



## THE EFFECT OF COMPETITION, CONCENTRATION AND FINANCIAL INCLUSION ON BANK STABILITY\*

### BANKA İSTİKRARINA REKABET, YOĞUNLAŞMA VE FİNANSAL TABANA YAYILMANIN ETKİSİ

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#### Abstract

This paper examines the effects of competition, concentration and financial inclusion on bank stability in the Turkish banking industry from 2010 to 2020. Regarding the question of whether competition promotes stability or fragility, the literature often takes one of two positions. Within the scope of this study, the level of competition of the Turkish banking sector is determined by Panzar-Rosse model while k-bank concentration and HHI are used as a proxy of concentration level. The results of the study provide support for the competition-stability view, which is frequently supported in the literature. The study have enhanced the literature by incorporating financial inclusion into the stability-competition-concentration framework. The results also indicate that financial inclusion has a positive effect on variables other than capital.

**Key Words** : Competition, Concentration, Financial inclusion, financial stability

**Jel Classification** : D41, D42, D43, D69, F12, G21, G53, G50

#### Öz

Bu çalışma, 2010-2020 yılları arasında Türk bankacılık sektöründe rekabet, yoğunlaşma ve finansal tabana yayılmanın banka istikrarı üzerindeki etkilerini incelemektedir. Rekabetin istikrarı mı yoksa kırılganlığı mı artırdığı sorusuna ilişkin olarak, literatür genellikle iki görüşten birini benimsemektedir. Bu çalışma kapsamında, Türk bankacılık sektörünün rekabet düzeyi Panzar-Rosse modeli ile temsil edilirken, k-banka yoğunlaşması ve HHI endeksleri yoğunlaşma düzeyinin bir göstergesi olarak kullanılmıştır. Çalışmanın sonuçları, literatürde sıklıkla desteklenen rekabet-istikrar görüşüne destek sağlamaktadır. Çalışma, finansal tabana yayılmayı istikrar-rekabet-yoğunlaşma çerçevesine dahil ederek literatüre katkı sağlamıştır. Sonuçlar ayrıca finansal kapsayıcılığın sermaye dışındaki değişkenler üzerinde olumlu bir etkisi olduğunu göstermektedir.

**Anahtar Kelimeler** : Rekabet, Yoğunlaşma, İstikrar, Finansal tabana yayılma

**Jel Kodları** : D41, D42, D43, D69, F12, G21, G53, G50

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## **INTRODUCTION**

Banks are the cornerstone of the economy. A well-performing banking system ensures the healthy running of the monetary component of the economy in particular and the whole economy in general. All stakeholders of the economy are affected by instability in the banking system or negative expectations about the future of the sector. Banks serve as the primary source of financing for investments, acting as the conduit for households' savings to be transferred into the economy. Additionally, banks play a pivotal role in guiding the financial system as the conduit for monetary policies conducted by the Central Bank. Furthermore, banks influence the distribution of income and wealth within society. They also enhance the efficiency of the payments system and contribute to the development of international trade. It is therefore essential to monitor all developments affecting the banking sector and to implement appropriate measures at the opportune moment (Yağcılar, 2010).

Since the 1980s, financial liberalization and globalization have led the banking sector to undergo a period of rapid change and development in Türkiye and around the world. Liberalization, relaxation of rules and technological developments have led to major changes. The number of bank mergers and acquisitions has increased in order to gain market power, grow and increase scale. These developments all over the world have led to the deterioration of the market structure of the banking sector, the withdrawal of small banks and the concentration of the market.

There are two main views in the literature: competition-stability and competition-fragility. One argues that competition will bring fragility to banks, while the other argues that it will bring stability. These two diametrically opposed views have also divided the literature. Many studies have been conducted to reveal the relationship between competition, concentration, efficiency and stability in banking. In general, the results obtained from these studies vary from country to country and from period to period. Although the basic hypotheses in economic theory have been accepted, they have not always been fully supported. The relationship between competition and stability in the banking sector is a complex issue and, in some cases, competition may increase stability, while in other cases concentration may be preferred to competition in terms of household welfare (OECD, 2010).

