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Governance perspective and the effect of economic policy uncertainty on financial stability: evidence from developed and developing economies

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Abstract

Economic Policy Uncertainty (EPU) research has grown in importance in today's highly volatile and interconnected economy. This work investigates the relationship between EPU and Financial Stability (FS) (i.e., Z-scores and non-performing loans (NPL)) with the mediating variable of governance quality through a 23-country panel data from 2005 to 2019. The System Generalized Method of Moment (SYS-GMM) is adopted to address the issue of endogeneity, which is common in panel data regression. The two-stage Sequential of the Linear Panel Data Model (SELPDM) was also used to test the robustness of the results. According to the findings, EPU has a significant negative effect on financial stability (measured by the Z-score) and a significant positive effect on financial stability in the banking industry of most developed economies (proxied by NPL). We also discovered that good governance can be used to mitigate the negative effects of EPU on financial stability; however, this influence varies depending on region, bank, and market structure, and it was significantly greater during the global financial crisis. Finally, this study can help financial managers and policymakers develop appropriate policies to understand how banks respond to EPU.

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1 Introduction

The economic risk posed by unclear future legislative initiatives and regulatory schemes is termed as policy uncertainty. Due to market uncertainty, this phenomenon forces businesses and individuals to delay their purchases and investments (Al-Thaqeb et al. 2019; Dou et al. 2022). It may also be used to explain how financial system participants behave when faced with greater levels of uncertainty, such as the high levels experienced prior to, during, and after the global financial crises. It is therefore critical to comprehend the significance of economic policy uncertainty for financial markets and institutions. The global financial industry was defined by various structural changes during the Global Financial Crisis (GFC) of 2007–2009. The world's largest financial institutions were either declared bankrupt or had suffered sizable losses, endangering the stability of the entire financial system. The result was significant turmoil in the world's financial and economic sectors. In this context, financial economists have been researching the causes of rising EPU and variable policy-induced volatility across financial markets (Belke et al. 2018; Albulescu et al. 2019).

Financial industry may hoard liquidity, decrease cash outflow, curtail lending, and mitigate risk as a result of financial institutions' significant uncertainties (see Fig. 1) due to the timing and nature of policy initiatives (Berger et al. 2022a). In recent years, numerous events (particularly during the GFC) have compelled governments to adjust their monetary, fiscal, trade, and other regulatory policy measures (Shen et al. 2021; Cui et al. 2021; Tang et al. 2021) For instance the Gulf war in 1991, the

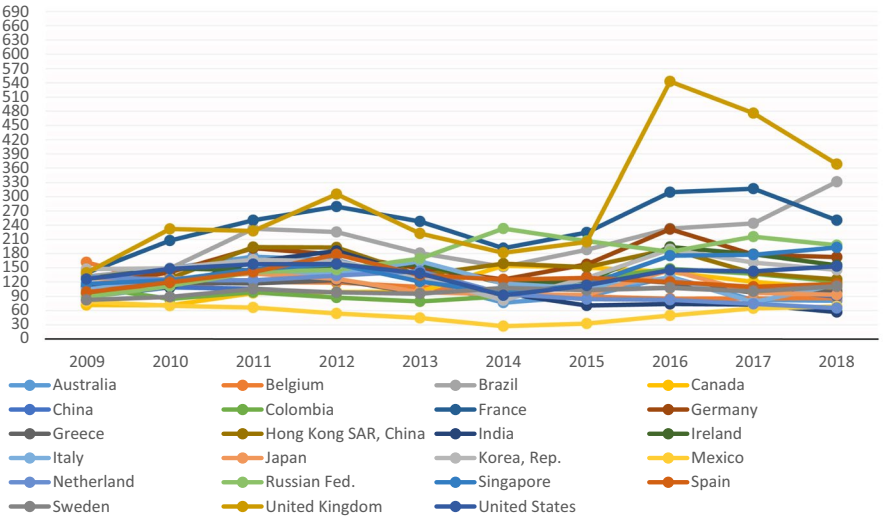

Fig. 1 Economic Policy Uncertainty, Uncertain Times. *Source* authors completion https://www.policyuncertainty.com/

(9/11) 2001 attacks on the USA, the global financial crisis from 2007 to 2009, the Dodd-Frank Act in 2010, the Eurozone debt crisis from 2011 to 2012, European emigration crisis in 2015, United Kingdom Brexit referendum and decision in 2016 and 2018, respectively, the corona virus pandemic Covid-19 from 2019 to 2021 and the recent Russia and Ukraine military conflict 2022. Al-Shboul et al. (2020) claim that these financial and economic changes have made it difficult to conduct business and have raised questions about future government policy.

