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**ECONOMIC POLICY UNCERTAINTY,  
COMPETITION, AND BANKING STABILITY**

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## **LIST OF AUTHOR'S PUBLISHED PAPER**

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## **CHAPTER 1. INTRODUCTION**

### **1.1 Research rationale**

#### **1.1.1. Practical context**

Recent and ongoing crises have highlighted the growing importance of Economic Policy Uncertainty (EPU). EPU refers to uncertainty in a nation's fiscal, regulatory, monetary, and other socio-political events that impact the economy and international economic relations, and it has surged in many countries in recent years. Most countries worldwide are facing a challenging and uncertain global environment. Notably, the economic policy uncertainty index reached a 21st-century peak in early 2025, surpassing previous crisis periods. The risk of a global recession is present if the 2.5% growth threshold is not maintained, inflation persists, and particularly, the risk of global trade fragmentation continues to pressure most economies.

#### **1.1.2. Theoretical context**

The banking system is one of the most critical economic sectors, contributing significantly to the overall functioning of national economies. Consequently, many researchers have focused on bank stability, arguing that regions with more stable banking systems are essential for maintaining financial system resilience and protecting against systemic risks that could disrupt the economy. Furthermore, many studies agree that the activities of banks during "normal" times contribute to accelerating economic development. This is because an appropriate level of bank competition positively impacts economic growth, and bank

stability reduces the adverse effects of crises on banks in particular and the economy in general. However, the theoretical relationship among EPU, competition, and bank stability has not been clearly explained, with analyses remaining fragmented and focused on individual relationships. Therefore, it is essential and urgent to conduct a more comprehensive study of this relationship to provide deeper insights into the impact of EPU on bank competition and stability.

### **1.1.3. Research trends**

In recent years, EPU has been considered to affect nearly all aspects of the banking system. Empirical studies indicate a shift in EPU research from unidirectional relationships to multidimensional ones. However, the majority of current research focuses only on the direct impact of EPU on economic growth, capital flows, or financial stability, while the multidimensional relationship among EPU, bank competition, and bank stability has not been systematically studied. For the reasons that: (1) The context of global EPU issues; (2) the necessity of addressing bank competition and stability amid uncertainty; (3) the limited attention given to the relationship between competition and bank stability in a high EPU environment; and (4) the unexploited or inconsistent findings on the relationships among EPU, competition, and bank stability from different perspectives (non-linear, two-way, moderating), the author was motivated to choose the topic: "Economic policy

uncertainty, competition, and bank stability" for this doctoral dissertation.

## **1.2. Research Objectives and Questions**

### **1.2.1. Research Objectives**

The general objective of the dissertation is to conduct an in-depth analysis of the multidimensional impacts of EPU on bank competition and stability.

The specific objectives are as follows:

- Specific Objective 1: To analyze and quantify the non-linear impact of EPU on the level of bank competition.
- Specific Objective 2: To analyze the two-way impact between EPU and bank stability.
- Specific Objective 3: To analyze the non-linear impact of competition on bank stability.
- Specific Objective 4: To analyze the moderating role of EPU in the relationship between competition and bank stability.

### **1.2.2. Research Questions**

To address the objectives above, the following corresponding questions are posed:

- Research Question 1: What is the non-linear impact of EPU on banking competition?
- Research Question 2: Does a two-way relationship exist between EPU and banking stability?
- Research Question 3: What is the threshold at which bank competition's impact on banking stability reverses?

- Research Question 4: How does EPU moderate the relationship between competition and banking stability?

### **1.3. Research Object and Scope**

#### **1.3.1. Research Object**

The research object focuses on analyzing the complex and multidimensional relationship (including linear, non-linear, two-way, and moderating impacts) among economic policy uncertainty, bank competition, and bank stability at both the industry and firm levels in 22 countries from 2009 to 2023.

#### **1.3.2. Research Scope**

**Spatial Scope:** The research is limited to 22 countries: Australia, Brazil, Canada, Chile, China, Colombia, France, Germany, Greece, India, Ireland, Italy, Japan, Mexico, Netherlands, South Korea, Russia, Singapore, Spain, Sweden, the United Kingdom, and the United States.

