

Bank Competition and Stability: Evidence from Rural Banks in Bali

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Abstract. *The relationship between competition and stability is widely understood by researchers with two different perspectives, namely competition-fragility and competition-stability. A lot of research has been conducted regarding the relationship between competition and stability in the banking sector but has not specifically examined the stability of the classic model of rural banks. The purpose of this study was to empirically examine the effects of rural banks' competition and stability based on the aspects of capital, earning asset quality, profitability and liquidity. The indicators used in this study are adjusted to the characteristics of rural banks and existing regulations. The results of the study indicate that the competition variable has a significant positive effect on the stability of rural banks, and supports the view of competition stability.*

Keywords: Banking Stability, Competition, Financial Crisis, Rural Banks

JEL Codes: G01, G21

1. Introduction

A Bank crisis is a phenomenon that can occur at any time. Demirguc-Kunt and Detragiache (1998) defined a bank crisis as a condition in which one of the following conditions is met: (1) non-performing assets account for 10% of the total assets of the banking system; (2) the cost of saving the banking system is up to 2% of Gross Domestic Product (GDP); (3) there was a transfer of ownership of banks on a large scale to the government; and (4) there has been a widespread bank-run or there have been emergency measures taken by the government in the form of freezing public savings, closing bank offices for a sufficiently long period of time, or implementing comprehensive deposit insurance. Reinhart and Rogoff (2008) reported that there were as many as 121 banking crises in the world from the period 1800-1970 (Deltuvaitė, 2011). Furthermore, in the period 1970-2007, 124 banking crises were indicated worldwide (Laeven & Valencia, 2008).

The facts showed that there is always a chance for a financial crisis to occur. Banks can survive a financial crisis if they have sufficient capital during a crisis. In America, there are five capital adequacy ratios that must be met by banks to protect themselves from the risk of loss during a crisis, namely: capital ratio, tier 1 ratio, common equity tier 1 (CET1) ratio, leverage ratio, and supplemental leverage ratio (García & Steele, 2020). Schuermann (2014) states that the standard approach of relying on capital ratios is unable to provide good information about how much capital is needed to face a financial crisis so stress testing is an indispensable tool.

Financial authorities and banks do need to carry out disaster simulations through stress tests in order to better prepare themselves for the various possibilities that may occur in the future. Besides conducting stress

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tests to prepare for various possibilities that arise in the future, another important thing is to maintain financial stability so that financial crises can be avoided. Financial stability is defined as a condition in which the financial system consisting of financial institutions, financial markets, and financial infrastructure can accept shocks and harmonize with existing conditions to reduce the possibility of disruptions in the financial intermediation process, thereby significantly changing the allocation of savings. be a profitable investment opportunity (Gadanecz & Jayaram, 2009).

The financial structure in Indonesia is not dominated by the capital market, but rather by banking institutions (Zulverdi et al., 2005). With the dominance of the financial structure by banking institutions, banking stability is very important to be considered. If we investigate further the causes of instability in the banking industry originating from the internal banking sector, then of course attention will be focused on the competition in that sector. With increasingly fierce competition, various new banking activities emerged. This is in accordance with what Vives (2019) stated, which states that competition is a source of instability in the banking sector.

The relationship between competition and stability is widely understood by researchers from two different points of view, namely competition-fragility and competition-stability (İskenderoğlu & Tomak, 2013). Competition stability states that higher competition will result in the banking sector becoming more stable, while competition-fragility states the opposite, namely that higher competition will result in instability in the banking sector.

Given these different views, it is necessary to conduct empirical research related to the relationship between rural banks' competition and stability because there was very little literature on the competition and stability of rural banks. In addition, rural banks play an important role in the economy of all provinces in Indonesia, especially in Bali because Bali is ranked in the top three in terms of assets or loans disbursed.

2. Research Elaboration

The history of banking shows that the emergence of banking activities outside existing regulations such as Real Estate Investment Trusts (REIT), mutual funds (mutual funds), and securitization (conversion of financial assets such as credit cards, bank loans, and mortgages or physical assets into financial instruments tradable), has become a source of instability and even panic that resulted in the banking crisis. Bikker and Haaf (2000) emphasized that deregulation and advances in information technology contributed to changes in competition and concentration marked by merger activities in the banking sector in Europe.

