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Cyclical behavior of price–cost margins in the Turkish banking industry

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ABSTRACT

Using a dynamic panel data framework, the cyclical behavior of the banks' price–cost margins in Turkey over the period 2002Q1–2008Q2 is analyzed. The findings provide evidence towards countercyclical behavior of the margins. This is important for the Turkish economy since the countercyclicality of banks' margins may deepen the contraction by constraining the credit opportunities over economic downturn periods. Furthermore, the control variables, monetary policy, market structure and financial deepening of the economy indicate significant effect on the price–cost margins of the banks. The findings also serve as evidence towards the "financial accelerator" mechanism in Turkish economy over the sample period.

1. Introduction

The banking industry is a crucial link between the financial and real sectors. In many of the developed and developing economies, banks play an important intermediation role in transforming savings into productive investments. The banking industry is also an important channel in the implication of the monetary policy through banking loans. Supply of bank loans affects the investment and production decisions of the firms since many firms, particularly the small and medium sized ones, are credit dependent.

The role of the banking industry becomes more significant during the economic fluctuation periods. Particularly, when the economy is contracting, the ability of the banking industry to synchronize with the changing conditions affects economic stability. During hard times, if the banking industry can play a balancing role in economy through supply of loans, then recovery may be faster and easier. However, the supply of loans are related to the price–cost margins of the banks. Hence, during the economic fluctuation periods, the response of the price–cost margins stem as one of the major determinants of the supply of banking loans. If, during economic downturn periods, margins stay high behaving countercyclically, credit becomes more expensive. Firms may delay their production and investment decisions, which in turn deepens the economic contraction. Bernanke et al. (1996, 1998) call this mechanism as "financial accelerator". In the modern economy, where the financial system has gained a significant influence on the real economy, this mechanism can be used to explain the persistence and magnitude of cyclical fluctuations. Hence, analyzing the cyclical behavior of banks' price–cost margins can provide useful information about the possible effect of the financial system on the real economy.

The cyclical variations in the price–cost margins have been analyzed in various studies in the industrial organization literature. However, these studies provide mixed results. Some find that price–cost margins behave procyclically while some find evidence towards countercyclical margins. Green and Porter (1984) and Rotemberg and Saloner (1986) are the pioneering studies modelling this relationship. Of these studies, Green and Porter (1984) predict procyclical behavior while Rotemberg and Saloner (1986) predict countercyclical behavior for the margins. Many empricial studies followed these contributions to find evidence on the behavior of price–cost margins. Domowitz et al. (1986a,b) examine the changing patterns of the price–cost margins in 284 U.S. manufacturing industries during the fluctuations in the demand for their products. They find that margins behave procyclically and state that this is obvious particularly in more concentrated industries. Prince and Thurik (1992) focus on the cyclical behavior of price–cost margins and its relation with concentration in 66 Dutch manufacturing industries over the period 1974–1986. They find that the procyclical behavior of the margins depends on business cycle measure used. Machin and Van Reenen (1993) investigate the behavior of profit margins of 709 large UK manufacturing firms over the period 1972–1986. Their findings indicate significant procyclical behavior. Chand and Sen (2000) analyze the beahvior of mark-ups in 15 Indian manufacturing industries over the period 1973–1988. They find that mark-ups are countercyclical, particularly in the

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concentrated industries. In a more recent study, Lima and Resende (2004) focus on the relationship between profit margins and business cycle in the Brazilian manufacturing industry over the 1992–1998 period following a conjectural variations framework. They use two measures of business cycle, one representing the aggregate cycle and another for sector-specific cycle. The results indicate existence of procyclical behavior of profit margins for the aggregate business cycle but the evidence is less clear for the sector-specific cycle.

To date, almost all of the studies investigating the cyclical behavior of the price–cost margins focus on the manufacturing industry. The empirical evidence on the cyclical behavior of bank price–cost margins is lacking. There is only one study by Aliaga-Diaz and Olivero (2006) analyzing the cyclical behavior of price–cost margins in the U.S. banking industry. They focus on the 1979–2005 period. The results indicate the countercyclicality of the margins and they try to give possible explanations for this behavior. Despite its importance for the economy, there are no studies on the banks' price–cost margins over the economic fluctuation periods for the developing countries. Hence, this study aims to contribute the existing literature in two ways. First, it examines the cyclical behavior of banks' price–cost margins in Turkey over the period 2002Q1–2008Q2. Turkey is a developing economy where the credit channels and behavior of the supply of loans are extremely important for the macroeconomic development and stability. Second, the analyses rest on a dynamic panel data framework to provide broader information on the behavior of bank price–cost margins and and its determinants.

The rest of the paper is organized as follows: the methodological issues are provided in Section 2. Data set and empirical results are explained in Section 3. The last section is devoted to conclusions.

