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**ROUNDTABLE ON COMPETITION, CONCENTRATION AND STABILITY IN THE BANKING
SECTOR**

-- Note by the Delegation of Turkey --

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ROUNDTABLE ON COMPETITION, CONCENTRATION AND STABILITY IN THE BANKING SECTOR

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1. Introduction

1. As in other industries, competition in banking system is desirable for efficiency and maximisation of social welfare. However, banking sector has specific features that make it of particular importance to an economy and has properties that distinguish it from other industries. Banks contribute greatly to economic growth by playing an intermediating role between borrowers and lenders and providing financial resources to other industries. Banking system is also important since any instability in the system has the potential to lead to a financial instability and economic crisis. Hence, a well functioning banking system is regarded as a cornerstone of a market economy. Policymakers try to ensure that banking system is stable besides ensuring that it is competitive and efficient.

2. However, there has been a conventional wisdom among policymakers and academicians that more competition and less concentration in banking system are associated with greater instability and therefore there exists a trade-off between competition and stability. This so called "*competition-fragility*" or "*concentration-stability*" view is mainly based on the "*franchise value hypothesis*" which states that higher competition erodes profit margins causing banks' franchise value to drop, thus reducing incentives for prudent behaviour and leading to more aggressive risk taking in an attempt to earn higher profits.

3. Recently, there is a counter-argument in the literature that greater competition among banks contributes to banking system stability and hence there exists no trade-off between competition and stability in the banking system. This "*competition-stability*" or "*concentration-fragility*" view is mainly built on the "*risk shifting paradigm*" which states that increase in market power and the resulting higher loan rates have the potential to negatively affect the stability of banks due to moral hazard and adverse selection problems on the part of borrowers. Another argument is about the effect of "too-big-to-fail or too-important-to-fail policies" in concentrated banking systems on risk taking incentives of banks and borrowers.

4. There is a large empirical literature which aims to examine the impact of banking system structure on its stability and hence shed light on the conflicting theoretical predictions and policy debates on this issue. However, similar to the theoretical literature, empirical studies produce different findings and do not offer concrete single evidence on the validity of either the competition-stability or the competition-fragility views.

5. Within this context, this paper focuses on the theoretical and empirical literature on the relation between competition and stability in banking system and analyses this relation for the Turkish banking system for the period between 1990 and 2008.

2. Competition and stability in banking system: Theory

6. There are mainly two arguments arising from the theoretical literature on the impact of concentration and competition in banking system. Relatively earlier studies support the “*competition-fragility*” or “*concentration-stability*” view which states that as banking system becomes more competitive and less concentrated, it becomes more fragile and less stable. The second view in the literature is the so-called “*competition-stability*” or “*concentration-fragility*” paradigm which proposes that as banking system becomes more competitive, it is less prone to risk of bank failures which in turn enhances financial system stability.

2.1. Competition-Fragility or Concentration-Stability View

7. The conventional wisdom in the banking literature is that there is a trade-off between competition and stability in the banking sector. This competition-fragility or concentration-stability view states that competition has a detrimental impact on the stability of banks leading to undesirable outcomes in the form of bank failures. In contrast, concentration and hence market power enhances stability by probability of bank failures¹.

8. The dominant perception in the competition-fragility view is the “*franchise value hypothesis*”. The essence of this paradigm is the analysis of the relationship between market structure and excessive risk taking by banks. It focuses on the risk incentive of banks and analyses the effects of competition on banks’ risk taking behaviour. Banks choose the risk of their asset portfolio and invest in assets with exogenous distributions of returns. This paradigm allows competition to exist in the deposit market but suppress it in the loan market. Therefore, paradigm takes into account the liability side of the balance sheet of banks to analyse the incentive effects of high franchise values for bank risk taking².

9. Generally speaking, this view states that competition increases banking system fragility since it negatively affects the franchise value of banks. Franchise value plays a key role in limiting the riskiness of individual banks and hence of banking systems more broadly. The reason is that since franchise value exists only when banks remain in business, banks try to avoid bankruptcy not to lose it. Therefore higher franchise values reduce incentive for banks to take excessive risk. Banks limit or reduce their risk-taking and become relatively conservative in order to protect their franchise values. Banks tend to behave more prudently by holding more equity capital or less risky portfolios which in turn contribute to the stability of the whole banking system³.

¹ Carletti, E., Hartmann, P. (2002), “Competition and Stability: What is Special About Banking?”, *European Central Bank Working Paper Series, 146*; Beck, T. (2008), “Bank Competition and Financial Stability: Friends or Foes?”, *World Bank Policy Research Working Paper, 4656*.

² Carletti and Hartmann (2002); Boyd, J. H., De Nicolo G., (2005), “The Theory of Bank Risk Taking and Competition Revisited,” *Journal of Finance, 60 (3), 1329-1343*; Boyd, J. H., De Nicolo, G., Jalal, A. M. (2006), “Bank Risk-Taking and Competition Revisited: New Theory and New Evidence”, *IMF Working Paper, 06/29*; Martinez-Miera, D., Repullo, R. (2008), “Does Competition Reduce The Risk of Bank Failure?”, *CEMFI Working Paper, 0801*.

³ Keeley, M. C. (1990), “Deposit Insurance, Risk, and Market Power in Banking”, *The American Economic Review, 80, 1183-1200*; Schaeck, K., Cihak, M., Wolfe, S. (2006), “Are More Competitive Banking Systems More Stable?”, *IMF Working Paper, 06/143*; Jimenez, G., Lopez, J. A., Saurina, J. (2007), “How Does Competition Impact Bank Risk-Taking?”, *Federal Reserve Bank of San Francisco Working Paper Series, .23*; Levy Yeyati, E., Micco, A. (2007), “Concentration and Foreign Penetration in Latin American Banking Sectors: Impact on Competition and Risk”, *Journal of Banking and Finance, 31, 1633-47*; Beck (2008).

10. Higher competition, instead, have a deleterious impact on stability. It erodes market power and profit margins causing banks' franchise value to drop, thus reducing incentives for prudent behaviour. It leads to more aggressive risk taking in an attempt to earn higher profits. Examples of riskier policies that banks may follow are choosing more risky and lower quality portfolios, taking on more credit risk, lowering capital levels, etc. These riskier policies increase the probability of higher non-performing loan ratios and more bank bankruptcies resulting in greater fragility and financial instability. Therefore, less concentrated banking systems are more prone to experience crises⁴.

2.2. *Competition-Stability or Concentration-Fragility View*

11. The traditional competition-fragility view is challenged by the relatively recent competition-stability strand of the literature which argues that greater competition contributes to bank stability or in other words financial instability increases as the degree of competitiveness is lessened. Competition-stability view is mainly built on the "*risk shifting paradigm*". The studies supporting this paradigm basically analyse the effects of competition on moral hazard and adverse selection incentives of borrowers.