In this study, the impact of the concept of financial inclusion, which can be simply defined as the access of households to finance, on bank stability is evaluated together with competition and concentration. Although the relationship between competition, concentration and stability has been widely examined in previous studies (Kasman and Kasman (2015), Yildirim & Philippatos, (2007)), there has not been a study in which the issue of financial inclusion is addressed together with these three variables. In this study, firstly, the level of competition in the Turkish banking system is determined with the Panzar-Rosse model and the effects of concentration, competition and financial inclusion on bank stability are evaluated with the results obtained from this model. Hypotheses to be tested;

H1: There is a positive relationship between competition and bank stability in the Turkish banking sector (Competition-Stability view).

H2: There is a negative relationship between concentration and bank stability in the Turkish banking sector.

H3: There is a positive relationship between financial inclusion and bank stability in the Turkish banking sector.

These three assumptions are interdependent and fundamentally offer a family welfare viewpoint on competition and concentration.

## **1. THEORETICAL FRAMEWORK**

### **1.1 Bank Stability**

Financial stability by definition means strong and sound financial institutions and stable payment systems. In this respect, the economic infrastructure, institutions and markets, which are the main elements of the financial system, and the private and public sectors working together and in harmony are a necessity to ensure stability (Özince, 2005). In addition, bank stability is critical for the stability and proper functioning of the financial system. Banks fulfil the basic functions of the financial system, such as accepting deposits, lending and realising payment systems. In order to do all these properly, a bank must be adequately capitalised, remain liquid and manage risks effectively.

The most commonly used variables in the literature to measure bank stability are generally  $Z\_score$ , NPL (Non-Performing loans).  $Z\_score$  is a useful measurement tool that combines profitability, leverage and return volatility into a single measure.  $Z\_score$  is an indicator of financial stability at the firm level, representing the probability of bank failure (Berger et al., 2008). NPL variable is calculated as non-performing loans/ all credits. For this study Equity / Total assets is a variable of stability as it is used by Berger et al., (2008).

### **2.1 Competition and Concentration in Banking**

Market concentration means that fewer firms produce a larger share of total output. (Bod'a, 2014). Concentration in the banking market is often associated with market power and concentrated markets tend to be more profitable than unconcentrated markets (Demirguc-Kunt and Levine ,2000).

Crisis-related consolidations and acquisitions exacerbated banking sector concentration. As concentration increases, larger and more powerful banks are expected to emerge in the market, bringing more stability to the sector. However, stronger banks may be able to charge higher interest rates due to their dominance. In addition, as concentration increases, larger banks are likely to emerge and may lead these banks to implement risky policies (Kuzucu, 2014).

The primary effect of banking market concentration is that a limited number of large and influential financial organizations may collaborate on policies that safeguard their interests, sometimes to the detriment of society at large. A concentrated banking system can influence the regulation of commercial banks, taxation, the entry of foreign banks, and laws regarding industrial competitiveness. Major financial institutions may be averse to intense competition. Influential banks can undermine the political process and obstruct the implementation of more transparent and precise accounting rules (Demirguc-Kunt and Levine, 2000).

The k-bank concentration is one of the most popular techniques for calculating the level of banking sector concentration. The method's primary benefit is that it uses a small and straightforward data set for calculation. The approach accounts for shifts in the k biggest banks' overall market shares. K-bank concentration is the percentage difference between the assets of the k banks that operate in the sector and the assets of all banks in the sector.

One of the most significant metrics frequently employed in market concentration studies is the Herfindahl-Hirschman index (HHI). The HHI index is calculated by summing the squares of the market shares of all banks in the sector. The formula used for the calculation is given below as Equation 1.

$$HHI = \sum_{i=1}^N (Bi/BT)^2 \quad (1)$$

$B_i$  represents the asset size of bank  $i$  and  $BT$  signifies the aggregate asset size of all banks.

### 3.1 Financial Inclusion

Financial Inclusion refers to the accessibility of beneficial and inexpensive financial products and services (transactions, payments, savings, credit, and insurance) for individuals and enterprises, tailored to their requirements in a responsible and sustainable manner (World Bank, 2023). According to Triki and Faye (2013), it is defined as 'all measures that render formal financial services accessible, available, and suitable for all sectors of the public.' The World Bank's 'Universal Financial Inclusion 2020' initiative emphasizes the necessity of everybody possessing a deposit account.

