

DOI: 10.55643/fcaptop.1.66.2026.5050

Khalil Ullah Mohammad

Associate Professor, Bahria Business School, Islamabad Pakistan;
e-mail: khalilullah.buic@bahria.edu.pk
ORCID: [0000-0003-0235-0226](https://orcid.org/0000-0003-0235-0226)
(Corresponding author)

Muhammad Kasheer

Senior Assistant Professor, Bahria Business School, Islamabad Pakistan;
ORCID: [0009-0006-3135-3089](https://orcid.org/0009-0006-3135-3089)

Noor-Ul-Haya Adnan

PhD Student, Foundation University, Islamabad, Pakistan; Senior Lecturer, Bahria Business School, Islamabad Pakistan;
ORCID: [0009-0000-5516-537X](https://orcid.org/0009-0000-5516-537X)

Received: 31/10/2025

Accepted: 28/01/2026

Published: 28/02/2026

© Copyright
2026 by the author(s)



This is an Open Access article distributed under the terms of the [Creative Commons CC-BY 4.0](https://creativecommons.org/licenses/by/4.0/)

NONLINEAR BANK RISK APPETITE UNDER ECONOMIC POLICY UNCERTAINTY: THE ROLE OF REGULATORY QUALITY AND DEPOSIT INSURANCE

ABSTRACT

Economic policy uncertainty has been increasing globally, with consequences for financial sector stability. This paper investigates its influence on the risk-taking behavior of banks. The study examines the functional form of responses of banks to economic policy uncertainty and explores how regulatory quality and safety nets change bank behavior in periods of high uncertainty.

We utilize data from 1999 to 2023 of 796 banks in 21 countries, employing a quadratic two-step system GMM estimation technique to evaluate the impact of economic policy uncertainty on banks' risk-taking. Using the U-test, we confirm the nonlinear relationship and identify its threshold point. Finally, we show the consistency of the estimates by controlling for multiple major crisis periods during the sample period.

We find that economic policy uncertainty generally increases risk-taking among banks. However, beyond a certain point, further increases in economic policy uncertainty could lead to diminishing returns and heightened risk aversion, resulting in decreased risk-taking behavior. Stronger regulatory quality mitigates this effect; however, the reduction in risk-taking is less pronounced when economic policy uncertainty increases. Safetynets moderate the relationship by impacting bank risk-taking sensitivity. Additionally, we find cross-country heterogeneity in the size of economic policy uncertainty and risk-taking. Lastly, we find that the nonlinear effects are robust after controlling for major events like the global financial crisis, the eurozone crisis, COVID-19, and the Ukraine war.

We provide evidence of nonlinearity in the nexus of economic policy uncertainty, regulatory frameworks, safety nets, and bank risk-taking behavior. The findings underscore the significance of robust regulatory quality and safety nets in moderating banks' risk-taking behavior during economic policy uncertainty.

Keywords: risk-taking, economic policy uncertainty, banking, explicit deposit insurance, regulatory quality, nonlinearity, threshold effects, Z score, nonperforming loans

JEL Classification: G21, G28, E44

INTRODUCTION

Over the last two decades, the global economy has faced increased political and economic uncertainty. The global financial crisis, the COVID-19 pandemic, and post-COVID inflationary periods illustrate the persistent rise of uncertainty. Globalization, interconnectedness, and technological spillovers have resulted in the rapid evolution of the world (Al-Thaqeb & Algharabali, 2019). Political polarization, conflicts, and the growing role of government spending further exacerbate uncertainty and adversely impact growth (Baker & Bloom, 2013). More recently, trade wars have fueled global economic uncertainty even further (see figure 1). Given these developments, understanding how uncertainty affects financial and economic systems has become increasingly important.

Researchers have developed various measures of economic policy uncertainty (EPU). The most significantly used measure of EPU is the EPU Index by Baker, Bloom, and

Davis (2016). Using information on policy-related economic uncertainty found in newspapers, the quantity of federal tax code provisions that are about to expire, and the disagreement among economic forecasters, they created an EPU index. Figure 1 illustrates the monthly global economic uncertainty data based on this methodology.

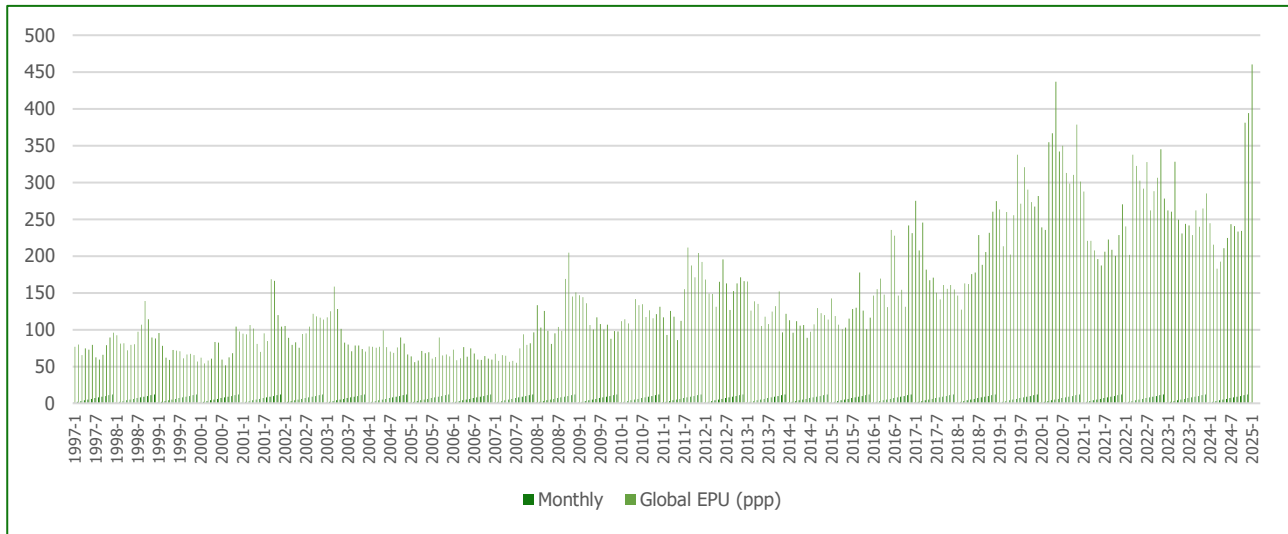


Figure 1. Global economic policy uncertainty monthly data. (Source: based on information from <https://www.policyuncertainty.com/>)

The financial sector is particularly vulnerable to uncertainty (Shabir, Jiang, Bakhsh, & Zhao, 2021). Banks, as central actors in the financial system, are particularly susceptible to economic policy uncertainty due to their reliance on forward-looking decisions regarding credit allocation, asset composition, and capital management. Changes in the EPU can impact banks' ability to create credit and allocate resources, thereby influencing broader economic outcomes. Rising EPU increases volatility and unpredictability in the banking sector (Al-Thaqeb & Algharabali, 2019), reduces profitability (Ozili & Arun, 2023), and increases banks' propensity to hold liquid assets (Berger, Guedhami, Kim, & Li, 2022; Lu & Wang, 2023). Under such circumstances, banks may alter their risk appetite by adopting conservative strategies to safeguard capital or, alternatively, pursue riskier opportunities to offset uncertainty (Alhalabi, Castro, & Wood, 2023). This study empirically investigates banks' responses to changes in EPU.

Economic uncertainty's impact on risk-taking presents contradictory theoretical perspectives and empirical evidence. High uncertainty periods can either induce banks to become risk-averse or engage in higher risk-taking. The risk-shifting hypothesis suggests that when uncertainty increases, banks may engage in riskier investments, while the precautionary behavior hypothesis posits that uncertainty prompts banks to reduce risk exposure by tightening credit, hoarding liquidity, or shifting toward safer assets. We argue that these inconsistencies reflect a potential model misspecification problem. Specifically, the relationship between EPU and bank risk-taking may be nonlinear, and threshold effects might hold in the relationship. At low levels of EPU, the risk shifting hypothesis holds, leading to greater risk taking. Whereas at high levels of EPU beyond a threshold, the precautionary behavior hypothesis prevails, prompting banks to reduce risk through credit tightening, liquidity hoarding, or shifting to safer assets. Therefore, a nonlinear quadratic relationship may explain the reasons for contradictory empirical evidence of the impact of EPU on risk-taking observed in the literature.

Institutional attributes also play a strong role in how banks respond to EPU. Factors such as strong regulatory frameworks, institutional quality, and the presence of safety nets in the banking system, such as explicit deposit insurance (EDI) and market structure, influence bank risk-taking (Etudaiye-Muhtar & Abdul-Baki, 2021; Moudud-UI-Huq & Akter, 2024). Evidence shows that institutional quality influences risk-taking behavior (Chau & Oanh, 2023; Shabir et al., 2021) such that banks in well-regulated systems demonstrate more conservative behavior in risk-taking (Wang & Duan, 2025). On the other hand, a lack of well-defined institutional frameworks within a system tends to exacerbate risk-taking behavior of banks during periods of economic uncertainty, leading to increased systemic risk (Tran et al. 2022). Evidence on how regulatory quality, economic policy uncertainty, and risk-taking have a nexus is also missing in the literature.

Similarly, the introduction of deposit insurance represents an underlying risk governance framework and institutional arrangement that systematically regulates risk-taking behavior in banks. While deposit insurance schemes are designed to protect a bank's customers and mitigate threats to the financial sector, they can potentially fuel banks' risk appetite by fostering moral hazard (Che Johari, Chronopoulos, Scholtens, Sobiech, & Wilson, 2020; Jumreornvong, Chakreyavanich, Treepongkaruna, & Jiraporn, 2018). Such schemes instill sufficient assurance into depositors that their funds are secured,

hence reducing their likelihood of panic withdrawals in the event of financial instability. Conversely, if perceived to be too lenient or inadequately monitored, deposit insurance tends to increase the risk-bearing activities banks undertake (Bonfim & Santos, 2023). Despite their importance, researchers have not explored the role of EPU in the regulatory quality, EDI, and risk-taking relationship. Understanding this relationship is crucial for designing more effective EDI systems and regulatory interventions.

Given the divergent theoretical perspectives and conflicting empirical findings regarding the impact of EPU on bank risk-taking, there is a need to clarify the nature of this relationship. This is particularly important in the post-crisis financial landscape, where policymakers and regulators seek to enhance the resilience of banking systems against systemic shocks and rising uncertainty. Understanding how banks respond to rising uncertainty will help in quantifying and pricing the risk associated with economic policy uncertainty. Moreover, existing studies have largely overlooked the potential nonlinear dynamics in the EPU-risk relationship and have insufficiently accounted for how EPU may shape bank responses under institutional frameworks, such as regulatory quality and EDI systems. By addressing these gaps, this study contributes to a deeper and more nuanced understanding of the mechanisms through which uncertainty influences financial stability.

Our study contributes by testing the nonlinear relationship between EPU and bank risk taking, thereby addressing a potential model misspecification problem in the extant literature. We examine how institutional attributes – regulatory quality and deposit insurance – moderate the EPU-risk relationship. We also provide cross-country evidence to determine heterogeneity in banks' responses across diverse institutional environments. The investigation of these quadratic and moderating effects not only advances theoretical development but also provides critical insights for tailoring macroprudential policies across heterogeneous institutional environments.

We employ a two-step system dynamic panel data generalized method of moment (GMM) estimation technique, using data from 1999 to 2023 from publicly listed banks across 21 countries for which data on EPU is available. We investigate a quadratic relationship and analyze the moderating effects of EPU on regulatory quality, EDI, and bank risk-taking. We reverify our findings by running a U-test (Lind & Mehlum, 2010). Finally, we test for cross-country differences in how EPU influences banks. Finally, to show the robustness of our findings, we control for all major events that could be a cause of structural breaks.

