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The Effect of Bank Capital on Profitability and Risk in Turkish Banking

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Abstract

The purpose of the study is to shed some crucial light on the determinants of bank risk-taking and analyze its relationship with capital and profitability. For the explanatory variables we use a range of bank-specific and country-specific variables that are believed to be important in explaining the performance and risk-taking propensity of banks.This paper applies the Two-Step System Generalized Method of Moments technique developed by Arellano and Bover (1995) and Blundell and Bond (1998)for dynamic panels using bank-level data for 23 Turkish commercial banks over the period 2003 to 2011 to investigate the impacts of bank capital on profitability and risk. We find evidence that the effect of increasing bank capital on risk is significantly positive and negative, supporting the regulatory hypotheses and moral hazard hypothesis, respectively. The results also suggest thatthere is a positive and negative relation between the capital and profitability. Thus, the sample supports also structure-conduct-performance hypothesis. Important policy implications emerge from our empirical results. First, different profitability (risk) variables present different patterns with capital. Hence, the authorities should realize that using a single profitability (risk) variable may result in a totally wrong policy. Second, Turkish banking supervisor or regulators should improve their banking system by mending the financial efficiency of commercial banks to implement the suggestions proposed by Basel III.

Keywords: Bank capital, Profitability, Risk, Dynamic panel data, Turkey

1. Introduction

In modern finance, banks play a crucial role in the process of financial intermediation (Fungacova and Poghosyan, 2011). The banking sector is a sector that mediates the funds transfer in converting the savings to investment through the payment system and with numerous financial instruments that provides in the financial system (Yıldırım, 2004). The banks are not only a channel for monetary control; they are also effective institutions in restructuring of the economy and ensuring long-term sustainable macroeconomic stability. It is necessary for banking sector that has so important role in the financial system to put forward the interaction with the economic system clearly and to function in a healthy structure (Parasız, 2000). The banking system changed and made some innovations about non-banking capital systems as investment banking, insurance. We meet the new banking approach with those innovations done and elimination of intermediaries in the banking sector (Hefferman, 2005).

The risks originating of the banking sector creates the basis of the crisis of banking sector. The management of the risks occurring of the banking sector becomes important for reducing the losses of the banking crises on financial stability and banking system (Aloglu, 2005). Especially, the international big banks discovered the importance of risk management and they have recognized the added value of prevention of potential losses created for banks by obtaining the necessary measures against these risks and being aware of the risks carried. Does a higher level of capital structure refer to a lower risk for banks?

This topic earns a round of discussions, including from the perspective of supervisors. The relationship between a bank's capitalization and its risk-taking behaviors is one of central topics in banking studies, because of the potential implications for regulatory policies (Lee and Hsieh, 2013).

The function of capital in banking sector is not different from other for-profit institutions. The basic functions of the capital are listed as follows: i) It is a buffer that absorb losses, ii) Increase the confidence of depositors, iii) It shows the fact that how much risk the bank owners get into, iv) It shows the fact that how much the lowest cost financing method has been used (Karabulut, 2003). In this regard, it is important for investigating the profitability of the capital of the banks and their impacts on the risk.Moreimportantly, the recent credit crisis has emphasized the need to further understand the determinants of bank risk in an environment of lower bank capital (Festic*et al.,* 2011). It is thus no surprise that the relationship between bank capital and risk (profitability) has recently become a cause for concern, especially as the level of capital may give rise to both beneficial and adverse effects on bank profitability (Lee and Hsieh, 2013).

This paper applies the Two-Step System Generalized Method of Moments technique for dynamic panels using bank-level data for Turkish banking sector over the period 2003 to 2011 to investigate the impacts of bank capital on profitability and risk. We aim to shed some crucial light on the determinants of bank risk-taking and analyze its relationship with capital and profitability. We contribute to existing empirical analyses in several ways. First, the existing literature has drawn a lot of attention on U.S. or European cases (Brewer and Lee, 1986; Berger, 1995; Carbo*et al*., 2009). This is, to our knowledge, the first study of bank capital's impacts on profitability and risk for Turkish banking sector. Turkish economy and Turkish Banking System are going on to develop promptly.Especially for Turkey; the banks are the most important actors of the money markets that short-term fund supply and demand meets. Examining the effect of bank capital over the profitability of the banks and risk of the banks in terms of Turkish banks that recently came into the limelight become striking subject.

The Turkish banking industry therefore provides an interesting laboratory for investigation. Second, most studies focus mainly on the relationship between capital and risk (Aggarwal and Jacques, 1998; Agusman*et al.*, 2008), yet seldom on the relationship between capital and profitability (Berger, 1995; Goddard *et al.*, 2004). This study discusses capital, risk, and profitability together. Third, we adopt four proxies for profitability and three for risk. Finally, from the methodology viewpoint, most studies utilize a static model (Berger, 1995; Demirguc -Kunt and Huizinga, 2000; Rime, 2001; Agusman*et al*., 2008). Dynamic panel techniques are adopted to analyze the panel data, which are designed to check the persistence of profit (or risk) in the study.

The remainder of this paper is organized as follows. Section 2 reviews the relevant literature. Section 3 presents theoretical framework. Section 4 describes the econometric model and data sources employed herein. Section 5 discusses the empirical results, and Section 6 presents our conclusions.

2. Literature Review

2.1. Relationship between Capital and Risk

The relationship between capital and risk were mixed in the literature. A pioneer research by Pettway (1976) explores the relationship between capital structure and risk for U.S. banks, surprisingly finding a positive relationship between equity-to-total-assets and risk. Shrieves and Dahl (1992) also adopt U.S. data and reach the same positive result. Similar results are reached by applying Europe data, such as in Rime (2001) and Iannotta*et al.* (2007).Some works find opposite results. Equity to total assets is found to be negatively related to risk (Jahankhani and Lynge, 1980; Brewer and Lee, 1986; Jacques and Nigro, 1997; and Agusman*et al.,* 2008). Jacques and Nigro (1997) find a negative relationship between changes in capital and risk levels. They note that such a finding may be attributable to methodological flaws in the risk-based guidelines.Alternatively, as suggested by Shrieves and Dahl (1992), a negative relationship may exist between capital and risk adjustments if banks seek to exploit the deposit insurance subsidy. Agusman et al. (2008) analyze Asian banks during 1998–2003, finding equity to total assets are negatively related to risk, but do not reach any significance.Agoraki*et al.* (2011) find that capital requirements reduce risk in general, but for banks with market power this effect significantly weakens or can even be reversed.

2.2. Relationship between Capital and Profitability

Capital is found to be associated with positive profitability (Berger, 1995; Jacques and Nigro, 1997; Demirgüç-Kunt and Huizinga, 2000; Rime, 2001; Iannotta*et al.,* 2007;Naceur and Omran, 2011).

Berger (1995) find a strong positive relationship between capital and earnings. Altunbas*et al.* (2007) finds that inefficient European banks appear to hold more capital. Goddard *et al.* (2010) explore that a negative relationship between the capital ratio and profitability. Another literature stream concentrating on the relationship between capital and profitability focuses on the macro prospective, *structure-conduct-performance Hypothesis*(SCP). Theresults of such research show that operating performance is significantly related to market structure. Market structure, which refers to the degree of market concentration within an industry, represents the degree of competition within the specific industry. For example, Heggestad (1977), Short (1979), and Akhavein*et al.* (1997) find that, within a financial system characterized by less competition, firms tend to have larger scales of operation, and this in turn leads to a higher degree of market concentration and profits.

