatory standards for bank capitalization.

The ratio of FX assets to FX liabilities contributes positively to the capital adequacy of banks before the global crisis, implying that a relatively lower risk of currency mismatch due to narrowing FX open position feeds into higher holdings of equity. Meanwhile, bank listing positively affects equity holdings of banks after the global crisis.

³³ The effect of the global crisis was initially captured by the inclusion of a crisis dummy variable in the overall sample, which yielded a statistically significant coefficient. Hence, this provided the sufficient evidence that the sample would be split.

³⁴ The analysis could have also included some interaction terms. However, the extra information provided by the addition of these interaction terms failed to surpass the increased complexity of the regression equations, which for simplicity, caused the analysis to be based on the parsimonious regression model.

As for macroeconomic indicators, while the effect of GDP growth is significantly negative before the crisis, suggesting that contractions lead to more prudent banking behavior; the coefficients of FX reserves to total assets, exchange rate and the policy rate turn out to be significant after the global crisis. The coefficient of exchange rate is negative; while those of policy rate and FX reserves to total assets are positive during this period. This implies that depreciation of TL results in lower capitalization of banks; whereas tighter monetary policy leads to higher capitalization.

5.2. Asset Quality

The coefficient of overdue loans to total loans and receivables is highly significant for asset quality in both periods, with a negative sign as expected and the magnitude of the coefficient increasing after the global crisis. Meanwhile, FX open position contributes negatively to lending in both periods.

Total loans and receivables to total assets are affected significantly by bank size in both periods; but the coefficient is positive before the global crisis and negative in the post-crisis period. This indicates that relatively larger banks offer more lending prior to the global crisis; whereas they are reluctant to grant loans in the aftermath of the global crisis.

The coefficients of dummy variables for private and foreign banks enter the equation for lending negatively after the global crisis; but they are not statistically significant, indicating that ownership does not play a role on credit growth during this period. On the other hand, the dummy variable for foreign banks has a statistically significant and positive coefficient before the global crisis, implying that foreign ownership is directly linked to lending in the pre-crisis period.³⁵

Bank listing positively affects bank lending after the global crisis, suggesting that listed banks provide relatively more credits in this period. Meanwhile, the positive and significant coefficient of the dummy variable for banks founded during the 1990s implies more lending by these banks before the crisis.

Both the disinflationary process that the Turkish economy underwent during the pre-crisis period and the elevated levels of inflation in the post-crisis period seem to have

³⁵ Guo and Stepanyan (2011) and Mohanty et al. (2006) discuss the negative link between overdue loans and bank lending.

affected bank lending favorably. The positive and strong association between inflation and lending in both periods implies that banks can well adjust for inflation in granting loans. In other words, inflation affects loan rates more strongly than deposit rates. Hence, banks are positively affected by inflation as far as credits are concerned.³⁶ In the meantime, the GDP growth also affects lending significantly after the global crisis.

The impact of policy rate on bank lending is negative and significant in both periods, indicating that tighter monetary policy leads to lower credits and vice versa. This observation is in line with an earlier finding by Aydın and İgan (2012), which document that contractionary monetary policy in Turkey leads to lower bank lending.

FX reserves to total assets contribute significantly and positively to bank lending before the global crisis, suggesting that the relatively loose reserve requirements prior to the global crisis cause banks to grant more credits.

5.3. Liquidity

Liquidity is affected by overdue loans to total loans and receivables in both periods; but the effect turns from negative to positive after the crisis. This indicates that overdue loans disable banks from being more liquid before the global crisis; whereas banks are urged to hold more liquid assets against their overdue loans after the global crisis.

Overhead costs have a positive impact on banks' liquidity before the crisis; while the impact is negative after the global crisis. Meanwhile, liquid assets to total assets are affected positively by bank size after the global crisis, pointing that relatively larger banks are more liquid in this period.

The relationship between inflation and liquidity appears to be negative and significant after the global crisis, suggesting that higher inflation reduces liquidity. In the meantime, the effect of policy rate on liquidity is highly positive before the global crisis, indicating that policy rates, which followed a rather downward course prior to the global crisis, have a lowering effect on liquid assets to total assets during this period.

As for reserves, the impact of TL reserves to total assets is significantly positive both before and after the global crisis; whereas FX reserves to total assets contribute negatively to liquidity in both periods.

³⁶ Guo and Stepanyan (2011) argue that bank lending is positively linked to inflation.

5.4. Profitability

The ratio of overdue loans to total loans and receivables is viewed to have a positive impact on return on assets after the global crisis; while this effect is statistically insignificant and negative before the global crisis. Meanwhile, the effect of overdue loans on profitability is significantly negative for the overall sample. This adverse relation is also confirmed by findings of Alper and Anbar (2011) and Aydođan (1990).

Coefficient of overhead costs is highly significant in both periods; but the sign turns to positive after the global crisis. The negative relation between overhead costs and profitability before the global crisis is in line with the prior evidences by Molyneux and Thornton (1992) and Bourke (1989) that link bank profitability to efficient management.

The ratio of FX assets to FX liabilities affects return on assets significantly, but negatively before the global crisis; whereas this inverse relation is broken after the global crisis. This implies that lower currency mismatch due to narrowing FX open position reduces banks' profits prior to the global crisis. Hence, this indicates that banks prefer less risk for lower return.

Net profits on total assets are affected positively by bank size after the global crisis, implying that relatively larger banks earn higher return on assets during this period. This finding is in line with the previous findings by Short (1979), Molyneux and Thornton (1992), Bikker and Hu (2002) and Goddard et al. (2004) that conjecture a positive relation between bank size and profitability.

