

AN ANALYSIS OF THE MACROECONOMIC CONDITIONS REQUIRED FOR SME LENDING: THE CASE OF TURKEY

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Development Discussion Paper: 2014-06

Abstract

Providing SMEs with access to external finance has been a major concern for many governments and international organizations for three decades. In recent years the experiences of emerging market countries suggest that a paradigm shift is taking place in SME finance. Particularly in fast-growing emerging market countries, banks are increasingly targeting SMEs as a new line of banking business. This research analyzes how the macroeconomic factors have contributed to the increased commercial bank lending to SMEs in Turkey, a fast-growing emerging market country. Based on an econometric analysis it is found that a high GDP growth rate and increasing competition in the Turkish banking sector have contributed to the growing banking sector credit to SMEs. The findings also reveal that curbing the high inflation rate and reducing government domestic borrowings have significantly helped to encourage bank lending to the SME segment. This research contributes to the literature by providing empirical evidence to much-discussed theoretical arguments on the characteristics of an enabling macroeconomic environment for SME finance.

Keywords: SME lending, macroeconomics, banking sector, emerging markets, access to credit

JEL Classification: G21, G28, O12

1. Introduction

It is widely understood that SMEs play a crucial role in job creation and economic growth in all countries. However, limited access to formal sector credit remained a major obstacle for SMEs' growth until very recently (Ayyagari et al., 2007; Beck et al., 2008; Beck et al., 2009; Beck and Demirgüç-Kunt, 2006). To overcome this obstacle, governments and donor organizations have, over the past three decades, undertaken supportive programs to promote SME finance. Such efforts, although found to be helpful, were not able to substitute for commercial bank lending to SMEs. Demand for credit from this sector was simply too large to be financed by a limited number of special credit programs. Yet the SME sector was not perceived as a potential market for profitable business lending by commercial banks. While more than 98% of total private businesses in developing countries are SMEs, only a small percentage of banks' loan portfolios were lent to this sector (Ayyagari et al., 2007; Beck et al., 2009).

It was often argued that this was largely because the characteristics of SMEs are incompatible with conventional banks' lending practices. Lack of transparency in the financial position of SMEs and the inadequate or insufficient collateral owned by these businesses made SMEs unattractive for banks (Berger and Udell, 1995). On the other hand, recent country surveys conducted by the World Bank Group have consistently showed that commercial banks, in particular in the emerging market countries, have been increasingly focusing on SMEs (De la Torre et al., 2010; IFC, 2007). There is no evidence to suggest that SMEs are now more transparent or that they are more creditworthy than they were before. The common characteristics of SMEs that made them unattractive for banks 40 years ago still exist. Therefore,

what has attracted banks to SMEs in emerging market countries during the past decade is a critical research question.

This paper aims to investigate whether the changing macroeconomic environment has contributed to the transformation of banks' approach toward SME lending in Turkey. Turkey is an important emerging market country that has showed remarkable progress in SME finance over the past ten years. Furthermore, Turkey has a strong banking sector that was not affected by the recent global financial crises. Based on a recent survey study in Turkey, Jenkins (2014) states that a visible transformation has been taking place in the way that commercial banks are conducting business with SMEs. All the commercial banks interviewed indicated that they established their dedicated SME banking departments and websites for SME clients between 2003 and 2011 (Jenkins, 2014). The purpose of the current research is to analyze whether and to what extent the changing macroeconomic environment has contributed to this historical change in commercial bank lending to SMEs in the Turkish economy.

The importance of the macroeconomic environment for successful SME finance cannot be disputed. However, to the best of our knowledge, no econometric analysis has so far been conducted to analyze the effect of macroeconomic factors on the growth of SME bank credit. Our research contributes to the literature by providing empirical evidence that economic instability and government domestic borrowing play a major role in reducing banks' lending to SMEs, whereas economic growth increases it significantly. It is also found that competition – in other words, a less concentrated banking sector – is positively related to banks' lending to SMEs.

This paper is organized as follows. Section 2 reviews the literature and develops the conceptual framework for the analysis. Section 3 summarizes the economic and financial environment of Turkey between 1980 and 2012, and Section 4 describes how the relationship between commercial banks and SMEs changed over this period. Section 5 reviews the data and methodology. Section 6 discusses the findings and checks the robustness of the regression results. In Section 7 we present our concluding remarks and discuss the implications of our findings.

2. Literature review and conceptual framework

The fact that in most countries SMEs make up the biggest share of total businesses yet receive the smallest share of credit has stimulated a great deal of research around the world. Earlier studies mostly focused on SME-specific (opaqueness of SMEs) or bank-specific (banks' lending capacity) factors to explain banks' credit-rationing behavior toward SMEs. In order to make correct lending decisions, banks need to have up-to-date, reliable financial information to assess the credit risk of their potential borrowers. However, the opaqueness of SMEs, i.e. information asymmetries between SMEs and banks, makes it difficult and costly for banks to deal with SME borrowers. Hence, banks often choose to ration credit to this sector, or ask for more collateral than they would normally ask for from large enterprises (Berger and Udell, 1995; Berger et al., 2001; Rajan, 1992, Beck et al, 2005).