12. Boyd and De Nicolo (2005) states that market power may destabilise the banking system and be detrimental for financial stability. They introduce a model where loan markets exist besides deposit markets and competition is allowed in both. They take into account the fact that banks also invest in loans and therefore when making optimal asset allocation decisions they are faced with both a portfolio decision and an optimal contracting problem. They also point out that besides banks; borrowers also choose the riskiness of their investment financed by bank loans.

13. As deposit markets become more concentrated, banks become less eager to seek low probability, high return outcomes in turn decreasing their risk profile. Increase in concentration or decrease in competition among banks in the loan markets however translates into higher interest rates charged on business loans. Higher interest rates increase the expected rate of return on bank assets. On the other hand, it also increases the standard deviation of those returns in a moral hazard and adverse selection environment. This is because when confronted with increased interest rates on their loan, borrowers optimally choose higher risk projects and increase their own risk of bankruptcy. The higher interest rates charged to loan customers make it harder to repay loans and create moral hazard incentives for borrowers to shift into riskier projects to compensate for the high loan rates. This practice results in an increase in firm default risk and so in a higher probability that loans turn non-performing and a higher bankruptcy risk for banks and greater bank instability. Also the higher rates may result in a riskier set of borrowers due to adverse selection problems. Bank competition via reducing loan rates, makes it easier for borrowers to repay loans and then reduces moral hazard incentives to shift into riskier projects. Therefore, greater competition reduces default risk of borrowers and hence banks losses and so risk of failure unambiguously declines⁵.

14. Another argument is the so-called "*too-big-to-fail*" or "*too-important-to fail*" view which is related to the effect of market structure on regulatory policies in the banking system. Advocates of this view argue that policymakers are more concerned about bank failures in concentrated banking systems with fewer and larger banks relative to competitive banking systems with many small banks. The reason is that presence of larger banks constitutes a potential threat to the safety and soundness of the financial system because a failure of a large bank exposes the financial system to systemic risk. Concerns about contagion and financial crisis resulting from the failure of large banks make regulators reluctant to let them

⁴ Berger, A. N., Klapper, L. F., Turk-Ariss, R. (2008), "Bank Competition and Financial Stability", *World Bank Policy Research Working Paper*, 4696; Keeley (1990), Carletti and Hartmann (2002), Jimenez *et al.* (2007), Beck (2008).

⁵ Boyd and De Nicolo (2005).

fail in the event of solvency problems. Therefore, governments give the implication that they will guarantee the survival of these banks to avoid country-wide crisis. However, these policies in turn pose problems for the safety and stability of the banking system. These problems originate from the fact that unwillingness of the regulator to let the bank fail intensifies risk-taking incentives of banks. Banks believe that they are too-big-to-fail and are likely to be protected by the government. From this perspective, concentrated banking systems may lead to more risk taking and tend to be more fragile than diffuse banking systems⁶.

15. Moreover, too-big-to-fail policies also create moral hazard problem on the part of depositors. Depositors of large banks know that they are likely to be completely protected by government insurance if the bank fails. This enhances moral hazard problem because depositors have little incentive to monitor the bank and withdraw their funds if the bank is taking on too much risk. Because of this lack of monitoring, banks take on even more risks making failure more likely⁷.

3. Competition and stability in banking system: empirical literature

16. There is a large and growing empirical literature which aims to examine the impact of banking system structure on its stability and hence shed light on the conflicting theoretical predictions and policy debates on this issue. However, similar to the theoretical literature, empirical studies produce mixed findings and contradictory evidence. In this part, before reviewing the empirical literature, the measures of stability and competition that are frequently used in empirical studies are explained briefly.

3.1. Measuring Stability and Competition

3.1.1. Measuring Stability

17. In empirical studies several measures are used to approximate market structure and stability. Stability in banking system is generally measured as either by identifying the occurrence of systemic banking distress or measuring individual bank distress⁸. Systemic banking distress is measured by taking into account the episodes of banking system crisis. It is broadly defined as periods when the banking system is not capable of fulfilling its intermediation function effectively anymore. Individual banking distress, however, is approximated by using bank level accounting data. There are two commonly used measures of individual bank fragility; namely Z-Index and non-performing loan ratio (NPL). They both measure the probability of occurrence of a banking distress⁹.

18. Z-Index is a proxy for the probability of insolvency or entry into bankruptcy. It is an inverse measure of overall bank risk. Z-Index is defined as the sum of return on assets and capital to asset ratio divided by the standard deviation of return on assets. Z-Index combines in a single indicator the profitability, leverage or capitalisation level and return volatility. It indicates the number of standard deviations in return on assets that a bank is away from insolvency and likelihood of failure. Thus, a larger

⁶ Mishkin, F. S. (1999), "Financial Consolidation: Dangers and Opportunities", *Journal of Banking and Finance*, 23, 675-691; Beck, T., Demirgüç-Kunt, A., Levine, R. (2006b), "Bank Concentration and Fragility: Impact and Mechanics", In: Stulz, R., and Carey, M. (eds), *The Risks of Financial Institutions*, National Bureau of Economic Research; Schaeck *et al.* (2006); Levy Yeyati and Micco (2007), Beck (2008).

⁷ Beck *et al.* (2006b), Levy Yeyati and Micco (2007), Beck (2008).

⁸ Beck *et al.* (2006b).

⁹ Beck (2008).

value of the Z-Index indicates a smaller risk profile for a bank and higher bank stability¹⁰. NPL is defined as the ratio of the volume of non-performing loans to total loans of a bank and measures the credit or loan portfolio risk¹¹.

3.1.2. Measuring Competition

19. The approaches for the measurement of competition can be divided into two major streams: the structural approach and the non-structural approach. The structural approach is based on the traditional industrial organisation literature and centres on the Structure-Conduct-Performance (SCP) paradigm. The SCP paradigm makes links between structure and performance of industries. Structure refers to mainly the concentration in the market. Conduct refers to the behaviour of firms in various dimensions such as pricing, research and development, advertising, etc. Performance refers to efficiency, mainly defined by extent of market power, with greater market power implying lower efficiency. The paradigm is based on the hypotheses that structure influences conduct (lower concentration leads to more competitive behaviour of firms); conduct influences performance (more competitive behaviour leads to less market power, less profits and greater efficiency) and structure therefore influences performance (lower concentration leads to lower market power). Hence the causality goes from structure to performance. Generally speaking, the SCP paradigm argues that greater concentration causes less competitive bank conduct and leads to greater market power and profitability of the bank. This in turn drives loan rates up and decreases deposit rates and hence decrease consumer welfare¹². Moreover, SCP paradigm assumes that since market structure is related to competitive conduct, competition can be approximated by the degree of concentration. Hence competition is measured by market structure measures such as number of banks, concentration ratios and Herfindahl-Hirschman Index as inverse indicators of the intensity of competition¹³.