The various banking activities that have just emerged are a reflection of the intense competition that occurs in the banking world. The main contributor to financial institutions in taking risks is competition (Naaman et al., 2021). Vives (2019) states that competition is related to all failures (instability) in the financial and banking system, such as excessive risk-taking, excessive credit expansion, unreasonable growth, and bad bank behavior. However, it should also be understood that competition is also a source of efficiency in various fields.

Rakestraw (2015) emphasized that the higher the competition, the lower the economic benefits that can be obtained, which in turn will reduce the value of the company. With tighter competition, there is a chance for incumbent firms to leave the industry (exit the market). If a bank experiences problems and spread to others or it has a systemic impact on the banking system, then this situation can certainly result in a slowdown in the real sector accompanied by high social costs and moral-hazard problems (Vives, 2019). Due to the large impact on the economy, competition conditions need to be monitored continuously in order to maintain banking stability.

The difference in views and research findings on competition and stability variables is related to the charter value hypothesis which is first introduced by Keeley (1990). In principle, the charter value states that if the competition is lower, then banks will be more careful in channeling loans because banks are worried about losing the current value of cash flows that will be received at a later date (charter value). A different view is introduced by Boyd and Nicola (2005) regarding the risk shifting view which states that the higher the competition, the banks cannot provide higher interest (lower risk) so that the chances of default for customers are lower or in other words the banking system becomes more stable. Hartmann and Carletti (2002) stated that theoretically, there is no agreement about the direction of the relationship between competition and stability. Claessens and Laeven (2004) stated that the relationship between competition and stability becomes more complex as financial products diversify.

The empirical evidence of the relationship between competition and stability has been studied by Schaeck and Cihak (2012) who stated that competition has a positive effect on banking stability. The main contributor to financial institutions taking risks is competition (Naaman et al., 2021). On the other hand, Vives (2019) stated that competition is a source of instability in the banking sector. Freixas and Ma (2014) also stated that the effect of competition on financial stability can have different results in the banking sector model which is classified as originate-to-hold (classic) and originate-to-distribute. Jun and Yeo (2018) conducted research on Peer-to-Peer (P2P) Lending Platforms and Banking System Stability by emphasizing portfolio risk, insolvency risk, liquidity risk, and systemic risk. The effect of the competition is analyzed separately for each of these risks. The business competition analyzed is not only related to the banking sector but also involves P2P Lending. The results of his research indicate that bank stability has decreased as measured by insolvency risk, illiquidity risk, and systemic risk in the presence of bank competition with P2P Lending.

2.1. Banking Stability Indicators

Research on financial stability, especially in the banking sector, is not an easy job. The definition of financial stability itself is not easy, especially how to measure it. Gadanez and Jayaram (2009) defined financial stability as a condition in which the financial system consisting of financial institutions, financial markets and financial infrastructure can accept shocks and adapt to existing conditions to reduce the possibility of disruptions in the financial intermediation process. thus significantly changing the allocation of savings into profitable investment opportunities (Kočišová, 2015). Tsomocos (2003) defined financial instability as a condition in which a number of bank customers experience default and a number of banks experience liquidity difficulties without having to go bankrupt, resulting in a significant decrease in the profitability of the banking sector.

Dumicic (2016) conducted a study to determine indicators of financial stability using the principal component analysis method which is then summarized in the Systemic Risk Accumulation Index (SRMI). Freixas and Ma (2014) measured stability based on the risks faced by banks. Bank risk is classified into four risks, namely asset/portfolio risk, insolvency risk, illiquidity risk, and systemic risk. These risks are measured using several indicators such as Non-Performing Loans (NPL), z-score, distance to default, and other accounting data. The International Monetary Fund (IMF) has also developed Financial Soundness Indicators (FSIs) to measure financial stability using 40 indicators consisting of 12 core indicators (Core Financial Soundness Indicators) and 28 supporting indicators.