The relationship lending theory that emerged in the early 1990s argued that the information asymmetries between banks and SMEs can be overcome by banks through developing close relationships with SMEs. Based on the "know your customer" principle, this theory suggests that

small banks are better equipped to serve SME clients because such banks have a smaller number of clients to serve, and hence, they can get to know their customers better. In large banks, however, the client–bank relationship is mostly impersonal and distant because bank personnel often have no time to develop relationships with their SME clients. Hence, according to this theory, small banks have an advantage over large banks when dealing with the information asymmetries. This implies that small banks are able to make a bigger share of their loans to SMEs than the large banks. This approach gained support in the 1990s through research by Petersen and Rajan (1994), Rajan (1992), Keeton (1995), and Berger et al. (1998). According to the findings of these studies, large banks allocated a smaller percentage of their assets to SMEs than the small banks did. Furthermore, bigger banks created through bank mergers and acquisitions were found in some studies to have reduced their credit supply to small businesses (Berger et al., 1998).

More recently, however, these views have been challenged by IFC (2007), World Bank (2007a; 2007b), De la Torre et al. (2010), Beck et al. (2008), Rocha et al. (2010), Berg and Fuchs (2013), and Jenkins (2014). Contrary to earlier research, these studies found that, primarily in emerging market countries, not only the small niche banks but also large domestic and foreign banks are increasingly lending to SMEs and targeting this sector when marketing their financial products. In line with these observations, Jenkins (2014) provides further evidence that in Turkey the large banks, on average, allocate 26% of their total loan portfolio to SMEs, whereas the smaller banks allocate only 17%.¹ It is clear that these findings, which come recently from emerging market countries, cannot be explained by the relationship lending theory of the 1990s. This implies that there must be factors other than bank size affecting SME lending.

¹ This finding is based on a survey study of the Turkish commercial banks in 2012.

The recent World Bank studies confirm our intuition that external factors such as the macroeconomic environment, banking sector competition, credit bureaus and countries' legal systems play a more significant role in encouraging or discouraging bank SME lending than was previously believed. For example, based on the survey results of 91 banks from 45 countries, Beck et al. (2008, p. 3) states that "banks perceive the SME segment to be highly profitable, but perceive macroeconomic instability in developing countries and competition in developed countries as the main obstacles".

These recent findings bring our attention back to the theoretical discussions on a favorable macroeconomic environment that is conducive for SME finance. Early studies on financial liberalization and financial repression theories suggest that repressive interest rate policies are harmful for business finance (McKinnon, 1973; Shaw, 1973). According to these studies, imposing interest rate ceilings below market rates keeps interest rates artificially low and discourages savers from saving in financial institutions. This causes a shortage of funds in which banks are forced to ration credit for some businesses. The experiences showed that credit rationing affects mostly young small businesses with no credit record, or a lack of sufficient collateral. According to McKinnon (1973) and Shaw (1973), liberalization of interest rates can increase domestic savings and hence increase the availability of loanable funds for all businesses. Furthermore, the financial liberalization theory suggests that foreign banks' entry into the domestic market can increase competition in the domestic banking sector, forcing banks to look for other markets, such as the SME sector.

The early research on financial liberalization experiences has been surveyed by Fry (1982), Cho (1988), Dornbusch and Edwards (1991), and Pehlivan and Kirkpatrick (1992), and later by Levine (2001), Hanson and Ramachandran (2005), and many others. These studies showed that financial reforms and liberalization policies produced many positive results in the 1990s. However, the results fell short of expectations. During this period, as a result of economic instability and severe financial crises in many countries, the effectiveness of financial liberalization policies was reduced. Moreover, the suitability of financial liberalization policies for developing countries was often questioned. Although bank deposits increased rapidly in the 1990s in most developing countries, SMEs' access to credit remained low owing to the crowding-out effect of governments (World Bank, 2005; Hanson and Ramachandran, 2005).

The full benefits of the financial liberalization policies began to emerge in 2000s in emerging market countries where economic stability was largely achieved and institutional reforms were mostly realized. In these countries, high liquidity, reduced government borrowing, and increased competition for corporate lending began to push banks out of their comfort zone toward the more challenging and profitable SME sector. In this respect, the recent World Bank and IFC cross-country studies play a significant role in advancing our understanding of SME lending in emerging market countries (Beck et al., 2008; De la Torre et al., 2010; IFC, 2007; World Bank, 2007a, 2007b; Fuch et al, 2011). Within this framework, our research aims to investigate whether economic growth and stability, the government budget deficit, and banking sector competition significantly affected bank lending to SMEs in the Turkish economy between 2007 and 2013.