**Temporal Scope:** The study period is limited from 2009 to 2023.

### **1.4. Research Methodology**

The dissertation employs a quantitative research method with dynamic panel data from 22 countries for the period 2009–2023, based on variables used to measure the EPU index, HHI and Market Share (bank competition), Z-score (bank stability), and control variables to perform relevant tests and analyses of the research models. To ensure the accuracy and reliability of the estimation results against challenges of endogeneity, data stationarity, and cross-sectional dependence, the study applies

several estimation methods, including Fixed Effects (FE), Feasible Generalized Least Squares (FGLS), Robust Ordinary Least Squares (Robust OLS), Driscoll-Kraay Standard Errors (DKSE), Instrumental Variable Generalised Method of Moments (IV-GMM), and System Generalised Method of Moments (SGMM). The selection and combination of these methods are strategically implemented to address specific econometric issues in each model.

## **1.5. Contributions of the Research**

### **1.5.1. Theoretical Contributions**

First, the dissertation constructs an integrated analytical framework that simultaneously incorporates three key concepts: EPU, bank competition, and bank stability.

Second, this dissertation opens a new research direction on the non-linear nature of the relationship between EPU and bank competition.

Third, the dissertation comprehensively analyzes the two-way relationship between EPU and bank stability, moving beyond the traditional approach that focuses only on the impact of EPU on bank stability.

Finally, the dissertation explores the moderating role of EPU in the relationship between competition and bank stability.

### **1.5.2. Practical Contributions**

In the context of growing global concern over EPU, the dissertation provides quantitative and systematic evidence of the



potential impacts of EPU on the banking system through the channels of competition and stability.

Furthermore, it discovers the non-linear impact of EPU on bank competition, the two-way relationship between EPU and bank stability, and especially the moderating role of EPU in the relationship between competition and bank stability.

Finally, by assessing various aspects of the impact between EPU, competition, and bank stability, combined with the application of diverse data analysis methods, the dissertation will serve as a valuable reference for researchers in the field of finance and banking.

### **1.6. Dissertation Structure**

The dissertation is structured into 5 chapters:

CHAPTER 1. INTRODUCTION

CHAPTER 2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

CHAPTER 3. RESEARCH METHODOLOGY

CHAPTER 4. RESEARCH RESULTS

CHAPTER 5. CONCLUSION AND POLICY IMPLICATIONS

## **CHAPTER 2: THEORETICAL FRAMEWORK AND LITERATURE REVIEW**

### **2.1. Research Concepts**

#### **2.1.1. Concept of EPU**

EPU is understood as unexpected changes related to the direction of fiscal policy, monetary policy, or any other government economic policy that affects almost all agents in the economy—rather than risk, as has been argued.

#### **2.1.2. Concept of Bank Competition**

Bank competition reflects the intrinsic strength of a bank to attract customers, expand market share, and increase profits through products and services that best meet customer needs.

#### **2.1.3. Concept of Bank Stability**

Miskin (1992) argued that bank stability is a property of the financial system that can ensure the sustainable, uninterrupted allocation of savings to investment opportunities, helping to overcome financial imbalances caused by systemic or adverse and unforeseen external events.

### **2.2. Measurement of Research Concepts**

#### **2.2.1. Measuring EPU**

Researchers worldwide tend to use two groups of methods. The first group uses economic and financial parameters, also known as measurement using non-textual analytical data, while the second group uses text-mining methods based on extracting information from various text sources to estimate uncertainty in

general and EPU in particular. To date, the EPU index by Baker, Bloom, and Davis (2016) is considered highly accurate.

### **2.2.2. Measuring Bank Competition**

The theoretical foundation for measuring bank competition is often approached in two ways: the Structure-Conduct-Performance (SCP) paradigm and the New Empirical Industrial Organization (NEIO) approach. To analyze the overall competition trend at the industry level, the Herfindahl-Hirschman Index (HHI) is a suitable, stable, and practically feasible choice. Additionally, when bank competition is the dependent variable, the study uses the market share of each bank (measured by the ratio of its total assets to the industry's total assets or its loans to the industry's total loans) to represent the competition level of each bank.

### **2.2.3. Measuring Bank Stability**

For measuring bank stability, the dissertation uses the Z-score due to its ability to directly and effectively reflect the risk of insolvency. This index combines three components: profitability (ROA), the ratio of equity to total assets (E/TA), and income volatility ( $\sigma$ ROA), thereby calculating the average distance between the value of assets and the bank's default threshold.

## **2.3. Foundational Theories for the Research**

### **2.3.1. Uncertainty Theory**

Developed by Baoding Liu in 2007 and refined in 2010, uncertainty theory addresses how to understand and model uncertainty. Through the aspect of uncertain finance, it considers

uncertain fluctuations in financial markets and human uncertainty in decision-making and expert estimations to address the fundamental risks of portfolio optimization and propose practical option pricing formulas.