3. Theoretical Background and Hypotheses

3.1.Capital, Risk and Profitability

Previous studies focusing on the relationship between capital and risk have mixed results. Some studies find a positive relationship between capital and risk, meaning regulators encourage banks to increase their capital commensurably with the amount of risk taken, which refers to the *'regulatory hypotheses*.Most of the studies have confirmed positive relationship between capital and risk adjustments predicted by theory, indicating that banks that have increased their capital levels over time, have also increased their risk appetite (Shrieves and Dahl, 1992; Berger, 1995; Aggarwal and Jacques, 1998; Demirgüç-Kunt and Huizinga, 2000; Rime, 2001; Iannotta*et al.,* 2007). An alternative hypothesis, a negative relationship between capital and risk may refer to the *'moral hazard hypothesis'* whereby banks have incentives to exploit existing flat deposit insurance schemes (Demirgüç-Kunt and Kane, 2002).Jacques and Nigro (1997), Altunbas*et al* (2007) and Agusman*et al.* (2008) find evidencethat equity to total assets is negatively related to risk. The moral hazard hypothesis could arise due to the existence of relevant agency problems between owners and stakeholders (Altunbas*et al,* 2007).

H1: Bank capital is positively related to risk in Turkish Commercial Banks.

The relationship between equity and profitability is also ambigious. The traditional view suggests a higher capital-asset ratio (CAR) is linked with a lower return on equity (ROE) because a higher CAR decreases the risk on equity and the tax subsidy provided by interest deductibility.Literature stream concentrating on the relationship between capital and profitability focuses on the macro prospective, '*structure-conduct-performance hypothesis(SCP)'*. Heggestad (1977), Short (1979), and Akhavein*et al.* (1997) find that, within a financial system characterized by less competition, firms tend to have larger scales of operation, and this in turn leads to a higher degree of market concentration and profits.Emprically, a number of studies find a positive relationship between probability and capitalization (Berger, 1995; Demirgüç- Kunt and Huizinga, 2000; Iannotta*et al.,* 2007;Allen *et al.,*2011; Mehran and Thakor, 2011and Berger and Bouwman, 2013), while others argue that it should lead to a reduced return on equity (e.g. Modigliani and Miller, 1963; Altunbas*et al.,* 2007; Goddard *et al.,* 2010).

H2: Bank capital is negatively related to profitability in Turkish Commercial Banks.

3.2. Loans, Loan Loss Reserves, Risk and Probability

Demirguc-KuntandHuizingua (1999) and Flamini*et al.* (2009)find that a higher loan ratio is associated with higher interest margins, which suggest that risk averse shareholders seek larger earnings to compensate higher credit risk. Brewer and Lee (1986) find a positive relationship between the ratio of gross loans to total assets and risk. Agusman*et al.* (2008) shows that the standard deviation of the return on assets and loan loss reserves togross loans and net loans to total assets are positive significantly related to total risk. Mansur *et al.* (1993), Naceur and Omran (2011) and Akhigbe*et al.* (2012) find a positive relationship between the ratio of loan loss reserves to gross loans and risk. A bank making relatively high-risk loans will allocate more funds to loan loss reserve, compared to a bank taking lower risks (Bai and Elyasiani, 2013).Fungacova and Poghosyan (2011) suggest that the negative sign they get can thus be explained using the market discipline argument for Russia (Karas*et al.,* 2010). Following this argument, depositors require a higher premium for depositing their savings in riskierbanks. An increase in deposit rates ceteris paribus would contribute to the decline in interest margins, establishing a negative relationship between nonperforming loans and the margin.Therefore, the coefficients of loan loss reserves to gross loans and net loans to total assets are expected to be positive with profitability (risk). A higher level of loans implies a higher profit (risk) will be generated.However, a negative sign between loan loss reserves to gross loans and probability can be explained using the market discipline argument for Russia (Karas*et al.,* 2010).

H3: Loan, loan loss reserves is positively related to risk and profitability in Turkish Commercial Banks.

3.3. Liquid Asset, Risk and Probability

Banks with more liquid assets generally have smaller target capital buffers and may also be willing to increase their levels of risk (Jokipii and Milne, 2011). Additionally, the regulatory hypothesis whereby regulators encourage banks to hold more capital and liquidity to cover the risks being taken (Altunbas et al, 2007).Alternatively, a bank that holds a relatively high proportion of capital is unlikely to earn high profits; yet is less exposed to risk (Goddard *et al*., 2004). Cash and marketable securities are the most liquid assets. High cash holding can reduce liquidity risk for banks and could help them survive (Berger and Bouwman, 2013).The more the demand liabilities of the bank are backed up by liquid assets, the lower the liquidity risk of the bank and its margins (Fungacova and Poghosyan, 2011).Fungacova and Poghosyan (2011) find a negative relationship between the ratio of liquid assets to total assets and profitability in Russia. Jahankhani and Lynge (1980) and Mansur *et al.* (1993) find a negative relationship between the ratio of liquid assets to total assets and risk.

H4: Liquidity is negatively related to risk and profitability in Turkish Commercial Banks.

3.4. Competition (Concentration) Structure (HHI), Profitability and Risk

Turning to market concentration and its impact on bank profitability, it should be noted that two opposing hypotheses have been proposed: *'structure-conduct-performance (SCP)'* hypothesis and *'efficient-structure (ES)'* hypothesis. The SCP hypothesis states that increased market power yields monopoly powers (Short, 1979). In the literature, bank level Herfindahl-Hirschman Index (HHI) is used control for local market power. The larger is HHI, the greater is a bank's market power and higher product market concentration (Berger and Bouwman, 2013). Higher product market concentration is associated with lower competition and vice versa (Fosu, 2013). As higher market concentration is likely to contribute to higher margins, the estimated coefficient is expected to have a positive sign (Mudambi and Navarra, 2004). The ES hypothesis asserts that market concentration is not the case of a bank's superior profitability and attributes the higher profit to superior efficiency that enables efficient banks to gain market share and earn higher profits (Demsetz, 1973 and Peltzman, 1977). A number of studies confirm the SCP hypothesis (Rose and Fraser, 1976;Neumark and Sharpe, 1992; Beiner*et al.,* 2011; Berger and Bouwman, 2013).Other researches provide support to the ES hypothesis in the banking sector (Smirlock, 1985 and Evanoff and Fortier, 1988).

H5: Concentration is positively related to risk and profitability in Turkish Commercial Banks.

3.5. Ownership Structure, Profitability and Risk

According to theoretical and empirical literature, agency problems and risk-taking behavior are different depending on the nature of the shareholder. A first issue is the conflict of interest between managers and shareholders identified by Jensen and Meckling (1976). The theory indicates that shareholders with a diversified portfolio are motivated to take more risk for a higher expected return whereas managers take less risk to protect their position and personal benefits and to preserve their acquired human capital (Jensen and Meckling, 1976; Demsetz and Lehn, 1985).Empirically, Saunders *et al.* (1990) find that banks controlledby shareholders take more risk than banks controlled by managers. However, there is a no consensus on the sign of a relationship between ownership concentration on risk taking, means that some studies find a negative relationship (Barry *et al.,* 2010; Haw *et al.,* 2010), whereas others obtain a positiverelationshipbetween ownership concentration and risk (Laeven and Levine, 2009; Chen *et al.,* 1998; Anderson and Fraser, 2000). The banking sector is also affected by the well-known owner–manager agency conflict (Fama and Jensen, 1983).

Berle and Means (1932) suggested that an inverse correlation could be observed between the concentration of shareholdings, and firm performance, in which ownership structure affects firm performance. Central to this ownership is the agency theory that explains the conflict of interest between inside owners and outside shareholders (Jensen and Meckling, 1976).While Belkhir (2004) finds a statistically significant negative relation between ownership and performance, McConnell and Servaes (1990) find a statistically significant positive relation between ownership and performance. Qi*et al.* (2000) find a negative the effect of foreign ownership on performance.Pound (1988) considers three assumptions in the relationship between the value of the firm and foreign ownership, namely: The assumption of efficient monitoring when the institutional shareholdershave a great expertise and can supervise the manager at a lower cost than the individual shareholders; the assumption of conflict of interest and because of other business advantageous relationship with the firm, the institutional investors are in conflict with the manager (DaoudEllili,2011).