3. The economic and financial environment in Turkey between 1980 and 2012

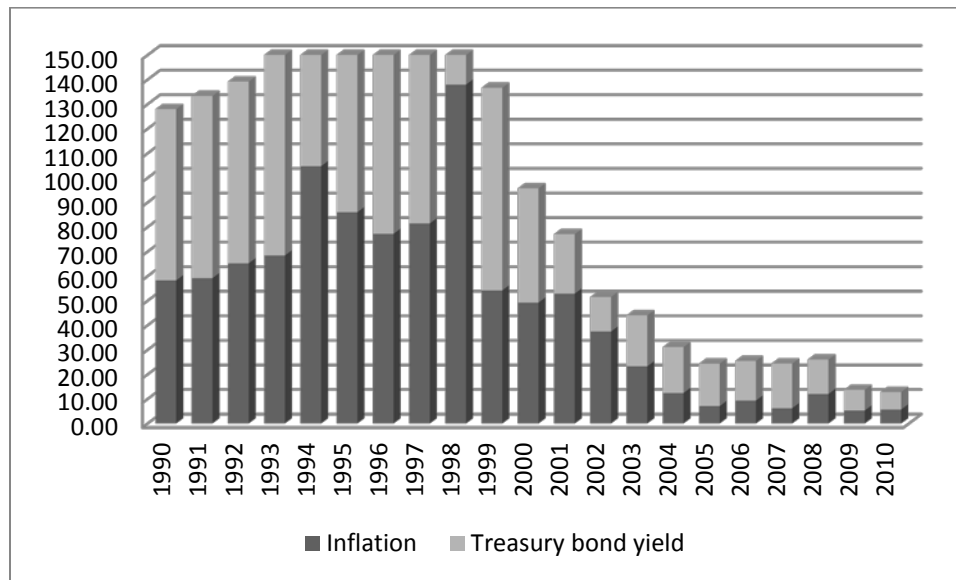
In the 1960s and 1970s Turkey followed an import substitution industrialization strategy in which protectionist economic policies were applied. Starting from 1980, Turkey began to liberalize its economy and to adopt open, export-oriented economic policies. The Turkish financial system was liberalized in two phases. First, interest rates were liberalized in 1980, and the liberalization of the capital account and full liberalization of the economy continued in the following years (Pehlivan and Kirkpatrick, 1992; Ucer, 1998). These policies were supported by World Bank structural adjustment and stabilization programs for Turkey that aimed to promote economic stability and growth. However, most of these reforms were implemented in an inflationary and unstable economic environment, and the country went through several financial and economic crises between 1980 and 2001. High inflation, sharp exchange rate depreciation and macroeconomic instability became regular phenomena in Turkey throughout the 1980s and 1990s. During this period economic growth fluctuated between -5.5% and over 9% and the inflation rate fluctuated between 25% to 127% .

Between 2000 and 2001 Turkey experienced a severe financial crisis in which 18 domestic banks had to be liquidated. Before the crisis Turkey already had a fragile banking system in which banks relied heavily on financing the government budget deficit (Özatay and Sak, 2002). The banking sector acted as the government agent, financing mainly government debt instruments. Interest rates on treasury bills and bonds were on average 30% above the inflation rate during the 1990s (Figure 1). This high yield encouraged banks to borrow from abroad and invest in treasury securities. As a result, both the capital and money markets became heavily dependent on short-term capital inflows. In 2000 more than half of the interest earnings of private banks consisted of

government securities, whereas almost two-third of their liabilities were denominated in foreign currency (Akyüz and Boratav, 2003). Consequently, the banking sector was exposed to foreign exchange rate risk and became vulnerable to sudden capital reversals. In late 1990s the East Asian financial crisis worsened the economic instability in Turkey. The capital inflows to the Turkish financial sector declined suddenly and economic growth decreased sharply from 7.5% in 1997 to 2.5% in 1998.

In 2000 government borrowing went up to 40% of GDP and the interbank rate jumped to 873% as the interbank credit market dried up (Brinke, 2013). In February 2001 the Turkish lira depreciated by about one-third of its value against the dollar. Private banks made big losses as a result of their unhedged foreign currency positions. The Savings and Deposit Insurance Fund (SDIF) had to rescue 18 banks and the total banking sector asset decreased by 12% in real value during the crisis. The Istanbul Stock Exchange fell by 14% and the economy shrunk by 5.7% (BRSA, 2010).

Figure 1: The treasury bill rate and inflation rate in Turkey



Source: World Development Indicators, 2013, World Bank; and OECD Main Economic indicators, Turkey, 2013.

The crisis shook the Turkish banking system, and its fragility was fully recognized by policymakers. In 2000 Turkey established an independent banking authority called the Banking Regulation and Supervision Agency (BRSA). The main objectives of BRSA were to ensure the stability of and confidence in financial markets, provide effective operation of the loan system, and safeguard the rights and interests of depositors (BRSA, 2010). Immediately after the crisis, BRSA implemented policy initiatives and a restructuring program in order to strengthen the regulatory and supervisory framework in Turkey. Various amendments to banking law were made in line with international best practice and EU directives.

Along with the reforms in the banking sector, the new government elected in 2002 implemented initiatives to improve the business environment. These initiatives included large tax cuts, reduced bureaucracy for foreign companies, and privatization of state enterprises. State banks and banks

under SDIF control were privatized or merged with other banks (Brinke, 2013). These policy changes helped to regain investors' trust both at home and abroad, resulting in significant capital inflows. The economy recovered from the crisis and started to grow steadily. From 2002 to 2007 Turkey maintained an average growth rate of about 7%. In 2004, both the inflation and unemployment rates came down to single digits. Finally, macroeconomic stability was achieved, along with a stable political regime, which helped the country's private sector to develop.

4. Trends in commercial bank lending to SMEs in Turkey

According to the official statistics there are about 3.2 million businesses in Turkey and 99.9% of these are SMEs (TUIK, 2009).² In Turkey, the term "SMEs" includes not only small and medium-sized enterprises but also microenterprises. As many as 96% of all SMEs in Turkey are microenterprises, while 3.5% are small and only 0.50% are medium-sized (KOSGEB, 2011). This indicates that the majority of businesses in Turkey are very small businesses. However, these businesses play a very significant role in the economy, accounting for 78% of employment, 55% of GDP, and 59% of exports (KOSGEB, 2011). Nevertheless, SMEs' share of commercial bank credit remained very low until very recently. It is estimated by the State Planning Organization of Turkey that SMEs received only 5% of the total bank credit in the 1990s.