In times of adverse economic uncertainty, a variety of financial and other indicators, such as banking stability (investment, lending, growth) and climate policy (Ren et al. 2022; Wang et al. 2022) are influenced. For instance, after experiencing an uptrend in recent years due to the Covid-19 outbreak, NPL in the euro region decreased by 3.4% in the third quarter of 2019 (Botshekan et al. 2021; Karadima and Louri 2021). Additionally, a number of macroeconomic indicators, such as inflation, unemployment, GDP growth, and subpar bank management, have an impact on FS (Z-score, NPL) in the banking sectors worldwide. In this context, financial managers must take effective steps to reduce bank credit risk before it negatively impacts the productivity. Karadima and Louri (2021) and Shabir et al. (2021) conducted research in this aspect and applied Z-scores and NPL ratios to measure the performance of the banking sector. They established that it is crucial to assess the link between EPU and FS (Z-score, NPL) to establish how much EPU may influence bank performance.

In order to reduce economic uncertainty and achieve economic governance, this work primarily evaluates the application, productivity, and effectiveness of government-issued macroeconomic, microeconomic, as well as market structure policies. However, the relationship between macroeconomic indicators, bank performance dimensions, and market structure variables, has received less attention in the literature.

We investigate the effect of EPU on financial stability proxies from various angles. It is anticipated that as the economy changes, researchers will continue to examine the variables that impact how financial institutions operate. Even though there have been numerous studies on EPU, none have examined the connection between EPU and FS (Z-scores, NPL). By examining the correlation between EPU and Z-scores as well as non-performing loans (NPLs) by macroeconomic, bank, and market structure indicators, this study fills this gap in the literature. When deciding how to allocate their capital, investors and portfolio managers can consider the relationship between macroeconomic variables like policy uncertainty, market structure indicators, and bank performance dimensions. They must ascertain whether their investments or assets can withstand difficult times and other important occurrences that have an impact on asset values. After adjusting for a wide range of potential confounding factors, this study adds three new ideas to the literature. By extending the work of Shabir et al. (2021), who examined the relationship between EPU and bank risk in developed and developing countries, this paper analyses the impact of EPU on FS proxies, i.e., Z-scores and NPL. This contrasts with most prior empirical research on non-financial institutions (Tran 2019; Vural-Yavaş 2020; Saha and Dutta 2021; Zhang et al. 2021). It then uses the panel threshold model to illustrate the significance of QOG in the dissemination of economic policy. Our findings contribute

to the body of knowledge about how EPU affects the banking sector (Ashraf 2020; Berger et al. 2022a; Chi and Li 2017).

The importance of QOG in enhancing bank stability is highlighted by a small number of recent studies (van Duuren et al. 2020; Saha and Dutta 2021). Therefore, this work compares the aggregate and individual components of QOG to establish a more comprehensive institutional understanding of the uncertainty-finance nexus. Additionally, it offers insights into the component level to examine how each of the QOG aspects, namely ROL, PST, GEF, COC, and RQT, impacts the relationship between EPU and FS proxies from the perspective of QOG in the EPU-FS (Z-score, NPL) nexus, probing its positive or negative impact on financial stability. As a result, this work mainly contributes to the understanding of the cross-country heterogeneity with respect to the effectiveness of EPU on FS proxies. It also adds to the literature on the Global Financial Crisis (GFC) by examining the role of QOG in mitigating the impact of EPU on FS-proxies (Phan et al. 2021). To the best of our knowledge, very few studies have examined and compared the effects of EPU on FS (Z-score, NPL) in the context of the GFC (2007–2009). We investigate how Z-score and NPL respond to deviations in EPU during the pre-2007, during-2008, and post-2009 GFC periods in this study.

Furthermore, this is the first study to look at the role of QOG in the relationship between EPU and FS (Z-score, NPL ratio) in the context of 23 countries (see country details in appendix Table 10) during the global financial crisis (pre-during, post). We investigate whether EPU has a negative impact on FS (proxy Z-score). The results show that EPU is associated with FS (proxy NPL) in the banking sector of the 23-country sample. Its impact grew significantly during the GFC (pre-during, during, and after) crises, though the effect varies depending on market and banking structure. These findings are consistent when examining various proxies for bank performance.

The rest of this study is organized as follows. Section 2 examines prior theoretical and empirical literature. Section 3 describes the study's data and methodology. Section 4 contains the empirical findings and discussion. Finally, Sect. 5 presents the study's conclusions as well as a few significant policy recommendations based on the practical outcomes of this extensive research.