H6: Foreign ownershipconcentration is positively related to risk and profitability in Turkish Commercial Banks.

3.6. Macroeconomic Indicators, Profitability and Risk

We use three proxies for macro-economic environment; inflation, real GDP growth ratio, and the recent subprime lending crisis. Most of the studies on the impact of inflation on profitability find a positive and significant relationship (Bourke, 1989; Claessens*et al.,* 2001; Athanasoglou*et al.,* 2006, and Pasiouoras and Kosmidou, 2007). However, Afanasieff*et al.* (2002) and Naceur and Kandil (2009) find evidence that the inflation rate negatively affects interest margins. Afanasieff*et al.*(2002) suggests that inflation may be capturing the effect of seignorage collection on interest margins. Naceur and Kandil(2009) explain the negative coefficient by the fact that a higher inflation rate increases uncertainty and reduces demand for credit. One could also argue that this negative relationship may be linked to slower adjustment of revenues compared with costs for inflation (Wendell and Valderrama, 2006).

H7: Inflation ratiois negatively related to risk and profitability in Turkish Commercial Banks.

Claeys and Vennet (2008) find,in the Western European countries, higher economic growth is associated withhigher margins. A negative relationship is found inDemirguc-Kunt*et al.* (2004). Demirguc-Kunt and Huizinga (1998), Bikker and Hu (2002), Goddard *et al.* (2004), Albertazzi and Gambacorta (2009) and Flamini*et al.* (2009) find a positive relationship with real GDP growth.An improvement in economic conditions increases lending demand by households and firms and improves the financial conditions of borrowers, with positive effects on the profitability of the traditional financial intermediation activities (Albertazzi and Gambacorta, 2009). Berger and Bouwman (2013) argue that banks with more capital could have greater flexibility to make certain types of loans that may be unavailable to lower-capital banks because of regulatory and market constraints during crises.

H8: GDP growthisnegatively (positively) related to risk (profitability) in Turkish Commercial Banks.

We use also the recentfinancial crisis as a proxy for macro-economic environment. Bolt *et al.* (2012) suggets that a decline in real economic activity increases net provisioning and costs stronger during severe recessions. Akhigbe*et al.*(2012) find that banks with more capital experienced more severe stock price declines during the recent financial crisis. They find also that banks with more capital experienced higher betas and stock volatility levels during the financial crisis. Akhigbe et al. (2012) states during the financial crisis, bank asset values were exposed to a weak economy, and to a severe shock in prices of real estate that served as collateral for many of their loans. Albertazzi and Gambacorta (2009) asserts that bad economic conditions can worsen the quality of the loan portfolio, generating credit losses, which eventually reduce banks' profits. Acharya and Mora (2011) find that banks bid more for deposits during a financial crisis, which could lower profitability. However, Berger (1995) finds that the relation between capital and earnings can be positive or negative but, like the theory papers, does not differentiate between financial crises and normal times.

H9: Global financial crisisis negatively related to risk and profitability in Turkish Commercial Banks.

4. Data and Methodology

4.1. Data

We have a balanced panel of 207 samples of 23 banks from Turkish banking sector. We heve selected over the period of 2003-2011 due to the completion of the process of the restructuring of the Turkish Banking Sector and the exit from the crisis of Turkish economy, after the economic crisis in Turkey in 2001.The data base related to bank variables comes from The Banks Association of Turkey (TBB) and macroeconomic data obtains fromTurkey Statistical Institute (TUIK).The dependent and independentvariables are shown in Table 1.

Table 1.Variables Description

	Variables		Descriptions
Dependent Variables	Profitability	Net interest margin (NIM)	Net interest revenue against average assets
		Return on assets (ROA)	Net income / total assets
		Return on equities (ROE)	Net income / equity
		Interest income (IITA)	Interest income /total assets
	Risk	Variance of ROA (VROA)	Variance of ROA is calculated using the overlapping ROA data averaged every three years
		Variance of ROE (VROE)	Variance of ROE is calculated using the overlapping ROE data averaged every three years
		Reserves rate (LLR)	Loan loss reserves / total assets
Independent Variables	Bank variables	Capital rate (CAR)	Equity to total assets
		Loan loss reserve rate (LLGL)	Loan loss reserve to gross loans
		Loans rate (NLTA)	Net loans to total assets
		Liquidity rate (LAD)	Liquid assets to customer and short-term deposits
		Foreign ownership (FO)	Total the percentage of foreign ownership
	Competition	Herfindahl-Hirschman Index (HHI)	Herfindahl-Hirschman Index for assets of competition structure
	Macro control variables	Inflation rate (INF)	The change of Consumer Price Index (CPI)
		Real GDP growth rate (RGDP)	GDP growth rate at 2003 costant price
		The recent subprime crisis dummy (D)	Before 2009 = 0; otherwise 1

Following the previous studies (Naceur and Omran, 2011; Fungacova and Poghosyan, 2011; Lee and Hsieh, 2013), for the explanatory variables we use a range of bank-specific and country-specific variables that are believed to be important in explaining the performance and risk-taking propensity of banks. There are three the dependent risk variablesandfour of them measures profitability. Profitability is measured in terms of net interest income, interest income and net return, risk is mesured in the context of non-performing loans as well as changes in profitability. We there fore try to observe that the effects of bank capital, loan policy, liquidity, foreign ownership, competition structure and macro economic variables such as inflation, GDP growth and the recent subprime crisis on profitability and risk in Turkish banking sector.

4.2. Methodology and Empirical Models

We examine the effect of bank capital on profitability and risk with the dynamic panel data methodology. In econometrics literature, dynamic panel data analysis is based on the Generalised Method of Moments (GMM), which was the first developed by Hansen (1982). Anderson and Hsiao (1981 and 1982) adapted GMM method to panel data. After that, Arellano and Bond (1991) proposed the GMM estimator for panel data to control the potential endogenous explanatory variables. This method uses the first difference model, which eliminates the time-invariant firm-specific effect, and instrumental variables for the endogenous variables were generated by lags of their original level (Mueller, 1977). Arellano and Bover (1995) and Blundell and Bond (1998) developed a dynamic panel GMM estimator that estimated with a level-equation and a difference equation, which is called a 'System GMM'. The resulting system of regression equations in differences and levels has better asymptotic and finite sample properties than the Arellano and Bond (1991) differences GMM estimator.

Thus, this study analyzed the proposed models using the dynamic panel system GMM estimator, which produces unbiased and consistent estimates after controlling for endogeneity and firm-specific effects even when the sample period is short.Two-stageanalysisofdynamicpaneldataestimationtechniquesproducesmore consistent results rather than single-stage.In case ofanendogenousvariableof independent variables, the findings from two-stage estimations are consistentand unbiased.

We therefore estimated our models using the two-step generalized method of moments (GMM) estimator based on Arellano and Bover (1995) and Blundell and Bond (1998), which allows us to control for endogeneity by using instruments.In particular, we use the GMM-System (GMM-SYS) estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998) methodology to deal with endogeneity. It is especially appropriate for this situation where we have (i) few time periods and many individuals; (ii) a linear functional relationship; (iii) more importantly, in a period of economic and financial behavior is largely influenced by past experiences and old patterns of behavior, economic or financial relations lagged values of the variables examined in the research model.