In the 1980s and 1990s, SMEs in Turkey operated in an unstable macroeconomic environment shaped by high inflation, frequent financial crises, and economic recessions (Akyüz, 1990;

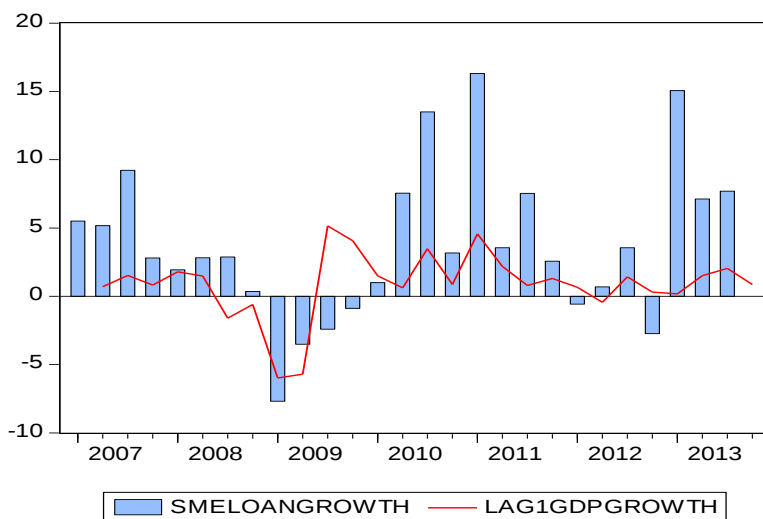
² In Turkey SMEs are classified as follows: businesses with fewer than 10 employees or annual sales of less than 1 million TL are classified as microenterprises; businesses with 10–49 employees or annual sales of 1–5 million TL are classified as small businesses; and businesses that have 50–249 employees or annual sales of 5–25 million TL are classified as medium-sized businesses (KOSGEB, 2011).

Ertugrul and Selcuk, 2001; Us, 2004). These unfavorable conditions negatively affected SMEs and discouraged banks from extending credit to this sector. In order to help offset these poor economic conditions, numerous government programs were introduced in 2004 and 2005 to support SMEs' development and growth.³ As a result of Turkey becoming a candidate for EU membership, a number of EU projects have also been created to support SMEs in the country (OECD, 2004).

In recent years the most important development in SME lending in Turkey has become the increased interest on the part of commercial banks in providing financial services to SMEs. After the inflation rate fell from around 75% per annum in 2001 to 7% in 2005, banks started to establish SME banking departments to target SME clients for lending and to provide them with other financial services (Jenkins, 2014). Bank lending to SMEs moved in line with GDP growth: it declined during the global financial crisis between 2008–2010, and recovered after 2010 (Figure 2).

³ These programs were executed by both governmental and non-governmental organizations. Three of the most important institutions are the Small and Medium Scale Enterprises Development Organization (KOSGEB), the Credit Guarantee Fund (KGF), and the Confederation of Turkish Handcraft and Artisans (TESK).

Figure 2. SME loan growth and GDP growth in Turkey (quarterly data)



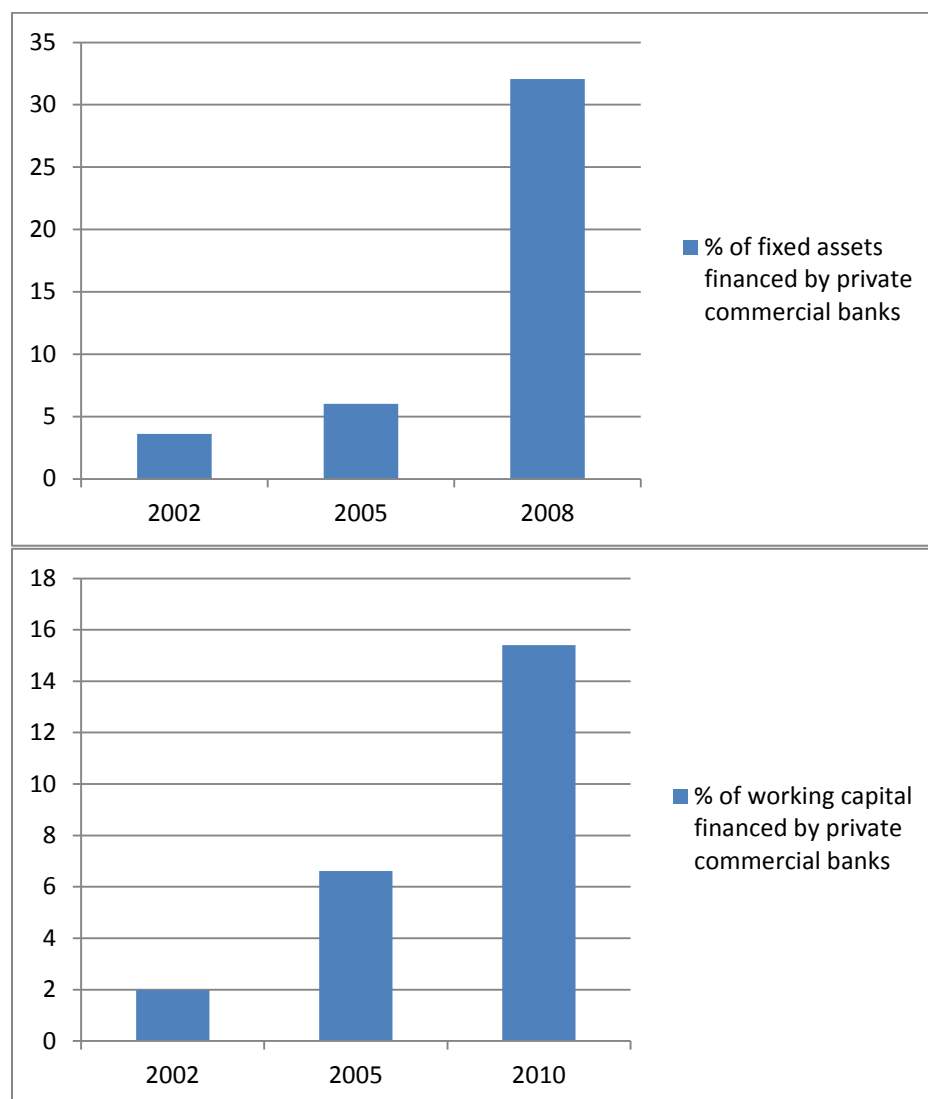
Source: BDDK, and OECD Quarterly National Accounts Database, Turkey.