In various countries, many studies have attempted to identify conditions that can ensure the maintenance of a stable financial system. Research that has been conducted in various countries related to financial stability states that the main indicator that is widely used to measure financial stability is related to CAMELS

(C - Capital Adequacy, A - Asset Quality, M - Management, E - Earning, L - Liquidity, S - Sensitivity to Market Risk).

Table 1: Financial Stability Indicators

Researcher	Year	Indicators
Gersl and Hermanek	2007	Capital adequacy (CAR)
		Asset quality (NPL/TL)
		Profitability (ROA, ROE)
		Liquidity (LA/TA, LA/TD)
		Interest rate risk (Net position/TA)
		Foreign exchange risk (FX1, FX2)
Central Bank of the Republic of Turkey	2008	Asset quality (NPL/TL, NPL/E, FA/TA)
		Liquidity (LA/TA)
		Exchange rate risk (FX1, FX2)
		Profitability (ROA, ROE)
		Capital adequacy (CAR, FC/TA)
		Interest rate risk (Net position/E)
Albulescu	2010	Financial development index
		Financial vulnerability index
		Financial soundness index
		World economic climate index
Bank of Albania	2010	Asset quality (NPL/TL, NPL/E, FA/TA)
		Liquidity (LA/TA, STA/STL)
		Exchange rate risk (FX1, FX2)
		Profitability (ROA, ROE)
		Capital adequacy (CAR, FC/TA)
		Interest rate risk (Net position/E)
Maudos	2012	Profitability (ROA)
		Solvency (CAR)
		Efficiency (CI)
		Asset quality (NPL/TL)
Ginevičius and Podvieszko	2013	Capital adequacy (CAR)
		Asset quality (NII, TL/TA, DELINQ, LD)
		Management (NIE/GI)
		Earnings (PPP/RWA, NI/RWA)
		Liquidity (TD/TL, LIQ)
		Profitability (ROA)
Laznia	2013	Liquidity (TD/TL)
		Capital adequacy (CAR)
		Asset quality (NPL/TL)
		Profitability (ROA)
Trovaska and Mihajlovska	2013	Insolvency (CAR)
		Credit risk (NPL/TL, GNPL)
		Profitability (ROE, NIE/GI)
		Liquidity (LA/TA, LA/TD)
		Currency risk (Net FX/OF)
		Asset quality (NPL/TL)

* CAR-Capital adequacy ratio, CI-Cost to income ratio, DELINQ-Delinquent loans/Total assets, FA/TA-Fixed assets/TAs, FC/TA-Free capital/TA, FX1-Absolute value of open total position in foreign exchange/Tier 1 capital, FX2-Absolute value of open balance sheet position in foreign exchange/Tier 1 capital, GNPL-Annual growth rate of

non-performing loans, LA/TA-Liquid assets/TA, LA/TD-Liquid assets/Total deposits, LD-Loan value decrease/TA, LIQ-Regulatory liquid ratio, NI/RWA-Net income/Risk weighted assets, NII-Net interest income/Risk weighted assets, Net FX/OF-Net open position in foreign exchange/Own funds, Net position/E-Cumulative net balance sheet position to 1 month/Equity, Net position/TA-Cumulative net balance sheet position to 3 month/TA, NIE/GI-Non-interest expenses/Gross income, NPL/E-Non-performing loans/Shareholders' Equity, NPL/TL-Non-performing loans/Total loans, PPP/RWA-Pre-provision profit/Risk weighted assets, ROA-Return on assets, ROE-Return on equity, STA/STL- Assets with a maturity up to 3 months/Liabilities with a maturity up to 3 months, TA- Total assets, TD/TL-total deposits to total loans, TL/TA-Total loans/TA

Source: Kočiřová (2015)

Besides being used to explain the condition of banking stability, the CAMEL method is often used to determine the soundness level of an individual bank. In Indonesia, the procedure for determining the soundness level of a bank has been regulated since the issuance of the Decree of the Board of Directors of Bank Indonesia Number 30/12 / KEP / DIR / 1997. In this regulation, the assessment of bank soundness is determined based on five factors, namely capital, earning asset quality, management, profitability, and liquidity.