The literature on financial inclusion is categorized into three segments: the development of financial inclusion indicators, the analysis of factors influencing financial inclusion, and the exploration of the relationship between financial inclusion and various dimensions of economic and financial development (Le et al., 2019).

To enhance the clarity of the concept of financial inclusion, it is essential to render it measurable. The conclusions derived from analyzing supply and demand data facilitate future planning for countries. To formulate a national financial inclusion plan and attain established targets, governments seek to obtain analyzable data through indicators like as usage and quality. The data necessary for policymakers indicates the degree of financial inclusion in nations and serves as the foundation for forthcoming initiatives (Yıldırım, 2020).

Emerging nations have sought to increase financial inclusion as part of their overall strategy for economic and financial development. This raises the question of whether financial stability and financial inclusion are, in general terms, alternatives or complements (Morgan and Pontines, 2014).

A positive correlation exists between financial inclusion and bank stability. Augmented financial inclusion may bolster bank stability by enhancing credit quality, diversifying the financial system, and increasing transparency within the financial system. Policies to expand financial inclusion can help improve bank stability. These policies may include Facilitating access to financial services, decreasing the cost of financial services, and strengthening regulation of financial services.

## 2. LITERATURE REVIEW

The relationship between competition, concentration, and financial stability in the banking sector has been widely debated in the literature, often framed through two competing hypotheses: the competition-fragility view, which suggests that increased competition leads to greater risk-taking, and the competition-stability view, which argues that moderate competition improves efficiency and lowers risk.

Empirical studies offer mixed results. Ben Ali et al. (2018) find that banking concentration has an ambiguous impact on financial stability across 156 countries, moderated by regulatory quality. Similarly, Clark et al. (2018) and Cuestas et al. (2020) identify non-linear relationships, with moderate competition enhancing stability, while excessive or insufficient competition may increase risk.

Other studies emphasize institutional and regional nuances. Ramzan et al. (2021) demonstrate that corporate social responsibility positively influences financial inclusion and stability. Le et al. (2019) link financial inclusion to reduced financial efficiency but enhanced sustainability. Yudaruddin (2022) and Kasman & Kasman (2015) show that market concentration may either support or undermine stability depending on capital adequacy and risk behavior, with Turkish data supporting the competition-fragility hypothesis.

Berger et al. (2008) and Kabir & Worthington (2017) provide robust cross-country evidence. While higher market power reduces risk exposure, it can also increase portfolio risk due to adverse selection and moral hazard though this may be offset by strong capital buffers.

Allen and Gale (2004) laid the theoretical groundwork by categorizing types of competition (e.g., spatial, Schumpeterian) and emphasizing the need to evaluate banking competition from both institutional and consumer welfare perspectives. Their study highlights that different forms of competition can have varying implications for stability.

The literature suggests a nuanced, often non-linear relationship between competition and financial stability. While moderate competition is generally beneficial, both excessive competition and high

concentration can pose systemic risks. Regulatory quality, institutional context, and bank behavior play critical mediating roles.

### 3. DATA AND METHODOLOGY

The statistics assessing financial stability, concentration, and financial inclusion included in the study are sourced from the BAT's website. Certain data regarding financial inclusion is sourced from the TurkStat website. The author incorporated certain computations into the analyses. The Panzar-Rosse H-Statistic utilized for assessing competitiveness, was derived using econometric calculations, with comprehensive information available in the associated thesis (Arslan, 2024). The table summarizes the variables utilized in the analysis.

<b>Variables</b>	<b>Explanations</b>
<b><i>Dependent Variables</i></b>	
NPL	Non-performing loans/ Total loans
<i>Equity/ Total Asset</i>	<i>Equity/ Total Asset</i>
Z-Score	$ROA + (Equity/ Total Asset) / \text{standard deviation}$
<b><i>Independent Variables</i></b>	
CR <sub>3</sub> _ asset	Assets of the 3 largest banks / Assets of all sector
CR <sub>3</sub> _ loan	Loans of the 3 largest banks / Loans of all sector
CR <sub>3</sub> _ deposit	Deposits of the 3 largest banks / Deposits of all sector
CR <sub>5</sub> _ asset	Assets of the 5 largest banks / Assets of all sector
CR <sub>5</sub> _ loan	Loans of the 5 largest banks / Loans of all sector
CR <sub>5</sub> _ deposit	Deposits of the 5 largest banks / Deposits of all sector
HHI_ asset	Squaring and summing the % share of assets
HHI_ loan	Squaring and summing the % share of loans
HHI_ deposit	Squaring and summing the % share of deposits
H-Stat	Measure of competition developed by Panzar-Rosse
msay	Number of deposits
kbms	Number of deposits / Population*100000
ssay	Number of branch
kbss	Number of branch / Population *100000
csay	Number of personnel
kbc	Number of personnel / Population *100000
<b><i>Control Variables</i></b>	
Size	Natural logarithm of total assets
LR	The ratio of total loans to total assets
Cycle	Real GDP growth (yearly)