20. SCP paradigm is criticised on the assumption that structure determines performance and it is argued that structure is not necessarily exogenous and market structure itself is affected by conduct and performance. Moreover, the measures of competition based on SCP approach are also criticised since the competitiveness of an industry cannot be measured by market structure indicators alone. They measure the actual market shares without allowing inferences on the competitive behaviour of banks. Hence they are indirect proxies¹⁴. Claessens and Laeven (2004) and Claessens (2009) argue that the degree of competition in the banking system should be measured with respect to the actual behaviour of banks. The actual behaviour is related not only to market structure but also to entry barriers, barriers on foreign ownership and activity restrictions which can limit the degree of competition.

¹⁰ De Nicolo, G., Bartholomew, P., Zaman, J., Zephirin, M. (2003), "Bank Consolidation, Internationalization, and Conglomeration: Trends and Implications for Financial Risk", *IMF Working Paper*, 03/158; Boyd *et al.* (2006), Beck (2008), Berger *et al.* (2008).

¹¹ Jimenez *et al.* (2007), Beck (2008), Berger *et al.* (2008).

¹² Bikker, J.A., Haaf, K. (2000), "Competition, Concentration and Their Relationship: an Empirical Analysis of the Banking Industry", *De Nederlandsche Ban, Research Series*, 30; Berger, A. N., Demirgüç-Kunt, A., Levine, R., Haubrich, J. G. (2004), "Bank Concentration and Competition: An Evolution in the Making", *Journal of Money, Credit and Banking*, 36 (3), 433-451; Carletti, E., Hartmann, P., Spagnolo, G. (2007), "Bank Mergers, Competition, and Liquidity", *Journal of Money, Credit and Banking*, 39 (5), 1067-1105; Claessens, S. (2009), "Competition in the Financial Sector: Overview of Competition Policies", *IMF Working Paper*, 09/45; Levy Yeyati, and Micco (2007).

¹³ Claessens, S., Laeven, L. (2004), "What Drives Bank Competition? Some International Evidence", *Journal of Money, Credit and Banking*, 36 (3), 563-583; Claessens (2009).

¹⁴ Bikker, J.A., Haaf, K. (2000), "Competition, Concentration and Their Relationship: an Empirical Analysis of the Banking Industry", *De Nederlandsche Ban, Research Series*, 30; Berger *et al.* (2004), Claessens and Laeven (2004), Claessens (2009).

21. As a response to the theoretical and empirical deficiencies of the structural models, non-structural models of competition are developed. These new industrial organisation approaches provide non-structural measures such as Lerner Index, Iwata model, Bresnahan and Lau model and Panzar and Rosse model to circumvent the problems of the competition measures based on traditional industrial organisation approach. Non-structural measures do not assess the competitive conduct of banks through the analysis of market structure but rather measure banks' conduct directly¹⁵.

22. Panzar and Rosse (PR) model which is developed by Panzar and Rosse (1982, 1987) is a commonly used non-structural measure of competition in the empirical literature. The model investigates the extent to which a change in factor input prices is reflected in equilibrium revenues earned by a specific bank. It assumes that equilibrium condition exists in the banking market. Also it supposes a demand with constant elasticity and a Cobb-Douglas production function. Under these assumptions, in perfect competition, an increase in input prices raises both marginal costs and total revenues by the same amount as the rise in costs.

23. Under a monopoly, an increase in input prices will increase marginal costs, reduce equilibrium output, and consequently reduce total revenues. The PR model provides a measure called "*H-Statistics*" ranging between 0 and 1 which is a competition measure based on the estimated responsiveness of firm revenue to changes in factor input prices. *H-Statistics* is calculated from reduced-form bank revenue equations and measures the sum of the elasticity of the total revenue of the banks with respect to the bank's input prices¹⁶.

3.2. *The Empirical Literature*

3.2.1. *Studies Based on One Country*

24. Keeley (1990) tests whether increase in competition after deregulation of the banking industry in the US in 1970s and 1980s leads to a decline in bank franchise values and increase in bank default risk. He provides evidence that increased competition erodes franchise values and capital cushions; in turn induces banks to increase their risk profiles resulting in higher bank fragility. Banks with more market power hold more capital relative to assets and they have a lower default risk as reflected in lower risk premiums on certificate of deposits¹⁷.

25. Jayaratne and Strahan (1998) contrast Keeley's result. They show that branching restrictions in US banking serve as entry barriers that prevent efficient banks from expanding and therefore reduce the efficiency and performance of the banking system. Once these restrictions are lifted and interstate banking is allowed, competition among banks increases and more efficient banks grow at the expense of their less efficient rivals. Hence the efficiency and performance of the banking system improve significantly. Thus increase in competition has the opposite effect of the franchise value paradigm by improving bank performance and stability. Dick (2006) for the period 1993–1999, examines the effect of the latter stage of

¹⁵ Bikker and Haaf (2000), Levy Yeyati and Micco (2007).

¹⁶ Schaeck, K., Cihak, M. (2007), "Banking Competition and Capital Ratios", *IMF Working Paper*, 07/216; Claessens and Laeven (2004)

¹⁷ Keeley, M. C. (1990), "Deposit Insurance, Risk, and Market Power in Banking", *The American Economic Review*, 80, 1183-1200; Carletti, E., Hartmann, P. (2002), "Competition and Stability: What is Special About Banking?", *European Central Bank Working Paper Series*, 146; Boyd, J. H., De Nicolo G., (2005), "The Theory of Bank Risk Taking and Competition Revisited," *Journal of Finance*, 60 (3), 1329-1343; Jimenez, G., Lopez, J. A., Saurina, J. (2007), "How Does Competition Impact Bank Risk-Taking?", *Federal Reserve Bank of San Francisco Working Paper Series*, .23.

nationwide branching deregulation in the US on banking system performance. He finds that deregulation decreases bank stability.

26. Jimenez *et al.* (2007) assess the relationship between bank competition and risk taking in the Spanish banking system for the period 1988-2003. Their measure of bank risk taking is the NPL ratio. They use Lerner indices for commercial loans and deposits as well as their average as a measure of market power. In addition to these, they use concentration measures such as HHI, CR₅ and the number of banks to measure the market power. They provide empirical evidence in support of the franchise value paradigm which suggest a negative relationship between market power and risk-taking; as bank market power increases, bank NPL ratios decline.