2 Theoretical background

Generally, banking stability is a crucial part of FS and is considered one of the most significant components of economic growth. According to Shabir et al. (2021), the absence of a banking crisis and the individual stability of all banks result in the stability of the banking sector. Banks demonstrate stability when they provide credit and conduct normal banking operations without interruptions (Taghizadeh-Hesary et al. 2022). As a result, if the financial system is weakened due to a lack of banking stability, it eventually reduces the flow of funds and discourages entrepreneurial endeavors and overall economic activity (Rasoulinezhad and Taghizadeh-Hesary 2022), leading to financial instability. In this regard, FS can be explained as a well-functioning element of the financial sector, which includes banking institutions,

intermediaries, payments, markets, clearing and reimbursement structures (Taskinsoy 2019; Phan et al. (2021);. The financial sector consists of Financial institutions, markets, and settlement mechanisms that are dependable and effective in providing intermediary financial roles to support economic growth in the face of external and internal shocks.

2.1 Literature review

In the empirical literature, several determinants of bank stability have been identified. These factors are mostly related to the banking industry or bank-specific characteristics, as well as macroeconomics, market structure, and institutional indicators. We investigate how these variables affect bank stability in greater depth. On the other hand, one of the aspects associated with economic fluctuations is EPU, which has an impact on economic activities and financial stability (Junttila and Vataja 2018). Many scholars and policymakers have been preoccupied with EPU, the GFC, and political crises in recent years. Many studies on EPU have been conducted to investigate its impact on the economy. In particular, Berger et al. (2022b), Tao and Xu (2019) and Yaya et al. (2021) created an EPU index. EPU can take the form of black swan events, uncertainty (inflation), negative GDP growth, a financial crisis, unexpected loan reductions, epidemics, rising unemployment rates, foreign exchange volatility, and significant shifts in fiscal, regulatory, and monetary policy rates (Ozili 2022; Sha et al. 2020; Taghizadeh-Hesary and Yoshino 2016; Zhang et al. 2021). Hu and Gong (2019) discovered that in response to high EPU, most banks cut credit growth to reduce risk exposure. Similarly, Phan et al. (2021) found a negative association between EPU and FS due to increased information irregularity when EPU is high. This irregularity eventually makes it difficult for lenders to recognize credit risks in turmoil. Cui et al. (2021) and Tran (2019) discovered that businesses seem to hold more cash as EPU rises.

Meanwhile, Khan et al. (2020b) identified political instability as a major factor influencing bank credit growth. In addition, Canh et al. (2020) investigated the relationships between EPU and other factors, First, a higher EPU level has a negative impact on bank credit growth, which is critical for the EPU's domestic measures. Second, the positive shift in the EPU appears to have boosted bank credit growth. The outcomes of both cases differ in terms of credit demand and supply. Third, the EPU's effects are negative and far more significant in developing economies than in advanced economies. In general, the EPU index has been used in several studies to investigate the economic consequences of EPU (Wen et al. 2021; Ozili 2022; Phan et al. 2021; Shabir et al. 2021). In addition, Tabash et al. (2022) evaluated the effects of EPU on the structure of corporate financing in Asia. Their research divided the financing source into two types of debt, namely bank loans and trade credits. In this context, Yu et al. (2022a) contends that high EPU has a negative impact on bank loans, lowering the total amount of investment required for financial stability. Similarly, Yu et al. (2022b) discovered an inverse relationship between EPU and bank financing for Chinese firms, concluding that EPU raises financing costs, reducing demand for bank financing.

Aside from EPU, the Quality of Governance (QOG) is also important for financial stability and the effective execution of the financial activity. Bakhsh et al. (2022) examined that a country's QOG considerably influences banking sector stability, while Beck et al. (2013) argued that institutions enforcing property rights are vital for banking sector stability. Similarly, according to Hou and Wang (2016), QOG reduces the detrimental effect of banking marketization on Chinese bank stability. In addition, Bermpei et al. (2018) argued that bank capital regulation has a positive influence on bank stability in both emerging and developed countries because of good governance and corruption control. On the same line, Saha and Dutta (2021) argued that QOG has an impact on a country's contract enforcement quality and economic policies chosen by the ruling elite. Furthermore, Khan et al. (2020a, b), Saha and Dutta (2021) as well as Shabir et al. (2021) suggest that the accountability of government and bureaucracy will be strongly established in the presence of a strong QOG, acting as a deterrent/guard against confiscation. To summarize, QOG indices such as government effectiveness, corruption control, regulation quality, and the rule of law significantly reduce bank risk and contribute to financial stability.

Despite the vast amount of literature on the impact of EPU and QOG on FS, there are extremely few studies on the moderating role of QOG on the relationship between EPU and FS from the perspective of Z-Scores and NPLs in the banking industry, based on all previous discussions.