Based on the existence of rules regarding the assessment of bank soundness as a determinant of banking stability as a whole, the indicators used in this study is measuring the latent variable of rural banks stability are also adjusted to existing regulations. In addition to providing regulations regarding procedures for determining the soundness level of a bank, the government also requires rural banks to submit financial reports in accordance with the regulation SE OJK No. 39/SEOJK.03/2017 concerning Annual Reports and Published Financial Reports of Rural Banks in Indonesia.

Taking into consideration the provisions and data availability, this study describes rural banks stability into four components with the following seven indicators.

1) Capital

Assessment of capital is based on the Capital Adequacy Ratio (in Indonesia known as Kewajiban Penyediaan Modal Minimum or KPMM) which is calculated based on the Total Capital to Risk Weighted Assets (RWA). According to the regulation POJK No. 5/POJK. 03/2015, Total Capital is a combination of core capital (tier-1) and supplementary capital (tier-2), while ATMR is the amount of assets on the balance sheet of a rural bank that is weighted according to the level of risk attached to each asset.

2) Earning Asset Quality

The components of earning asset quality are based on two ratios, namely:

- a. Ratio of Classified Earning Asset to Earning Assets (in Indonesia known as Kualitas Aktiva Produktif or KAP).
- b. Ratio of Provision for Loan Losses established by the bank to Provision for Loan Losses that must be established by the bank (in Indonesia known as Penyisihan Penghapusan Aktiva Produktif or PPAP).

3) Profitability

The profitability component is based on two ratios, namely:

- a. Ratio of Profit Before Tax in the last 12 months to the average Operating Volume in the same period.
- b. Ratio of Operating Expenses in the last 12 months to Operating Income in the same period.

4) Liquidity

Liquidity component is based on two ratios, namely:

- a. Ratio of Liquid Assets to Current Debt.
- b. Ratio of Credit to Funds Received by the bank.

Table 2: Rural Banks Stability Indicators

Component/Factor	Indicators
Capital	KPMM
Earning Asset Quality	KAP
	PPAP
Profitability	ROA
	BOPO
Liquidity	LDR
	Cash Ratio

* KPMM-Kewajiban Penyediaan Modal Minimum (CAR-Capital Adequacy Ratio), KAP-Kualitas Aktiva Produktif (NPL/TL- Non-performing loans/Total loans), PPAP-Penyisihan Penghapusan Aktiva Produktif (provision for loan losses), ROA-Return on Assets, BOPO-Beban Operasional Pendapatan Operasional (operating expense to operating revenue), LDR-Loan to Deposit Ratio

2.2. Competition Measurement

Basically, there are two approaches used to measure competition, namely structural and non-structural approaches (Astuti & Saputra, 2019). Bikker and Haaf (2002) stated that the structural approach measures competition based on the level of concentration, while the non-structural approach measures competition not based on the level of concentration. The simplest method of measuring competition is to measure the level of concentration (control of most of the existing market by several banks) using the Concentration Ratio (Wibowo, 2017). The concentration ratio (CR) is a measure of competition that can be calculated from the proportion or percentage of income, profits, or third party funds in the banking sector which is dominated by several large banks.

Calculations based on a few existing banks or ignoring the market share distribution of other banks have a high chance of producing inappropriate conclusions regarding the level of competition that exists (Wibowo, 2017). Therefore, many researchers use another measure, namely the Herfindahl-Hirschman Index (Naaman et al., 2021). The Herfindahl-Hirschman Index (HHI) measures the level of competition using the same way as the Concentration Ratio, however it involves all existing banks. Mathematically it can be expressed in the following formula:

$$HHI \equiv \sum_i^N s^2(i) \quad (1)$$

Annotation

$s(i)$: market share of bank i

N : the total number of existing banks

The value of the HHI is between 0 and 10000. The value of the HHI close to 0 means that it leads to perfect market competition, while the value of the HHI close to 10000 means that it leads to a monopoly market. This means that the higher the HHI value indicates a lower level of competition.

Table 3: Market Classification

Market Type	Threshold HHI
Unconcentrated	< 1500
Moderately Concentrated	1500 < HHI < 2500
Highly Concentrated	> 2500

Source: US Department of Justice (2015)

2.3. Hypotheses

Based on the identification of phenomena, and literature review regarding the relationship between competition and stability, the research hypothesis can be formulated as follows.