LITERATURE REVIEW

Baker et al. (2016) introduced the EPU index. This index quantifies uncertainty by tracking the frequency of newspaper articles discussing economic policy-related uncertainty. In the past decade, multiple measures of economic uncertainty have been developed using Wall Street Journal text, investor sentiments based on internet shares, textual analysis of earnings calls, political uncertainty, and macroeconomic variable-based indexes. See (Da et al., 2015; Hassan et al., 2019; Julio & Yook, 2012; Jurado et al., 2015; Manela & Moreira, 2017; Scotti, 2016). These measures provide valuable insights but have limitations, such as a narrow focus, limited accessibility, and challenges in broader application. Thus, there is a need for a comprehensive, publicly accessible, and adaptable measure that incorporates multiple factors and can be applied across different countries and time periods. Baker et al. (2016b) developed the EPU index, a comprehensive measure of EPU influenced by prior research. The index combines three main elements: how often policy-related economic uncertainty appears in newspaper coverage, the count of federal tax provisions nearing expiration, and the level of divergence in predictions made by economic forecasters. Their analysis highlights that newspaper coverage of economic uncertainty can effectively reflect EPU indicators. The EPU index, closely aligned with events like elections, wars, and financial crises, correlates strongly with the VIX index. EPU is notably higher during periods of political instability, significant policy shifts, or economic crises—such as the 2008 global financial crisis, the Eurozone debt crisis, Brexit, and the U.S. fiscal cliff debates.

EPU's impact extends beyond immediate market volatility, influencing long-term investment decisions, corporate financing, and overall economic growth (Ghosh et al., 2024). The underlying mechanism suggests that heightened uncertainty increases risk premiums, prompting firms and households to become more cautious and reduce investment and consumption. In the financial sector, EPU's influence is pervasive. Higher EPU typically leads to delayed investments and hiring for firms as managers adopt a "wait-and-see" approach. Gulen and Ion (2016) and Julio and Yook (2012) confirm that high EPU correlates with reduced capital expenditures, leading to lower aggregate investment. Moreover, in financial markets, EPU is positively correlated with market volatility and risk aversion (Bekaert, Hoerova, & Lo Duca, 2013), affecting the behavior of banks and other financial institutions. It influences financial systems and investment behavior in multiple interconnected ways, shaping market dynamics, institutional responses, and policy design. In volatile stock markets, such as Malaysia's, EPU amplifies return fluctuations, indicating that uncertainty intensifies risk during unstable periods and requires investors to anticipate sharper market swings (Hoque & Zaidi, 2018). Investor sentiment also shifts under high

EPU, as uncertainty delays decision-making and encourages caution, suggesting the need for adaptive investment strategies (Zhang, 2018). In emerging economies like India and Pakistan, EPU affects financial innovation and economic growth asymmetrically, calling for policies that maintain stability while fostering development (Xu, Adow, & Qamruzzaman, 2021). Sector-specific impacts, as observed in China, highlight that tailored policy measures are essential because industries respond differently to policy shifts (Chiang, 2021; Feng, Luo, & Wang, 2021). Furthermore, EPU disrupts market liquidity, emphasizing the importance of liquidity-enhancing measures during turbulent times (Dash, Mahakud, Debata, & Maitra, 2019), while geopolitical risks compound these effects, making diversification strategies, such as holding safe-haven assets like gold, vital to mitigate overlapping uncertainties (Chiang, 2021). Together, these findings stress that both investors and policymakers must adopt flexible, context-specific approaches to manage risk and maintain financial resilience under policy uncertainty.

Research on the impact of EPU has seen extensive growth in the banking industry in the last decade, including its impact on profitability, leverage, risk-taking behaviors, and stability. Uncertainty has been suggested to impact bank profitability negatively (Hossain & Alam, 2019; L. Nguyen, Tran, & Ho, 2021; Ozili & Arun, 2023). However, some studies show that returns increased in periods of high economic uncertainty with attribution to regional and bank-specific factors as the eventual determinant of the relationship (Ozili & Arun, 2022). Liquidity hoarding during high EPU periods is another impact documented in the literature (Niu, 2024).

Literature has suggested that EPU adversely impacts banking stability. While policymakers generally implement deposit insurance to promote financial stability and prevent bank runs, certain conditions can limit its effectiveness (Anginer & Demirgüç-Kunt, 2018). Deposit insurance coverage is a significant factor that can increase the propensity to withdraw, resulting in a higher frequency of bank runs (Peia, 2017). Moral hazard in the banking system is dependent on bank characteristics and market conditions. Larger banks are more vulnerable to the negative impact of EPU on stability, while well-capitalized liquid banks are better able to withstand uncertainty (Danisman & Tarazi, 2023). Additionally, state-owned banks demonstrate a higher capacity to resist uncertainty (Yu, Lv, Liu, & Wang, 2022).

Bank risk-taking, characterized by decisions on lending, asset allocation, capital structure, and off-balance-sheet activities, is influenced by internal factors such as bank capital levels and governance structures and external factors like market conditions and regulatory environments. Two primary theoretical frameworks address bank risk-taking behavior: the risk-shifting hypothesis and the precautionary savings hypothesis. Jensen and Meckling (1976) suggest that banks with lower capital buffers may engage in riskier activities to maximize shareholder value, particularly when potential losses are underwritten by depositors or government insurance. This behavior is often linked to moral hazard, exacerbated by EDI and government bailout expectations (Merton, 1977). However, the precautionary savings hypothesis suggests that banks reduce risk-taking during periods of heightened uncertainty to preserve capital and ensure solvency (Acharya & Richardson, 2009).

Laeven and Levine (2009) suggest that stronger shareholder rights led to more risk-taking. Similarly, Altunbas et al. (2010) argue that prolonged periods of low interest rates encourage banks to pursue higher yields through increased risk-taking. This phenomenon is known as the "search for yield." The precautionary behavior theory suggests that banks may become more risk-averse under high EPU, tightening their lending standards, reducing leverage, and focusing on safer assets to avoid potential losses from adverse policy shifts or economic downturns (Acharya & Richardson, 2009). This is consistent with evidence from the 2008 financial crisis, where banks increased capital buffers and reduced risk exposure (Ivashina & Scharfstein, 2010).

However, the risk-shifting hypothesis posits that banks may increase their risk-taking in response to EPU, driven by the anticipation of future regulatory changes or the desire to exploit short-term profit opportunities in volatile markets (Dell'ariccia, Laeven, & Suarez, 2017; Jensen & Meckling, 1976). Empirical research offers varied insights, with (C. P. Nguyen, Le, & Su, 2020) finding that EPU increases bank risk-taking in emerging markets with unstable regulatory environments, while in developed markets with stronger oversight, EPU leads to more cautious behavior.

Empirical research on the relationship between EPU and bank risk-taking reveals contradictory evidence, particularly when comparing emerging and developed markets. In emerging markets characterized by unstable regulatory environments, increased EPU correlates with heightened risk-taking among banks (Haque, 2019). Low regulatory oversight can result in banks pursuing aggressive lending strategies that increase risk. Conversely, in developed markets with stronger regulatory frameworks, the same levels of EPU tend to result in more cautious behavior by banks maintaining capital buffers to mitigate potential losses from adverse policy shifts (Imbierowicz, Kragh, & Rangvid, 2018). The European Union exhibits varying risk-taking behaviors based on the strength of its governance structures and regulatory oversight (Garcia & Ye, 2023). This divergence underscores the importance of regulatory environments and the need for further investigation.

The role of deposit insurance schemes in mitigating risky behavior has conflicting evidence. Some studies argue that deposit insurance mitigates risk-taking by reducing moral hazard (Gropp & Vesala, 2004; Lopez-Quiles & Petricek, 2018). Others suggest that deposit insurance can incentivize risk-taking by reducing market discipline (Demirgüç-Kunt & Huizinga, 2004; Karas, Pyle, & Schoors, 2021; Keeley, 1990). Various factors, including regulatory frameworks, bank governance structures, and economic conditions, influence the relationship between deposit insurance and risk-taking. Angkinand Prabha and Wihlborg (2011) propose a U-shaped relationship between risk and deposit insurance coverage moderated by institutional characteristics. Other studies suggest that stringent capital regulation, particularly with EDI implemented in a country, reduces bank default risk during crises (Ashraf, Zheng, Jiang, & Qian, 2020).

AIMS AND OBJECTIVES

Given the diverse theoretical perspectives and conflicting empirical findings regarding the impact of EPU on bank risk-taking, it is essential to clarify this relationship. This clarification is especially important in the post-crisis financial environment, where policymakers and regulators aim to strengthen the resilience of banking systems to systemic shocks. Additionally, prior research has often overlooked the potential nonlinear dynamics in the relationship between EPU and risk and has inadequately considered how institutional factors—such as regulatory quality and the presence of explicit deposit insurance—might influence banks' behavior. By addressing these gaps, this study offers a more comprehensive and nuanced understanding of how uncertainty affects financial stability. Examining these moderating effects not only promotes theoretical development but also provides valuable insights for adapting macroprudential policies to varying institutional contexts. The objective of the study is to empirically test the following hypotheses:

- **H₁**: EPU significantly increases bank risk-taking as banks seek higher returns in uncertain environments
- **H_{1a}**: The EPU and bank risk-taking relationship is quadratic in nature
- **H₂**: EPU significantly weakens the regulatory quality and bank risk-taking relation
- **H₃**: EPU significantly strengthens the deposit insurance and bank risk-taking relation
- **H₄**: The sensitivity of bank risk-taking to EPU significantly influences risk-taking behavior
- **H₅**: The strength of the bank risk-taking and uncertainty relationship is heterogeneous across countries

METHODS

The study employs a two-step system GMM approach, extending Özsuca and Akbostanci (2016) by incorporating EPU and its quadratic term. We estimate nine (09) models. Each model uses two proxies of bank risk: the z-score and the nonperforming loans ratio. We start by assessing the impact of EPU on bank risk-taking, extending our analysis to test for a quadratic relationship. After establishing a nonlinear relationship, we test for the moderating role of EPU on the regulatory quality and risk-taking relationship and the explicit deposit insurance and risk-taking relationship. We extend the relationship further by estimating the role of EPU sensitivity of banks in moderating the relationship. To test for cross-country variations in the EPU and risk-taking behavior, we test for cross-country heterogeneity. Finally, the study controls for major crises during our sample period to make sure that our findings are robust.

Selection of the sample

The data is an unbalanced panel from 1999 to 2023; however, due to the dynamic nature of the model and missing data, a total of 21 years of data from 2002 to 2022 is used. The study uses banking data from 21 countries (list included in Appendix A). All countries for which EPU data is available are used in our analysis, sourced from the economic policy website (Baker et al., 2016). This is a limitation in our study. We utilize the LSEG data and analytics database to extract data from all banks operating in 21 countries, resulting in data on 796 banks.

Measurement of variables

Consistent with Özsuca and Akbostanci (2016), the study employs the Z-score and nonperforming loans (NPL) ratio as two proxies for bank risk. Z-score is calculated as return on assets plus capital to assets ratio divided by the standard deviation of return on assets. Increasing values of NPL indicate higher bank risk-taking, whereas those of the Z-score proxy indicate lower risk-taking. Therefore, we expect opposite signs of the coefficients in the two models. We use bank size as the log of total assets. The impact of bank size on risk-taking is ambiguous, with empirical studies suggesting both positive and negative effects (Khan, Scheule, & Wu, 2015; Moudud-Ul-Huq & Rahman, 2023; Rahman, Zheng, & Ashraf, 2015). Liquidity

is measured by the liquidity coverage ratio, which is the ratio of high-quality liquid assets to total net cash flow. Market conditions and capitalization impact the risk liquidity relationship (Abbas, Ali, Yousaf, & Wong, 2021). Bank capitalization is measured using the total tier 1 capital to total assets. The impact of bank capitalization on risk-taking is nonlinear (Dias, 2021). For macroeconomic variables, the model includes deposit insurance and regulatory quality. EPU is taken from the policy uncertainty website (Armelius, Hull, & Stenbacka Köhler, 2017; Baker et al., 2016; Davis, 2016; Ghirelli, Pérez, & Urtasun, 2019; Hardouvelis, Karalas, Karanastasis, & Samartzis, 2018). The index combines three main elements: how often policy-related economic uncertainty appears in newspaper coverage, the count of federal tax provisions nearing expiration, and the level of divergence in predictions made by economic forecasters. The model controls for cross-country differentials using country dummies.