The coefficient of TL reserves to total assets is positive after the global crisis. In addition, policy rate also has a significantly positive impact during the same period, implying that relatively tighter monetary policy increases return on assets in the post-crisis period. This observation supports the seminal work of Samuelson (1945), Flannery (1981) and Hancock (1985), which assert that increases in interest rates improve profitability of the banking system. Meanwhile, exchange rate affects net profits to total assets significantly, but negatively in this period. This indicates that depreciation of the TL adversely affects profitability of Turkish banks.

The findings for net profits on total shareholders' equity are very similar to those for return on assets. Accordingly, the impact of overdue loans to total loans and receivables is negative and significant in this period, suggesting that overdue loans reduce return on equity.

Likewise, coefficient of overhead costs is highly significant in both periods; but the sign turns from negative to positive after the global crisis. Meanwhile, coefficient of FX assets to FX liabilities is significantly positive in the post-crisis period, implying that lower currency mismatch due to narrowing FX open position causes higher return on equity.

Bank listing positively affects return on equity after the global crisis, implying that listed banks have relatively more return on equity. A negative and significant coefficient of banks founded during 1980s indicates that bank age also matters in terms of profitability in the post-crisis period. In the meantime, return on equity is affected significantly by bank size before the global crisis.

Macroeconomic and policy-related variables become statistically significant for profitability after the global crisis. While TL reserves to total assets and policy rate positively affect return on equity; exchange rate has a negative effect on net profits to total shareholders' equity during this period. Hence, the conduct of tight monetary policy (both via policy rate hikes and increases in reserve requirement ratios) causes higher profitability in the post-crisis period; whereas depreciation of TL leads to lower return on equity during the same period.

5.5. Balance Sheet Structure

In both periods, deposits to total assets are affected very significantly by overdue loans to total loans and receivables, overhead costs and FX open position. On the other hand, the coefficients of overdue loans and overhead costs turn to positive after the global crisis; while the coefficient of FX open position is positive during both periods.

Before the global crisis, the dummy variable for ownership negatively affects deposits to total assets for private banks. This implies that, compared to state banks, private banks are less preferred for deposits in this period. Meanwhile, foreign and private banks negatively affect deposits to total assets after the global crisis period, indicating that the crisis adversely affects the reliability of both ownership categories with respect to state banks.

Meanwhile, GDP growth and inflation have a positive and highly significant effect on the ratio of deposits to total assets before the global crisis. TL reserves to total assets positively affect the balance sheet structure both before and after the global crisis.

5.6. Income-Expenditure Structure

Net interest income on total assets is affected negatively by overdue loans to total loans and receivables after the global crisis, suggesting that overdue loans reduce net interest margin. Coefficient of overhead costs to assets is positive and highly significant in both periods, indicating that increases in expenses are almost fully passed to depositors and lenders as lower deposit rates and/or higher lending rates. Findings by Demirgüç-Kunt and Huizinga (1999), Doliente (2005) and Gerlach et al. (2005) also confirm these results.

After the global crisis, dummy variables for both ownership categories have a significantly negative effect on the income-expenditure structure, indicating that both foreign and private banks have lower net interest margin than state banks in this period. This observation is in line with findings by İgan and Tamirisa (2008), which suggest that ownership matters in willingness to venture into high-risk/high-return activities.

Net interest margin is affected positively by inflation in the pre-crisis period. This positive relation is also reported by Demirgüç-Kunt and Huizinga (1999) among many others. Meanwhile, policy rate has a significantly positive effect after the global crisis, pointing that tight monetary policy increases the ratio of net interest income to total assets in this period. As for reserves, TL reserves to total assets have a significant effect on net interest margin in both periods; but the coefficient is negative before the crisis and positive after the global crisis.

6. CONCLUSION

This paper analyzes whether the structure of the Turkish banking sector has changed after the global crisis. The descriptive analysis of selected financial ratios shows that the global crisis has a significant impact on the banking sector. This finding is further supported by the panel regression results, which indicate that the global crisis has a profound effect on the Turkish banking sector. Accordingly, some major points need to be highlighted about how the Turkish banking sector is affected by the global crisis.

First of all, the analysis of descriptive statistics reveals that financial ratios vary remarkably before and after the global crisis. More specifically, the global crisis prompts higher capitalization and deposit holdings for banks, while also raising return on assets.

On the other hand, the global crisis causes a slight decline in return on equity and net interest margin. Moreover, the global crisis leads to higher overhead costs and

overdue loans. Meanwhile, bank lending slows down and asset size accelerates relative to GDP growth.

The global crisis also causes FX assets to grow faster than FX liabilities, thereby narrowing FX open position and leading to a lower currency mismatch. In the meantime, the both TL and FX reserves decline; whereas liquidity stays almost constant during the crisis.

In addition to what descriptive statistics reveal about the effects of global crisis on the banking sector, these statistics provide further evidence on the changing structure of Turkish banks. A striking fact that should be highlighted in this regard is that banks differ notably with respect to their ownership categories. In other words, private banks are relatively more capitalized than other banks; whereas state banks have a comparatively higher share of deposits in total assets than other banks. State banks also earn remarkably higher return on assets and equity; while foreign banks have a higher net interest margin than other banks.

In addition, state banks are considerably more efficient than other banks in terms of overhead costs. On the other hand, private banks bear relatively lower ratio of overdue loans to total loans and receivables. Also, private banks are comparatively more eager; while foreign banks are more reluctant to lend. Regarding bank size, state banks are notably larger; whereas foreign banks are remarkably smaller than other banks.

State banks also have substantially larger FX assets to FX liabilities, thereby causing these banks to have a lower FX open position than other banks. As for liquidity, state and private banks are comparable; while foreign banks are considerably more liquid. Furthermore, state banks have a slightly higher share of TL reserves in total assets; whereas foreign banks have a rather larger share of FX reserves than other banks.

Another important observation that should be underlined is the increased significance of monetary policy after the global crisis. More specifically, prior to the global crisis, policy rate is effective only on bank lending and liquidity. However, after the global crisis, policy rate does not only affect lending; but also influences capital adequacy, profitability (both return on assets and equity) and the net interest margin of banks.