3.2.2. *Cross-Country Empirical Studies*

27. Beck *et al.* (2003) investigate the impact of concentration and competition on banking system fragility for 70 countries over the period 1980-1997. Banking fragility is measured by the likelihood of suffering a systemic banking crisis. Concentration is measured by CR₃ based on assets. The concentration ratio is found to be negatively and significantly associated with the probability of a systemic banking crisis consistent with the concentration-stability view.

28. Beck *et al.* (2006a, 2006b) assess the relationship between bank concentration and the probability of a systemic banking crisis for 69 countries over the period 1980–1997. They find that more concentrated banking systems are subject to lower probability of systemic banking crisis and hence are more stable which is consistent with the concentration-stability view. They also emphasise that concentration measures are not a reliable and sufficient indicator of the lack of competition. They also find evidence that more concentrated banking systems have better-diversified banks and therefore diversification is one of the mechanisms underlying the negative relationship between concentration and banking system fragility.

29. Boyd *et al.* (2006) examine the relationship between competition and risk-taking of banks. They find that the relationship between competition and probability of failure is negative and significant. This finding is consistent with the competition-stability view.

30. Schaeck *et al.* (2006) analyse the effect of competition and concentration on banking system soundness for 45 countries over the period 1980–2005 by using systemic banking distress and H-statistics. They find that more competitive and less concentrated banking systems are less prone to experience a systemic crisis and that time to crisis is longer in more competitive banking systems. Therefore they reject the franchise value hypothesis. They also find independent effects of the concentration ratios and H-statistics on both the likelihood and timing of systemic crises. They point out that concentration and competition describe different characteristics of banking systems meaning that concentration is an inappropriate proxy for competition.

31. De Nicolo and Loukoianova (2007) examine the joint effects of bank ownership and market structure on banks' risk profiles for 133 non-industrialised countries for 1993-2004. In the empirical analysis, Z-Index and HHI are used as a measure of bank risk and concentration respectively. The results indicate positive relation between bank concentration and risk of failure and this relation is stronger when state-owned banks have high market shares.

32. Schaeck and Cihak (2007) assess the impact of bank competition and concentration on bank safety and soundness for ten European countries over the period 1999-2004. They use CR₃ and H-statistic as a measure of concentration and competition and capital ratios to account for soundness of banks. Their results indicate competition is positively linked with bank soundness. However, they find no consistent

relationship between concentration and capital ratios and conclude that concentration is an inappropriate measure of competition in banking.

33. Levy Yeyati and Micco (2007) examine the impact of concentration on competitive behaviour of banks and financial stability for eight Latin American countries. They use CR₃, CR₅ and HHI based on assets to measure concentration; H-statistic to measure competitiveness; and Z-index to proxy insolvency. In terms of banking sector stability, increased concentration is found to have no influence on bank insolvency risk. However, they find that bank solvency risk is positively related with competition which supports the franchise value paradigm. Therefore they observe no evidence that concentration significantly reduces competition.

34. Berger *et al.* (2009) test the impact of market structure on the risk potential of banks for 23 industrialised countries. They use NPL and Z-Index and equity to total assets ratio to proxy banking system stability and Lerner index and HHI as a proxy for market power. They find that more market power leads to riskier loan portfolios consistent with competition-stability view. However, they also find that overall bank risk is reduced with market. This result implies that banks enjoying more market power seem to be exposed to less overall bank risk as a result of their higher franchise value. Therefore they argue even if market power in the loan market results in riskier loan portfolios, banks may protect their franchise values from through more equity capital, a smaller loan portfolio, or other risk-mitigating techniques.

4. Structure of the Turkish banking system

35. In this section, evolution of the Turkish banking system since the 1980s is explained briefly by focusing on major structural features of the economy. Then, structure of the banking system is analysed in the context of some indicators such as number of banks, composition of banks according to their ownership and field of activity, competition and concentration measures (CR₃, CR₅, HHI and H-Statistics).

4.1. Evolution of the Turkish Banking System¹⁸

36. In 1980s, Turkish economy witnessed some important structural changes including financial liberalisation and banking system regulation. In this context, ceilings on interest rates were abolished, foreign exchange rates were freed, Interbank Money Market was set up in order to regulate liquidity in the banking system, Capital Markets Board and Istanbul Stock Exchange were established to enhance the efficiency and competition in the financial markets. After capital account liberalisation, transition to full convertibility of the Turkish Lira was achieved in 1989. In order to increase efficiency and competition in the banking system, new entry to the banking sector was eased and foreign banks were encouraged to come to Turkey. Furthermore, Turkish banks began to do business abroad through purchasing banks in foreign countries or opening branches and representative offices. The liberalisation of foreign exchange regulations increased foreign exchange transactions of banks.

37. Despite these favourable developments in 1980s, many structural problems started to arise in the Turkish banking system in 1990s. First of all, there was a significant weight of public banks in the system. The distortions resulting from the duty losses of these banks marked the 1990s. Furthermore, granting of new bank licenses and hence entry of new banks into the sector was mainly on the basis of political criteria which had a detrimental effect on the development and efficiency of banking sector¹⁹. Moreover, the

¹⁸ Akyüz and Boratav (2002), Özatay and Sak (2003), Alper and Öniş (2004), Hekimoğlu *et al.* (2008), Sayılğan and Yıldırım (2009) and Bankacılıkta Yapısal Gelişmeler (2006, 2008 and 2009) are used as references.

¹⁹ Alper, C. E., Z. Öniş (2004) "The Turkish Banking System and the IMF in the Age of Capital Account Liberalization," *New Perspectives on Turkey*, 30, 25-55.

regulation and supervision of the banking system was weak and the political authority was directly involved in the regulatory process²⁰. During this period, the presence of foreign banks was negligible due to the lack of a well-regulated and closely supervised banking system.

38. During the 1990s, private banks had significant elements of instability. First of all, at the beginning of the 1990s, government changed its borrowing policy from external sources towards internal debt instruments. As a result of the favourable returns of government securities, banks began to decrease the amount of traditional banking activities such as lending to the real sector and invested more in risk free government debt instruments. This also motivated new entries into the banking sector. Moreover, new banks which belong to industrial groups were established in order to finance their own companies using the sources collected as deposits. Hence, increase in the number of banks continued in 1990s. In an environment of free movement of capital, majority of banks especially the private ones tried to take advantage of arbitrage opportunities. They borrow in foreign currency and mainly hold Turkish Lira denominated government securities. Therefore, they had open positions which made them extremely vulnerable to speculative attacks. Moreover, inadequate level of capital, maturity mismatch, high level of open positions, insufficient risk management practices, and bad governance contributed to the structural problems of the Turkish banking sector²¹.