The validity of the results of dynamic panel data model developed by Arellano and Bond (1991) could be realized by two tests after estimate. One of those tests is the Sargan test that shows whether the tool variables are used accurately and completely for the estimate of GMM and the other is first and second-order autocorrelation test. Sargan test is the test suggested by Arellano and Bond (1991) in order to test whether the tool variables used for estimating the results are adequate or not (Tatoglu, 2012). We conducted a serial correlation test for panel GMM estimators developed by Arellano and Bond (1991). The significant serial correlation means our estimated coefficients were biased. Thus, in order to produce robust results we tested the serial correlation and the test results were insignificant.Also, it is necessary to test the results of dynamic panel data estimation model that are realized under the conditions of GMM with first and second-order autocorrelation tests suggested by Arellano and Bond (1991). According to the results, it is expected that second-order autocorrelation would be significant statistically. The models that do not have the second-order autocorrelation are the suitable models (Tatoglu, 2012).The fact could be tested by the Wald test that whether the model estimate is done correctly or not (Roodman, 2006).It has been argued that the standard errors of the two-step estimates of the GMM system are usually biased downward. Therefore, we employ Windmeijer's (2005) finite-sample correction to report standard errors of the two-step estimation, without which those standard errors tend to be severely downward biased.

The independent variables with lagged periods are included in Eq. (1) and (2) as shown below. Beyond the dynamic panel data, the model that establishes the relationship between bank capital and profitability (risk) is based on the earlier literature.According to the earlier literature discussion and this study' purpose of research,we modify the works of Lee and Hsieh (2013), Naceur and Omran (2011), Altunbas*et al.* (2007) and Goddard *et al.* (2004) to establish the relationship between bank capital and profitability (risk). The relationship between bank capital and profitability (risk) can be specified as follows:

$$\pi_{it} = \alpha_0 + \alpha_1\pi_{it-1} + \alpha_2 cap_{it} + \alpha_3 \times_{it} + \lambda_i + n_{it}, \forall i,t \qquad \text{Eqs. (1)}$$

$$\sigma_{it} = \beta_0 + \beta_1\sigma_{it-1} + \beta_2 cap_{it} + \beta_3 \times_{it} + \mu i + \nu_{it}, \forall i,t \qquad \text{Eqs. (2)}$$

Here, *t* and *i* denote time period and banks, respectively, λ_i (μ_i) is an unobserved bank-specific effect, and n_{it} (ν_{it}) is the idiosyncratic error term.Eq. (1) and (2) are designed to examine the impact of bank capital on bank profitability and risk,respectively.

Term cap_{it} is the level of bank capital, proxied by the equity-to-assets ratio(Berger, 1995; Goddard *et al*., 2004; Agusman*et al.*, 2008; Naceur and Omran, 2011; Fungacova and Poghosyan, 2011; Lee and Hsieh, 2013); π_{it}refers to the*i*th bank's profitability in year *t*, proxied by four profitability variables: return on assets (ROA), returnon equities (ROE), interest income (IITA), and net interest revenue against average assets (NIM). Here,σ_{it} denotes the *i*th bank's risk in year *t,*proxied by three risk variables (Lee and Hsieh, 2013; Lepetit*et al.,* 2008): variance ofROA (VROA), variance of ROE (VROE), and loan loss reserves to total assets (LLR). Term $\times_{it}$ includes the set ofexplanatory variables, while α_1 and β_1 are the estimated persistence coefficient for profitability andrisk, respectively. Lee and Hsieh (2013) suggests that banks are always accompanied by the feature of profitability persistence, difficulty in entry-and-exit, a monopoly on resources, and a special ability for management resource allocation.

Thus, it is crucial to consider the persistence of profitability through the dynamic panel model.As for the related internal control variables, according to Short (1979), Smirlock (1985), Naceur and Omran (2011), Lee and Hsieh (2013) they include loan loss reserves to gross loans (LLGL), net loans to total assets (NLTA), liquid assets to customer and short-term deposits (LAD). Three macro control variables are set as the related external control variables: inflation (INF), GDP growth rate (RGDP) and the recent subprime crises dummy (D). The coefficient of INF is uncertain because in high-inflation countries, banks may charge customers more, yet at the same time they face due loans that are shrinking.

We control for local market power by including the bank-level Herfindahl-Hirschman Index (HHI) of asset concentration for the local markets in which the bank is present, is a proxy for bank asset concentration (competition). Additionaly, we add the models total the percentage of foreign ownership (FO) to measure effect of foreign ownership structure on profitability and risk.

5. Emprical Results and Discussion

5.1. General Features of the Variables

The trends of the dependent and independent variables in the study during the examination period are shown below Fig.1-5.