The detailed variable list, operationalization, and source are added in the annex (See Annex B). No interpolation was done to cater to missing values. Table 1 shows the descriptive statistics. After considering all lags used in the GMM estimation, a total of 10373 observations were used. For consistency and ease of interpretation, the logs of variables were used. The data is skewed for the dependent variables with longer right tails, suggesting a higher concentration of high values in the distribution. The deposit insurance dummy is also skewed with longer left tails, suggesting there are more banks in the sample with explicit deposit insurance.

Table 1. Descriptive statistics.

Variables	Obs	Mean	Std. Dev.	Min	Max	Skew.	Kurt.
Z Score	10373	0.088	0.144	0	3.734	9.987	175.68
NPL	10373	0.756	1.345	0	22.173	5.639	54.048
KA	10373	-4.656	1.267	-11.231	-1.487	-0.881	3.983
BankSize	10373	22.656	2.365	16.676	29.379	0.482	2.551
liquiditycoverageratio	10373	0.675	0.181	-0.018	1.861	1.143	10.131
EPU	10373	1.482	0.724	0.185	5.392	1.247	5.281
GDPgrowth	10373	2.372	2.813	-11.167	24.475	-0.177	6.507
DI	10373	0.948	0.223	0	1	-4.02	17.158
RegulatoryQuality	10373	1.106	0.686	-1.142	2.252	-1.461	3.771

The research models

The following models are estimated in the study extending Özsüca and Akbostanci (2016). Equation 02 serves as the base model for estimating the impact on bank risk-taking.

$$y_{ict} = \beta_0 + \beta_1 y_{ict-1} + \beta_2 Size_{ict} + \beta_3 LiquidityRatio_{ict} + \beta_4 EquityRatio_{ict} + \beta_5 EDI_{ct} + \beta_6 Regulatory\ Quality_{ct} + \beta_7 EPU_{ct} + \sum_{c=1}^c \gamma_c D_c + \mu_{ict} \quad (1)$$

$$y_{ict} = \beta_0 + \beta_1 y_{ict-1} + \beta_2 Size_{ict} + \beta_3 LiquidityRatio_{ict} + \beta_4 EquityRatio_{ict} + \beta_5 EDI_{ct} + \beta_6 Regulatory\ Quality_{ct} + \beta_7 EPU_{ct} + \beta_8 EPU^2_{ct} + \sum_{c=1}^c \gamma_c D_c + \mu_{ict} \quad (2)$$

For testing H₂ and H₃ and measuring the moderating effects, equations 3 and 4 include interaction terms.

$$y_{ict} = \beta_0 + \beta_1 y_{ict-1} + \beta_2 Size_{ict} + \beta_3 LiquidityRatio_{ict} + \beta_4 EquityRatio_{ict} + \beta_5 EDI_{ct} + \beta_6 EPU \times RQ_{ct} + \beta_7 EPU_{ct} + \beta_8 EPU^2_{ct} + \sum_{c=1}^c \gamma_c D_c + \mu_{ict} \quad (3)$$

$$y_{ict} = \beta_0 + \beta_1 y_{ict-1} + \beta_2 Size_{ict} + \beta_3 LiquidityRatio_{ict} + \beta_4 EquityRatio_{ict} + \beta_5 Regulatory\ Quality_{ct} + \beta_6 EPU \times EDI_{ct} + \beta_7 EPU_{ct} + \beta_8 EPU^2_{ct} + \sum_{c=1}^c \gamma_c D_c + \mu_{ict} \quad (4)$$

To measure how regulatory quality and EDI impact the risk-taking of banks, and how EPU moderates these effects, equations 5 and 6 are estimated.

$$y_{ict} = \beta_0 + \beta_1 y_{ict-1} + \beta_2 Size_{ict} + \beta_3 LiquidityRatio_{ict} + \beta_4 EquityRatio_{ict} + \beta_5 EDI_{ct} + \beta_6 EPU^2 \times RQ_{ct} + \beta_7 EPU_{ct} + \beta_8 EPU^2_{ct} + \sum_{c=1}^c \gamma_c D_c + \mu_{ict} \quad (5)$$

$$y_{ict} = \beta_0 + \beta_1 y_{ict-1} + \beta_2 Size_{ict} + \beta_3 LiquidityRatio_{ict} + \beta_4 EquityRatio_{ict} + \beta_5 Regulatory\ Quality_{ct} + \beta_6 EPU^2 \times EDI_{ct} + \beta_7 EPU_{ct} + \beta_8 EPU^2_{ct} + \sum_{c=1}^c \gamma_c D_c + \mu_{ict} \quad (6)$$

Testing hypothesis 4 and cross-country heterogeneity, we estimate equations 7 and 8. We interact the EPU and its quadratic term with country dummies to capture the difference in the relationship across countries.

$$y_{ict} = \beta_0 + \beta_1 y_{ict-1} + \beta_2 Size_{ict} + \beta_3 LiquidityRatio_{ict} + \beta_4 EquityRatio_{ict} + \beta_5 DI_{ct} + \beta_6 Regulatory\ Quality_{ct} + \beta_7 EPU_{ct} + \beta_8 EPU^2_{ct} + \beta_9 EPU * CountryDummy_{ct} + \mu_{ict} \quad (7)$$

$$y_{ict} = \beta_0 + \beta_1 y_{ict-1} + \beta_2 Size_{ict} + \beta_3 LiquidityRatio_{ict} + \beta_4 EquityRatio_{ict} + \beta_5 DI_{ct} + \beta_6 Regulatory\ Quality_{ct} + \beta_7 EPU_{ct} + \beta_8 EPU^2_{ct} + \beta_9 EPU^2 * CountryDummy_{ct} + \mu_{ict} \quad (8)$$

Finally, we control for the multiple crisis periods in the estimation using equation 9. The crises are proxied using a consolidated crisis dummy, which takes a value of 1 for the global financial crisis (2008 and 2009), for the eurozone crisis (2010-2012), the COVID-19 crisis (2020), and 2022 and 2023 for the Ukraine War crisis. Since the nature of these crises and their impacts were different, we modeled each crisis differently to see if the effect varies with different crises.

$$y_{ict} = \beta_0 + \beta_1 y_{ict-1} + \beta_2 Size_{ict} + \beta_3 LiquidityRatio_{ict} + \beta_4 EquityRatio_{ict} + \beta_5 EDI_{ct} + \beta_6 Regulatory\ Quality_{ct} + \beta_7 EPU_{ct} + \beta_8 EPU^2_{ct} + \beta_9 CrisisDummy_t + \sum_{c=1}^c \gamma_c D_c + \mu_{ict} \quad (9)$$

The research technique

All equations are estimated for both Z score and nonperforming loans through general methods of moments (GMM/DPD). We use a two-step system, GMM, and white standard errors are reported. The system GMM assumes that the fixed effects are uncorrelated with difference instruments and is suggested to be more efficient (Roodman, 2009). The validity of the GMM estimation results is ensured by verifying that the instruments are fewer than the number of cross sections and are valid, as confirmed by the Hansen statistic reported in all the results. Prior to estimation, we test for multicollinearity, heteroscedasticity, and stationarity.

Table 2 shows the correlation matrix to check for issues of multicollinearity. We do not find any high correlations between our predictors. We reverify the results by carrying out a VIF test (Table 2b).

Table 2a. Matrix of correlations. Note: *** p<0.01, ** p<0.05, * p<0.1.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Z	1								
(2) NPL	0.109*	1							
(3) KA	0.383*	0.334*	1						
(4) BankSize	0.094*	0.101*	-0.061*	1					
(5) Liquiditycoverageratio	-0.098*	-0.213*	0.000	-0.289*	1				
(6) EPU	0.030*	-0.015	-0.045*	0.067*	0.018	1			
(7) GDPgrowth	0.156*	0.000	0.247*	0.082*	-0.125*	-0.082*	1		
(8) DI	-0.116*	-0.149*	-0.221*	-0.094*	0.153*	0.124*	-0.235*	1	
(9) RegulatoryQuality	-0.271*	-0.398*	-0.360*	-0.296*	0.342*	0.029*	-0.338*	0.478*	1

Table 2b. Variance inflation factor.

	VIF	1/VIF
Regulatory Quality	1.811	.552
DI	1.357	.737
KA	1.236	.809
Liquiditycoverageratio	1.203	.831
BankSize	1.18	.847
GDP growth	1.165	.859
EPU	1.024	.977
Mean VIF	1.282	.

We also test for stationarity of the variables used in the estimation using the augmented dicky fuller method and the Fisher test that allows for an unbalanced dataset. The result is reported in Table 2c. All variables are stationary except DI, which is a dummy variable and hence not a problem.

Table 2c. Panel Fisher Type Unit Root Test. Note: All panels are stationary.

Variable	Type	Statistic	P-value
NPL	Inverse chi-squared(1586)	P 4877.6175	0.0000
KA	Inverse chi-squared(1586)	P 2430.9207	0.0000
BankSize	Inverse chi-squared(1586)	P 3047.3495	0.0000
LiquidityCoverageRatioBasel3	Inverse chi-squared(1586)	P 3467.0391	0.0000
EPU	Inverse chi-squared(1586)	P 5284.2103	0.0000
GDPgrowth	Inverse chi-squared(1586)	P 11000	0.0000
RegulatoryQuality	Inverse chi-squared(1562)	P 2676.9504	0.0000
DI	Inverse chi-squared(1586)	P 60.5369	1.0000

RESULTS AND DISCUSSION

This section reports the results of estimation equations 01 to 08, utilizing two proxies for bank risk-taking: the Z score and nonperforming loans (NPL). Table 3 reports the estimation results of equations 1 and 2 to test the role of EPU in moderating the regulatory and risk-taking behaviour relationship. Table 3 displays the estimation results for base equations one (01) and two (02). Models 1 and 2 employ the Z score as a proxy for bank risk-taking, while models 3 and 4 utilize nonperforming loans as a proxy for bank risk appetite.

Table 3. Main results. Note: The dependent variables used are the Z score and NPL ratio, respectively. Two step GMM estimation is used $p < .1$, * $p < .05$, ** $p < .001$

	Model 1	Model 2	Model 3	Model 4
	Coef./ (Rob Std.Err)	Coef./ (Rob Std.Err)	Coef./ (Rob Std.Err)	Coef./ (Rob Std.Err)
L.Z Score	0.7482** (0.0221)	0.7519** (0.0219)		
L.NonPerformingLoansRatio			0.3831** (0.0809)	0.3822** (0.0807)
Capital To Equity	0.0151** (0.0018)	0.0135** (0.0019)	0.1818** (0.0409)	0.1999** (0.0436)
BankSize	0.0078* (0.0026)	0.0074* (0.0026)	-0.1165 (0.1137)	-0.1093 (0.1161)
Liquidity Coverage Ratio	0.0294* (0.0092)	0.0285* (0.0093)	-1.0099* (0.4650)	-1.0066* (0.4723)
GDP growth	0.0023** (0.0002)	0.0018** (0.0002)	-0.0666** (0.0067)	-0.0604** (0.0074)
Deposit Insurance Dummy	0.0037 (0.0108)	0.0038 (0.0109)	0.2555 (0.2244)	0.2702 (0.2234)
RegulatoryQuality	0.0102* (0.0039)	0.0076* (0.0042)	-0.0581 (0.0834)	-0.0205 (0.0800)
Economic Policy Uncertainty	-0.0071** (0.0009)	-0.0282** (0.0034)	0.0584* (0.0252)	0.3298** (0.0823)
Economic Policy Uncertainty ^ 2		0.0054** (0.0009)		-0.0697* (0.0230)
Constant	-0.1181* (0.0570)	-0.0925 (0.0569)	4.2229* (2.2875)	3.8413 (2.3814)
AR1	0.009	0.008	0.004	0.004
AR2	.1232533	.0749258	.5465153	.5408302
Hansen-Pvalue	.5677181	.5427365	.6778319	.6865293
Observations	10373	10373	10445	10445
Groups	785	785	796	796
NoofInstruments	779	779	779	779

Consistent with the literature, our results suggest a positive relationship between bank risk-taking and EPU (Deng & Li, 2024; Olalere & Mukuddem-Petersen, 2023). Model one (01) shows an inverse impact of EPU on Z scores. This suggests that high economic uncertainty decreases a bank's Z-score, signaling increased financial instability and risk. Similarly, model three (03) shows a positive relationship between EPU and NPL. Higher EPU is positively associated with nonperforming loans, confirming that banks take on more risk as uncertainty grows. This outcome is supported by studies that attribute it to decreases in volumes and loan quality. Uncertainty negatively affects both loan demand and supply, prompting banks to increase loan spreads and engage in riskier lending practices (Wu et al., 2022).