39. All of these features made the banking system highly vulnerable to macroeconomic crises. Financial crises of 2000-2001 aggravated the weak financial stance of banks. 21 banks were transferred to the Saving Deposits Insurance Fund (SDIF) between 1997 and 2002 as they were not able to meet their liabilities²². After the financial crises of 2000-2001, with the initiation of the “Program for Transition to a Strong Economy”, the Turkish economy has experienced a notable improvement. An important part of this program was the restructuring of the banking sector and it produced positive results. The financial and operational restructuring of public banks, strengthening of private banks and the improvement of the regulatory and supervisory framework contributed to improvement of the banking sector. Banks taken by SDIF were sold, merged or liquidated. Consequently, the number of deposit taking banks declined. It also started to decline due to mergers and acquisitions as a result of the consolidation in the sector. Besides, favourable macroeconomic conditions, recapitalising and restructuring processes in the banking sector boosted foreign interest and direct capital flows which enhanced the consolidation process. Banking system which was the main source of financing public deficits in 1990s returned back to their traditional role of intermediation and financing the households and the real sector.

4.2. Structure of the Turkish Banking System

40. Table-1 presents the number of banks in the Turkish banking system between 2000 and 2008. It also shows the composition of the total number according to the field of operation (deposit vs. development and investment) and ownership of banks. As already noted, during 1990s due to the easiness of setting up a bank and attractiveness of banking business, the number of banks has continuously increased. While it was 66 and 68 in 1990 and 1995 respectively, the number reached to 79 in 2000. As presented in the table, the number of banks started to decline during the financial crisis in 2000-2001 since many banks went bankrupt and transferred to SDIF. The number has continued to decrease after 2001 and it has been relatively constant since 2005. The reason of the decline after 2002 is mainly due to the

²⁰ Alper and Öniş (2004).

²¹ Akyüz, Y., Boratav, K. (2002), “The Making of Turkish Financial Crisis”, *UNCTAD Discussion Paper*, 158; Sayılğan, G., Yıldırım, O. (2009), “Determinants of Profitability in Turkish Banking Sector: 2002-2007”, *International Research Journal of Finance and Economics*, 28, 207-214.

²² Özatay, F. and Sak, G. (2003), “Banking Sector Fragility And Turkey’s 2000–01 Financial Crisis”, *The Central Bank of the Republic of Turkey Discussion Paper*.

consolidation of Turkish banks especially with foreign ones which is a result of the positive outcomes of the restructuring process of banking system and favourable macroeconomic conditions²³.

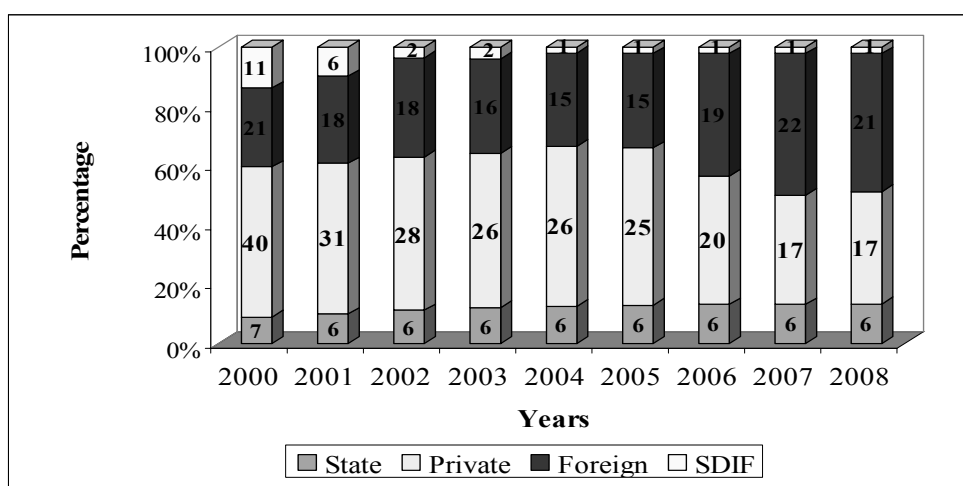
Table 1. Number of Banks in the Turkish Banking System: 2000-2008

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Deposit Banks	61	46	40	36	35	34	33	33	32
State-Owned Banks	4	3	3	3	3	3	3	3	3
Private Banks	28	22	20	18	18	17	14	11	11
Banks transferred to SDIF	11	6	2	2	1	1	1	1	1
Foreign Banks	18	15	15	13	13	13	15	18	17
Development and Investment Banks	18	15	14	14	13	13	13	13	13
State-Owned Banks	3	3	3	3	3	3	3	3	3
Private Banks	12	9	8	8	8	8	6	6	6
Foreign Banks	3	3	3	3	2	2	4	4	4
Total	79	61	54	50	48	47	46	46	45

Source: The Banks Association of Turkey, Banking Regulation and Supervision Agency

41. Figure-1 shows changes in the ownership composition of banks. The ratio of privately owned domestic banks has been continuously declining since 2000. The decrease at the beginning of the 2000s was mainly due to the banks transferred to SDIF. However, in recent years it is the result of consolidation especially with foreign banks. Furthermore, the share of foreign banks is at an increasing trend. The reason is that favourable macroeconomic stance and improvement in the banking sector after the crisis increased the interest of foreign banks in Turkey. Lastly, the number and the percentage of state-owned banks have been relatively constant since 2000.

Figure 1. The Ownership Composition of Banks in Turkey: 2000-2008



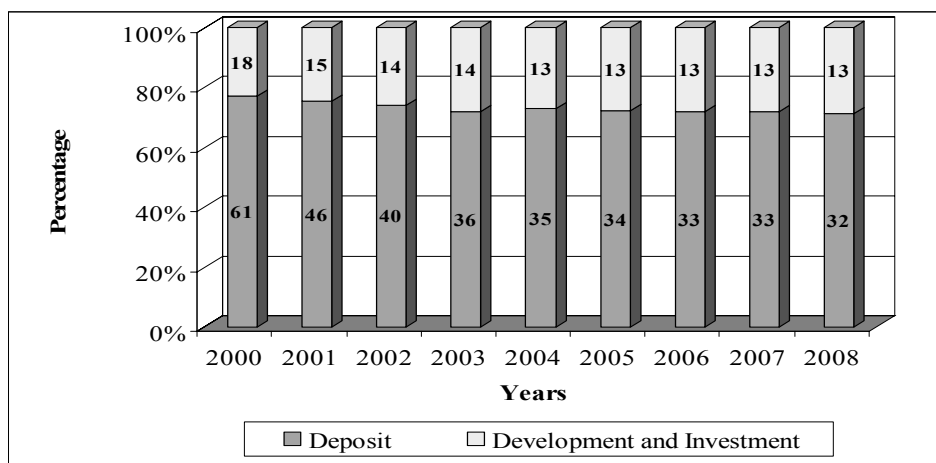
Source: The Banks Association of Turkey, Banking Regulation and Supervision Agency

42. Figure-2 shows the composition of banks according to their field of operation. Generally speaking, the share of deposit banks is higher than that of development and investment banks. Deposit

²³ Banking Regulation and Supervision Agency (BRSA) (2006, 2007, 2008). Bankacılıkta Yapısal Gelişmeler.

banks constitute approximately 75% of the Turkish banking system. Although the number of deposit banks has continuously declined since 2000, the ratio of them was relatively constant during the period between 2000 and 2008.