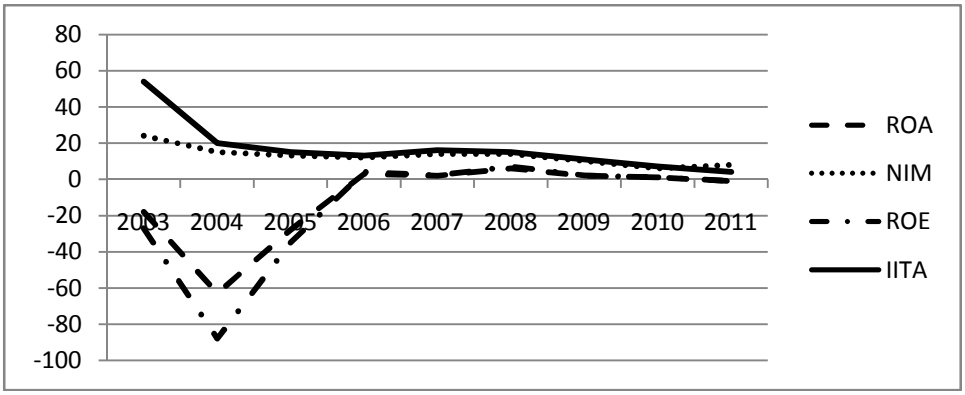

Fig. 1.The Profitability Ratios

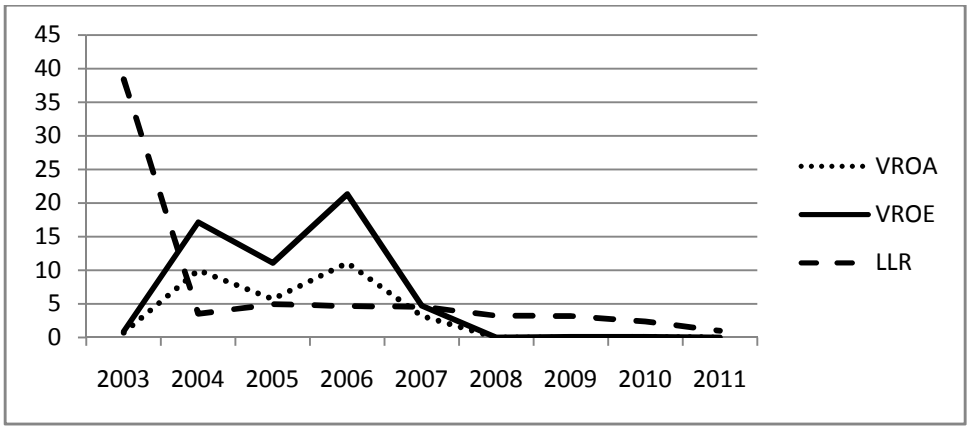

Fig. 2.Risk Indicators

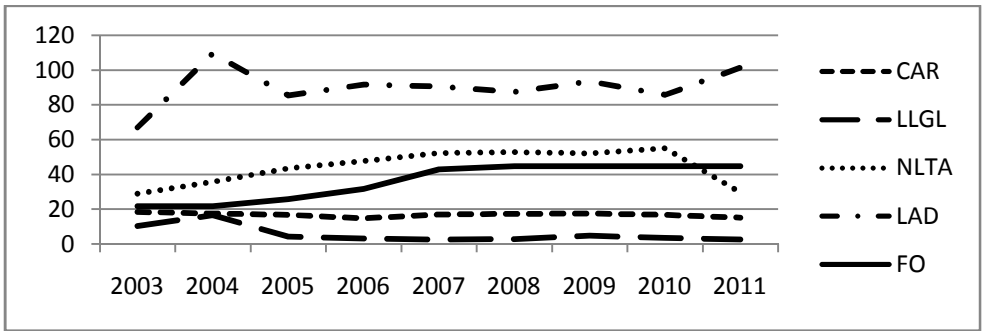

Fig. 3.Bank Independent Variables

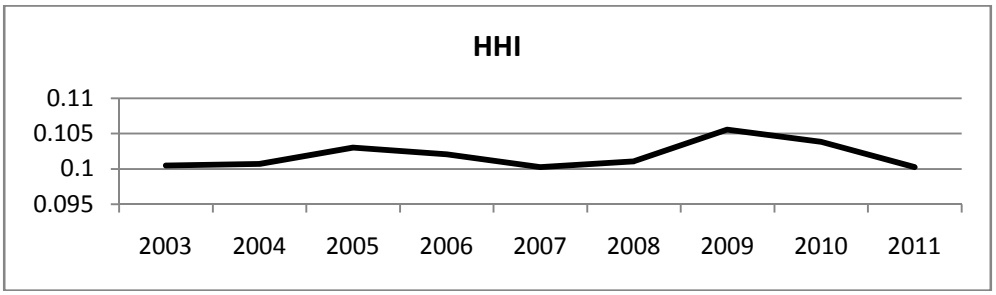

Fig. 4.The Competition Level

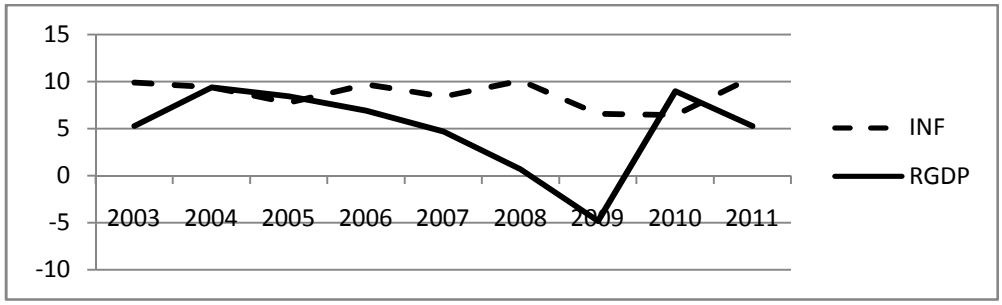

Fig. 5: Real Growth and the Trend of Inflation Indicators

In Fig. 1, the development over the years of banks' profitability ratios is shown. In the period under review, the return on assets and equity capital profitability ratio are acting together. The regarding profit abilities are negative in the years of 2003-2005 and are positive in following years.Especially the assets and equity capital profitability ratios are respectively -%60 and -%80 in 2004. Then the improvement on profit abilities has been lived and it became positive in the year of 2006. The limited level profitability has been lived in ongoing periods and the profit abilities again become negative in the year of 2011. The net interest margin and the rate of interest expenses to assets as the other profitability indicators are acting parallelly. The regarding rates were on the highest value in 2003but they decreased over the years. It is seen that, the regarding profitability rates were more variable till the year of 2006 and they are more stable with the year of 2006.

In Fig. 2, the propensity of the risk indicators of the banks over the years is seen. Variance of the rate of return on assets and variance of the equity rate of return are acting together in the examined period. Both of them showed vicissitudes in the period between the years of 2003-2007. With the year of 2007, there has been a steady reduction in both. The reserve ratio as the other risk indicator was very high in 2003 but it decreased consistently with the year of 2004. Thus, there has been a reduction in the risk of it by the year of 2007.It will not be wrong to say that this decreasing on profitability and risk with the year of 2007 has been lived due to the competition in the sector.

In Fig.3, the equity capital ratio used in models, the ratio of loans to provisions, the ratio of loans to assets,the ratio of liquid assets to deposit and the trends of the bank independent variable that has the share of foreigners in the research periods are appearing.The ratio of the equity capital as the measure of capital adequacy is acting approximately about the level of % 20 and horizontally.

The ratio of the provisions to the credits was approximately on the level of % 15 in 2003 and later it become % 20 in 2004 and in the following years it occurred in the range of 3-4%.The ratio of the credits to ratio started on the level of % 30 and increased regularly till the year of 2010 and reached the level of % 55.But this increasing did not go on in the year of 2011 and the ratio of the credits to the actives again godown to the level of 2033.The bank liquidity that is the ratio of the liquid assets to deposit become more stable after the year of 2004 and occurred on the level of %90.The share of the foreigners in the trade and deposit banks that shows the foreign ownership become approximately % 20 in 2003 and increased in 2011 more. The findings show that the bank shows a better performance in last years about credit management and openness to foreign capital. Especially it can be said that the borrowing and lending policies as the main function of the banks is relatively managed better in recent years.

In the Fig. 4, Herfindahl-Hirschman Index (HHI) that shows the competition level of the deposit banks is shown. If there are several numbers of banks are exist in the market that have equal share, HHI approaches 0 and while a single bank is a monopoly, the value of HHI reaches 1.

It is observed from the chart that the concentration of the deposit banks according to actives is low (close to 0) relatively. This makes us to think that the important part of the market in terms of asset size is handled by the greater numbers of banks in other word the market is more competitive.

In Fig. 5, the inflation rate in Turkey and the growth in real gross domestic product (real GDP growth) rate have been given. It is seen from the chart that the inflation has floating process between the rates of %6-%10.In the relevant period, the floating in real gross domestic product is more dramatic. It shows the variability in growth rate from -%4 till the levels of +%10.The sources of regarding floating are the fluctuations lived in both domestic and global economy.

5.2. The Correlations of Variables

Table 2.The Correlations of Dependent Variables

	NIM	ROE	ROA	IITA	VROE	VROA
NIM	1					
ROE	-0,246**	1				
ROA	-0,413**	0,784**	1			
IITA	-0,081	0,081	0,054	1		
VROE	-0,172	-0,039	-0,066	0,208**	1	
VROA	0,215**	-0,416***	-0,577**	0,126	0,021	1
LLR	0,405***	-0,327***	-0,418***	0,107	-0,026	0,804***

*, ** and *** show respectively the level of statistical significance on the levels of 0.10, 0.05, and 0.01.

In Table 2, the correlation coefficients between the dependent variables are given the correlation coefficients show the level of relationship between the dependent variables. As seen at the correlation coefficients, it is seen that, there is positive and negative relation between the profitability and risk indicators. There is a negative relation between net interest margin, equity capital and return on assets and there is a positive relation between return on assets and return on equity capital. In spite of that, the correlation between the ratio of interest incomes to actives and net interest margin, return on assets and return on equity capital is not statistically significant. By the other hand, only the positive relation between variance of return on assets and reserve ratio of the risk indicators is significant. Thus, it could be said that the return on assets and return on equity capitals, the profitability ratios in profit and risk management of the banks and the relation between the reserve ratio and the variance of return on assets are strong. The correlation among the independent variables is in Table 3.

Table 3.The Correlations of Independent Variables

	CAR	LLGL	NLTA	LAD	INF	RGDP	HHI
CAR	1						
LLGL	0,173	1					
NLTA	-0,528***	-0,242*	1				
LAD	-0,056	-0,046	-0,111	1			
INF	-0,0135	0,050	-0,283**	0,060	1		
RGDP	-0,022	0,056	-0,140	0,042	0,160	1	
HHI	0,003	-0,058	0,250**	-0,074	-0,841***	-0,390***	1
FO	-0,01	-0,128	0,108	0,032	-0,069	-0,118	0,068

*, ** and *** show respectively the level of statistical significance on the levels of 0.10, 0.05, and 0.01.