The higher explanatory power of reserves in the post-crisis period also supports the observation that monetary policy has an increased significance on the banking sector

after the global crisis. Particularly, preceding the crisis, TL reserves are only influential on liquidity, net interest margin and deposits. On the other hand, after the global crisis, TL reserves are effective on a wider range of variables, including return on assets, return on equity, liquidity, net interest margin and deposits. Meanwhile, FX reserves, which affect lending and liquidity in the pre-crisis period, continue to affect liquidity and also influence capital adequacy after the global crisis.

In contrast to the observation on the relatively increased significance of monetary policy on the structure of the Turkish banking sector, macroeconomic variables are less influential on Turkish banks after the global crisis. More specifically, inflation, which affects lending, net interest margin and the balance sheet structure of banks in the pre-crisis period, is only effective on lending and liquidity in the post-crisis period.

The same conclusion can be drawn for GDP growth, which loses its explanatory power after the global crisis. More specifically, before the global crisis, GDP growth is significant for capital adequacy and deposits. However, following the global crisis, GDP growth solely affects bank lending.

On the other hand, exchange rate, which does not have any explanatory power preceding the global crisis, becomes a significant determinant of capital adequacy and profitability, including both return on assets and equity, in the post-crisis period.

Meanwhile, it should be noted that bank-specific determinants are highly significant for capital adequacy, asset quality, liquidity, profitability, balance sheet and income-expenditure structure of the Turkish banking sector over the entire period of analysis. More specifically, overdue loans, overhead costs and FX open position considerably affect banks both before and after the global crisis. In fact, overdue loans have an even intensified effect in the post-crisis period as all dependent variables in the analysis (except for return on equity) are affected by this variable; whereas prior to the crisis, the effect of overdue loans is limited to lending, liquidity, deposits and return on equity.

Overhead costs also notably affect capital adequacy, asset quality, liquidity, profitability, balance sheet and income-expenditure structure of the Turkish banking sector. Meanwhile, after the global crisis, overhead costs have a lower explanatory power only on bank lending.

FX open position of banks is also another important bank-specific determinant of capital adequacy, profitability, lending and deposits even though the variable is no longer significant for bank lending after the global crisis.

Likewise, bank size has a significant effect on the changing structure of the Turkish banking sector. Bank size affects lending, liquidity and profitability in the post-crisis period; and it also influences lending and profitability prior to the crisis.

Meanwhile, bank listing at the stock exchange, which is not statistically significant before the global crisis, is considerably influential after the crisis by affecting capital adequacy, lending and return on equity. As for bank age, it is relatively less important as a bank-specific explanatory variable.

To sum up, this study shows that the structure of the Turkish banking sector has changed in the aftermath of the global crisis. The underlying reasons for this change can mainly be attributed to the increased significance of the monetary policy as well as the changing macroeconomic conditions after the global crisis. Meanwhile, bank ownership and other bank-specific determinants, which are important in the pre-crisis period, are found to have an even accentuated effect on the structure of the Turkish banking sector in the post-crisis period.

For refinement of these results, future research may elaborate on how ownership matters with respect to the changing structure of the Turkish banking sector and may analyze whether banks respond assymmetrically to the global crisis. Prospective studies may also examine the individual aspects of this changing structure. In this regard, profitability and bank lending behavior stand out as major issues to be explored further.

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APPENDIX

RESTRUCTURING OF THE TURKISH BANKING SECTOR

The Banking Sector Restructuring Program constituted the most important part of the transition program for strengthening the Turkish economy. Restructuring of state banks, strengthening of private banks, solving the problems of troubled banks taken over by SDIF and enhancing the regulation and supervision of the banking sector were among the priorities of the program. IN 2001, significant achievements were made in the bank restructuring process, the first step of which was the termination of the short-term liabilities of state banks. Moreover, some state banks were merged and some of the SDIF banks were taken over by bridge banks. Also, some privately owned banks were provided with capital support under provisional Article 4 added to the Banking Act No. 4389. Banking licenses of some banks were cancelled and several private banks were merged. In addition, financial restructuring of state banks was completed with the ultimate aim to privatize these banks.

Furthermore, the Law No. 4743 on Restructuring of Debts to Financial Sector and Amendments to Some Laws was put into effect in January 2002 in order to strengthen the financial condition of firms affected negatively by the economic contraction and to resolve overdue loans of private banks. The new legal framework allowed BAT to initiate the Financial Restructuring Framework Agreement. Through this agreement that was informally called Istanbul Approach³⁷ after London Approach³⁸, corporate restructuring of debts to financial sector was formulated on a voluntary basis.

The new legislation also allowed the establishment of Asset Management Companies (AMCs), in order to effectively collect bank claims and provide a high rate of

³⁷ Financial Restructuring Framework Agreement was signed by 25 banks, 17 non-bank financial institutions, the SDIF and the Emlak Bank in liquidation. However, Istanbul Approach had been less fruitful than expected. More specifically, despite the initial understanding that private banks, in return for restructuring their creditors' debt, would be able remove overdue loans from their balance sheets and these banks would also be provided the required financing by international institutions; private banks did not receive any financial support and they were only provided with an exemption from provisioning requirements for loans restructured within the Istanbul Approach. Besides, Istanbul Approach was not well suited to cover a wide array of debtor firms, especially the small and medium-sized enterprises in Anatolia; but mostly the big companies in Istanbul. Finally, Istanbul Approach has been criticized for evolving into a means for debt rescheduling rather than being a platform for debt restructuring (Steinherr et al., 2004).