Additionally, banks may be resorting to riskier lending practices to maintain profitability amidst declining loan demand (Silva & da Silva, 2022). Syed (2024) suggests that changes in operational strategies during periods of high uncertainty may be another reason. This indicates that the impact of EPU on bank risk-taking is not merely a reflection of immediate lending behaviors but also extends to long-term strategic decisions. Jiang, Levine, and Lin (2019) find similar results when analyzing the EPU and bank stability nexus in the context of bank competition and institutional quality. However, there is ample evidence in the literature that suggests that EPU decreases risk-taking (Olalere & Mukuddem-Petersen, 2023; Ozili, 2021).

Models two (02) and four (04) show that the quadratic term for EPU is also significant. This suggests that although EPU increases risk-taking among banks, beyond a certain point, further increases in EPU could result in diminishing returns or heightened risk aversion, leading to decreased risk-taking behavior. Jiang, Levine, and Lin (2019) use the threshold model to investigate the relationship's linearity and find similar evidence. There is a diminishing impact of EPU on risk-taking. As EPU increases the degree of risk-taking, in response to heightening uncertainty, decreases. The coefficient of the quadratic term in model 2 is positive, suggesting a minimum, with a convex relationship between EPU and Z score. However, since the Z score is inversely correlated with bank risk, this indicates an actual maximum in the case of the bank risk-taking and EPU relationship. Similarly, the relationship is also concave for model 4 with nonperforming loans as the risk proxy, mirroring the EPU Z-score relationship. A nonlinear association suggests that an initial increase in EPU might lead to higher risk-taking by banks, reflecting efforts to offset perceived economic risks or capitalize on potential gains. However, beyond a certain point, further increases in EPU could result in diminishing returns or heightened risk aversion, leading to decreased risk-taking. This pattern indicates that while moderate uncertainty might stimulate risk-taking as banks adjust to market conditions, excessive uncertainty could undermine confidence, prompting more conservative financial strategies.

We estimate equation two and predict bank risk taking (NPL and Z scores) using a range of regulatory quality and economic policy uncertainty values, and plot the relationship in a 3D surface plot (Figure 2). Increases in regulatory quality reduce bank risk taking, and economic policy uncertainty increases the risk taking nonlinearly. The plots also show that when EPU is high but regulatory quality is low, the risk-taking is higher compared to the case of high EPU and high regulatory quality.

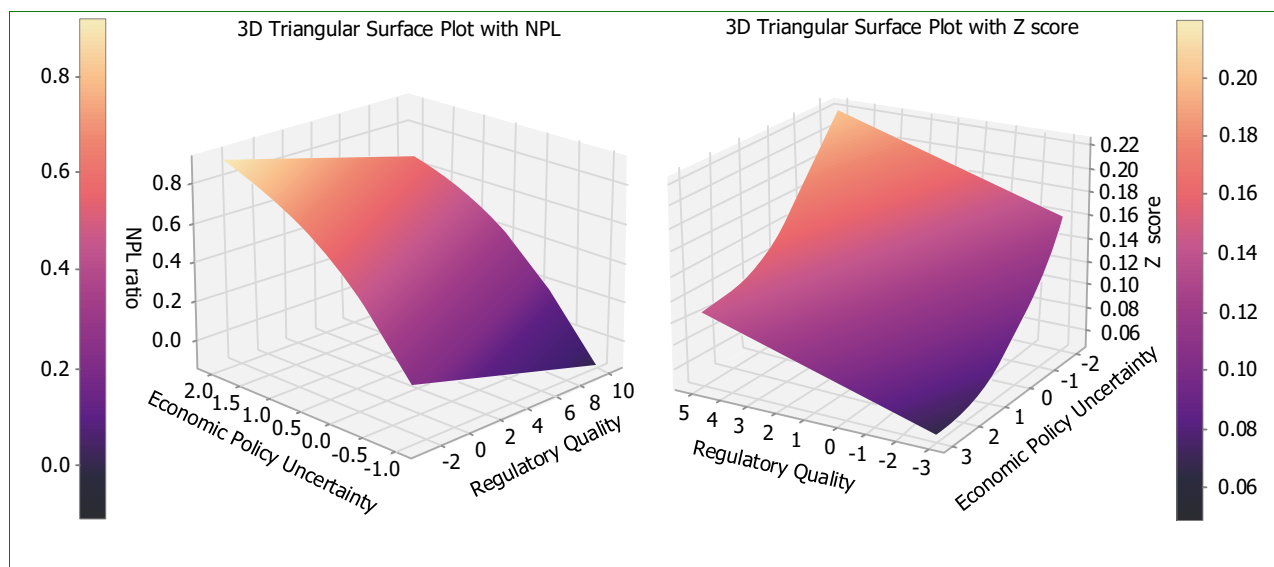


Figure 2. 3d Surface Plot of Bank Risk-taking (NPL and Z score) with regulatory quality and economic policy uncertainty.

To confirm the robustness of our findings, we conducted the U-test using NPL and EPU to validate the nonlinear relationship (Lind & Mehlum, 2010). Table 4 reports the results and represents the nonlinear relationship between NPL and EPU. The results confirm our finding and suggest an EPU value of 1.97 as the extreme point in the EPU and risk-taking relationship.

This is the threshold point (turning point) beyond which the relationship switches direction. This means that financial systems are sensitive to policy signals, stressing the need for more care in policy communications. The magnitude of the uncertainty could potentially stimulate or stall growth, emphasizing the need to consider threshold effects during policy making and its communication.

Table 4. U Test for nonlinearity. (Source: Lind & Mehlum, 2010)

Specification: $f(x)=x^2$		
Extreme point: 1.971849		
Test:		
H1: Inverse U shape		
vs. H0: Monotone or U shape		
	Lower bound	Upper bound
Interval	0.185	5.392
Slope	0.224	-0.429
t-value	4.762	-4.863
P> t	9.71E-07	5.85E-07
Overall test of the presence of an inverse U shape:		
t-value = 4.76		
P> t = 9.71e-07		

Consistent with existing theory, we find that regulatory quality reduces the risk-taking of banks. Bank risk-taking, proxied by the Z score, increases in response to an increase in regulatory quality, while the nonperforming loans fall with improving regulatory quality (Kandrac & Schlusche, 2021). However, the impact in the case of models 3 and 4, where NPL was used, is consistent with our hypothesis but statistically insignificant. The direct effect of EDI schemes on risk-taking is also statistically insignificant. Based on the coefficient signs alone, deposit insurance seems to improve banking system stability, as shown by the positive and significant coefficient in model 1. Interestingly, Model 2 shows that deposit insurance increases the nonperforming loan ratio of banks in favor of the moral hazard hypothesis.

Contrary to our evidence, Akhter et al. (2023), we find that economic freedom and regulatory frameworks can exacerbate risk-taking behaviors in banks, particularly in environments characterized by high uncertainty. Moudud-UI-Huq and Akter (2024) find that EPU, in conjunction with institutional quality, significantly influences banks' risk-taking strategies. The interplay of these factors suggests that banks may engage in riskier behaviors as a compensatory mechanism in response to the pressures exerted by EPU.

Other control variables, such as bank size and liquidity ratio, have a significant impact on risk-taking. Bank size is positively associated with risk, suggesting that larger banks tend to engage in more risk-taking, possibly due to the "too big to fail" perception. This is in line with the findings that large financial institutions might be more prone to moral hazard due to implicit government guarantees (Kane, 2010). Berger & Bouwman (2009) provide support for this complexity, noting that liquidity can either cushion against shocks or lead to complacency, depending on the context. We find that higher bank liquidity is negatively associated with risk-taking.

Moderation effects of EPU

Table 5 reports estimation results for the moderation effects using equations 05 and 06. Results suggest that regulatory quality increases the Z score of a bank (decreases risk-taking) and EPU moderates this relationship. High uncertainty decreases the influence of improved regulatory quality on reducing bank risk-taking. We find similar results in Model 6 for nonperforming loans. Regulatory quality helps in reducing nonperforming loans for banks; however, as EPU increases, the impact of regulatory quality in reducing nonperforming loans decreases. This suggests that EPU moderates the regulatory quality and risk-taking relationship. However, the overall effect of regulatory quality on bank risk-taking is still positive. Effective regulation and supervision can limit the rise of nonperforming loans (NPLs) during periods of economic uncertainty, thereby promoting banking stability (Bordo, Duca, & Koch, 2016; Syed, 2024). The result suggests that high-quality regulatory frameworks may enhance the stability of the banking sector by reducing the negative impacts of EPU. However, their effectiveness decreases during high periods of EPU. Models 7 and 8 include the interaction terms between EPU and deposit insurance. The estimation result is positive but statistically insignificant.

Table 5 reports the estimation results of equations 3 and 4 to test the role of EPU in moderating the regulatory and risk-taking relationship. The dependent variables are the Z score and NPL ratio. Two-step GMM estimation is used with orthogonalized instruments.

Table 5. Moderating Effects Using NPL ratios and Z scores. Note: Whites' robust standard errors are reported. The estimation * p<.1, * p<.05, ** p<.001* p<.1, * p<.05, ** p<.001.

	Model 5	Model 6	Model 7	Model 8
	Coef./ (Rob Std.Err)	Coef./ (Rob Std.Err)	Coef./ (Rob Std.Err)	Coef./ (Rob Std.Err)
L.Z Score	0.7512** (0.0219)		0.7521** (0.0218)	
L.NonPerformingLoansRatio		0.3806** (0.0811)		0.3815** (0.0808)
Capital To Equity	0.0128** (0.0020)	0.2114** (0.0437)	0.0135** (0.0019)	0.2002** (0.0439)
BankSize	0.0071* (0.0026)	-0.1074 (0.1165)	0.0073* (0.0026)	-0.1090 (0.1159)
Liquidity Coverage Ratio - Basel 3	0.0259* (0.0092)	-0.9743* (0.4631)	0.0280* (0.0093)	-1.0132* (0.4712)
GDP growth	0.0018** (0.0002)	-0.0599** (0.0074)	0.0018** (0.0002)	-0.0608** (0.0074)
Deposit Insurance Dummy	-0.0027 (0.0115)	0.3723 (0.2370)	-0.0021 (0.0123)	0.1720 (0.2696)
RegulatoryQuality	0.0202** (0.0050)	-0.2023* (0.1116)	0.0079* (0.0041)	-0.0174 (0.0802)
Economic Policy Uncertainty	-0.0167** (0.0039)	0.1715 (0.1314)	-0.0337** (0.0063)	0.2398 (0.1481)
Economic Policy Uncertainty ^ 2	0.0045** (0.0008)	-0.0571* (0.0253)	0.0055** (0.0009)	-0.0672* (0.0232)
Economic Policy Uncertainty x Regulatory Quality	-0.0069** (0.0017)	0.0967* (0.0446)		
Economic Policy Uncertainty x DepositInsurance			0.0001 (0.0000)	0.0008 (0.0010)
Constant	-0.1013* (0.0579)	3.9918* (2.4052)	-0.0853 (0.0572)	3.9357* (2.3815)
AR1	0.008	0.004	0.008	0.004
AR2	.0760947	.5435457	.0842712	.545503
Hansen-Pvalue	.5551872	.6893275	.5496642	.6834131
Observations	10373	10445	10373	10445
Groups	785	796	785	796
NoofInstruments	779	779	779	779

We show that EPU impacts bank risk-taking nonlinearly. However, does the risk-reducing ability of good regulation change when banks are more responsive to economic policy uncertainty (having a lower turning point)? Does the impact of the EDI vary based on how responsive banks' risk-taking is to EPU? We address this by investigating whether EPU has a nonlinear impact on regulatory quality, EDI, and the risk-taking relationship. Table 6 reports the moderation effects using the quadratic term. A larger squared EPU indicates an increasing turning point that suggests a lower risk-taking sensitivity of banks to EPU. As the squared EPU grows (the banks' risk-taking becomes less responsive to EPU), the ability of regulatory quality to reduce risk-taking diminishes. This implies that risk-taking sensitivity to EPU moderates the relationship between regulatory quality and risk by dampening the effectiveness of good regulation. For EDI, we do not find a statistically significant impact of EDI on risk-taking or any difference in the EPU-bank risk-taking relationship in the presence or absence of EDI. However, results in Table 6 show a positive and significant interaction, suggesting a nonlinear moderating role of economic policy uncertainty in the deposit insurance–risk-taking relationship. Specifically, when banks are less sensitive to EPU (increasing values of EPU-squared), the impact of EDI on risk-taking increases further, indicating an increase in moral hazard behavior. Banks may engage in riskier behavior, knowing that deposits are insured. This could

lead banks to escalate their risk profiles, particularly when the economic outlook is uncertain (Demirgüç-Kunt & Detragiache, 2002). The results are consistent for the Z-score proxy.