- H.1. Competition has a positive effect on rural banks' stability in the aspect of capital.
- H.2. Competition has a positive effect on rural banks' stability in the aspect of asset quality.
- H.3. Competition has a positive effect on rural banks' stability in the aspect of profitability.
- H.4. Competition has a positive effect on rural banks' stability in the aspect of liquidity.
- H.5. Competition has a positive effect on rural banks' stability.

2.4. Research Methodology

In this study, the competition variable was measured using the Herfindahl-Hirschman Index (HHI) and the latent variable of rural banks' stability was measured using four components, namely capital, earning asset quality, profitability and liquidity. These four components are latent variables with seven reflective indicators, namely Kewajiban Penyediaan Modal Minimum shortened to KPMM (CAR-Capital Adequacy Ratio), Kualitas Aktiva Produktif shortened to KAP (NPL/TL- Non-performing Loans/Total loans), Penyisihan Penghapusan Aktiva Produktif shortened to PPAP (provision for loan losses), ROA (Return on Assets), Beban Operasional Pendapatan Operasional shortened to BOPO (operating expense to operating revenue), and LDR (Loan to Deposit Ratio).

Before the analysis is carried out, the indicators on the variable of competition and stability are adjusted. Adjustments are made only to indicators that have a negative impact on the latent variable. The adjusted value is the reciprocal value of the indicator value which has a negative impact on banking stability.

Table 4: Indicator Adjustments

Latent Variable	Indicators	Impact	Adjustment
Competition	HHI	-	Reciprocal (HHI)
Capital	KPMM	+	KPMM
Asset Quality	KAP	-	Reciprocal (KAP)
	PPAP	+	PPAP
Earning	ROA	+	ROA
	BOPO	-	Reciprocal (BOPO)
Liquidity	LDR	-	Reciprocal (LDR)
	Cash Ratio	+	Cash Ratio

Furthermore, to explain the characteristics of the variables and answer the research hypothesis used descriptive and inferential statistics. The analytical tool used to test the hypothesis in this study is the analysis of Structural Equation Modeling (SEM). SEM is used in this study because this study examines the relationship between latent variables that cannot be measured directly but are measured through the indicators of each latent variable. SEM in this study uses the Partial Least Square (PLS) approach. PLS is used because it has the following advantages (Pirouz, 2006).

- 1) PLS can do modeling using many independent variables and dependent variables.
- 2) PLS can handle collinearity problems.
- 3) PLS produces robust estimates even if there is noise or missing data.
- 4) PLS is able to produce accurate predictions.
- 5) PLS is able to handle measurement models in a reflective and formative way.
- 6) PLS can be used on small amounts of data samples.
- 7) PLS is not tied to any form of data distribution.
- 8) PLS can be used for various types of data: nominal, ordinal, interval or ratio.

3. Results and Discussions

In SEM analysis, the first step is to build a model that fits the research problem. The SEM model consists of a measurement model (outer model) and a structural model (inner model). Nachtigall et al. (2003) stated that the measurement model is a model that contains the relationship between the latent and observed variables, while the structural model contains the relationship between the latent variables.

In a measurement model, a latent or construct variable can be formed in a reflective and formative manner. In this study, the variable of rural bank stability is a construct that is formed reflectively. This means that BPR stability does not have to be stated as a combination of all its components, but can be reviewed separately based on aspects of capital, asset quality, profitability, or liquidity. To test the effect of the research variables, three stages were carried out as follows.

1) Measurement Model Assessment

Measurement model assessment is used to test whether indicators can explain latent variables. One way that can be used is to perform convergent validity analysis by looking at the outer loading value of each indicator in the research variable. The absolute value of outer loading ≥ 0.7 is said to be valid (Henseler et al., 2016).