³⁸ The London Approach is a non-statutory and informal framework introduced with the support of the Bank of England for dealing with temporary support operations mounted by banks and other lenders to a company or group in financial difficulties, pending a possible restructuring during the recession of the late 1980s. Following a consultative process, the Bank of England circulated a letter to banking associations in London in August 1990 with the aim of ensuring that every bank in London should be familiar with the multi-bank approach to supporting companies in difficulty (www.bba.org.uk).

return on these claims. An AMC, to be founded as a subsidiary of a bank, was granted the authority to make agreements with firms about their repayment to the affiliated bank.³⁹

Finally, with Banking Act No. 5411 in 2005, the previous banking regulation was repealed; financial holding companies and participation banks were included in the Act; and a number of provisions of the Central Bank Law were changed.

³⁹ In order to establish rules and procedures relating to the establishment and operations of AMCs, the Regulation on the Establishment and Operations of the Asset Management Companies was issued by BRSA in October 2002. This regulation was repealed by the issue of Banks Act No. 5411 and the new regulation on the establishment and operations of the AMCs was issued by BRSA in November 2006.

TABLE A1.
DESCRIPTIVE STATISTICS OF SELECTED BANK-SPECIFIC VARIABLES

		OVERALL SAMPLE				BEFORE THE GLOBAL CRISIS				AFTER THE GLOBAL CRISIS			
		Mean	Std. De5.	Min	Max	Mean	Std. De5.	Min	Max	Mean	Std. De5.	Min	Max
EQUITY/ ASSETS	All	0.132	0.062	0.033	0.916	0.133	0.075	0.033	0.916	0.131	0.040	0.062	0.340
	State	0.100	0.017	0.060	0.137	0.101	0.021	0.060	0.137	0.098	0.012	0.071	0.116
	Private	0.134	0.070	0.033	0.916	0.133	0.090	0.033	0.916	0.135	0.032	0.062	0.242
	Foreign	0.141	0.058	0.047	0.442	0.145	0.065	0.047	0.442	0.138	0.049	0.078	0.340
LOANS/ ASSETS	All	0.498	0.174	0.001	0.878	0.437	0.180	0.001	0.810	0.572	0.134	0.214	0.878
	State	0.394	0.175	0.069	0.657	0.286	0.139	0.069	0.604	0.524	0.113	0.280	0.657
	Private	0.505	0.176	0.001	0.878	0.430	0.175	0.001	0.810	0.594	0.129	0.227	0.878
	Foreign	0.529	0.157	0.100	0.777	0.502	0.165	0.100	0.752	0.562	0.140	0.214	0.777
LIQASSETS/ ASSETS	All	0.313	0.135	0.029	0.853	0.320	0.146	0.029	0.853	0.306	0.121	0.060	0.731
	State	0.304	0.124	0.029	0.548	0.328	0.150	0.029	0.548	0.275	0.073	0.142	0.389
	Private	0.319	0.164	0.059	0.853	0.339	0.179	0.059	0.853	0.294	0.140	0.060	0.731
	Foreign	0.310	0.093	0.129	0.661	0.293	0.078	0.129	0.509	0.332	0.104	0.164	0.661
PROFITS/ ASSETS	All	0.009	0.015	-0.176	0.059	0.008	0.019	-0.176	0.059	0.009	0.007	-0.017	0.031
	State	0.014	0.008	0.000	0.034	0.015	0.008	0.000	0.034	0.013	0.007	0.004	0.028
	Private	0.007	0.020	-0.176	0.059	0.005	0.026	-0.176	0.059	0.009	0.008	-0.017	0.031
	Foreign	0.009	0.008	-0.022	0.037	0.010	0.009	-0.022	0.037	0.008	0.006	-0.004	0.026
PROFITS/ EQUITY	All	0.077	0.114	-1.786	0.618	0.078	0.143	-1.786	0.618	0.076	0.063	-0.146	0.339
	State	0.143	0.085	-0.003	0.403	0.150	0.091	-0.003	0.403	0.135	0.075	0.040	0.339
	Private	0.064	0.145	-1.786	0.618	0.057	0.187	-1.786	0.618	0.072	0.063	-0.146	0.222
	Foreign	0.070	0.059	-0.075	0.334	0.078	0.069	-0.075	0.334	0.060	0.043	-0.044	0.223
DEPOSITS/ ASSETS	All	0.625	0.130	0.012	0.875	0.629	0.146	0.012	0.875	0.621	0.109	0.123	0.837
	State	0.737	0.059	0.608	0.851	0.752	0.056	0.619	0.851	0.718	0.058	0.608	0.837
	Private	0.626	0.097	0.012	0.875	0.628	0.114	0.012	0.875	0.624	0.072	0.474	0.832
	Foreign	0.582	0.159	0.108	0.852	0.584	0.175	0.108	0.852	0.580	0.136	0.123	0.774
NII/ASSETS	All	0.026	0.024	-0.232	0.230	0.027	0.030	-0.232	0.230	0.024	0.015	0.004	0.136
	State	0.024	0.013	-0.002	0.067	0.026	0.015	-0.002	0.067	0.023	0.010	0.007	0.046
	Private	0.023	0.018	-0.047	0.230	0.024	0.022	-0.047	0.230	0.022	0.012	0.005	0.066
	Foreign	0.029	0.033	-0.232	0.230	0.031	0.040	-0.232	0.230	0.028	0.020	0.004	0.136
ODL/LOANS	All	0.056	0.080	0.000	0.946	0.069	0.105	0.000	0.946	0.041	0.022	0.007	0.124
	State	0.113	0.170	0.012	0.946	0.178	0.209	0.018	0.946	0.035	0.014	0.012	0.064
	Private	0.043	0.042	0.000	0.459	0.047	0.054	0.000	0.459	0.039	0.019	0.008	0.095
	Foreign	0.050	0.051	0.006	0.371	0.054	0.064	0.006	0.371	0.045	0.028	0.007	0.124
OTHEREXP/ ASSETS	All	0.028	0.029	0.004	0.274	0.034	0.037	0.005	0.274	0.022	0.015	0.004	0.104
	State	0.015	0.008	0.004	0.049	0.016	0.010	0.005	0.049	0.012	0.006	0.004	0.025
	Private	0.026	0.026	0.005	0.274	0.032	0.034	0.005	0.274	0.020	0.011	0.005	0.053
	Foreign	0.036	0.035	0.004	0.274	0.043	0.043	0.006	0.274	0.027	0.018	0.004	0.104
FXASSETS/ FXLIABILITIES	All	0.793	0.195	0.125	1.567	0.800	0.193	0.190	1.128	0.785	0.197	0.125	1.567
	State	0.930	0.097	0.646	1.050	0.915	0.124	0.646	1.050	0.948	0.045	0.852	1.034
	Private	0.782	0.228	0.125	1.567	0.784	0.232	0.190	1.128	0.779	0.224	0.125	1.567
	Foreign	0.756	0.151	0.402	1.128	0.776	0.138	0.424	0.984	0.731	0.161	0.402	1.128
ASSETS/GDP	All	0.122	0.145	0.000	0.536	0.097	0.117	0.000	0.442	0.152	0.168	0.002	0.536
	State	0.283	0.114	0.113	0.536	0.238	0.100	0.113	0.442	0.338	0.105	0.219	0.536
	Private	0.135	0.163	0.000	0.510	0.107	0.126	0.000	0.418	0.169	0.193	0.002	0.510
	Foreign	0.045	0.040	0.001	0.153	0.033	0.027	0.001	0.109	0.061	0.047	0.003	0.153
TLRESERVES/ ASSETS	All	0.020	0.018	0.000	0.103	0.027	0.018	0.000	0.103	0.011	0.012	0.000	0.058
	State	0.023	0.021	0.001	0.103	0.031	0.021	0.008	0.103	0.013	0.015	0.001	0.054
	Private	0.019	0.017	0.001	0.095	0.026	0.016	0.001	0.095	0.010	0.012	0.001	0.058
	Foreign	0.019	0.017	0.000	0.097	0.026	0.019	0.000	0.097	0.011	0.011	0.000	0.049
FXRESERVES/ ASSETS	All	0.040	0.031	0.001	0.230	0.051	0.025	0.014	0.144	0.028	0.033	0.001	0.230
	State	0.027	0.022	0.001	0.104	0.038	0.022	0.014	0.104	0.013	0.010	0.001	0.037
	Private	0.040	0.028	0.003	0.185	0.051	0.022	0.022	0.131	0.027	0.028	0.003	0.185
	Foreign	0.046	0.037	0.002	0.230	0.055	0.028	0.018	0.144	0.035	0.043	0.002	0.230