Even strong regulation may not reduce risk-taking effectively under high uncertainty. Regulatory improvements lose effectiveness as uncertainty dominates risk perception and decision-making. Banks may override regulatory incentives due to fear or ambiguity; therefore, coordination between regulatory and macroeconomic policies is critical. This suggests that there is a need for resilience-building in institutions and economies during uncertain periods/

Table 6 reports the estimation results of equations 5 and 6 to test for changes in the regulatory and risk-taking behaviour in response to EPU. The dependent variables are the Z score and NPL ratio. Two-step GMM estimation is used with orthogonalized instruments.

Table 6. Moderating Effects on the Nonlinearity. Note: Whites' robust standard errors are reported. The estimation * p<.1, * p<.05, ** p<.001* p<.1, * p<.05, ** p<.001.

	Model 9	Model 10	Model 11	Model 12
	Coef./ (Rob Std.Err)	Coef./ (Rob Std.Err)	Coef./ (Rob Std.Err)	Coef./ (Rob Std.Err)
L.Z Score	0.7514** (0.0218)		0.7527** (0.0216)	
L.NonPerformingLoansRatio		0.3829** (0.0807)		0.3816** (0.0808)
Capital To Equity	0.0133** (0.0020)	0.2067** (0.0440)	0.0134** (0.0019)	0.2002** (0.0438)
BankSize	0.0073* (0.0026)	-0.1083 (0.1166)	0.0072* (0.0026)	-0.1097 (0.1161)
Liquidity Coverage Ratio - Basel 3	0.0277* (0.0093)	-0.9860* (0.4681)	0.0275* (0.0092)	-1.0192* (0.4705)
GDP growth	0.0018** (0.0002)	-0.0601** (0.0074)	0.0018** (0.0002)	-0.0610** (0.0074)
Deposit Insurance Dummy	0.0019 (0.0113)	0.3395 (0.2284)	-0.0009 (0.0109)	0.2057 (0.2315)
RegulatoryQuality	0.0097* (0.0043)	-0.0878 (0.0828)	0.0082* (0.0041)	-0.0152 (0.0804)
Economic Policy Uncertainty	-0.0269** (0.0033)	0.2929** (0.0811)	-0.0296** (0.0034)	0.3088** (0.0787)
Economic Policy Uncertainty ^ 2	0.0057** (0.0010)	-0.0783** (0.0226)	0.0033* (0.0011)	-0.0955* (0.0300)
Economic Policy Uncertainty^2 x Regulatory Quality	-0.0006 (0.0004)	0.0167* (0.0071)		
Economic Policy Uncertainty^2 x DepositInsurance			0.0025* (0.0009)	0.0336* (0.0193)
Constant	-0.0933 (0.0579)	3.8820 (2.3900)	-0.0842 (0.0562)	3.9299* (2.3750)
AR1	0.008	0.004	0.007	0.004
AR2	.0714496	.5407406	.1055224	.5443006
Hansen-Pvalue	.5477535	.7032859	.5532942	.6826753
Observations	10373	10445	10373	10445
Groups	785	796	785	796
NoofInstruments	779	779	779	779

Cross-country Heterogeneity

To test for cross-country heterogeneity in the EPU risk-taking relationship, we estimate equations 7 and 8. Table 7 shows an extract of the complete estimation (see Annex C for the full result). It presents beta coefficients of the interaction terms of countries with EPU and its quadratic term. The reference interaction term is the United States. We find considerable heterogeneity across countries in the magnitude of the relationship between EPU and bank risk-taking behavior. Develop-

ing economies like Pakistan, India, Brazil, and China exhibit a significantly stronger EPU and risk-taking relationship compared to the United States. Countries like Ireland, Australia, the United Kingdom, Canada, and France seem to have a significantly weaker EPU and Z-score relationship compared to the United States. This relationship has a similar impact on the squared EPU bank dummy coefficients.

Table 7 is extracted from the estimation of equations 7 and 8 to test for differences in the EPU and risk-taking relationship across countries. The country dummy is interacted with EPU or EPU in the top row, and the dependent variable is the Z score or NPL ratio. The comparison dummy Country is the United States.

Table 7. Cross-Country Heterogeneity of the Impact of EPU on Bank Risk-taking. Note: The complete result is available in the annex: Impact of EPU on risk-taking: Cross Country Differences. * p<.1, * p<.05, ** p<.001.

	EPU		EPU Squared	
	Z score (Coef.)	NPL (Coef.)	Z score (Coef.)	NPL (Coef.)
Pakistan	0.0870**	-0.4867	0.0801**	-0.3665
Singapore	0.0461	1.1628	0.0108	0.2532
Greece	0.0225	2.6504*	0.0077	1.9842**
Brazil	0.0203*	0.2321	0.0033	0.0659
India	0.0188*	-0.7783*	0.0083*	-0.4696**
China (Mainland)	0.0132*	-0.1535	0.0021*	-0.0225
Sweden	0.0114	-0.8235	-0.0209	-0.0454
Italy	0.0043	-0.4369	-0.0011	-0.0168
South Korea	0.0025	-0.2340	-0.0017	0.0236
Ireland	-0.1408*	0.6262	-0.0587	0.3553
Spain	-0.0828	1.8519	-0.0536*	1.4375
Australia	-0.0400*	-0.2784	-0.0121	-0.0592
United Kingdom	-0.0203*	0.2225	-0.0041**	0.0560
Mexico	-0.0189	-0.1638	-0.0054	-0.1510
Japan	-0.0175	0.3285	-0.0107	0.1817
Canada	-0.0174*	-0.0107	-0.0052*	0.0135
France	-0.0117*	0.0836	-0.0041**	0.0387
Chile	-0.0025	-0.2807	0.0102	-0.0192
Russia	-0.0020	0.0613	-0.0029**	0.0041
Germany	-0.0017	1.1608*	-0.0001	0.1783*

Cross-country variations reveal that developing economies are more vulnerable to uncertainty-induced risk-taking, underscoring the necessity for credible policy communication, coordinated macro-financial strategies, and resilient regulatory frameworks adaptable to volatile environments. In strong economies with effective supervision and clear policies, EPU minimally impacts banks, as strong institutions help maintain stable expectations and curb excessive risk-taking. However, in developing economies with weak governance and inadequate regulations, EPU can lead to significant changes. Even minor policy shifts can influence lending, asset choice, and capital reserves. These disparities highlight the importance of investors considering country-specific risks. Policymakers should communicate clearly to prevent increasing uncertainty, and regulators should establish flexible rules that maintain control even in unstable conditions. The difference in magnitude across different countries suggests structural differences in regulatory quality, market maturity, and institutional trust. This also indicates the need for developing country-specific risk management strategies. Developing economies must complement regulatory reform with credibility-building and uncertainty-reduction strategies. Global investors may consider adjusting exposure based on perceived macro-financial stability across regions.

Crises Periods

As a final robustness test to confirm our findings, we control for the potential impact of major global crises that occurred during the sample period. We approach the estimation by including dummy variables for all crisis periods, which encompass the global financial crisis, Eurozone debt crisis, COVID-19 pandemic, and the Ukraine war. These are coded as 1 during the crisis periods. We also estimate the impact of these crises separately. These events are likely to influence the results. We find that even after controlling for these factors, the risk-taking and economic policy uncertainty relationship is robust. All crises, except for the COVID crisis, impact risk-taking in the same way as rising economic policy uncertainty. In the case of COVID-19, we find that risk-taking is lower compared to other periods. The consolidated crisis_dummy takes a

value of 1 during 2008 and 2009 for the global financial crisis, 1 during 2010 and 2012 for the eurozone crisis, 1 during 2020 for the COVID-19 crisis, and 1 during 2022 for the Ukraine War crisis. Since the nature of these crises and their impacts differ, we model each one differently to see if the impact varies with different crises.

Table 8. The impact of major global crises. Note: We use white robust standard errors. * $p < .1$, * $p < .05$, ** $p < .001$

	Consolidated Crisis Dummy		Global Financial Crisis		EuroZone Crisis		Covid		Ukraine War	
	NPL	Z-Score	NPL	Z-Score	NPL	Z-Score	NPL	Z-Score	NPL	Z-Score
	Coef./ (Rob. Std.Err)	Coef./ (Rob. Std.Err)	Coef./ (Rob. Std.Err)	Coef./ (Rob. Std.Err)	Coef./ (Rob. Std.Err)	Coef./ (Rob. Std.Err)	Coef./ (Rob. Std.Err)	Coef./ (Rob. Std.Err)	Coef./ (Rob. Std.Err)	Coef./ (Rob. Std.Err)
Constant	3.9670 (2.4140)	-0.0976* (0.0585)	3.7633 (2.3609)	-0.0949 (0.0579)	3.8373 (2.3730)	-0.0866 (0.0572)	3.6716 (2.3788)	-0.0909 (0.0578)	3.8057 (2.4319)	-0.0609 (0.0583)
L.Z		0.7519** (0.0219)		0.7549** (0.0219)		0.7494** (0.0222)		0.7517** (0.0219)		0.7510** (0.0219)
L.NonPerformingLoansRatio	0.3711** (0.0864)		0.3801** (0.0812)		0.3834** (0.0890)		0.3715** (0.0806)		0.3813** (0.0795)	
Capital To Equity	0.1898** (0.0465)	0.0139** (0.0019)	0.1033* (0.0446)	0.0151** (0.0018)	0.2003** (0.0447)	0.0140** (0.0019)	0.1434* (0.0439)	0.0138** (0.0020)	0.1997** (0.0428)	0.0137** (0.0019)
BankSize	-0.1214 (0.1198)	0.0079* (0.0027)	-0.1167 (0.1151)	0.0076* (0.0026)	-0.1087 (0.1176)	0.0077* (0.0026)	-0.1073 (0.1161)	0.0073* (0.0026)	-0.1081 (0.1174)	0.0061* (0.0026)
Liquidity Coverage Ratio - Basel 3	-1.0014* (0.4715)	0.0274* (0.0093)	-1.1361* (0.4666)	0.0311** (0.0094)	-1.0107* (0.4562)	0.0234* (0.0093)	-0.9955* (0.4666)	0.0283* (0.0093)	-1.0061* (0.4861)	0.0257* (0.0091)
Economic Policy Uncertainty	0.2806* (0.1026)	-0.0267** (0.0032)	0.0715 (0.0897)	-0.0236** (0.0033)	0.3308** (0.0888)	-0.0268** (0.0033)	0.2302* (0.0831)	-0.0276** (0.0032)	0.3294** (0.0823)	-0.0280** (0.0034)
Economic Policy Uncertainty ^ 2	-0.0566* (0.0288)	0.0050** (0.0008)	-0.0206 (0.0246)	0.0045** (0.0008)	-0.0702* (0.0254)	0.0049** (0.0008)	-0.0514* (0.0231)	0.0053** (0.0008)	-0.0698* (0.0232)	0.0054** (0.0009)
Crisis Proxy	0.0958 (0.0600)	-0.0031* (0.0010)	0.4748** (0.0611)	-0.0086** (0.0020)	-0.0066 (0.0614)	-0.0062** (0.0011)	-0.3873** (0.0594)	0.0021 (0.0025)	-0.0250 (0.0649)	0.0179** (0.0035)
GDPgrowth	-0.0512** (0.0062)	0.0015** (0.0002)	-0.0375** (0.0071)	0.0014** (0.0002)	-0.0603** (0.0083)	0.0020** (0.0002)	-0.0894** (0.0102)	0.0020** (0.0003)	-0.0604** (0.0074)	0.0018** (0.0002)
Deposit Insurance Dummy	0.2892 (0.2270)	0.0028 (0.0110)	0.4592* (0.2229)	0.0009 (0.0111)	0.2704 (0.2286)	0.0015 (0.0108)	0.3316 (0.2259)	0.0035 (0.0110)	0.2804 (0.2182)	-0.0002 (0.0105)
RegulatoryQuality	0.0152 (0.0890)	0.0063 (0.0042)	-0.1328 (0.0813)	0.0096* (0.0041)	-0.0239 (0.0925)	0.0043 (0.0043)	-0.0384 (0.0817)	0.0077* (0.0041)	-0.0221 (0.0809)	0.0086* (0.0041)
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR1	0.005	0.008	0.005	0.009	0.005	0.009	0.004	0.008	0.004	0.010
AR2	0.5444	0.0786	0.5266	0.0901	0.5411	0.0632	0.5254	0.0717	0.5428	0.0959
Hansen-Pvalue	0.7096	0.5208	0.8296	0.6061	0.7033	0.5533	0.7200	0.5556	0.6958	0.5243
Observations	10445	10373	10445	10373	10445	10373	10445	10373	10445	10373
Groups	796	785	796	785	796	785	796	785	796	785
NoofInstruments	779	779	779	779	779	779	779	779	779	779