### **2.3.2. Real Option Theory**

Widely used to explain investment decisions when firms face uncertainty, this theory primarily stems from corporate investment and development. It explains that under rising EPU, the potential business risks and profit pressures faced by firms also increase. Firms may then pursue short-term benefits to avoid potential risks and losses associated with reduced investment, leading banks to reduce their credit allocation during uncertain events, waiting for uncertainty to subside. These decisions ultimately hinder and reduce bank profits.

### **2.3.3. Franchise Value Theory**

Researched by Marcus (1984) and Keeley (1990), this theory suggests that competition encourages banks to pursue riskier strategies. Franchise value controls bank operations by reducing the number of risk-taking banking activities. Banks with high-risk appetites are considered to have a higher risk of insolvency.

### **2.3.4. Trade-off Theory**

This theory advocates for leverage in building capital structure by assuming the benefits of leverage. The optimal leverage level is achieved by balancing the benefits of interest payments against the costs of issuing debt. Financially, debt is considered beneficial because the tax shield helps minimize expected taxes

and maximize after-tax cash flows. This theory further clarifies the view that bank competition is detrimental to bank stability, as competition erodes bank profits and thus their franchise value. As a result, banks' incentive to take risks increases because the opportunity cost of bankruptcy for shareholders decreases.

### **2.3.5. Other related supplementary theories**

## **2.4. Overview of empirical studies**

### **2.4.1. Approach using bibliometric analysis**

### **2.4.2. Traditional approach**

## **2.5. Research Gaps**

First, although the theoretical basis has somewhat confirmed this relationship, empirical studies, especially those delving into the non-linear nature of this impact, are still very limited at both national and international levels.

Second, while many empirical studies have significantly contributed to identifying the relationship from EPU to bank stability, the existence and extent of the reverse impact of bank stability on EPU is a less explored area.

Finally, the academic debate on the relationship between competition and bank stability remains inconclusive, with evidence supporting both the "competition-stability" and "competition-instability" hypotheses, especially in the current context of intense economic policy uncertainty. Exploring this gap will provide profound insights into how EPU moderates the relationship between competition and stability in the banking industry.

## **2.6. Research Hypotheses**

### **2.6.1. EPU and bank competition**

H1: EPU has a non-linear impact on bank competition.

### **2.6.2. EPU and bank stability**

H2a: EPU has a negative impact on bank stability.

H2b: Bank stability has a negative impact on EPU.

### **2.6.3. The impact of EPU on the relationship between competition and bank stability**

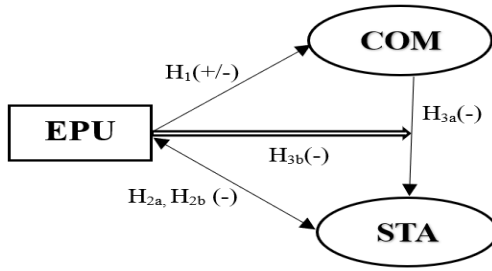
H3a: Bank competition has a non-linear impact on bank stability.

H3b: EPU negatively moderates the relationship between competition and bank stability.

## CHAPTER 3. RESEARCH METHODOLOGY

### 3.1. Proposed Research Model

Based on the research hypotheses, the author proposes a research model to assess the impacts of EPU on bank competition and stability (Figure 3.1).



*Note: —> Direct effect    <--> Two-way effect    <==> Moderating effect*

**Figure 3.1. Proposed Research Model**

*Source: Proposed by the author*

#### 3.1.1. Model of the non-linear impact of EPU on bank competition

#### 3.1.2. Model of the two-way impact between EPU and bank stability

#### 3.1.3. Model of the moderating effect of EPU on the relationship between competition and bank stability

### 3.2. Description of variables in the model

#### 3.2.1. Economic Policy Uncertainty variable

### **3.2.2. Bank Competition variable – HHI and MS (Market Share)**

### **3.2.3. Bank Stability variable – Z-SCORE**

### **3.2.4. Bank-level control variables**

### **3.2.5. Macroeconomic-level control variables**

### **3.3.2. Data processing method**

To test for multicollinearity among the variables, the author uses the Variance Inflation Factor (VIF) method. Subsequently, an appropriate regression model is selected for analysis using the F-test and Hausman test. The author then tests for heteroscedasticity in the research models using the White test. Finally, the issue of endogeneity is identified and addressed. To ensure the accuracy, enhance the reliability, and maintain the stability of the estimation results, especially when the model faces potential endogeneity, data stationarity issues, and cross-sectional dependence, it is crucial to use various estimation methods such as FGLS, Robust OLS, Driscoll-Kraay, and IV-GMM. Each method can address different issues as mentioned.