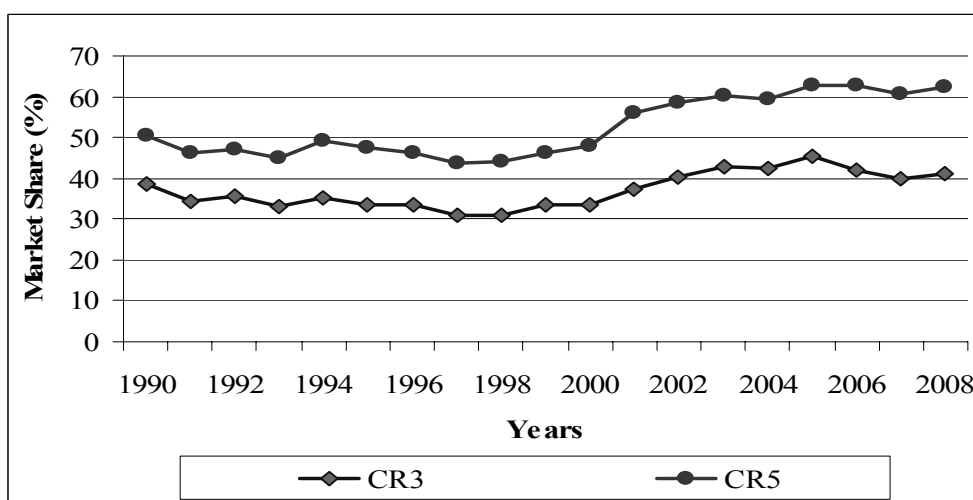
Figure 2. Composition of Banks According to Field of Operation: 2000-2008



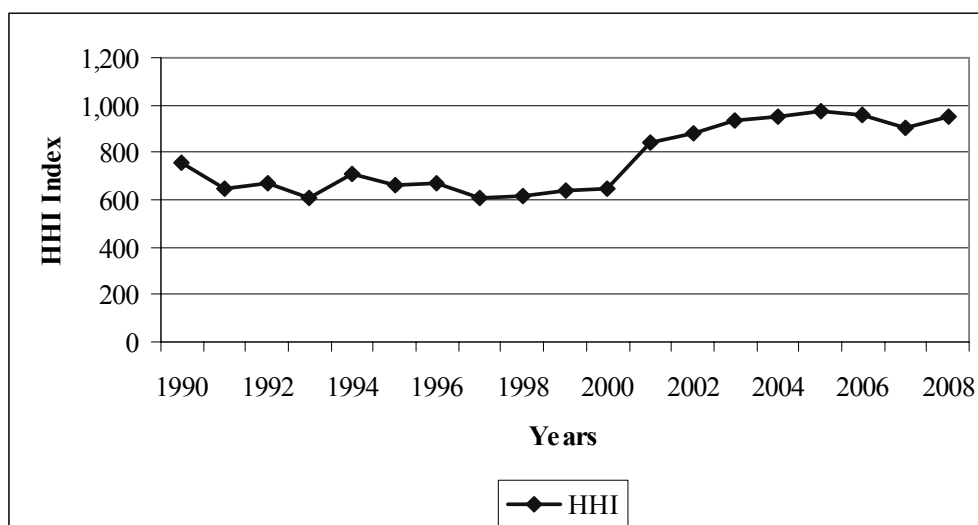
Source: The Banks Association of Turkey, Bank Regulation and Supervision Agency

43. Figure-3 and Figure-4 demonstrate trends of three structural measures of competition, namely concentration ratios (CR_3 and CR_5) and HHI based on total assets of the Turkish banking system in the period 1990-2008. The concentration ratios were relatively stable between 1990 and 2000. However, they both began to increase after 2000 and reached the maximum value at the year 2005. After a slight decrease, they reached a relatively stable trend again. However, there was a slight decrease in 2006 and they began to rise after 2007 again. The increase in the concentration in the banking system after 2000 was mainly the result of the exit of troubled banks from the system in 2000-2001 crisis and bank merger and acquisitions that took place after 2002.

Figure 3. CR_3 and CR_5 in the Turkish Banking System: 1990-2008

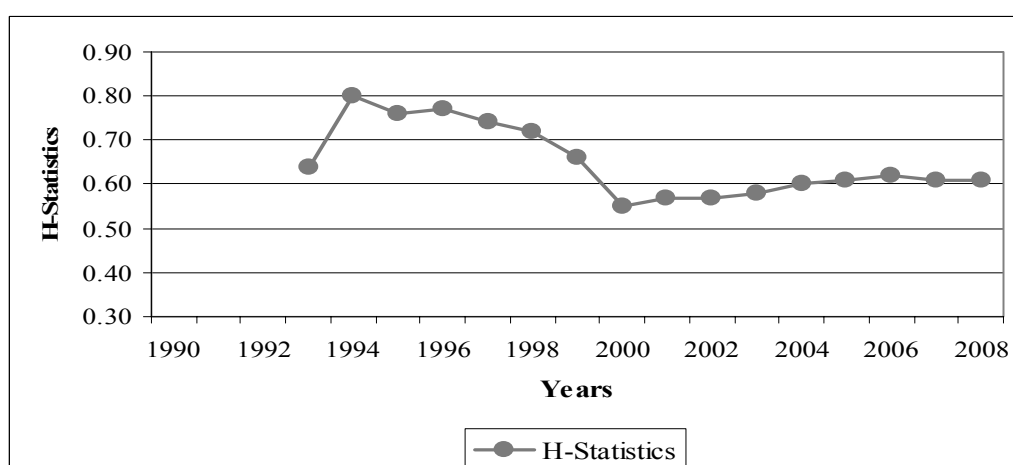


Source: Kocabay Ak (2009)

Figure 4. HHI of the Turkish Banking System: 1990-2008

Source: Kocabay Ak (2009)