The World Bank Enterprise Surveys (WBES) data on Turkey also show that bank financing of SMEs increased significantly between 2002 and 2010 (Figure 3). The working capital financed by private commercial banks increased from 2% in 2002 to 15.4% in 2008. Similarly, financing of fixed assets increased from less than 4 % in 2002 to over 32% in 2010 (Figure 3).

During this period Turkish banks also relaxed collateral requirements from the SME sector. According to the WBES 2008 data, the proportion of total SME loans that required collateral was only 67.7% in Turkey. This rate is much lower than both the regional and world averages of 89% and 88% respectively. The average value of collateral required for SMEs loans (measured as the percentage of the loan amount) also declined from 105% in 2005 to 77% in 2008. Again, this rate is much lower than the upper middle income country average of 92% in 2008, and is the

lowest value of collateral needed within the Eastern Europe and Central Asia region (WBES country report Turkey, 2011).

Figure 3. SME financing by private commercial banks in Turkey

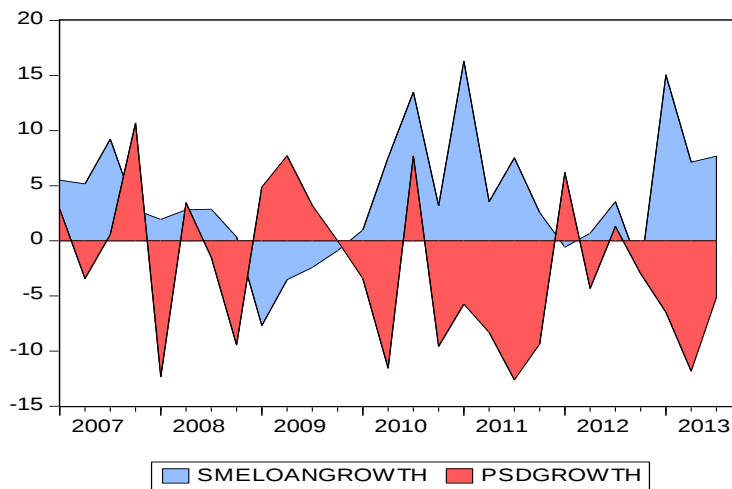


Source: World Bank Enterprise Surveys (2002, 2005, 2008, 2010), Turkey.

Another important factor that appears to be closely related to the recent SME lending growth in the Turkish market is the decrease in government borrowing. Prior to the mid-2000s, Turkish

banks were highly concentrated in financing public sector borrowing and large corporations (Akyüz and Boratav, 2003). When government borrowing started to decrease, banks' lending to SMEs began to increase. Figure 4 illustrates this negative relationship between SME lending and government borrowing.

Figure 4. The growth of SME lending and public sector debt (PSD) in Turkey



Source: BRSA, and World Bank Quarterly Public Sector Debt Statistics, Turkey.

These trends suggest that there is a possible relationship between the macroeconomic environment and SME lending in Turkey. In order to test the significance of this relationship we develop an empirical model and test it with the available data.

5. Data and methodology

We use multiple regression analysis to test the relationship between the dependent variable, SME bank credit growth, and the independent variables, namely economic stability, government budget deficit, real economic growth and the competitiveness of the banking sector. These

independent variables are consistent with the theoretical and conceptual framework that was discussed in earlier sections.

The data used in the regression analysis are obtained from secondary sources such as the World Bank, Organisation for Economic Co-operation and Development (OECD), Banks Association of Turkey, and BRSA. Although the data on independent variables are readily available from both domestic and international sources, the data on the dependent variable, i.e. SME bank credit, is difficult to find. It is only recently that some emerging market countries, such as Turkey, have started to collect separate data on banks' lending to this sector. In most countries private sector credit is used as a proxy for SME credit, though this data is not accurate as it also includes credit for large enterprises. Data collection on SME bank credit in Turkey was initiated by BRSA as recently as 2007. Although this data has been collected monthly and is easily available on the internet, it is not possible to go back to the earlier periods. Therefore, our analysis is limited to the period between 2007 and 2013.⁴ The monthly credit amounts are converted into quarterly data by taking the three-month average within each quarter. The nominal values of the quarterly data are then converted into real values using the 2003 consumer price index (CPI). The growth rates are calculated as the percentage change of total SME credit from the previous quarter. The rest of the data on independent variables were available as annual data. For consistency, we convert them into quarterly data and use the 2003 CPI to calculate the real values.

⁴ The total amount of SME bank credit provided by the Turkish banking sector is published monthly as online data by the BRSA (<http://www.bddk.org.tr>).