We demonstrate that while economic policy uncertainty (EPU) generally heightens bank risk-taking, its effects are nonlinear and can undermine the stabilizing influence of regulatory quality and deposit insurance. Although robust regulation typically curbs risk, its effectiveness wanes amid high uncertainty. Moreover, explicit deposit insurance may heighten moral hazards when banks feel shielded from potential losses.

CONCLUSIONS

The study explored the complex interplay between EPU, regulatory quality, and EDI in shaping banks' risk-taking behavior. We empirically tested the nonlinear impact of EPU on bank risk-taking behavior and its moderating role on regulatory oversight, EDI safety net, and risk-taking. Finally, we tested to see if there were any cross-country differences in bank behavior.

We find evidence in line with the risk-shifting hypothesis and the moral hazard hypothesis. EPU increases bank risk-taking as banks seek higher returns in uncertain environments. Additionally, we contribute to the bank risk-taking literature by showing that EPU has a nonlinear relationship with risk-taking. EPU incentivizes risk-taking; however, beyond a certain level, bank risk-taking would start decreasing, leading to more cautious risk-taking behavior. This shows that bank risk-

taking increases with increasing EPU at a decreasing rate, which supports the moral hazard hypothesis. This also helps in explaining why empirical literature suggests both a positive and a negative impact of EPU on bank risk-taking. We also find that EPU moderates the regulatory quality and risk-taking relationship. From a policy point of view, enhancing regulatory quality will help improve banking stability and reduce excessive risk-taking. However, in times of high EPU, the relationship weakens, stressing the need for additional oversight. Regulators may need to closely monitor banks' activities during economic uncertainty and adjust regulations as required to prevent excessive risk-taking. Our findings augment the argument for strong regulatory oversight, especially considering the increasing global uncertainty. Finally, deposit insurance schemes are not found to impact bank risk-taking directly. However, we find that the relationship becomes significant when the EPU and risk-taking relationship is less concave, with the turning point at high levels of EPU. Under such circumstances, EPU enhances the moral hazard behavior. Regulators and central banks should account for macro uncertainty when evaluating the effects of deposit insurance. During periods of high EPU, concerns over moral hazard from deposit insurance may be overstated, as banks tend to act conservatively. Additionally, while setting up EDI coverages, the EPU must also be accounted for. Finally, we find significant heterogeneity in the bank risk-taking and EPU relationship across countries, highlighting the need for tailored EDI schemes based on country-specific characteristics.

Practical/Implications of the study

In managing uncertainty through financial toolkits like uncertainty bonds and resilience swaps, modeling the nonlinearity of bank risk-taking impact is crucial. The vulnerability of financial systems to economic policy uncertainty (EPU) necessitates transparent communication from central banks and governments. EPU can boost or impede economic growth based on intensity, requiring thoughtful policy design. Given the nonlinear relationship, regulators should monitor EPU intensity and adjust interventions, deploying counter-cyclical capital buffers when EPU exceeds thresholds. Research indicates that stringent regulations may be less effective during periods of high uncertainty, as banks may circumvent these rules. This calls for better coordination between regulatory and macroeconomic policies, with enhanced institutional resilience. Policymakers should focus on transparent legal systems and clear crisis communication mechanisms. The varying EPU-risk relationship across countries reflects differences in regulatory quality and institutional credibility, requiring country-specific strategies. Regulatory frameworks must adapt to local capacities, with developing economies pairing reforms with credibility-building efforts. These insights may lead investors to reassess exposure based on macro-financial stability.

Limitations and further research

The study is limited by the number of countries used for analysis due to the lack of EPU index data. Regional and spillover effects of EPU can be explored as a future direction. Additionally, as researchers gain access to more country data on EPU, they can conduct a more expansive study to examine differences across countries with different income classifications. Finally, more data availability could allow for the use of panel threshold models and second-generation panel data estimation techniques. Finally, with the growth of climate and biodiversity risks, there are related uncertainties; this is an avenue that needs to be further exploration.

ADDITIONAL INFORMATION

AUTHOR CONTRIBUTIONS

All authors have contributed equally.

FUNDING

The Authors received no funding for this research.

CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

REFERENCES

1. Abbas, F., Ali, S., Yousaf, I., & Wong, W. K. (2021). Dynamics of Funding Liquidity and Risk-Taking: Evidence from Commercial Banks. *Journal of Risk and Financial Management*. <https://doi.org/10.3390/jrfm14060281>.
2. Acharya, V. V., & Richardson, M. (2009). *Causes of the financial crisis*. *Critical Review*, 21(2–3), 195–210. <https://doi.org/10.1080/08913810902952903>
3. Akhter, T., Abdul Halim, Z., Mehzabin, S., Shahriar, A., & Azad, M. A. K. (2023). Do national culture and economic freedom affect bank risk-taking behavior? Evidence from GCC countries. *International Journal of Islamic and Middle Eastern Finance and Management*, 16(6), 1159–1180. <https://doi.org/10.1108/IMEFM-07-2022-0283>
4. Al-Thaqeb, S. A., & Algharabali, B. G. (2019). Economic policy uncertainty: A literature review. *Journal of Economic Asymmetries*, 20. <https://doi.org/10.1016/j.jeca.2019.e00133>
5. Alhalabi, T., Castro, V., & Wood, J. (2023). Bank dividend payout policy and debt seniority: Evidence from US Banks. *Financial Markets, Institutions and Instruments*, 32(5), 285–340. <https://doi.org/10.1111/fmii.12183>
6. Altunbas, Y., Gambacorta, L., & Marques-Ibanez, D. (2010). Bank risk and monetary policy. *Journal of Financial Stability*, 6(3), 121–129. <https://doi.org/10.1016/j.jfs.2009.07.001>
7. Anginer, D., & Demirgüç-Kunt, A. (2018). Bank Runs and Moral Hazard: A Review of Deposit Insurance. *Bank Runs and Moral Hazard: A Review of Deposit Insurance*. <https://doi.org/10.1596/1813-9450-8589>
8. Angkinand Prabha, A. P., & Wihlborg, C. (2011). Deposit Insurance, Risk-Taking and Banking Crises: Is there a Risk-Minimizing Level of Deposit Insurance Coverage? *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1295452>
9. Armelius, H., Hull, I., & Stenbacka Köhler, H. (2017). The timing of uncertainty shocks in a small open economy. *Economics Letters*, 155, 31–34. <https://doi.org/10.1016/j.econlet.2017.03.016>
10. Ashraf, B. N., Zheng, C., Jiang, C., & Qian, N. (2020). Capital regulation, deposit insurance and bank risk: International evidence from normal and crisis periods. *Research in International Business and Finance*, 52. <https://doi.org/10.1016/j.ribaf.2020.101188>
11. Baker, S. R., & Bloom, N. (2013). Does Uncertainty Reduce Growth? Using Disasters as Natural Experiments. *NBER Working Papers*, 1–31. <http://www.nber.org/papers/w19475>
12. Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *Quarterly Journal of Economics*, 131(4), 1593–1636. <https://doi.org/10.1093/qje/qjw024>
13. Bekaert, G., Hoerova, M., & Lo Duca, M. (2013). Risk, uncertainty and monetary policy. *Journal of Monetary Economics*, 60(7), 771–788. <https://doi.org/10.1016/j.jmoneco.2013.06.003>
14. Berger, A. N., & Bouwman, C. H. S. (2009). Bank liquidity creation. *Review of Financial Studies*, 22(9), 3779–3837. <https://doi.org/10.1093/rfs/hhn104>
15. Berger, A. N., Guedhami, O., Kim, H. H., & Li, X. (2022). Economic policy uncertainty and bank liquidity hoarding. *Journal of Financial Intermediation*, 49. <https://doi.org/10.1016/j.jfi.2020.100893>
16. Bonfim, D., & Santos, J. A. C. (2023). The importance of deposit insurance credibility. *Journal of Banking and Finance*, 154. <https://doi.org/10.1016/j.jbankfin.2023.106916>
17. Bordo, M. D., Duca, J. V., & Koch, C. (2016). Economic policy uncertainty and the credit channel: Aggregate and bank level U.S. evidence over several decades. *Journal of Financial Stability*, 26, 90–106. <https://doi.org/10.1016/j.jfs.2016.07.002>
18. Caglayan, M., & Xu, B. (2019). Economic Policy Uncertainty Effects on Credit and Stability of Financial Institutions. *Bulletin of Economic Research*, 71(3), 342–347. <https://doi.org/10.1111/boer.12175>
19. Chau, N. T. M., & Oanh, D. L. K. (2023). the Impact of Global Economic Policy Uncertainty on Bank Stability. *Polish Journal of Management Studies*, 27(1), 46–61. <https://doi.org/10.17512/pjms.2023.27.1.03>
20. Che Johari, E. E., Chronopoulos, D. K., Scholtens, B., Sobiech, A. L., & Wilson, J. O. S. (2020). Deposit insurance and bank dividend policy. *Journal of Financial Stability*. <https://doi.org/10.1016/j.jfs.2020.100745>
21. Chi, Q., & Li, W. (2017). Economic policy uncertainty, credit risks and banks' lending decisions: Evidence from Chinese commercial banks. *China Journal of Accounting Research*. <https://doi.org/10.1016/j.cjar.2016.12.001>
22. Chiang, T. C. (2021). Geopolitical risk, economic policy uncertainty and asset returns in Chinese financial markets. *China Finance Review International*, 11(4), 474–501. <https://doi.org/10.1108/cfri-08-2020-0115>
23. Da, Z., Engelberg, J., & Gao, P. (2015). The sum of all FEARS investor sentiment and asset prices. *Review of Financial Studies*, 28(1), 1–32. <https://doi.org/10.1093/rfs/hhu072>
24. Danisman, G. O., & Tarazi, A. (2023). Economic policy uncertainty and bank stability: Size, capital, and liquidity matter. *The Quarterly Review of Economics and Finance*, 93, 102–118. <https://doi.org/10.1016/j.qref.2023.11.008>
25. Dash, S. R., Mahakud, J., Debata, B., & Maitra, D. (2019). Economic policy uncertainty and stock market liquidity: evidence from G7 countries. *International Review of Finance*, 21(2), 611–626. <https://doi.org/10.1111/irfi.12277>
26. Davis, S. J. (2016). An Index of Global Economic Policy Uncertainty. *Nber Working Paper Series*, 22740, 1–23. <https://doi.org/10.3386/w22740>
27. Demirgüç-Kunt, A., & Detragiache, E. (2002). Does deposit insurance increase banking system stability? An empirical