TABLE A2.
MEAN VALUES OF SELECTED BANK-SPECIFIC VARIABLES BY YEARS AND OWNERSHIP

		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
EQUITY/ ASSETS	All	0.154	0.157	0.141	0.131	0.110	0.120	0.130	0.143	0.141	0.120	0.126	0.122
	State	0.092	0.106	0.099	0.102	0.101	0.104	0.091	0.093	0.100	0.094	0.105	0.104
	Private	0.177	0.168	0.145	0.125	0.102	0.117	0.125	0.143	0.146	0.128	0.130	0.129
	Foreign	0.149	0.162	0.152	0.148	0.124	0.130	0.150	0.161	0.151	0.120	0.129	0.119
LOANS/ ASSETS	All	0.266	0.299	0.375	0.438	0.485	0.530	0.565	0.535	0.564	0.569	0.598	0.611
	State	0.154	0.160	0.219	0.246	0.320	0.391	0.456	0.453	0.493	0.549	0.567	0.590
	Private	0.232	0.264	0.350	0.430	0.491	0.542	0.582	0.551	0.583	0.601	0.620	0.640
	Foreign	0.350	0.394	0.463	0.519	0.538	0.566	0.586	0.547	0.567	0.536	0.581	0.584
LIQASSETS/ ASSETS	All	0.299	0.305	0.323	0.315	0.335	0.341	0.295	0.297	0.293	0.330	0.311	0.304
	State	0.201	0.263	0.280	0.310	0.375	0.418	0.324	0.260	0.286	0.281	0.275	0.288
	Private	0.305	0.322	0.371	0.352	0.338	0.347	0.301	0.301	0.290	0.301	0.295	0.282
	Foreign	0.328	0.299	0.279	0.271	0.317	0.304	0.278	0.305	0.299	0.384	0.345	0.337
PROFITS/ ASSETS	All	0.011	0.003	0.008	0.008	0.008	0.012	0.011	0.012	0.010	0.007	0.009	0.006
	State	0.021	0.013	0.014	0.014	0.015	0.018	0.013	0.016	0.015	0.011	0.011	0.009
	Private	0.007	-0.004	0.003	0.002	0.007	0.013	0.011	0.011	0.010	0.007	0.009	0.007
	Foreign	0.012	0.009	0.010	0.013	0.007	0.009	0.010	0.011	0.008	0.006	0.009	0.004
PROFITS/ EQUITY	All	0.164	0.064	0.072	0.051	0.074	0.105	0.093	0.093	0.079	0.061	0.077	0.054
	State	0.255	0.121	0.150	0.141	0.153	0.175	0.153	0.176	0.151	0.115	0.107	0.092
	Private	0.189	0.044	0.041	-0.013	0.054	0.108	0.091	0.082	0.073	0.055	0.074	0.059
	Foreign	0.097	0.068	0.082	0.098	0.069	0.076	0.073	0.075	0.059	0.050	0.069	0.034
DEPOSITS/ ASSETS	All	0.666	0.641	0.622	0.628	0.639	0.616	0.616	0.625	0.624	0.620	0.623	0.607
	State	0.714	0.714	0.743	0.757	0.766	0.766	0.778	0.741	0.746	0.703	0.706	0.672
	Private	0.675	0.644	0.618	0.627	0.625	0.618	0.626	0.638	0.642	0.615	0.614	0.600
	Foreign	0.638	0.611	0.582	0.582	0.608	0.557	0.543	0.564	0.557	0.594	0.603	0.590
NII/ASSETS	All	0.064	0.026	0.022	0.027	0.024	0.030	0.029	0.029	0.024	0.020	0.024	0.017
	State	0.044	0.026	0.032	0.024	0.024	0.025	0.023	0.027	0.022	0.019	0.022	0.017
	Private	0.062	0.014	0.028	0.024	0.020	0.028	0.026	0.025	0.023	0.018	0.021	0.016
	Foreign	0.074	0.041	0.010	0.032	0.027	0.035	0.035	0.033	0.026	0.023	0.028	0.019
ODL/LOANS	All	0.174	0.143	0.068	0.058	0.047	0.032	0.029	0.053	0.050	0.034	0.033	0.034
	State	0.580	0.465	0.191	0.122	0.068	0.047	0.037	0.045	0.040	0.028	0.029	0.032
	Private	0.105	0.088	0.041	0.044	0.039	0.027	0.027	0.051	0.047	0.033	0.031	0.030
	Foreign	0.107	0.092	0.055	0.050	0.049	0.032	0.029	0.057	0.056	0.038	0.037	0.039
OTHEREXP/ ASSETS	All	0.070	0.047	0.040	0.036	0.025	0.024	0.023	0.023	0.023	0.020	0.021	0.016
	State	0.041	0.022	0.017	0.015	0.013	0.013	0.013	0.013	0.012	0.012	0.012	0.010