The correlation coefficients will put forth both the relations among the variables and also the presence of high multicollinearity problems among the independent variables will be used in the model. In this regard, in case of the high correlation (± 0,90 and higher) among those independent variables, they will not been estimated in the same equation. Instead of this, they will take a part in different equations.

Table 4.The Correlations between Dependent and Independent Variables

	NIM	ROE	ROA	IıTA	VROE	VROA	LLR
CAR	0,218**	-0,349***	-0,289**	0,185	0,043	0,550***	0,713***
LLGL	0,322***	-0,360***	-0,627***	-0195	0,011	0,412***	0,239**
NLTA	0,104	0,165	0,152	-0,037	-0,066	-0,312***	-0,346***
LAD	-0,057	-0,038	0,023	-0,087	-0,048	-0,043	-0,042
INF	-0,045	0,010	-0,025	0,100	-0,052	0,054	-0,025
RGDP	-0,111	-0,077	-0,093	-0,022	0,019	0,098	0,013
HHI	0,040	-0,011	0,036	-0,125	0,009	-0,051	0,016
FO	-0,151	-0,131	0,081	0,032	0,083	-0,094	-0,151

*, ** and *** show respectively the level of statistical significance on the levels of 0.10, 0.05, and 0.01.

While look at the Table 4, it is seen that this multi collinearityproblem (multi collinearity)is not valid for any kind of independent variable. This finding expresses that it could take a part in estimating of all independent variables.

The correlations between the dependent and independent variables are seen in Table 4. The correlation coefficients show both the direction and greatness of the relations between dependent variables and independent variables.The independent variables important in estimates will be able to be determined a priori. The findings show there is significant correlation between the variables of equity capital ratio and the ratio of the provisions to the credits and net interest margin, return on assets and the profitability of equity capital. Additionally, there is also a significant correlation between the variables of the ratio of equity capital, the ratio of the reserves to the credits and the ratio of the credits to the actives with the variance of return on assets of the risk indicators and the ratio of reserve. It is said that the ratio of equity capital, the ratio of the reserves to the loans and the ratio of loans to assets as some of the findings from the correlation analysis have important effect on the estimates of the models.

5.3. Results

5.3.1. Panel Unit RootResults

Before using the panel data analysis, it should be examined that whether the process creates the variables is stable over time,in other words it is necessary to examine whether the variables stable or not.

Otherwise, if the econometric model set among the non-stable variables is estimated by the method of least-squares (LS), after a shock, there could be obtained the relations which do not exist in reality between the variables.Thissituation is a problem named spurious regression. In order not to meet this problem, panel unit root test is done to determine whether each variable is stable or not. The non-stable variables are kept out of the analysis and the analysis is realized only with the variables that are identified as stable. In the stability analysis of the variables in study; Harris and Tzavalis(1999) unit root test has been used due to the facts that there is no correlation among the units, all units have common autoregressive variable and the number of the period under review is smaller than number of units.InHarris and Tzavalis (1999) unit root test, it is identified that the units include unit root in H_0hypothesis.If the coefficient is different than zero significantly,it will be considered that regarding units do not include the root and they are stable on their level.The unit root tests are presented below in Table 5 and 6.

Table 5.Harris and Tzavalis Unit Root Test Findings of Dependent Variables

Dependent Variables		Z Statistics	Decision
Profitability	Return on assets (ROA)	-4,1465***	Stationary
	Return on equities (ROE)	-7,1571***	Stationary
	Net interest margin (NIM)	-1,6990**	Stationary
	Interest income (IITA)	-9.8174***	Stationary
Risk	Variance of ROA (VROA)	-6,1463***	Stationary
	Variance of ROE (VROE)	-11,9456***	Stationary
	Reserves rates (LLR)	-3,1511***	Stationary

*, ** and *** show respectively the level of statistical significance on the levels of 0.10, 0.05, and 0.01.

Table 6.Harris and Tzavalis Unit Root Test Findings of Independent Variables

Independent Variables		Z Statistics	Decision
Capital	Capital rate (CAR)	-6.1835***	Stationary
Bank variables	Loan loss reserve rate (LLGL)	-6.1471***	Stationary
	Loans rate (NLTA)	-5,7784***	Stationary
	Liquidity rate (LAD)	-1,7858**	Stationary
	Foreign ownership (FO)	-1,5645**	Stationary
Competition	Herfindahl-Hirschman Indeks (HHI)	-9.7432***	Stationary
Macro control variables	Inflation rate (INF)	-15,0074***	Stationary
	Real GDP growth rate (RGDP)	-8,4210***	Stationary

*, ** and *** show respectively the level of statistical significance on the levels of 0.10, 0.05 and 0.01.

The findings in Table 5 and 6 shows that both all the dependents and variables do not include unit root on original level according to Harris and Tzavalis unit root test in other words they are stable. Thus, the models will be established with seven dependent variables that all are on original level and eight independent variables and they will be used in panel data estimate.

5.3.2. Dynamic Panel Data Analysis Results

Here, the findings gained from the dynamic panel data analysis models are presented. In the below Table 7, the findings of profitability models are existing. As seen at the results of the Wald test that is done for examining the significance of all models of profitability in Table, it is seen that all models have general meaning. Also, for testing the presence of second order autocorrelation, the autocorrelation test of Arellano and Bond is not significant statistically. Next, the Sargan test which is done for the validity of vehicle variables that are obtained from the non-resistant models is not significant statistically. The Sargan and the serial-correlation tests do not reject the null hypothesis of correct specification, which means that we have valid instruments and no serial correlation.

Table 7.Profitability Models (Robust Standart Errors)

Models	NIM	ROA	ROE	IITA
NIM(-1)	0,630***			
ROA(-1)		0,403***		
ROE(-1)			0,219***	
IITA(-1)				0,022***
CAR	-0,012	-0,005	-0,365***	0,138***
LLGL	-0,019***	-0,541***	-0,855***	0,095***
NLTA	0,006	0,010	0,010	0,066***
LAD	-0.001**	-0,001	0,001	0,002***
FO	-0,001**	-0,001**	-0,001***	-0,001**
HHI	0,215***	0,492***	3,093***	1,061***
INF	0,082**	-0,136***	-0,617*	-0,395***
RGDP	-0,084***	-0,064***	-0,207***	-0,203***
D	-0,009***	-0,001	-0,031***	-0,054***
Wald Test	53298,10***	128000***	11195,10***	78247,88***
Autocorelation Test (*p*-value)	1,145 (0,26)	1,326 (0,18)	0,988 (0,32)	1,662 (0,11)
Sargan Test (*p*-value)	21,995(0,96)	17,122 (0,99)	19,344 (0,98)	21,872 (0,95)

*, ** and *** show respectively the level of statistical significance on the levels of 0.10, 0.05, and 0.01.

As seen at the results of the models in Table 7, the lagged values of the dependent variables are positive and significant. This result shows that the previous period profitability is important for the bank profitability.

Table 7 reports the empirical results of the full sample when Eq. (1) is considered, which focuses on when the two-step system GMM and dynamic panel data approach are adopted, as well as the estimation results of capital and profitability. The effects of the independent variables on profitability are significant generally.

We find significantly positive relationships between capital and IITA and a negative relationship between ROE for overall Turkish Banking, indicating that structure-conduct-performance (SCP) hypothesis holds. This is consistent with the findings of Berger (1995), Demirgüç- Kunt and Huizinga (2000), Iannotta*et al.,* (2007), Naceur and Omran (2011), Berger and Bouwman (2013) and Lee and Hsieh (2013).We find also significantly a negative relationship between capital and ROE for overall Turkish banking, and this is consistent with the findings of Modigliani and Miller (1963), Altunbas*et al.,* (2007), Goddard *et al.,* (2010) and Lee and Hsieh (2013).