- investigation. *Journal of Monetary Economics*, 49(7), 1373–1406. [https://doi.org/10.1016/S0304-3932\(02\)00171-X](https://doi.org/10.1016/S0304-3932(02)00171-X)
28. Demirgüç-Kunt, A., & Huizinga, H. (2004). Market discipline and deposit insurance. *Statistics and Probability Letters*. <https://doi.org/10.1016/j.jmoneco.2003.04.001>
 29. Deng, Y., & Li, S. (2024). Do global and local economic policy uncertainties matter for systemic risk in the international banking system. *Finance Research Letters*, 59, 104752. <https://doi.org/10.1016/J.FRL.2023.104752>
 30. Dias, R. (2021). Capital regulation and bank risk-taking – new global evidence. *Accounting and Finance*. <https://doi.org/10.1111/acfi.12595>
 31. Etudaiye-Muhtar, O. F., & Abdul-Baki, Z. (2021). Market structure, institutional quality and bank capital ratios: evidence from developing countries. *European Journal of Management and Business Economics*, 30(1), 92–107. <https://doi.org/10.1108/EJMBE-09-2019-0158>
 32. Feng, X., Luo, W., & Wang, Y. (2021). Economic policy uncertainty and firm performance: evidence from China. *Journal of the Asia Pacific Economy*, 28(4), 1476–1493. <https://doi.org/10.1080/13547860.2021.1962643>
 33. Garcia, M. T. M., & Ye, A. J. (2023). Risk-taking by banks: evidence from European Union countries. *China Finance Review International*. <https://doi.org/10.1108/CFRI-12-2022-0248>
 34. Ghirelli, C., Pérez, J. J., & Urtasun, A. (2019). A new economic policy uncertainty index for Spain. *Economics Letters*, 182, 64–67. <https://doi.org/10.1016/j.econlet.2019.05.021>
 35. Ghosh, R., Bagchi, B., & Chatterjee, S. (2024). The effect of economic policy uncertainty index on the Indian economy in the wake of COVID-19 pandemic. *Journal of Economic and Administrative Sciences*, 40(3), 591–604. <https://doi.org/10.1108/JEAS-08-2021-0172>
 36. Gropp, R., & Vesala, J. (2004). Deposit insurance, moral hazard and market monitoring. *Review of Finance*. <https://doi.org/10.1007/s10679-004-6280-0>
 37. Gulen, H., & Ion, M. (2016). Policy uncertainty and corporate investment. *Review of Financial Studies*. <https://doi.org/10.1093/rfs/hhv050>
 38. Haque, F. (2019). Ownership, regulation and bank risk-taking: evidence from the Middle East and North Africa (MENA) region. *Corporate Governance (Bingley)*. <https://doi.org/10.1108/CG-07-2017-0135>
 39. Hardouvelis, G. A., Karalas, G., Karanastasis, D., & Samartzis, P. (2018). Economic Policy Uncertainty, Political Uncertainty and the Greek Economic Crisis. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3155172>
 40. Hassan, T. A., Hollander, S., Van Lent, L., & Tahoun, A. (2019). Firm-level political risk: Measurement and effects. *Quarterly Journal of Economics*, 134(4), 2135–2202. <https://doi.org/10.1093/qje/qjz021>
 41. Hoque, M. E., & Zaidi, M. A. S. (2018). The impacts of global economic policy uncertainty on stock market returns in regime switching environment: evidence from sectoral perspectives. *International Journal of Finance & Economics*, 24(2), 991–1016. <https://doi.org/10.1002/ijfe.1702>
 42. Hossain, I., & Alam, J. (2019). The Relationship between Liquidity and Profitability in Emerging Countries: Evidence from Bangladesh. *Journal of Finance and Accounting*, 7(1), 22–27. <http://pubs.sciepub.com/jfa/7/1/4>
 43. Imbierowicz, B., Kragh, J., & Rangvid, J. (2018). Time-Varying Capital Requirements and Disclosure Rules: Effects on Capitalization and Lending Decisions. *Journal of Money, Credit and Banking*. <https://doi.org/10.1111/jmcb.12506>
 44. Ivashina, V., & Scharfstein, D. (2010). Bank lending during the financial crisis of 2008. *Journal of Financial Economics*, 97(3), 319–338. <https://doi.org/10.1016/j.jfineco.2009.12.001>
 45. Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)
 46. Jiang, L., Levine, R., & Lin, C. (2019). Competition and Bank Liquidity Creation. *Journal of Financial and Quantitative Analysis*, 54(2), 513–538. <https://doi.org/10.1017/S0022109018000820>
 47. Julio, B., & Yook, Y. (2012). Political uncertainty and corporate investment cycles. *Journal of Finance*, 67(1), 45–83. <https://doi.org/10.1111/j.1540-6261.2011.01707.x>
 48. Jumreornvong, S., Chakreyavanich, C., Treepongkaruna, S., & Jiraporn, P. (2018). Capital Adequacy, Deposit Insurance, and the Effect of Their Interaction on Bank Risk. *Journal of Risk and Financial Management*. <https://doi.org/10.3390/jrfm11040079>
 49. Jurado, K., Ludvigson, S. C., & Ng, S. (2015). Measuring uncertainty. *In American Economic Review*, 105, 1177–1216. <https://doi.org/10.1257/aer.2013.1193>
 50. Kandrac, J., & Schlusche, B. (2021). The effect of bank supervision and examination on risk taking: Evidence from a natural experiment. *Review of Financial Studies*. <https://doi.org/10.1093/rfs/hhaa090>
 51. Kane, E. J. (2010). Redefining and containing systemic risk. *Atlantic Economic Journal*, 38(3), 251–264. <https://doi.org/10.1007/s11293-010-9233-3>
 52. Karas, A., Pyle, W., & Schoors, K. J. L. (2021). Deposit Insurance, Moral Hazard and Bank Risk. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3774675>
 53. Keeley, M. C. (1990). Deposit Insurance, Risk, and Market Power in Banking. *The American Economic Review*, 80(5), 1183–1200. <http://www.jstor.org/stable/2006769>
 54. Khan, M. S., Scheule, H. (Harry), & Wu, E. (2015). The Impact of Bank Liquidity on Bank Risk Taking: Do High Capital Buffers and Big Banks Help or Hinder? *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2481887>
 55. Laeven, L., & Levine, R. (2009). Bank governance, regulation and risk taking. *Journal of Financial Economics*, 93(2), 259–275. <https://doi.org/10.1016/j.jfineco.2008.09.003>

56. Lind, J. T., & Mehlum, H. (2010). With or without u? the appropriate test for a U-shaped relationship. *Oxford Bulletin of Economics and Statistics*. <https://doi.org/10.1111/j.1468-0084.2009.00569.x>
57. Lopez-Quiles, C., & Petricek, M. (2018). Deposit Insurance and Bank Risk Taking. SSRN Electronic Journal. <https://doi.org/10.2139/ssrn.3158394>
58. Lu, Y., & Wang, Y. (2023). Bank liquidity hoarding and bank systemic risk: The moderating effect of economic policy uncertainty. *Pacific Basin Finance Journal*, 82. <https://doi.org/10.1016/j.pacfin.2023.102189>
59. Manela, A., & Moreira, A. (2017). News implied volatility and disaster concerns. *Journal of Financial Economics*, 123(1), 137–162. <https://doi.org/10.1016/j.jfineco.2016.01.032>
60. Merton, R. C. (1977). An analytic derivation of the cost of deposit insurance and loan guarantees An application of modern option pricing theory. *Journal of Banking and Finance*, 1(1), 3–11. [https://doi.org/10.1016/0378-4266\(77\)90015-2](https://doi.org/10.1016/0378-4266(77)90015-2)
61. Moudud-UI-Huq, S., & Akter, R. (2024). Impacts of economic policy uncertainty (EPU) and institutional quality (IQ) on bank risk-taking behavior. *Kybernetes*, 53(3), 1148–1167. <https://doi.org/10.1108/K-07-2022-1004>
62. Moudud-UI-Huq, S., & Rahman, M. (2023). Quadratic effect of bank size on capital regulation and risk-taking behavior: Evidence from the Central Europe. *International Journal of Financial Engineering*, 10(03). <https://doi.org/10.1142/s2424786323500196>
63. Nguyen, C. P., Le, T. H., & Su, T. D. (2020). Economic policy uncertainty and credit growth: Evidence from a global sample. *Research in International Business and Finance*, 51. <https://doi.org/10.1016/j.ribaf.2019.101118>
64. Nguyen, L., Tran, S., & Ho, T. (2021). Fintech credit, bank regulations and bank performance: a cross-country analysis. *Asia-Pacific Journal of Business Administration*. <https://doi.org/10.1108/APJBA-05-2021-0196>
65. Nguyen, T. C., Hong Nguyen, T. V., Schinckus, C., & Chu, T. T. (2024). Navigating bank risk-taking under excess liquidity: the moderating role of economic policy uncertainty and lessons from the Global Financial Crisis. *Cogent Economics & Finance*, 12(1), 2422958. <https://doi.org/10.1080/23322039.2024.2422958>
66. Niu, J. (2024). Liquidity hoarding and bank profitability: The role of economic policy uncertainty. *Finance Research Letters*, 68, 106003. <https://doi.org/10.1016/j.frl.2024.106003>
67. Olalere, O. E., & Mukuddem-Petersen, J. (2023). Geopolitical risk, economic policy uncertainty, and bank stability in BRICS countries. *Cogent Economics and Finance*. <https://doi.org/10.1080/23322039.2023.2290368>
68. Ozili, P. K. (2021). Economic Policy Uncertainty in Banking. *Handbook of Research on Financial Management During Economic Downturn and Recovery*. <https://doi.org/10.4018/978-1-7998-6643-5.ch015>
69. Ozili, P. K. (2022). Economic policy uncertainty, bank nonperforming loans and loan loss provisions: are they correlated? *Asian Journal of Economics and Banking*. <https://doi.org/10.1108/ajeb-10-2021-0119>
70. Ozili, P. K., & Arun, T. G. (2023). Does economic policy uncertainty affect bank profitability? *International Journal of Managerial Finance*, 19(4), 803–830. <https://doi.org/10.1108/IJMF-04-2022-0177>
71. Özşuca, E. A., & Akbostanci, E. (2016). An Empirical Analysis of the Risk-Taking Channel of Monetary Policy in Turkey. *Emerging Markets Finance and Trade*. <https://doi.org/10.1080/1540496X.2015.1047300>
72. Peia, O. (2017). Experimental Evidence on Bank Runs Under Partial Deposit Insurance. SSRN Electronic Journal. <https://doi.org/10.2139/ssrn.2955171>
73. Rahman, M. M., Zheng, C., & Ashraf, B. N. (2015). Bank Size, Risk-taking and Capital Regulation in Bangladesh. *Eurasian Journal of Business and Economics*, 8(15), 95–114. <https://doi.org/10.17015/ejbe.2015.015.05>
74. Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *Stata Journal*. <https://doi.org/10.1177/1536867x0900900106>
75. Scotti, C. (2016). Surprise and uncertainty indexes: Real-time aggregation of real-activity macro-surprises. *Journal of Monetary Economics*, 82, 1–19. <https://doi.org/10.1016/j.jmoneco.2016.06.002>
76. Shabir, M., Jiang, P., Bakhsh, S., & Zhao, Z. (2021). Economic policy uncertainty and bank stability: Threshold effect of institutional quality and competition. *Pacific Basin Finance Journal*, 68. <https://doi.org/10.1016/j.pacfin.2021.101610>
77. Silva, E. C., & da Silva, M. M. (2022). Research contributions and challenges in DLT-based cryptocurrency regulation: a systematic mapping study. *Journal of Banking and Financial Technology*, 6(1), 63–82. <https://doi.org/10.1007/s42786-021-00037-2>
78. Syed, A. A. (2024). Economic policy uncertainty and Indian banking stability: the mediating role of regulation and supervision. *Journal of Financial Regulation and Compliance*, 32(1), 47–60. <https://doi.org/10.1108/JFRC-03-2023-0038>
79. Tran, D. V., Hassan, M. K., Alam, A. W., & Dau, N. (2022). Banks' financial soundness during the COVID-19 pandemic. *Journal of Economics and Finance*. <https://doi.org/10.1007/s12197-022-09591-x>
80. Wang, C., & Duan, R. (2025). Impact of Economic Policy Uncertainty on Bank Loan Restructuring: Empirical Evidence from Industry-Level Loan Distribution in China. *SAGE Open*, 15(1), 21582440241310310. <https://doi.org/10.1177/21582440241310313>
81. Wu, J., Yan, Y., Chen, M., & Jeon, B. N. (2022). Monetary policy, economic uncertainty and bank risk: Cross-country evidence. *Journal of International Money and Finance*, 122. <https://doi.org/10.1016/j.jimonfin.2021.102580>
82. Xu, S., Adow, A. H., & Qamruzzaman, M. (2021). Is Financial Innovation Bestowed or a Curse for Economic