	Private	0.069	0.046	0.034	0.032	0.023	0.022	0.023	0.022	0.022	0.018	0.019	0.015
	Foreign	0.081	0.057	0.055	0.048	0.032	0.030	0.028	0.029	0.029	0.026	0.027	0.020
FXASSETS/ FXLIABILITIES	All	0.877	0.865	0.836	0.798	0.788	0.747	0.738	0.758	0.757	0.806	0.800	0.814
	State	0.952	0.955	0.952	0.880	0.886	0.902	0.917	0.966	0.942	0.955	0.934	0.940
	Private	0.849	0.840	0.805	0.785	0.786	0.743	0.722	0.715	0.725	0.815	0.828	0.833
	Foreign	0.885	0.863	0.833	0.784	0.753	0.695	0.692	0.733	0.727	0.739	0.715	0.744
ASSETS/GDP	All	0.085	0.082	0.085	0.092	0.103	0.111	0.122	0.142	0.145	0.154	0.157	0.169
	State	0.226	0.224	0.230	0.235	0.242	0.246	0.267	0.329	0.337	0.343	0.336	0.362
	Private	0.093	0.088	0.089	0.100	0.114	0.127	0.138	0.159	0.161	0.170	0.175	0.186
	Foreign	0.023	0.022	0.025	0.030	0.037	0.041	0.048	0.051	0.052	0.064	0.067	0.075
TLRESERVES/ ASSETS	All	0.018	0.018	0.037	0.035	0.025	0.027	0.022	0.020	0.010	0.006	0.007	0.007
	State	0.025	0.018	0.043	0.043	0.027	0.029	0.028	0.023	0.015	0.009	0.008	0.008
	Private	0.018	0.018	0.034	0.033	0.026	0.028	0.021	0.020	0.008	0.006	0.007	0.006
	Foreign	0.015	0.018	0.038	0.035	0.021	0.024	0.022	0.020	0.011	0.006	0.007	0.007
FXRESERVES/ ASSETS	All	0.092	0.079	0.053	0.037	0.034	0.042	0.050	0.043	0.019	0.023	0.022	0.027
	State	0.085	0.074	0.042	0.024	0.023	0.025	0.029	0.022	0.009	0.007	0.006	0.016
	Private	0.091	0.078	0.054	0.038	0.033	0.041	0.054	0.044	0.020	0.021	0.021	0.022
	Foreign	0.095	0.083	0.055	0.042	0.039	0.049	0.054	0.050	0.022	0.033	0.029	0.037

TABLE A3.
PANEL REGRESSION RESULTS FOR THE OVERALL SAMPLE

DEPENDENT VARIABLES

	EQUITY/ ASSETS	LOANS/ ASSETS	LIQASSETS/ ASSETS	PROFITS/ ASSETS	PROFITS/ EQUITY	DEPOSITS/ ASSETS	NIJ/ ASSETS
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BANK-SPECIFIC VARIABLES

ODL/LOANS	0.067*** (0.02)	-0.465*** (0.04)	-0.194*** (0.04)	-0.011* (0.01)	-0.132*** (0.05)	-0.266*** (0.04)	0.002 (0.01)
OTHEREXP/ ASSETS	0.750*** (0.06)	-0.810*** (0.12)	0.133 (0.11)	-0.137*** (0.02)	-0.416*** (0.13)	-0.519*** (0.11)	0.284*** (0.03)
FXASSETS/ FXLIABILITIES	0.062*** (0.01)	-0.124*** (0.02)	0.028 (0.02)	-0.003 (0.00)	0.062*** (0.03)	-0.026 (0.02)	-0.002 (0.01)
ASSETS/GDP	0.020 (0.04)	0.020 (0.07)	-0.055 (0.07)	-0.007 (0.01)	0.066 (0.08)	-0.332*** (0.07)	-0.023 (0.01)
DPRIVATE	0.017 (0.02)	0.007 (0.05)	0.041 (0.09)	-0.004 (0.01)	-0.053 (0.04)	-0.092* (0.05)	-0.001 (0.01)
DFOREIGN	0.007 (0.02)	0.035 (0.06)	0.049 (0.10)	0.001 (0.01)	-0.028 (0.04)	-0.124** (0.06)	0.003 (0.01)
DBIST	-0.033*** (0.01)	0.083** (0.04)	-0.075 (0.07)	0.003 (0.00)	0.049 (0.03)	0.045 (0.04)	-0.001 (0.00)
DEARLY1900s	0.046 (0.03)	0.091 (0.09)	0.005 (0.15)	-0.004 (0.01)	-0.053 (0.07)	-0.159* (0.09)	-0.014 (0.01)
D1980s	0.070** (0.03)	0.110 (0.10)	-0.031 (0.15)	-0.012 (0.01)	-0.061 (0.07)	-0.231*** (0.09)	-0.019* (0.01)
D1990s	0.049 (0.03)	0.192 (0.10)	-0.121 (0.15)	-0.006 (0.01)	-0.019 (0.07)	-0.208** (0.09)	-0.020* (0.01)