Table 5: Indicator Adjustments

Laten Variable	Indicators	Outer Loading	Decision
Competition	R HHI	1.000	Valid
Capital	KPMM	1.000	Valid
Asset Quality	R KAP	0.940	Valid
	PPAP	0.980	Valid
Earning	ROA	0.992	Valid
	R BOPO	0.991	Valid
Liquidity	R LDR	0.892	Valid
	Cash Ratio	0.843	Valid

* R HHI-Reciprocal HHI, R KAP-Reciprocal KAP, R BOPO-Reciprocal BOPO, R LDR-Reciprocal LDR

Then to ensure that the latent variables are valid and reliable, the Construct Reliability and Validity test are required. A construct is said to be valid and reliable if it meets the following criteria: $\rho_A \geq 0.7$ or Average Variance Extracted (AVE) ≥ 0.5 (Henseler et al., 2016).

Table 6: Indicator Adjustments

Latent Variable	ρ_A	AVE	Decision
Competition	1.000	1.000	Valid & Reliable
Capital	1.000	-	Valid & Reliable
Asset Quality	0.857	0.855	Valid & Reliable
Earning	0.983	0.983	Valid & Reliable
Liquidity	0.688	0.753	Valid & Reliable

2) Structural Model Assessment

Structural model assessment is used to determine the quality of the model. The quality of the model can be confirmed by looking at the coefficient of determination (R^2) which states how big the role of exogenous variables is in explaining endogenous variables. R^2 values are between 0 and 1. The higher R^2 , the more accurate the model is. As a rule of thumb, R^2 values of 0.75, 0.50, and 0.25 are categorized as substantial, moderate, and weak respectively.

Table 7: Coefficient Determination

Latent Variable	R^2	R^2 Adjusted	Rule of thumb
Capital	0.370	0.349	Weak
Asset Quality	0.871	0.866	Substantial
Earning	0.955	0.954	Substantial
Liquidity	0.923	0.920	Substantial
Stability	0.717	0.708	Substantial

3) Bootstrapping

Bootstrapping is used to test the significance of the relationship between variables so that it can be determined whether the research hypothesis can be accepted or rejected.

Table 8: Hypotheses Testing

Variables	Estimate	t-value	Sig	Decision
Stability => Capital	-0.608	7.002	***	Accepted
Stability => Asset Quality	0.933	38.629	***	Accepted
Stability => Earning	0.977	109.441	***	Accepted

Stability => Liquidity	0.961	45.209	***	Accepted
Competition => Capital	-0.515	7.006	***	Accepted
Competition => Asset Quality	0.790	13.647	***	Accepted
Competition => Earning	0.828	14.514	***	Accepted
Competition => Liquidity	0.813	12.966	***	Accepted
Competition => Stability	0.847	15.662	***	Accepted

Based on the results of the data output through the bootstrapping process, it can be concluded that the research results are as follows.

Table 8: Hypotheses Conclusion

Hypothesis	Statement	Total Effect	Decision
H1	Competition has a positive effect on rural banks' stability from the aspect of capital	-0.515	Not Accepted
H2	Competition has a positive effect on rural banks' stability from the aspect of asset quality	0.790	Accepted
H3	Competition has a positive effect on rural banks' stability from the aspect of profitability	0.828	Accepted
H4	Competition has a positive effect on rural banks' stability from the aspect of liquidity	0.813	Accepted
H5	Competition has a positive effect on rural banks' stability	0.847	Accepted

4. Conclusion and Recommendations

4.1. Conclusion

The results showed that the model used in this study and its indicators can explain the relationship between latent variables (constructs) competition and stability. Competition turns out to have a negative effect on stability from the aspect of capital. This means that the higher the competition, the lower the stability of the rural banks in terms of capital. In addition, competition has a positive effect on stability in terms of the quality of earning assets, profitability, and liquidity. Overall, it can be concluded that competition has a positive effect on rural banks' stability. This means that the higher the competition, the better the stability of the rural banks. Thus, this study supports the competition-stability view.

4.2. Recommendations

During the research period, the rural banks never experienced instability. Future research may use data more widely, including data reflecting the conditions of banking instability. If data on bank instability are

included, there is a possibility that competition will have a positive effect on stability, but under certain conditions, the opposite occurs. In other words, there is a chance that the relationship between competition and stability will have an inverted U-shape.

5. References

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