5.1 Empirical analysis

This research uses a growth model in which both dependent and explanatory variables are measured as the percentage change. All the data are given quarterly and their growth rates are calculated as the percentage change from the previous quarter. The equation of the model is:

$$SME\ bank\ credit = f(GDP\ growth, Inflation, Public\ Debt, Bank\ Competition)$$

SME bank credit growth

$$= \alpha + \beta_1 GDP\ growth\ rate + \beta_2 Inflation\ rate + \beta_3 Public\ Debt(\%change) + \beta_4 Bank\ Concentration(\%change) + \epsilon$$

In this model the coefficient α is the intercept of the regression line that represents the constant growth of SME bank credit regardless the effect of independent variables. $\beta_1, \beta_2, \beta_3$, and β_4 are the corresponding coefficients of the independent variables GDP growth, inflation, government borrowing, and bank competition, respectively. They represent the proportional effects that the corresponding variables have on the growth of the dependent variable. A positive sign in these coefficients would indicate a positive effect on the growth of SME loans and vice versa. We expect that real GDP growth is positively related to SME bank credit growth, whereas inflation, public sector debt and bank concentration are negatively related to SME bank credit growth. Lastly, ϵ is the error term of the model, which accounts for the effect of other factors that cannot be explained by the model.

The objective of the regression analysis is to find out whether there is a significant relationship between macroeconomic factors and SME credit growth. Therefore, SME credit growth is used as the dependent variable of the regression equation.

In general, GDP growth rate is used as a broad approximation for economic growth. We expect that there is a positive correlation between the GDP growth rate and SME credit growth. During the periods of increasing economic growth many new businesses emerge and existing ones expand. As part of this process it is likely that businesses will require external finance either for working capital or for new investment. Therefore, we expect to see a positive relationship between GDP growth and SME credit growth. GDP growth is calculated as the real value of GDP per quarter adjusted for inflation.

High inflation is frequently referred to in the literature as the indicator of economic instability. We expect that inflation rate is negatively related to SME credit growth. Economic instability affects lenders' as well as borrowers' decisions on lending and borrowing. High inflation may reduce the real interest income for banks. On the other hand, inflation may raise nominal interest rates too high for SMEs to borrow. In this case, firms may decide to postpone their investment and expansion, or they may default their existing loans. Furthermore, a fluctuating inflation rate causes a great deal of uncertainty and instability in the economy and discourages banks from lending to the private sector. We would therefore expect inflation to have a negative impact on the growth of SME credit. In our model inflation data is computed as the quarterly change of the consumer price index (CPI), where 2003 is the base year.

The Turkish government's domestic borrowing is another explanatory variable used in our model. The nominal amount of this variable is deflated by the CPI_{2003} , and the percentage change from the previous quarter is then taken to find the quarterly growth in real terms. An increase in government borrowing is expected to increase the crowding out of the loanable funds to the private sector. We therefore expect a negative correlation between government borrowing and private sector credit growth.

Banking sector competition is the last explanatory variable used in this model. Studies have shown that a lack of competition in the banking sector causes higher prices for financial products, less efficiency, and lower access to credit, especially for small businesses (Berg and Fuchs, 2013; De la Torre et al., 2010). There are several techniques for measuring competition; of these, market structure approaches such as market concentration (CR_n) and the Herfindahl Index (HHI) are commonly used. Market concentration accounts for the assets held by the top three to five banks as a share of total banking sector assets. In the current research the bank competition is measured as the ratio of total assets of the five largest banks to the total banking sector assets. In other words, the five-bank concentration ratio is used as the indicator of bank competition. Theoretically we expect that the decrease in bank concentration will increase banking sector competition and will therefore force banks to enter new markets such as the SME sector. In Turkey bank concentration data is available only on a yearly basis. Therefore, the data has been transformed into quarterly data by taking the moving average between consecutive years.

Results

The regression results show that all our independent variables have the expected signs. According to the results there is a significant and positive relationship between GDP growth and SME credit growth at the 5% significance level. On the other hand, we see a negative relationship between SME loan growth and the rest of the independent variables – inflation, government debt, and bank concentration ratio – indicating that any increase in these variables will reduce the amount of bank credit lent to SMEs (Table 1).

The negative coefficients of inflation and government debt are significant at the 10% and 5% significance levels, respectively. However, the bank concentration ratio does not appear to be significant, although the estimated coefficient has the expected negative sign. This unexpected result may simply be due to measurement error, because the bank concentration ratio does not fully capture the market competition. Therefore, a more representative measure of competition, such as a nonstructural approach that considers bank entry and exit barriers, ease of foreign banks' entry, and other competitive market behavior, might increase the level of significance. However, as a result of data limitations it was not possible to use this approach in our model.

Table 1. Regression results

Variable	Coefficient	Standard error	<i>t</i> -statistic	Probability
GDP	0.934022**	0.336467	2.775972	0.0110
INFLATION	−0.975095*	0.538069	−1.812212	0.0836
GOVDEBT	−0.320126**	0.119950	−2.668824	0.0140

BANKCR ₅	-0.178258	0.173003	-1.030370	0.3140
C	3.616225**	1.361371	2.656311	0.0144

$R^2 = 0.40$, Adjusted $R^2 = 0.30$, F -statistic = 3.67 (Prob = 0.01), Durbin–Watson statistic = 1.5

Note: All variables' data are expressed as the percentage change (growth) from the previous quarter.