2. Model and methodology

2.1. Model

In this study, to analyze the cyclical behavior of the banks' price–cost margins in Turkey, the following empirical model is set up:

$$PCM_{it} = \alpha + \beta_1 PCM_{i,t-1} + \beta_2 \log(BC)_{it} + \sum_{i=1}^{k} \beta_{3i} \boldsymbol{Z}_{it} + \sum_{i=1}^{3} \beta_{4i} Q_{it} + \beta_5 R_{it} + \beta_6 STATE_{it} + \varepsilon_{it} \quad (1)$$

where $\varepsilon_{it} = \alpha_i + u_{it}$, α_i the unobserved time-invariant bank-specific effects and u_{it} is an independent and identically distributed random disturbance with $E(u_{it}) = 0$ and $\mathrm{Var}(u_{it}) = \sigma^2$.

Following Aliaga-Diaz and Olivero (2006) three measures for banks' price–cost margins will be used.[1] Their definitions are given in Table 1.

PCM indicates the dependent variable, price–cost margin. In this study, it is assumed that price–cost margins of the banks may have a persistent characteristic, following similar literature (see for example Mueller, 1990; Resende, 2000; Lima and Resende, 2004). Persistence of the PCM is expected to be more significant when the competition is not very intense. For the banking industry, lower level of competition will lead to higher price–cost margins that can be carried out for several periods. However, the extra profits would be eroded in case of strong competition. Hence, past realizations of PCM may show up as a determinant of current PCM and to control this effect a lagged value of the dependent variable is included as a regressor. The second explanatory variable is the business cycle indicator, BC. Three different measures of business cycle; real total loans (TL), real gross domestic product (GDP) and real GDP per capita (GDPPC) are used.[2] However, GDP is the most widely used business cycle measure in the literature, since it represents the aggregate economic condition. However, GDP provides a very broad measure. To this end, total loans are also used as another measure of business cycle since a sector-specific measure might be more sensitive to cyclical fluctuations. Moreover, loans reflect the investment and production behaviors more closely which are key to the cyclical behavior of the banks' price–cost margins (Aliaga-Diaz and Olivero, 2006). A negative and significant coefficient of the business cycle variable implies countercyclical margins while a positive (and significant) coefficient indicates procyclical margins. Fig. 1 indicates the path that GDP and loans follow over the sample period. The two series follow similar upward and downward trends while loans have a smoother pattern over the period.[3]

Table 1
Definitions of price–cost margins.

Price–cost margin I (PCM1)	(Interest income on loans/total loans) − (interest expenses on deposits/total deposits)
Price–cost margin II (PCM2)	(Interest income − interest expenses)/total assets
Price–cost margin III (PCM3)	(Interest income − interest expenses)/total loans

The vector $\boldsymbol{Z}_{it}$ in Eq. (1) includes several variables to control economic policy and industry-specific factors. Supply of bank loans and banks' price–cost margins are directly related to the monetary policy. Contractionary monetary policy builds a constraint on the supply of the funds available and therefore limits the credit opportunities. This scarcity is reflected as higher price–cost margins of the banks. To control the effect of monetary policy, we use the three-month Treasury Bill rate (TBRATE).[4] Financial depth (FINDEPTH) is another variable which provides information about the availability of funds in an economy. Financial deepening makes access to money and credits easier. This implies a more competitive environment. Hence, price–cost margins of the banks are expected to be lower as financial deepening increases. We use the ratio M2/GDP as a proxy for financial depth. Market structure is an important industry-specific variable that may affect the price–cost margins of the banks. To this end, we calculate the Herfindahl–Hirschman index (HHI) for the Turkish banking industry for each year of our sample.[5] A higher (lower) value of HHI indicates higher (lower) concentration in the industry. In literature there are different views on the relation between the price–cost margins and market concentration during economic fluctuations. Some stress that in more concentrated industries, the transmission of costs into prices are rapid while some think that this transmission in less rapid in concentrated industries since they are usually associated with large irreversible investments that prevent them from adjusting their margins in the short-run. Hence, the coefficient of the HHI may be positive or negative depending on the adjustment ability of the banks. Banks of different sizes compete in the same industry. However, the behavior and strategies of small and large banks may be different. Larger banks may charge lower mark-ups over their marginal costs to enhance

[1] Aliaga-Diaz and Olivero (2006) use six different measures of PCM. We use three of them due to data availability. The first price–cost margin measure is the net interest margin of the banks while the other two approximations represent the banks' spreads.

[2] To establish the GDPPC series first real GDP per capita is detrended and the percentage deviation from the trend is calculated.

[3] Fig. 1 depicts only GDP and total loans as business cycle indicators. Since GDPPC has a different scale of measure and follows a very similar pattern with GDP, this series is not included in the figure.

[4] In literature, Treasury Bill rate is a widely accepted proxy for the risk-free interest rate to represent the monetary policy. In this study, money market rate and discount rate are also used to control for monetary policy but the results are not provided within the text. The results are available from the author upon request.

[5] HHI is calculated as $\sum_{i=1}^{n} s_i^2$, where s_i indicates the share of the ith bank in the sector measured based on assets.