The positive effect of HHI on profit abilities (due to the fact that the value of the index and the level of competition in the market move in the opposite direction) presents the fact that the reducing on the competition in the market increases the profit abilities. This finding is consistent with the SCP hypothesis states that increased market power yields monopoly powers and the larger is HHI, the greater is a bank's market power and higher product market concentration and higher product market concentration is associated with lower competition and vice versa. Thus, structure-conduct-performance (SCP) hypothesis that claims there is a positive relation between the activity performance and market structure is supported. The finding of Turkish Banks is similar with the researches such as Rose and Fraser (1976), Neumark and Sharpe (1992), Akhavein*et al.* (1997) and Beiner*et al.,* (2011).

Among the other control variables, the coefficients of the ratio of loan loss reserves to gross loans (LLGL) is significantly negative onprofit abilities (NIM, ROA, and ROE) except for IITA, not matching our expectations. A negative sign between loan loss reserves to gross loans and probability can be explained using the market discipline argument for Russia (Karas*et al.,* 2010). Fungacova and Poghosyan (2011) suggest that following this argument, depositors require a higher premium for depositing their savings in riskierbanks (i.e. banks with higher non-performing loan ratios). An increase in deposit rates ceteris paribus would contribute to the decline in interest margins, establishing a negative relationship between nonperforming loans and the margin.Lee and Hsieh (2013) also find the coefficients of the ratio of loan loss reserves to gross loans is significantly negative on profititability (ROA and ROE) for 42 Asian countries banking.

Net loans total assets ratio (NLTA) is significantly positive on all profit abilities, matching our expectations. Agusman*et al*., (2008) used net loans to total assets as a measure of bank credit risk. This is consistent with standard asset pricing arguments that imply a positive relationship between risk and earnings. Empirical studies find that a higher loan ratio is associated with higher interest margins, which suggest that risk averse shareholders seek larger earnings to compensate higher credit risk (Demirguc-Kunt and Huizingua, 1999 and Flamini*et al.,* 2009). Lee and Hsieh (2013) also find the coefficients of the ratio of net loans to total assets are significantly positive on profititability (ROA and ROE) for 42 Asian countries banking.

Liquid assets to customer and short-term deposits (LAD) also perform differently. The coefficient of the ratio of liquid assets to customer and short-term deposits (LAD) is significantly negative on NIM, but the same coefficient is positive on IITA. Those two different results show that the liquidity does not affect the bank profit abilities uniformly. This finding consistent with the finding of Lee and Hsieh (2013) and Fungacova and Poghosyan (2011) find a negative relationship between the ratio of liquid assets to total assets and bank interest margins for Russia. This finding also consistent withFungacova and Poghosyan (2011) state that the more the demand liabilities of the bank are backed up by liquid assets, the lower the liquidity risk of the bank and its margins.

The foreign ownership is significantly negative on all profit abilities. This result is not corroborating the agency theory predictions and affirms that the institutional shareholders should influence positively the performance of the firm. This finding is consistent with Berle and Means (1932) suggest that an inverse correlation can be observed between the concentration of shareholdings, and firm performance, in which ownership structure affects firm performance. At the core of their argument is the agency problem originating from conflicts of interest between the managers and the firm's owners or residual claimants. This finding also is consistent with Pound (1988)'s assumptions of conflict of interest and strategic arrangements are current in Turkish Commercial Banks.

Thus, due to the fact that the performance decreasing affects instead of performance increasing effects of foreignshareholders indicate an agency problem, this finding supports the agency problem hypothesis. The finding of Turkish Banks is similar with the researches such asQi*et al.,*(2000) and Belkhir (2004).

We use three proxies for macro-economic environment; inflation, real GDP growth and the recent subprime lending crisis. Inflation rate (INF) is significantly negative on all profit abilities (ROA,ROE, and IITA), except for NIM, matching our expectations. The negative affect shows the loss of purchasing power and also the positive affect is the result decreasing of interest income and interest expenses. The negative coefficient can be explained that a higher inflation rate increases uncertainty and reduces demand for credit. This negative relationship also may be linked to slower adjustment of revenues compared with costs for inflation according to Wendell and Valderrama (2006). Therefore, if inflation is not anticipated and banks are sluggish in adjusting their interest rates, there is a possibility that bank costs may increase faster than bank revenues and hence adversely affect bank profitability. This negative finding is consistent with the studies such as Afanasieff*et al.,* (2002) and Naceur and Kandil (2009).

On the other hand, among the other macro control variables, the coefficients of real gross domestic product (RGDP) is significantly negative on all profit abilities (NIM, ROA, ROE and IITA), not matching our expectations. That is, the increase on real gross domestic product decreases the profitabiliy. There could have been occurred a negative relation between the growth and bank profit abilities as the result of behaving more competitive of the banks in order to get more share from the market.This is consistent with the findings of Demirguc-Kunt*et al.,* (2004), but contravene the findings of Goddard *et al.*(2004), Demirguc- Kunt and Huizinga (1998), Bikker and Hu (2002), Albertazzi and Gambacorta (2009), Flamini*et al.*(2009) and Berger and Bouwman (2013).

We use also the recent subprime financial crisis as a proxy for macro-economic environment. The global financial crisis dummy variable shows that generally the profitability of the Turkish Commercial Banks has been decreased as expected.This is consistent with Bolt *et al.* (2012) suggets that a decline in real economic activity increases net provisioning and costs stronger during severe recessions. This result is also consistent withAkhigbe*et al.,* (2012) states during the financial crisis, bank asset values were exposed to a weak economy, and Albertazzi and Gambacorta (2009) asserts that bad economic conditions can worsen the quality of the loan portfolio, generating credit losses, which eventually reduce banks' profits. The effects of macro variables on bank profit abilities are naturally originating from the sensitivity of the banking sector against the changes in economy.

Table 8 provides the empirical results when Eq. (2) is considered for the estimation results of capital and risk. In the below Table 8, the findings of risk models are presented. The results of the Wald test shows that all risk models are significant. Also the second order correlation test of Arellano and Bond is not significant statistically. Thus, there is no second order correlation. TheSargan test obtained from the Non-robust models is not significant statistically. It is therefore found that the instrumental variables are valid. That is, the Sargan and the serial-correlation tests do not reject the null hypothesis of correct specification, which means that we have valid instruments and no serial correlation.

Tablo 8.Risk Models (Robust Standart Errors)

Modeller	LLR	VROA	VROE
LLR(-1)	0,980***		
VROA(-1)		0,461***	
VROE(-1)			-0,029***
CAR	0,057***	0,012***	-0,307***
LLGL	0.457**	0,083***	0,210**
NLTA	0,024***	-0,002	0,162***
LAD	0,001*	-0.001	-0,008***
FO	0,001***	0,001**	0,001***
HHI	-0,365***	0,003	4,598***
INF	-0,251***	0,022***	-1,963***
RGDP	0,102***	0,023***	0,294***
D	-0,016**	-0,001***	-0,147***
Wald Test	752036,8***	181000***	133776,71***
Autocorelation Test (*p*-value)	1,049 (0,29)	0,888 (0,37)	0,453 (0,64)
Sargan test (*p*-value)	22,383 (0,94)	18,853 (0,98)	19,496 (0,98)

*, ** and *** show respectively the level of statistical significance on the levels of 0.10, 0.05, and 0.01.

It is seen from the Table 8 that the lagged values of dependent variables are significant. This shows the fact that the previous period risk is important over the bank risk. It is come forward that the other independent variables have significant effects on bank risk. According to the estimate result of the models here, the banks, sector and macro variables are decisive on the risk of Turkish Commercial Banks.