*coefficient is significant at $\alpha = 10\%$, **coefficient is significant at $\alpha = 5\%$, ***coefficient is significant at $\alpha = 1\%$.

Assuming other factors remain unchanged, our results indicate that every 1% of quarterly growth in GDP contributes almost the same amount (1%) of quarterly real growth of SME bank credit in Turkey. As expected, inflation alone shrinks SME credit growth in real terms by a similar unit. Government borrowing is also statistically significant and the coefficient is negative, which is consistent with the theoretical expectation of the crowding-out effect. The coefficient 0.32 implies that if the growth of government borrowing decreases by 1%, SME loan growth will increase by 0.32% each quarter.

6.1 Robustness of the model

The regression results indicate that for our model the coefficient of determination, R^2 , is equal to 0.40, and the adjusted R^2 is equal to 0.30. Although these values are not very high, the F -statistic 3.67 is statistically significant at 5%, indicating that our model has a good fit (Appendix, Table A.1). The reason for the low R^2 can be explained by missing variables. It is expected that other environmental factors, such as the efficiency of the legal systems and the existence of credit bureaus, may also affect the amount of bank credit extended to the SMEs (Berg and Fuchs, 2013). However, this study aims to capture the relationship between the macroeconomic environment and SME lending, and therefore these variables are not included in our model.

According to the Durbin–Watson significance table, the Durbin–Watson statistic of 1.5 lies just on the upper limit (Appendix, Table A.1). This confirms that serial correlation is not a problem of the model. Correlation analysis allows us to check for the multicollinearity problem within the independent variables. The test results presented in the Appendix (Table A.2) show that there is no significant association within the independent variables; in other words, there is no collinearity in this model. Furthermore, residual tests are carried out using EViews software. From the test results it is confirmed that the residuals are normally distributed and homoscedastic, and have no serial correlations (Appendix, Figure A.1). We can therefore assume that the model fits well for this regression analysis and that the results are robust.

6. Concluding remarks

Until recently, access to credit has remained a major problem for SMEs. This implies that the costly direct-policy interventions of the last four decades, such as targeted credit programs and government guarantee funds mechanisms, were not very effective in giving SMEs access to commercial bank credit. The recent developments in the emerging market countries and banks' spontaneous lending to SMEs has pointed to the importance of a conducive macroeconomic environment for creating sustainable access to credit. This research chose Turkey, an emerging market country with significant SME finance experience, to analyze the relationship between macroeconomic factors and the growth of SME credit.

We used multiple regression analysis to test our model, the relationship between SME credit growth and the changing macroeconomic environment between 2007 and 2013. The empirical results from the Turkish market provide evidence that the macroeconomic environment, such as

economic growth, stability, and government borrowing, has a significant relationship with the expansion of SME bank credit. As expected, economic growth and stability has a positive relationship with banks' lending to SMEs. However, government domestic borrowing has a negative and significant relationship with SME credit, indicating the crowding-out effect of government borrowing. The policy implication of these results is that in order to promote SMEs' access to credit, governments need to implement policies that will help the building of a conducive, healthy macroeconomic environment.

These research findings are also consistent with recent World Bank studies in the emerging market countries (De la Torre et al., 2010; IFC, 2007). These studies showed that in emerging market countries where there is economic stability and high economic growth, as well as high market competition in corporate lending, banks tend to have greater exposure to SME lending. This highlights the importance of keeping the government budget deficit under control. By reducing public sector expenditure and the budget deficit, governments can control inflation as well as the crowding-out effect of government borrowing.

These findings indicate that in Turkey, this paradigm change in SME finance is not a coincidence. When Turkey won the decades-long battle with hyperinflation and began to build a conducive macroeconomic environment, the nature of SME finance also began to change. Banks began for the first time to see SMEs as a potential market for profitable lending. Interestingly, the SME-specific constraints (opaqueness of SMEs) or bank-specific factors (not having capacity to serve SMEs) did not stop banks developing their SME marketing strategies and opening their dedicated SME banking units. All commercial banks currently have a separate SME banking

department operating directly under the top management, which signifies the commitment of the banking sector to SME lending.

Although our findings indicate that the relationship between banking sector competition and SME lending does not appear to be statistically significant, it has the expected sign, indicating that SME lending is positively correlated with higher competition, i.e. lower bank concentration. We recommend further studies on banking sector competitiveness and SMEs' access to bank credit. Different methods of measuring banking sector competitiveness may improve the statistical results. We also recommend an analysis of how the competitive structure of the banking sector affects the pricing of SME loans, and hence, SMEs' access to credit.