### **3.3.3. Rationale for Method Selection for Each Objective**

Specific Objective 1: The model uses a non-linear response function and the squared EPU variable ( $EPU^2$ ). The primary estimation method is Fixed Effects OLS with a non-linear variable, and the results of this model are the main basis for interpretation. Other methods like FGLS, DKSE, and IV-GMM are used for robustness checks.



Specific Objective 2: The regression model uses lagged variables, with System GMM (S-GMM) chosen as the main method due to its ability to handle endogeneity, which is crucial when examining a two-way relationship.

Specific Objective 3: The linear and non-linear interaction model will use IV-GMM with interaction and threshold variables, following the structure proposed by Brambor et al. (2006). Methods such as Robust OLS, Driscoll-Kraay, or FGLS will be used to check the reliability and sensitivity of the results.

## CHAPTER 4. RESEARCH RESULTS

### 4.1. Descriptive Statistics of Research Variables

### 4.2. Research Findings

#### 4.2.1. Results on the Non-linear Impact of EPU on Bank Competition

The study finds a non-linear relationship between EPU and bank competition, confirmed at a 1% statistical significance level. This indicates that as EPU increases to a certain threshold, the level of bank competition tends to decrease. This phenomenon can be explained by the increase in information asymmetry between lenders and borrowers during periods of high economic policy uncertainty. As a result, banks become more cautious in their lending and investment strategies and reduce their risk appetite. This general trend causes banks to adopt similar strategies, leading to a decline in bank competition. Thus, the research accepts hypothesis H1. The result is confirmed across all four regression models: FEM, FGLS, DKSE, and IV-GMM.

#### 4.2.2. Results on the Two-Way Impact of EPU and Bank Stability

**Table 4.6. Two-way relationship between Economic Policy Uncertainty and Bank Stability**

Variable	(1) Z-Score	(2) EPU	(3) Z-Score	(4) WUI
L. Z-Score	<b>0,795<sup>***</sup></b> [0,008]		<b>0,795<sup>***</sup></b> [0,008]	

Uncertainty	<b>-0,0001***</b> [0,001]		<b>0,033**</b> [0,010]	
L. Uncertainty		<b>0,631***</b> [0,002]		<b>0,290***</b> [0,003]
Z-Score		<b>-0,277***</b> [0,122]		0.001 [0,001]
SIZ	0,006 [0,009]	<b>5,503***</b> [0,436]	0.010 [0.009]	<b>-0.062***</b> [0.004]
CAP	0,003 [0,006]	<b>2,253***</b> [1,840]	0.002 [0.006]	0.002 [0.003]
LTA	<b>1,130***</b> [0,059]	<b>-10,213***</b> [1.582]	<b>1.139***</b> [0.059]	0.003 [0.016]
ROA	<b>0,621***</b> [0,038]	-0.885 [1,126]	<b>0.628***</b> [0.038]	0.001 [0.008]
GDP	0,248 [0,226]	<b>-900,738***</b> [10,561]	<b>0.470**</b> [0.203]	<b>-4.457***</b> [0.041]
INF	<b>-0,672*</b> [0,378]	<b>-225,372***</b> [9,109]	-0.493 [0.382]	<b>-3.149***</b> [0.074]
INS	-0,043 [0,035]	<b>-19,470***</b> [1.087]	-0.042 [0.036]	<b>-0.127***</b> [0.006]
Constant	-0,051 [0,108]	<b>171,861***</b> [4.769]	-0.153 [0.107]	<b>1.633***</b> [0.039]
Observations	13.648	13.648	13.648	13.648
N. of Banks	1.006	1.006	1.006	1.006
Instruments	35	35	35	35
AR(2)	0.995	0.009	0.991	0.000
Hansen J test	0.000	0.000	0.005	0.000
Sargan test	0.002	0.000	0.000	0.000

*\*Note: \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively.*

The research results show that EPU has a statistically significant negative impact on the Z-Score, representing bank stability. Regarding the impact of bank stability on EPU, a decline in the banking system's stability exacerbates economic policy

uncertainty. This occurs because policymakers are forced to implement measures to restore stability through actions related to the financial system, credit, as well as economic growth and stability.