MACROECONOMIC & POLICY-RELATED VARIABLES

GDP	-0.082*** (0.03)	-0.206*** (0.06)	0.059 (0.06)	-0.008 (0.01)	-0.110 (0.07)	0.055 (0.06)	-0.031** (0.02)
INFLATION	0.027 (0.08)	0.872*** (0.15)	-0.373*** (0.14)	0.001 (0.02)	0.069 (0.17)	0.533*** (0.14)	0.034 (0.04)
EXCHANGE	-0.095*** (0.03)	-0.015 (0.05)	-0.009 (0.05)	-0.011 (0.01)	-0.088 (0.06)	0.037 (0.05)	-0.001 (0.01)
POLICYRATE	-0.055 (0.05)	-1.062*** (0.09)	0.311*** (0.08)	-0.007 (0.01)	0.056 (0.10)	-0.127 (0.08)	-0.007 (0.02)
TLRESERVES/ ASSETS	-0.122 (0.12)	-0.300 (0.22)	-0.161 (0.20)	0.041 (0.03)	0.156 (0.25)	0.400** (0.21)	-0.078 (0.06)
FXRESERVES/ ASSETS	0.157** (0.08)	0.373*** (0.15)	-0.703*** (0.14)	0.023 (0.02)	0.007 (0.17)	-0.010 (0.14)	-0.018 (0.04)
CONSTANT	0.017 (0.03)	0.536*** (0.08)	0.369*** (0.11)	0.022*** (0.01)	0.077 (0.06)	0.925*** (0.07)	0.040*** (0.01)
No of Obs.	924	924	924	924	924	924	924
Wald chi2(df)	269.15	1238.0	78.61	98.74	42.93	116.8	118.01
Prob>chi2 (p value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00

*** ** * denote statistical significance at 1, 5 and 10 percent, respectively.
Numbers in the parentheses are standard errors.

TABLE A4.
PANEL REGRESSION RESULTS BEFORE THE GLOBAL CRISIS

DEPENDENT VARIABLES

	EQUITY/ ASSETS	LOANS/ ASSETS	LIQASSETS/ ASSETS	PROFITS/ ASSETS	PROFITS/ EQUITY	DEPOSITS/ ASSETS	NI/ ASSETS
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BANK-SPECIFIC VARIABLES

ODL/LOANS	0.002 (0.03)	-0.178*** (0.04)	-0.283*** (0.04)	-0.005 (0.01)	-0.140* (0.08)	-0.325*** (0.04)	0.000 (0.02)
OTHEREXP/ ASSETS	0.599*** (0.08)	-0.648*** (0.11)	0.229** (0.11)	-0.137*** (0.02)	-0.471*** (0.19)	-0.519*** (0.11)	0.186*** (0.04)
FXASSETS/ FXLIABILITIES	0.219*** (0.02)	-0.242*** (0.03)	0.037 (0.03)	-0.031*** (0.01)	0.025 (0.05)	-0.190*** (0.03)	0.004 (0.01)
ASSETS/GDP	-0.056 (0.08)	0.443*** (0.13)	0.032 (0.13)	0.026 (0.02)	0.311* (0.19)	-0.208 (0.13)	-0.009 (0.02)
DPRIVATE	0.006 (0.03)	0.068 (0.08)	0.012 (0.12)	-0.006 (0.01)	-0.086 (0.06)	-0.116* (0.07)	0.000 (0.01)
DFOREIGN	-0.014 (0.03)	0.157* (0.09)	-0.011 (0.13)	0.005 (0.01)	-0.043 (0.07)	-0.125 (0.08)	0.005 (0.01)
DBIST	-0.020 (0.02)	0.090 (0.06)	-0.085 (0.09)	-0.001 (0.01)	0.052 (0.05)	0.006 (0.05)	-0.001 (0.00)
DEARLY1900s	0.047 (0.05)	0.113 (0.13)	0.048 (0.20)	0.002 (0.02)	-0.010 (0.11)	-0.113 (0.12)	-0.015 (0.01)
D1980s	0.089 (0.06)	0.142 (0.14)	0.035 (0.20)	-0.009 (0.02)	0.016 (0.12)	-0.232* (0.13)	-0.017 (0.01)
D1990s	0.085 (0.06)	0.273** (0.14)	-0.100 (0.21)	-0.004 (0.02)	0.063 (0.13)	-0.223* (0.13)	-0.018 (0.01)