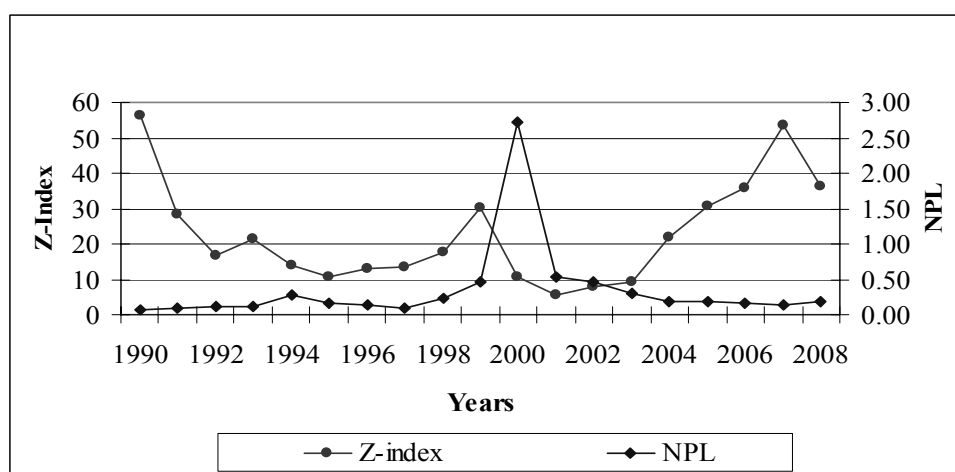
44. H-Statistics, which is a non-structural measure of competition proposed by Panzar and Rosse (1982, 1987), for the Turkish banking system is calculated using the method proposed by Claessens and Laeven (2004), Schaeck and Cihak (2007) and Bikker and Spierdijk (2008). Following Bikker and Spierdijk (2008), H-Statistics is estimated recursively to assess the change in the banking system competition structure in Turkey during the 1990-2008 periods (fixed effects recursive panel estimation procedure). Figure-5 plots the estimated H-Statistics based on the recursive fixed effects panel estimation. The level of competition in the market increases as the value of H-Statistics approaches to 1. With respect to the trend of H-Statistics for the Turkish banking system, after 1994 when it has a maximum value of approximately 0.80, it starts to decline and reaches its minimum level of approximately 0.55 in 2000. After this year, the H-Statistics has a relatively stable trend around the value of 0.60. The decline until 2000 means that competition in the banking sector decreased and after this year there is a stable level of competition in the sector.

Figure 5. Recursively Estimated H-Statistics of the Turkish Banking System: 1993-2008

Source: Kocabay Ak (2009)

45. Figure-6 presents two alternative stability measures for the Turkish banking system, namely Z-Index and NPL. These indicators are calculated for each bank and then the bank averages are taken for each year. Z-Index of the Turkish banking started to decline from a relatively high level in 1990 and it reached the lowest level of the 1990-2000 periods in 1995. It started to increase after this year and sharply declined after 1999. After the 2000-2001 crises, it again started to increase until 2007. As the figure shows, NPL of the Turkish banking system was relatively stable between 1990 and 1997 except from the 1994 when a crisis was occurred in Turkish economy. However, NPL started to increase after 1997 and it had a big jump in 2000. After 2000, it started to decline again. Since 2004 it has a stable trend.

Figure 6. Z-Index and NPL in the Turkish Banking System: 1990-2008



Source: Kocabay Ak (2009)

5. Bank competition and bank stability in turkey: empirical results

5.1. The Model and Data

46. The empirical relationship between bank competition and bank stability in Turkey is investigated for the period between the years 1990 and 2008. To analyse the effect of competition on stability of banks, bank stability measure is regressed on different measures of competition, macroeconomic and bank specific indicators. In the regressions, fixed effects panel data estimation produce is applied. All the banks operating in Turkey are included in the estimation (deposit banks and development and investment banks, both domestic and foreign, operating in the Turkish banking system and banks transferred to SDIF).

$$Stab_{it} = \beta_0 + \beta_1 Comp_t + \beta_2 Macro_t + \beta_3 BankChar_{it} + u_{it}$$

47. In the study the individual bank stability is taken into account. As an individual bank stability measure, Z-Index and non-performing loan ratio (NPL) are used. Both structural and non-structural measures of competition are included in the regression analysis. As for the structural measures, concentration ratios, namely CR₃, CR₅ and HHI based on total assets are employed. As a non-structural measure of competition H-Statistics is used. To control for the effect of macroeconomic stance of Turkey on the stability of banks, some macroeconomic indicators such as inflation rate, the ratio of public deficit to GDP and real interest rate of total domestic debt stock are taken into account. Since bank ownership also matters for bank performance and stability, ownership of banks is also taken into consideration. The empirical estimation covers deposit banks and development and investment banks, private and state-owned banks and banks taken by SDIF, foreign and domestic banks operating in the Turkish banking sector.

5.2. *Estimation Results*

48. When Z-Index and NPL are regressed on competition measures and macroeconomic condition variables without taking bank ownership into account, the coefficients of competition measures turn out to be all significant. For Z-Index, the negative coefficients of CR₃, CR₅ and HHI indicate that as competition in the banking system declines, Z-Index increases supporting the competition-stability hypothesis. However, the negative sign of the coefficient of H-Statistics implies that as the level of competition in the banking system rises, stability of banks declines which is in line with the competition-fragility view. As for NPL, the coefficients of CR₃, CR₅ and HHI are negative suggesting that nonperforming loans ratio declines as competition lessens as in the competition-fragility paradigm. However, the negative sign of the coefficient of H-Statistics means that NPL declines with the competition in the banking system and this in turn enhances the stability, which is in favour of the competition-stability hypothesis.

49. Then the equations are augmented with dummy variables which represent private banks (including foreign ones), state-owned banks and banks taken by SDIF. The interaction of these dummy variables with the competition measures estimates the different impacts of competition on bank stability for these types of bank ownership. As for the Z-Index, bank stability appears not to be affected by the level of concentration (CR₃, CR₅ and HHI) for the state owned banks. However, for private banks, concentration in the banking system still significantly and negatively affects stability. Although competition has a significant effect on the stability of all the banks; the distinction in the ownership of banks shows that this is not true for state-owned banks. Hence, there occurs a difference in the behaviour of state-owned and private banks and this should be taken into account. For the H-Statistics, on the other hand, the situation appears to be slightly different from other competition measures. All the coefficients of the ownership dummy variables interacted with the H-Statistics are negative and significant. Consequently, when the H-Statistics is used as a competition measure, the results support the competition-fragility view regardless of the ownership type.