**Table 1.** Explanations of the Variables

The study examined data from 22 banks in Turkey's banking sector from 2010 to 2020. According to the Hausman test results, all models utilize the panel fixed-effects estimator. A correlation matrix was generated to determine whether there is multicollinearity between independent variables. A multicollinearity problem can be identified quantitatively when the pairwise correlation coefficient between two variables surpasses 0.80 (Gujarati, 2004: p.359). The correlation matrix is available in the thesis (Arslan, 2024). Eight different models with NPL, Equity/ Total Asset and Z-Score as dependent variables were constructed. Durbin Watson test statistics developed by Bhargava et al. (1982) and Baltagi-Wu LBI test are used to test for the presence of autocorrelation. The modified Wald test (Greene, 2000) was used to test homoskedasticity. Pesaran's test of Cross-Sectional Independence (Pesaran CD) test was performed to investigate Cross Sectional Dependency. If the model has at least one of heteroskedasticity, autocorrelation, or inter-unit correlation, the standard errors should be rectified without affecting the parameters, or estimations should be produced using appropriate methods (Yerdelen Tatoğlu 2016). Because all eight models had at least one of these issues, we utilized a fixed effects model with Driscoll/Kraay robust standard errors to account for them.

#### 4. RESULTS

This paper uses the Panel regression methodology to investigate the impact of concentration, competition and financial inclusion on bank stability in the Turkish banking industry. The general regression model is specified as follows.

$$\text{Stability} = \alpha + \beta \text{Competition} + \gamma \text{Concentration} + \phi \text{Financial Inclusion} + \delta \text{Cycle} + \lambda_1 \text{Size} + \lambda_2 \text{LR} + \varepsilon$$

The stability measures included in our analysis are Equity/ Total Asset, the NPL ratio and the Z-score. The measure of competition included in our analysis is the Panzar-Rosse Hstatistics. This paper also uses three measures of concentration, the Herfindahl–Hirschmann Index (HHI), the 3-bank concentration ratio and 5-bank concentration ratio. Business cycle conditions are controlled by introducing the annual growth rate of real GDP. This variable is included since problem loans develop in line with the business cycle. To control for bank-specific heterogeneity, two variables measuring bank size (Size) and asset composition (LR) are included in the regressions. Bank size is the natural logarithm of the total assets and the LR is the ratio of total loans to total assets.

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Independent Variables	Dependent Variables							
	Equity/ Total Asset		NPL				Z_score	
	Model 1	Model 2	Model3	Model4	Model5	Model6	Model7	Model8
CR3_asset	0.160	0.179	0.129*					
CR3_deposit				0.123***	0.045	0.103***		
CR3_loan	-0.44***	-0.450***					-0.267*	-0.270***
CR5_asset								
CR5_deposit								
CR5_loan								
HHI_asset								
HHI_deposit								
HHI_loan								
H_stat	12.748***	12.565***	-0.789	-0.387	0.364	-0.267	6.372***	6.362***
msay								
kbms								
ssay								
kbss	-3.882*						-2.869	
csay			0.00009*	0.00014***	-0.0000***			
kbc		-0.351*						-0.248*
size			-1.446***	-1.642***		-1.475***		
LR			-3.33e+07***	-3.46e+07***	-1.09e+07***	-3.26e+07***	1.81e+07**	17830**
cycle							-0.166*	-0.157*