MACROECONOMIC & POLICY-RELATED VARIABLES

GDP	-0.355*** (0.12)	-0.821 (0.16)	0.053 (0.16)	0.040 (0.03)	-0.057 (0.28)	0.608*** (0.16)	0.076 (0.06)
INFLATION	-0.147 (0.13)	0.597*** (0.18)	-0.271 (0.18)	0.024 (0.04)	0.267 (0.32)	0.586*** (0.19)	0.161** (0.07)
EXCHANGE	-0.083 (0.05)	0.031 (0.07)	0.001 (0.07)	-0.022 (0.01)	-0.159 (0.12)	0.008 (0.07)	-0.040 (0.03)
POLICYRATE	0.055 (0.10)	-0.987*** (0.13)	0.325*** (0.13)	-0.025 (0.03)	-0.119 (0.23)	-0.069 (0.13)	-0.096 (0.05)
TLRESERVES/ ASSETS	-0.062 (0.15)	0.033 (0.20)	-0.370* (0.20)	0.047 (0.04)	0.171 (0.37)	0.421** (0.21)	-0.134* (0.08)
FXRESERVES/ ASSETS	0.220 (0.18)	0.610*** (0.24)	-1.024*** (0.24)	0.079 (0.05)	0.434 (0.43)	0.175 (0.25)	-0.002 (0.08)
CONSTANT	-0.094* (0.05)	0.481*** (0.11)	0.366*** (0.16)	0.034** (0.02)	0.033 (0.12)	1.002 (0.10)	0.033*** (0.01)
No of Obs.	504	504	504	504	504	504	504
Wald chi2(df)	252.85	1007.9	95.49	103.55	25.53	170.8	50.72
Prob>chi2 (p value)	0.00	0.00	0.00	0.00	0.06	0.00	0.00

***,**, * denote statistical significance at 1, 5 and 10 percent, respectively.
Numbers in the parentheses are standard errors.

TABLE A5.
PANEL REGRESSION RESULTS AFTER THE GLOBAL CRISIS

DEPENDENT VARIABLES

	EQUITY/ ASSETS	LOANS/ ASSETS	LIQASSETS/ ASSETS	PROFITS/ ASSETS	PROFITS/ EQUITY	DEPOSITS/ ASSETS	NI/ ASSETS
BANK-SPECIFIC VARIABLES							
ODL/LOANS	0.319*** (0.09)	-2.217*** (0.22)	0.784*** (0.24)	0.002*** (0.02)	-0.146 (0.15)	0.716*** (0.25)	-0.071*** (0.03)
OTHEREXP/ ASSETS	0.270*** (0.11)	0.343 (0.26)	-0.504* (0.28)	0.227*** (0.02)	1.701*** (0.18)	0.685** (0.31)	0.965*** (0.03)
FXASSETS/ FXLIABILITIES	-0.010 (0.01)	-0.058*** (0.02)	0.027 (0.03)	0.012 (0.00)	0.108*** (0.02)	-0.059** (0.03)	0.004 (0.00)
ASSETS/GDP	0.038 (0.05)	-0.342*** (0.12)	0.280* (0.15)	-0.015* (0.01)	-0.074 (0.06)	-0.006 (0.11)	-0.005 (0.01)
DPRIVATE	0.016 (0.02)	-0.027 (0.06)	0.071 (0.09)	-0.001 (0.00)	-0.031 (0.02)	-0.091** (0.05)	-0.007* (0.00)
DFOREIGN	0.006 (0.02)	-0.065 (0.07)	0.122 (0.10)	-0.002 (0.00)	-0.037 (0.03)	-0.145*** (0.05)	-0.009* (0.00)
DBIST	-0.029* (0.02)	0.088** (0.04)	-0.087 (0.06)	0.003 (0.00)	0.042** (0.02)	0.031 (0.04)	0.001 (0.00)
DEARLY1900s	0.041 (0.04)	0.088 (0.10)	0.023 (0.15)	-0.006 (0.01)	-0.070 (0.05)	-0.081 (0.08)	-0.002 (0.01)
D1980s	0.066 (0.04)	0.072 (0.11)	0.043 (0.16)	-0.012 (0.01)	-0.109** (0.05)	-0.063 (0.10)	-0.002 (0.01)
D1990s	0.038 (0.04)	0.110 (0.11)	-0.009 (0.16)	-0.010 (0.01)	-0.083 (0.05)	-0.063 (0.10)	-0.002 (0.01)

MACROECONOMIC & POLICY-RELATED VARIABLES

GDP	0.051 (0.03)	-0.144* (0.08)	-0.041 (0.09)	0.006 (0.01)	0.049 (0.06)	-0.023 (0.09)	0.000 (0.01)
INFLATION	-0.078 (0.09)	0.715*** (0.21)	-0.435** (0.23)	-0.022 (0.02)	-0.163 (0.15)	0.281 (0.25)	-0.026 (0.03)
EXCHANGE	-0.112*** (0.03)	-0.032 (0.06)	0.103 (0.07)	-0.020*** (0.01)	-0.106*** (0.04)	0.085 (0.07)	-0.011 (0.01)
POLICYRATE	0.300*** (0.10)	-1.002*** (0.25)	0.027 (0.27)	0.045** (0.02)	0.356** (0.17)	-0.437 (0.30)	0.060** (0.03)
TLRESERVES/ ASSETS	-0.140 (0.17)	-0.187 (0.41)	-1.104*** (0.44)	0.067** (0.03)	0.691*** (0.29)	1.133** (0.49)	0.087* (0.05)
FXRESERVES/ ASSETS	0.152*** (0.06)	0.165 (0.13)	-0.424*** (0.15)	0.003 (0.01)	-0.021 (0.09)	-0.120 (0.16)	0.014 (0.02)
CONSTANT	0.057 (0.04)	0.680*** (0.10)	0.225* (0.14)	0.003 (0.01)	0.037 (0.05)	0.774*** (0.09)	0.009 (0.01)
No of Obs.	420	420	420	420	420	420	420
Wald chi2(df)	83.29	186.88	40.35	187	178.63	47.2	1112.99
Prob>chi2 (p value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00

***, **, * denote statistical significance at 1, 5 and 10 percent, respectively.

Numbers in the parentheses are standard errors.

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