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APPENDIX

Table A.1 Regression Results

Dependent Variable: SMELOAN

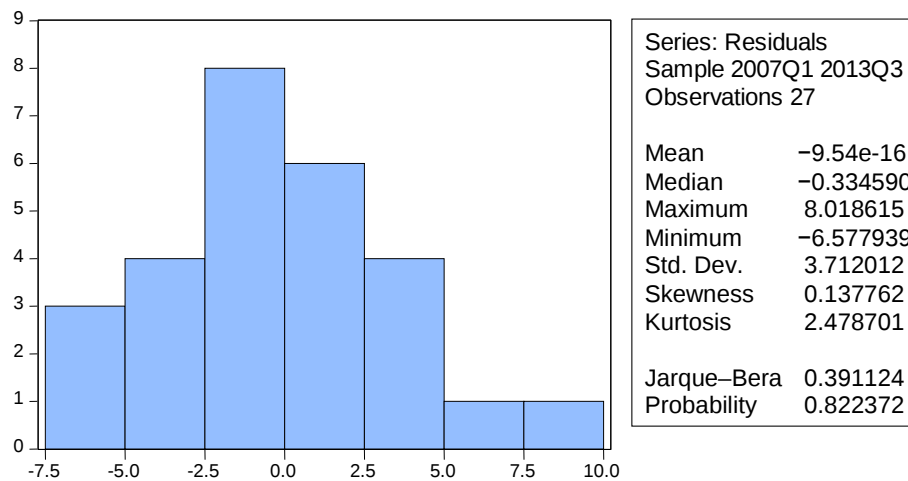
Method: Least Squares

Sample (adjusted): 2007Q1 2013Q3

Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPGROWTH	0.934022	0.336467	2.775972	0.0110
INFLATION	-0.975095	0.538069	-1.812212	0.0836
PUBLICDEBT	-0.320126	0.119950	-2.668824	0.0140
BANKCR5	-0.178258	0.173003	-1.030370	0.3140
C	3.616225	1.361371	2.656311	0.0144
R-squared	0.400278	Mean dependent var	3.420000	
Adjusted R-squared	0.291237	S.D. dependent var	4.793296	
S.E. of regression	4.035382	Akaike info criterion	5.793655	
Sum squared resid	358.2548	Schwarz criterion	6.033625	
Log likelihood	-73.21434	Hannan–Quinn criter.	5.865011	
F-statistic	3.670911	Durbin–Watson stat	1.503324	
Prob(F-statistic)	0.019503			

Figure A.1 Jarque–Bera Normality Test



Null hypothesis: Residuals are normally distributed.

Alternative: Residuals are not normally distributed.

*We cannot reject the null hypothesis; therefore, the series are normally distributed.

Table A.2 Testing the Serial Correlation: LM Test Breusch–Godfrey

<i>F</i> -statistic	0.717366	Prob. <i>F</i> (2,20)	0.5002
Obs*R-squared	1.807242	Prob. Chi-Square(2)	0.4051

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 04/19/14 Time: 16:53

Sample: 2007Q1 2013Q3

Included observations: 27

Presample missing value lagged residuals set to zero

Variable	Coefficient	Std. Error	<i>t</i> -Statistic	Prob.
GDP GROWTH	−0.072120	0.351240	−0.205329	0.8394
INFLATION	0.129868	0.557542	0.232929	0.8182
PUBLIC DEBT	0.089685	0.143009	0.627131	0.5377
BANK-CR5	0.016578	0.175823	0.094286	0.9258
C	0.022444	1.384250	0.016214	0.9872
RESID(−1)	0.227056	0.241115	0.941693	0.3576
RESID(−2)	0.166723	0.240328	0.693731	0.4958
R-squared	0.066935	Mean dependent var	−9.54E−16	
Adjusted R-squared	−0.212985	S.D. dependent var	3.712012	
S.E. of regression	4.088246	Akaike info criterion	5.872523	
Sum squared resid	334.2750	Schwarz criterion	6.208481	
Log likelihood	−72.27906	Hannan–Quinn criter.	5.972421	
<i>F</i> -statistic	0.239122	Durbin–Watson stat	1.703666	
Prob(<i>F</i> -statistic)	0.958212			

Null hypothesis: Residuals are not serially correlated.

Alternative: Residuals are serially correlated.

*We cannot reject the null hypothesis; therefore, the series are not serially correlated.

Table A.3 Heteroscedasticity Test: Breusch–Pagan–Godfrey

F-statistic	1.329715	Prob. F(4,22)	0.2902
Obs*R-squared	5.256779	Prob. Chi-Square(4)	0.2620
Scaled explained SS	2.580406	Prob. Chi-Square(4)	0.6303

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 04/19/14 Time: 16:58

Sample: 2007Q1 2013Q3

Included observations: 27

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	18.12828	5.411415	3.350008	0.0029
GDP GROWTH	0.055152	1.337447	0.041236	0.9675
INFLATION	-1.649512	2.138810	-0.771229	0.4488
PUBLIC DEBT	0.902303	0.476799	1.892418	0.0717
BANK-CR5	0.107880	0.687685	0.156874	0.8768
R-squared	0.194696	Mean dependent var		13.26870
Adjusted R-squared	0.048277	S.D. dependent var		16.44234
S.E. of regression	16.04054	Akaike info criterion		8.553692
Sum squared resid	5660.577	Schwarz criterion		8.793662
Log likelihood	-110.4748	Hannan–Quinn criter.		8.625047
F-statistic	1.329715	Durbin–Watson stat		2.196710
Prob(F-statistic)	0.290215			

Null hypothesis: Residuals are not heteroscedastic

Alternative: Residuals are heteroscedastic.

*We cannot reject the null hypothesis; therefore, the series are not heteroscedastic, or the series are homoscedastic.

Table A. 4 The Pearson Correlation Matrix

	SMEloangrowth	GDPgrowth	Inflation	GovDebtgrowth	BankCR ₅
SMEloangrowth	1				
GDPgrowth	0.382** (0.049)	1			
Inflation	-0.256 (0.198)	-0.101 (0.615)	1		
GovDebt	-0.258 (0.194)	0.275 (0.165)	-0.193 (0.334)	1	
BankCR ₅	-0.108 (0.594)	-0.016 (0.937)	-0.045 (0.824)	-0.124 (0.537)	1

**Correlation is significant at the 0.05 level (2-tailed).