**Table 2.** Results (\* Significance level at 1%. \*\* Significance levels at 5%. \*\*\* Significance levels at 10%)

Our findings are congruent with the results of Clark et al. (2018), Cuestas et al. (2020) and Kasman & Kasman (2015). For competition, there is a positive effect of the equity/total assets variable and a partial positive effect of the Z\_score variable. For concentration, a negative effect is observed except for the NPL variable. Contrary to expectations, there is a negative outlook in general for financial inclusion. The cycle variable, which represents the growth in gross domestic product, is included in the models where the dependent variable is Z\_score and has a significant and negative effect at the 10% level. This situation implies that the decrease in gross domestic product increases the risk. The size variable, which is also a control variable and constructed by taking the logarithm of total assets, is only included in the models where the dependent variable is NPL and is negative and significant at the 1% level. Therefore, it is possible to interpret that the risk of large banks is lower. The LR variable, which is calculated by dividing total loans by total assets, is included in the models where the dependent variable is NPL and Z\_score. While the variable has a positive coefficient in all models, it is significant

at the 1% level in models where the dependent variable is NPL and at the 5% level in models where the dependent variable is  $Z\_score$ . This result is consistent with the article of (Clark et al. 2018). A high level of the ratio indicates that the credit risk is lower. The results are in line with Kasman & Kasman (2015) for the cycle and size variables, whereas they are reversed for the LR variable.

The first hypothesis (H1) posits a positive relationship between bank stability and competition. Empirical results largely support this hypothesis, aligning with the competition–stability view found in studies such as Yudaruddin (2022) and Berger et al. (2008). However, some literature favors the competition–fragility perspective, suggesting that higher competition increases risk-taking behavior (e.g., Doll, 2010; Kasman & Kasman, 2015; Kabir & Worthington, 2017). In this study, models using equity-to-assets as the dependent variable fully support H1, while Z-score models provide mixed evidence, and NPL-based models show no statistically significant results

The second hypothesis (H2) suggests a negative relationship between bank concentration and stability. Findings support this for equity-to-assets and Z-score models but not for NPL models. This aligns with prior research (e.g., Kasman & Kasman, 2015; Cuestas et al., 2020), and echoes the notion that highly concentrated markets may harm smaller banks while benefiting dominant ones.

The third hypothesis (H3) examines the link between financial inclusion and banking stability. Results show partial support: financial inclusion improves stability when NPL is the dependent variable, consistent with studies by Ramzan et al. (2021), Feghali (2021), and Ofori-Abebrese (2020).

## 5. CONCLUSION

In conclusion, the banking sector plays a critical role in channeling savings into productive investments, particularly in developing economies where alternative financial intermediaries are limited. However, the sector's structural vulnerabilities, including financial contagion risks, necessitate stringent regulation and oversight. While increasing competition driven by globalization and technological advances can enhance efficiency and consumer welfare, it also introduces potential instability. Therefore, achieving a balance between competition and financial stability is essential. Banks must monitor their competitive environment closely and adopt proactive risk management strategies to remain resilient in the face of economic shocks.

For this purpose, this paper examines the impact of concentration, competition and financial inclusion on stability using data from Turkish commercial banks over the period 2010–2020. This study incorporates financial inclusion into the model to assess its impact on banking stability via household welfare and access to finance. Unlike prior research focusing separately on concentration or competition, this study uniquely considers all three dimensions concentration, competition, and inclusion offering a novel contribution to the literature.

## **The Effect of Competition, Concentration and Financial Inclusion on Banks Stability**

The findings suggest that competition generally enhances banking stability by improving efficiency, lowering borrowing costs, and increasing consumer welfare. However, excessive competition can lead banks to compensate for reduced profits by increasing risk-taking, which may undermine stability. Therefore, maintaining an optimal level of competition is essential to balance profitability and risk. Regulatory authorities must monitor market concentration and encourage mergers among weaker banks to enhance systemic stability. Turkey's 2001 banking crisis highlights the critical role of regulatory oversight in preventing instability caused by excessive market concentration.

Additionally, financial inclusion may enhance credit quality, transparency, and diversity in the financial system. Nonetheless, its effect on bank capital can vary depending on the risk profile of newly included borrowers, especially in contexts where financial access leads to increased exposure to higher-risk clients. Thus, while financial inclusion generally enhances household welfare and promotes equitable growth, its impact on bank capital may vary by country context.

Future research could expand the scope of the financial inclusion variable, particularly by incorporating digital-only banks. As the financial landscape evolves with technology, the role of such institutions in promoting inclusion and stability remains an important area of inquiry.

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