50. For NPL, the results demonstrate that CR₃ and HHI of the banking system significantly and negatively affect the NPL of private banks while it has an insignificant effect on that of state-owned banks. However, for CR₅, inclusion of ownership dummy variables does not change the results since stability of both private and state-owned banks are positively affected. For the H-Statistics, there is also a distinction between state and privately owned banks. NPL of state-owned banks is not affected from the competition level in the banking system. However, as competition among banks increases, nonperforming loan ratio hence the fragility of private banks decline.

51. In the final specification, a distinction is made between domestic and foreign ownership of banks operating in the Turkish banking system. For the Z-Index, for all the competition measures, there is no difference between domestic private banks and foreign banks. They negatively and significantly affect the stability of both the domestic and foreign banks. However for NPL, there is no significant influence of CR₅ on NPL of both domestic private and foreign banks. The direction of the impact of CR₃, HHI and H-Statistics on NPL is negative for both domestic and foreign banks.

5.3. *Implications of Estimation Results*

52. The empirical investigation of the relation between competition and stability in the Turkish banking system provides several outcomes. The results of the estimation of the relation between competition and stability using macroeconomic indicators as control variables and without differentiating the ownership of banks are summarised in Table-2. The table presents the sign of the relation between bank stability and competition measure and whether this result supports the competition-stability or competition-fragility view.

Table 2. Summary of the Estimation Results-I

	Z-index		NPL	
	Sign	The view supported	Sign	The view supported
CR₃	(-)	competition-stability	(-)	competition-fragility
CR₅	(-)	competition-stability	(-)	Competition-fragility
HHI	(-)	competition-stability	(-)	Competition-fragility
H-Statistic	(-)	competition-fragility	(-)	Competition-stability

53. First of all, it should be noted that there is a contradiction between the outcomes of the two bank stability measures. When Z-Index is used as a proxy for individual bank stability and concentration ratios, namely CR₃, CR₅ and HHI, are used as an indicator for the level of competition in the system, the results support the competition-stability view or reject the concentration-stability view. Specifically, this result is the opposite of the franchise value paradigm stating that as the banking market becomes more concentrated, the franchise value of banks arising from higher levels of profit discourages banks to take risk and so enhance stability. However, it is in line with the risk shifting paradigm which argues that as competition increases, loan rates decline and this has a mitigating effect on moral hazard and adverse selection incentives of borrowers and hence has a positive impact on bank stability. However, when NPL is used as a proxy for bank stability, the results seem to be in line with the competition-fragility view. Specifically, this result seems to support the franchise value paradigm since franchise values arising from concentration and market power may mitigate the risk taking of banks on their loan portfolio and reject the risk shifting paradigm.

54. As a result, direction of the impact of competition or concentration on the stability of banks depends on the specification of the bank stability measure. Z-Index measures bank stability by taking into account the return on assets or profitability, leverage or capitalization level of banks and the standard deviation of profitability. It provides a proxy for a probability of bank's going into bankruptcy or bank insolvency. It is an overall measure of bank risk. However, NPL measures only the risk of bank arising from the asset side of the balance sheet or more specifically arising from the loan or credit portfolio of banks. Therefore, the results of the empirical study can be interpreted as, while the level of competition in the banking sector enhances the riskiness of banks arising from loan or credit portfolio, it suppresses the overall riskiness of banks arising from all of the operations. This result can also be interpreted in this way: competition has some mitigating effects on the risk of banks arising from banking operations other than providing loans to agents; hence overall, it has a positive impact on stability.

55. The second implication of the estimation results is that selection of the competition measure is also important. For both stability measures, concentration ratios and H-Statistics have the opposite effects on bank stability. This result supports the view in the literature that structural measures of competition such as concentration ratios and non-structural measures of competition calculated based on firm level data are different proxies of competition level in an industry.

56. Another important result arises when differences in ownership of banks are taken into account. First of all, generally speaking, stability of state-owned banks is not affected by the level of competition in the system while that of private banks is significantly affected. This supports the view in the literature that ownership of banks should also be taken into account when making an interpretation. On the other hand, no difference is found among domestic private and foreign private banks in their responsiveness of competition in the banking system.

Table 3. Summary of the Estimation Results-II

Bank Ownership	Comp. Measure	Z-Index		NPL	
		Sign	The view supported	Sign	The view supported
Private	CR ₃	(-)	Competition-stability	(-)	Competition-fragility
	CR ₅	(-)	Competition-stability	(-)	Competition-fragility
	HHI	(-)	Competition-stability	(-)	Competition-fragility
	H-Statistic	(-)	Competition-fragility	(-)	Competition-stability
State	CR ₃	insig.	No effect	insig.	No effect
	CR ₅	insig.	No effect	(-)	Competition-fragility
	HHI	insig.	No effect	insig.	No effect
	H-Statistic	(-)	Competition-fragility	insig.	No effect
Domestic-private	CR ₃	(-)	Competition-stability	(-)	Competition-fragility
	CR ₅	(-)	Competition-stability	insig.	No effect
	HHI	(-)	Competition-stability	(-)	Competition-fragility
	H-Statistic	(-)	Competition-fragility	(-)	Competition-stability
Foreign	CR ₃	(-)	Competition-stability	(-)	Competition-fragility
	CR ₅	(-)	Competition-stability	insig.	No effect
	HHI	(-)	Competition-stability	(-)	Competition-fragility
	H-Statistic	(-)	Competition-fragility	(-)	Competition-stability

6. Concluding remarks

57. This study empirically investigates the validity of the competition and stability trade-off hypothesis for the Turkish banking system during the 1990-2008 periods. Besides annual bank level accounting data, the effects of macroeconomic factors and bank specific indicators including the ownership structure are also taken into account. Results of the study would be beneficial:

- Until macroeconomic indicators enter into the regression, majority of the competition measures have insignificant impact on the two stability measures. This implies that besides competition level in the banking system, macroeconomic stance of the country is an important determinant of banking system stability.
- The fixed effects panel estimation results suggest that the relation between competition and stability is not invariant to the use of alternative indicators. The results based on the Z-Index as a measure of bank stability support the competition-stability and competition-fragility views when concentration ratios and the H-Statistics are used as the alternative competition indicators, respectively. However, when nonperforming loan ratio, a proxy for loan portfolio risk, is used as a stability measure, exactly the opposite outcome is obtained.
- The results also change when the ownership structure of banks is considered. Stability of state-owned banks is not affected by the level of competition on the system while that of private banks is significantly affected. This supports the view in the literature that ownership of banks should also be taken into account when making an interpretation.
- Consequently, in line with the literature stating that there is no clear-cut relation between competition and stability, the direction of this relation for the Turkish banking system changes with different model specifications.

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