#### **4.2.3. Results on the Moderating Effect of EPU on the Relationship between Bank Competition and Stability**

The regression results show an inverted U-shaped non-linear relationship between competition and bank stability. This finding is consistently supported across three different estimation methods, all at a 1% significance level. Specifically, the threshold found by the author indicates that when bank competition reaches a level between 5,546.39 and 5,550.814, the relationship between competition and bank stability reverses. The research findings confirm that EPU has a moderating effect on the relationship between competition and bank stability, indicated by the negative sign of the  $HHI \times EPU$  interaction term on the Z-Score. Specifically, the interaction coefficient  $EPU \times HHI$  shows a negative and statistically significant relationship at the 1% level in several alternative estimation models such as FGLS, Robust OLS, and Driscoll-Kraay. This strongly reinforces the implication that as economic policy uncertainty increases, its negative impact on bank stability becomes more severe in less competitive banking markets (i.e., those with a higher HHI). Conversely, in more competitive markets, the EPU-induced decline in stability tends to be less pronounced.

#### **4.3. Discussion of Research Results**

Based on the regression model estimation results, the author draws the following general conclusions:

First, EPU has a strong non-linear impact on bank competition. An increase in EPU, in an effort to preserve profits, forces competition among banks to rise. However, during periods of high EPU, banks may seek to consolidate their market positions, leading to a more concentrated banking sector and reduced competition.

Second, a two-way relationship exists between EPU and bank stability. Rising EPU can lead to decreased bank stability, and conversely, a lack of bank stability limits credit supply, thereby exacerbating economic policy uncertainty.

Third, there is a non-linear impact of competition on bank stability, with a threshold of 5,546.39. Furthermore, the research results show that EPU moderates the relationship between competition and bank stability.

## **CHAPTER 5. CONCLUSION AND POLICY IMPLICATIONS**

### **5.1. CONCLUSION**

This study has empirically tested (i) the impact of EPU on bank competition, (ii) the impact of EPU on bank stability, and (iii) the moderating role of EPU in the relationship between competition and stability. Based on data from 20 countries during the 2009–2023 period, the study has yielded several theoretically significant findings.

#### **5.1.1. Theoretical aspects**

#### **5.1.2. Empirical aspects**

### **5.2. POLICY IMPLICATIONS**

Based on the three main empirical findings, the following policy implications are proposed for different stakeholders:

#### **5.2.1. For Financial and Banking Regulatory Agencies**

5.2.1.1. Enhance transparency and stability in policymaking

5.2.1.2. Improve systemic risk supervision and ensure bank stability.

#### **5.2.2. For Commercial Banks**

5.2.2.1. Strengthen risk management capacity

5.2.2.2. Develop flexible and sustainable risk management strategies

#### **5.2.3. For Investors and Customers**

5.2.3.1. Practice prudent financial management

5.2.3.2. Improve understanding of financial products

## **5.3. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS**

### **5.3.1. Research Limitations**

#### **5.3.1.1. Limitations in Research Scope**

Limited number of countries studied; omission of economies with specific financial policies; and the differences between developed and developing countries in the impact of EPU on banking systems.

#### **5.3.1.2. Limitations in Data**

Failure to cover previous financial crisis periods; and potential bias in the measurement of the EPU index.

#### **5.3.1.3. Limitations in the Research Model**

The model does not consider the impact of financial technology (Fintech), climate change, or geopolitical conflicts on EPU.

Despite these limitations, they do not diminish the value of the dissertation. Instead, they highlight areas for future exploration and deeper research. Specifically, the dissertation builds a solid theoretical foundation and employs appropriate research methods to provide empirical evidence on how EPU affects bank competition and stability within a specific research context. These findings offer valuable references for subsequent studies.

#### **5.3.1.4. Limitations in Methodology and Generalizability**

### **5.3.2. Future Research Directions**

#### **5.3.2.1. Expand the research scope**

#### **5.3.2.2. Integrate additional factors**

#### **5.3.2.3. Upgrade EPU measurement methods**

## **CONCLUSION**

This study empirically examined the relationship among EPU, bank competition, and bank stability from 2009–2023 in 20 countries. The results show a non-linear impact of EPU on bank competition; when EPU is low, competition may decrease due to caution in investment and lending. However, when EPU rises to a certain threshold, banks are forced to compete more fiercely to maintain market share, thus increasing the level of competition. Additionally, the study found a two-way relationship between EPU and bank stability. When EPU is high, credit risk, reduced capital flows, and liquidity crises can destabilize the banking system. Conversely, when the banking system is less stable, the government is forced to continuously adjust policies to control risks, thereby increasing the level of EPU. Notably, the dissertation emphasizes the moderating role of EPU in the relationship between competition and bank stability. When EPU is low, bank competition helps enhance operational efficiency, improve risk management, and promote stability. However, in a high EPU context, competition can lead banks to take on greater risks, thereby undermining bank stability.

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