The significantly positive relationship between capital and reserve rates and variance ROA, the significantly negative relationship between capital and variance of ROE are consistently found for the whole Asian banking. This implies that an increase in capital increases LLR and VROA decreases VROE. Some studies find a positive relationship between capital and risk, meaning regulators encourage banks to increase their capital commensurably with the amount of risk taken, which refers to the *'regulatory hypotheses'*. Most of these studies have confirmed the positive relationship between capital and risk adjustments predicted by theory, indicating that banks that have increased their capital levels over time, have also increased their risk appetite Pettway (1976) and Shrieves and Dahl(1992) for U.S. banks, Rime (2001) for European banks and Iannotta*et al.,* (2007) for 15 European countries.An alternative hypothesis, a negative relationship between capital and risk may refer to the *'moral hazard hypothesis'* whereby banks have incentives to exploit existing flat deposit insurance schemes (Demirgüç-Kunt and Kane, 2002; Jahankhani and Lynge, 1980;Brewer and Lee, 1986; Altunbas*et al.,* 2007 and Agusman*et al.,*2008). Thus, it is found that *'regulatory hypothesis'*that predicts the positive relation and *'moral hazard hypothesis'*predicts the negative relation is valid in Turkish Banks.

It affects the bank risks of HHI negatively and positively. It is identified that the increase on the market's competition increases LLR and decreases VROE. Those finding obtained for Turkish Banks look like the results of the studies done by Aggarwal and Jacques (1998). The findings reached are positive as in the studies done by Shrieves and Dahl (1992), Berger (1995), Demirguc-Kunt and Huizinga (2000), and Iannotta*et al.,* (2007) and also they rae negative as in the studies done by de Jacques and Nigro (1997), Agusman*et al.,* (2008), and Demirguc-Kunt and Kane (2002). Thus, it is found that *'regulatory hypothesis'* that predicts the positive relation and *'moral hazard hypothesis'* predicts the negative relation is valid in Turkish Banks.

The loan loss reserve to gross loans (LLGL) affect all bank risk indicators positively, and also the net loans to total assets (NLTA) affect loan loss reserves to total asset (LLR) and the variance of ROE positively. The fact that the credit and collection policies of Turkish Commercial Banks increase the bank risks indicates that especially the credit policies should be tighter. Because, the effort and losses for the collection of the credits given to the sections who has the low credit worthiness will increase the bank risk. This finding matches the findings of Brewer and Lee (1986), Mansur *et al.,* (1993), Agusman*et al.,* (2008), Lee and Hsieh (2013).

The liquidity ratio, liquid assets to customer and short-term deposits (LAD) has the positive affect on LLR and has negative affect on VROE. Those two different results show that the liquidity affects the bank risks changeably. This positive finding is consistent with '*regulatory hypothesis'*states that regulators encourage banks to increase their capital commensurably with the amount of risk taken. This negative finding is consistent with Berger and Bouwman (2013) ideas that high cash holding can reduce liquidity risk for banks and could help them survive, but they can also be associated with agency problems. It is also consistent with Fungacova and Poghosyan (2011) states that the more the demand liabilities of the bank are backed up by liquid assets, the lower the liquidity risk of the bank and its margins.This result is matches the findings of Jahankhani and Lynge(1980) and Mansur *et al.,* (1993).

The shares of the foreigners in the banks increase the risks. This finding is consistent with "Agency theory"indicates that shareholders with a diversified portfolio are motivated to take more risk for a higher expected return whereas managers take less risk to protect their position and personal benefits and to preserve their acquired human capital. Additionaly, the banking sector is also affected by the well-known owner–manager agency conflict according to Fama and Jensen (1983). Many authors agree that owner–manager agency conflict may counteract the increase in risk-taking arising from the moral hazard problem, indicating that there is a conflict of interest between managers and shareholders. As we can understand from here, due to the fact that the foreign shareholders indicate the agency problem, thesis finding supports the agency problem hypothesis. Empirically, this result matches findings of Saunders *et al.* (1990), Laeven and Levine (2009), Chen *et al.* (1998) and Anderson and Fraser (2000).

As seen at the effects of the macro variables on risk in Table 8, it is seen that RGDP affects positive, the recent crises dummy (D) affects negatively and inflation affects in both ways as positively and negatively. The inflation ratio affects the risks except for VROA negatively and affects VROA positively.

Due to the fact that the inflation is a macro risk element, it has positive affect on VROA. Against this fact, it could be told that the decrease of it on LLR and VROE arises of the strict follow-up of Turkish Banking Regulation and Supervision Agency (BDDK) on capital adequacy and credit provisions. On the other hand, the increasing on real gross domestic product (RGDP) improves the risks.The banks are undertaking more risks as the result of the more competitive behaviors of the banks in order to get more shares from the markets with the expansion in economy. It puts forward that generally the risks of the Turkish Commercial Banks decreased after the crisis. Those effects of the macro variables on bank risks show that the sector has a high sensitivity towards the economic developments.

6. Conclusions

This article examines the relationship between bank capital and profit (risk), using bank-level data for 23 Turkish Commercial Banks with the latest and a wider range of panel data that cover 207 banks over the period from 2003 to 2011. This study applies recent two-step system GMM dynamic panel data techniques.We aim to shed some crucial light on the determinants of bank risk-taking and analyze its relationship with capital and profitability. For the explanatory variables we use a range of bank-specific and country-specific variables that are believed to be important in explaining the performance and risk-taking propensity of banks. We contribute to existing empirical analyses in several ways. First, the existing literature has drawn a lot of attention on U.S. or European cases. This is, to our knowledge, the first study of bank capital's impacts on profitability and risk for Turkish Banking Sector.

Turkish Economy and Turkish Banking System are going on to develop promptly. Especially for Turkey, the banks are the most important actors of the money markets that short-term fund supply and demand meet. Examining the effect of bank capital over the profitability of the banks and risk of the banks in terms of Turkish banks that recently came into the limelight become striking subject. The Turkish banking industry therefore provides an interesting laboratory for investigation. Second, most studies focus mainly on the relationship between capital and risk, yet seldom on the relationship between capital and profitability. This study discusses capital, risk, and profitability together. Third, we adopt four proxies for profitability and three for risk. Finally, from the methodology viewpoint, most studies utilize a static model. Dynamic panel techniques are adopted to analyze the panel data, which are designed to check the persistence of profit (or risk) in the study.

The empirical results indicate that the effect of increasing bank capital on risk is significantly positive and negative, supporting the regulatory hypothesisand moral hazard hypothesis. There has been reached positive and negative relation between the capital and profitability. Thus, the sample supports also structure-conduct-performance hypothesis. Thus; our Turkish Commercial Bank sample supports the 'regulatory hypothesis', 'moral hazard hypothesis' and 'structure-conduct-performance hypothesis'.

We find that the positive effect of HHI on profit presents the fact that the reducing on the competition in the market increases the profit abilities. Structure-conduct-performance (SCP) hypothesis that claims there is a positive relation between the activity performance and market structure is supported. It affects the bank risks of HHI negatively and positively, indicating that that 'regulatory hypothesis' that predicts the positive relation and 'moral hazard hypothesis'predicts the negative relation is valid in Turkish Banks. The results also suggest that the foreign ownership is ignificantly negative on all profit abilities. This result is not corroborating the agency theory predictions and affirms that the institutional shareholders should influence positively the performance of the firm, means that the assumptions of conflict of interest and strategic arrangements are current in Turkish Commercial Banks. Thus, due to the fact that the performance decreasing affects instead of performance increasing effects of foreign shareholders indicate an agency problem, this finding supports the agency problem hypothesis. The shares of the foreigners in the banks increase the risks. This finding is consistent with 'agency theory'. The fact that there is a negative relation between the share of foreigners and profitability and the positive relation between the share of foreigners and risk shows that it supports the 'agency problems hypotheses.

Important policy implications emerge from our empirical results. First, different profitability (risk) variables present different patterns with capital. Hence, the authorities should realize that using a single profitability (risk) variable may result in a totally wrong policy. Second, Turkish banking supervisor or regulators should improve their banking system by mending the financial efficiency of commercial banks to implement the suggestions proposed by Basel III.

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