- Sustainably: The Mediating Role of Economic Policy Uncertainty. *Sustainability*, 13(4), 2391. <https://doi.org/10.3390/su13042391>
83. Yu, H., Lv, W., Liu, H., & Wang, J. (2022). Economic Policy Uncertainty and Corporate Bank Credits: Evidence from China. *Emerging Markets Finance and Trade*, 58(11), 3023–3033. <https://doi.org/10.1080/1540496x.2021.2021179>
84. Yuan, C., & Sun, P. (2023). Economic Policy Uncertainty and Financial Innovation: Evidence from Commercial Bank in China. *Advances in Economics, Management and Political Sciences*, 2(1), 36–48. <https://doi.org/10.54254/aemps.2023018>
85. Zhang, B. (2018). Economic Policy uncertainty and Investor Sentiment: linear and nonlinear causality analysis. *Applied Economics Letters*, 26(15), 1264–1268. <https://doi.org/10.1080/13504851.2018.1545073>

Мохаммад Х. У., Кашір М., Аднан Н.-У.-Х.

НЕЛІНІЙНИЙ БАНКІВСЬКИЙ РИЗИКОВИЙ АПЕТИТ В УМОВАХ НЕВИЗНАЧЕНОСТІ ЕКОНОМІЧНОЇ ПОЛІТИКИ: РОЛЬ ЯКОСТІ РЕГУЛЯТОРНОГО ЗАБЕЗПЕЧЕННЯ ТА СТРАХУВАННЯ ДЕПОЗИТІВ

Економічна політика зростає у світі, що має наслідки для стабільності фінансового сектора. У цій роботі автори досліджують його вплив на ризикову поведінку банків. Дослідження вивчає функціональну форму реакцій банків на економічну невизначеність і як якість регулювання та соціальні мережі змінюють поведінку банків за періодів високої невизначеності.

Використано дані з 1999 по 2023 рік 796 банків у 21 країні із застосуванням квадратичної двоступеневої системи оцінки GMM для оцінки впливу економічної політики на прийняття ризиків банками. За допомогою U-тесту автори підтверджують нелінійний зв'язок і визначають його порогову точку. Нарешті, автори демонструють узгодженість оцінок, контролюючи кілька великих кризових періодів протягом вибіркового періоду.

Виявлено, що невизначеність економічної політики загалом підвищує ризик для банків. Однак після певного рівня подальше зростання невизначеності економічної політики може призвести до зменшення прибутку та підвищеного уникнення ризику, що призведе до зменшення ризикової поведінки. Вища якість регулювання пом'якшує цей ефект; однак зниження ризику менш помітне, коли економічна невизначеність зростає. Соціальні мережі пом'якшують взаємозв'язок, впливаючи на чутливість банків до ризику. Крім того, видно міжкраїнну гетерогенність у розмірі економічної політики, невизначеності та ризику. Нарешті, зрозуміло, що нелінійні ефекти є стійкими після контролю великих подій, таких як глобальна фінансова криза, криза єврозони, COVID-19 і війна в Україні.

Автори надають докази нелінійності на перетині економічної невизначеності, регуляторних рамок, страхових сіток і поведінки банків, що беруть на себе ризик. Результати підкреслюють важливість надійної регуляторної якості й соціальних мереж для пом'якшення ризикової поведінки банків під час економічної невизначеності.

Ключові слова: ризикованість, невизначеність економічної політики, банківська справа, явне страхування депозитів, якість регулювання, нелінійність, порогові ефекти, Z-бал, безопераційні кредити

JEL Класифікація: G21, G28, E44

Annex A. List of countries.

No	List of Countries
1	Australia
2	Brazil
3	Canada
4	Chile
5	China (Mainland)
6	France
7	Germany
8	Greece
9	India
10	Ireland
11	Italy
12	Japan
13	Mexico
14	Pakistan
15	Russia
16	Singapore
17	South Korea
18	Spain
19	Sweden
20	United Kingdom
21	United States

Annex B. Variable Definitions.

	Definition	Source	Frequency
Z Score	$Z = (ROA + (Equity/Assets)) / SD(ROA)$	LSEG Rifinitiv	Bank Level Annual
NPL	Nonperforming Loans to total assets	LSEG Rifinitiv	Bank Level Annual
KA	$\log(\text{Total Equity to total assets})$	LSEG Rifinitiv	Bank Level Annual
BankSize	$\log(\text{Total Assets})$	LSEG Rifinitiv	Bank Level Annual
liquiditycoverageratio	High-Quality LiquidAsset Amount / Total Net Cash Flow Amount	LSEG Rifinitiv	Bank Level Annual
EPU	Economic Policy Uncertainty Index	policyuncertainty.com	Country Level Annual
GDPgrowth	GDPgrowth	WDI	Country Level Annual
DI	0 1 Dummy for implementation of Explicit Deposit insurance	WDI	Country Level Annual
RegulatoryQuality	Regulatory Quality Index	WDI	Country Level Annual

Annex C. Impact of EPU on risk-taking: Cross Country Differences. Note: * p<.1, * p<.05, ** p<.001

	Z Score	NPL	Zscore	NPL
	Coef. / (Rob. Std.Err)	Coef. / (Rob. Std.Err)	Coef./ (Std.Err) C	Coef./ (Std.Err) Coef./ (Std.Err)
L.Z Score	0.7610** (0.0218)		0.7554** (0.0215)	
L.NonPerformingLoansRatio		0.4028** (0.0679)		0.3911** (0.0718)
Capital To Equity	0.0121** (0.0016)	0.2636** (0.0305)	0.0122** (0.0016)	0.2733** (0.0307)
BankSize	0.0064** (0.0013)	-0.0458 (0.0527)	0.0078** (0.0017)	-0.0381 (0.0729)
Liquidity Coverage Ratio - Basel 3	0.0165*	-1.1787*	0.0204*	-1.1349*

	Z Score	NPL	Zscore	NPL
	(0.0085)	(0.5398)	(0.0089)	(0.5238)
GDP growth	0.0015**	-0.0501**	0.0015**	-0.0479**
	(0.0002)	(0.0075)	(0.0002)	(0.0069)
Deposit Insurance Dummy	0.0070	0.3720	0.0041	0.4103
	(0.0095)	(0.3578)	(0.0101)	(0.3122)
RegulatoryQuality	-0.0011	-0.4742**	0.0071*	-0.5290**
	(0.0040)	(0.0984)	(0.0040)	(0.1380)
Economic Policy Uncertainty	-0.0357**	0.4188**	-0.0298**	0.3711**
	(0.0043)	(0.1199)	(0.0037)	(0.1050)
Economic Policy Uncertainty ^ 2	0.0085**	-0.1087*	0.0062**	-0.0904*
	(0.0012)	(0.0344)	(0.0011)	(0.0299)
EPUxAustralia			-0.0400*	-0.2784
			(0.0214)	(0.4562)
EPUxBrazil			0.0203*	0.2321
			(0.0091)	(0.1725)
EPUxCanada			-0.0174*	-0.0107
			(0.0082)	(0.1629)
EPUxChile			-0.0025	-0.2807
			(0.0228)	(0.4812)
EPUxChina (Mainland)			0.0132*	-0.1535
			(0.0044)	(0.1074)
EPUxFrance			-0.0117*	0.0836
			(0.0042)	(0.1685)
EPUxGermany			-0.0017	1.1608*
			(0.0155)	(0.5988)
EPUxGreece			0.0225	2.6504*
			(0.0572)	(0.8330)
EPUxIndia			0.0188*	-0.7783*
			(0.0114)	(0.2418)
EPUxIreland			-0.1408*	0.6262
			(0.0849)	(1.0007)
EPUxItaly			0.0043	-0.4369
			(0.0133)	(0.4339)
EPUxJapan			-0.0175	0.3285
			(0.0121)	(0.2138)
EPUxMexico			-0.0189	-0.1638
			(0.0296)	(0.4533)
EPUxPakistan			0.0870**	-0.4867
			(0.0225)	(0.7449)
EPUxRussia			-0.0020	0.0613
			(0.0037)	(0.1719)
EPUxSingapore			0.0461	1.1628
			(0.0568)	(1.0458)
EPUxSouth Korea			0.0025	-0.2340
			(0.0065)	(0.2172)
EPUxSpain			-0.0828	1.8519
			(0.0551)	(2.1697)
EPUxSweden			0.0114	-0.8235
			(0.0738)	(1.9794)
EPUxUnited Kingdom			-0.0203*	0.2225
			(0.0063)	(0.1889)
EPU2xAustralia	-0.0121	-0.0592		
	(0.0098)	(0.2095)		
EPU2xBrazil	0.0033	0.0659		
	(0.0026)	(0.0426)		
EPU2xCanada	-0.0052*	0.0135		
	(0.0020)	(0.0380)		
EPU2xChile	0.0102	-0.0192		
	(0.0077)	(0.1612)		
EPU2xChina (Mainland)	0.0021*	-0.0225		
	(0.0011)	(0.0241)		
EPU2xFrance	-0.0041**	0.0387		

	Z Score	NPL	Zscore	NPL
	(0.0008)	(0.0295)		
EPU2xGermany	-0.0001	0.1783*		
	(0.0027)	(0.0853)		
EPU2xGreece	0.0077	1.9842**		
	(0.0260)	(0.5754)		
EPU2xIndia	0.0083*	-0.4696**		
	(0.0050)	(0.1077)		
EPU2xIreland	-0.0587	0.3553		
	(0.0405)	(0.4750)		
EPU2xItaly	-0.0011	-0.0168		
	(0.0035)	(0.1108)		
EPU2xJapan	-0.0107	0.1817		
	(0.0067)	(0.1291)		
EPU2xMexico	-0.0054	-0.1510		
	(0.0066)	(0.1484)		
EPU2xPakistan	0.0801**	-0.3665		
	(0.0216)	(0.5994)		
EPU2xRussia	-0.0029**	0.0041		
	(0.0007)	(0.0295)		
EPU2xSingapore	0.0108	0.2532		
	(0.0129)	(0.2366)		
EPU2xSouth Korea	-0.0017	0.0236		
	(0.0014)	(0.0486)		
EPU2xSpain	-0.0536*	1.4375		
	(0.0304)	(1.1333)		
EPU2xSweden	-0.0209	-0.0454		
	(0.0348)	(0.8112)		
EPU2xUnited Kingdom	-0.0041**	0.0560		
	(0.0010)	(0.0361)		
Constant	-0.0597*	3.4142*	-0.1019*	3.3203*
	(0.0350)	(1.6158)	(0.0399)	(2.0085)
AR1	0.006	0.002	0.006	0.003
AR2	.1409713	.5895191	.0807893	.5411487
Hansen-Pvalue	.6072307	.6684996	.6173281	.6817488
Observations	10373	10445	10373	10445
Groups	785	796	785	796
NoofInstruments	779	779	779	779
* p<.1, * p<.05, ** p<.001				