2.2 Hypothesis development

Many studies on economic policy uncertainty have been conducted to investigate its impact on the economy (Subramaniam and Loganathan 2022; Tao and Xu 2019). Previous research has gone into great detail about EPU. Economic uncertainty has been identified as having serious negative effects on the entire economy. It causes the organization to reduce its overall investments and workforce, as well as households to reduce their overall consumption. Furthermore, EPU has a negative impact on financial institutions because it reduces banks' lending capacity to organizations and households, which harms the economy. Similarly, Phan et al. (2021) found that EPU and FS have a statistically significant and negative relationship. Furthermore, it was discovered that the EPU on FS is stronger in economies with lower regulatory capital, higher competition, and a smaller financial system.

Karadima and Louri (2021) examined the effects of EPU on NPL, and concluded that EPU has a favorable influence on NPL. However, this influence is strongly moderated by bank concentration. On the same note, Ndou and Mokoena (2019) found that positive EPU shocks increase mortgage lending rate margins, while negative EPU shocks reduce bank lending rate margins. Chi and Li (2017) considered the impact of EPU on lending and bank credit risks and they found that there is a positive association between EPU and NPL, loan concentrations, and the average loan migration rate. In addition, Shabir et al. (2021) use data from several years, including the GFC, to evaluate the effect of EPU on cumulative bank credit growth. They discovered that EPU has a strong adverse influence

on bank loan growth. Their findings imply that the policy uncertainty of the great recession constrains total credit growth via the bank lending channel.

While several studies have been conducted on EPU, none have examined the relationship between EPU and FS proxies (Z-score, NPL) via the moderating channel of QOG dimensions during the GFC (Pre-2007-During-2008-post-2009 period). We predict that an increase in EPU can adversely affect the Z-score and NPL. Hence, based on the literature, the following hypothesis has been developed:

H1 Economic policy uncertainty has significant and negative/positive impacts on FS (Z-score, NPL ratio).

As stated earlier, QOG is critical for banking stability and the smooth operation of the financial sector. (Shabir et al. 2021) established that a country's QOG considerably influences the stability of the banking system, while Beck et al. (2013) argued that property rights enforcement mechanisms are critical to the stability of the financial sector. Ogbonna et al. (2022) stated that QOG plays an essential role in foreign direct investment and bringing financial stability to the country. Furthermore, better QOG in terms of control of corruption, political stability and the rule of law can help reduce lenders' moral hazard and improve bank performance. Hou et al. (2016) suggested strengthening China's financial institutions and as a result, reducing marketization's impact on the country's financial stability. Simultaneously, Bermpei et al. (2018) found that corruption control and political stability are QOG variables that contribute to bank stability in both developing and developed economies. In general, six indicators are commonly used to assess institutional quality and governance: government effectiveness, the rule of law, voice and accountability, regulatory quality, corruption control, and political stability (Law and Azman-Saini 2012). Apart from that, QOG can also significantly impact EPU. Choi et al. (2021) found that institutional quality are two crucial factors which can decrease the adverse influence of EPU on FS. Therefore, it can play an important role in bringing financial stability. Economic policy uncertainties cause disturbances in the financial system which exacerbate asymmetric information problems. When this occurs, financial institutions are unable to effectively channel funds to those with the most profitable investment prospects. In this case, improved QOG can significantly reduce the potential inefficiencies of these asymmetric information problems. Shabir et al. (2021) and Uddin et al. (2020) found that better QOG indicators such as COC, GEF, and the ROL all make a significant contribution to mitigating bank risk, which helps to maintain stability. Schiantarelli et al. (2020) argued that PLS, COC, and ROL may reduce lenders' hostile selection and moral hazard issues, thereby improving loan repayment conditions. The impact of BRI on FS could be significant for institutions looking to improve regulatory compliance. Channels are structured to analyze the abilities of powerful institutions to reduce the opposing influence of EPU on FS when an interaction term is added. All of this demonstrates that,, governance quality is critical in mitigating the negative impact of EPU on FS proxies. The following hypothesis has been developed as a result of this:

H2 Quality of Governance has a significant and positive moderating effect on the relationship between EPU and FS (Z-score, NPL ratio).

3 Methodology

3.1 Data collection, variables and sources

Data from 1058 banks in 23 economies[1] were gathered. 15,870 bank-specific records from 2005 to 2019[2] are included in the final sample. These economies are chosen based on their EPU index. The following study attempts to evaluate the functional governance perspective in shaping the EPU's effect upon FS (i.e., Z-score and NPL). With respect to the conceptual framework, the primary dependent variable in this study is FS.[3] FS is mainly measured from Z-score and NPL, where several studies have utilized the variable to measure banks' financial performance (Shabir et al. 2021). The index provided by (Baker et al. 2016) is used to measure the explanatory variable, or EPU. The other indicators which have been collected and utilized are the control variables[4] i.e., banks indicators: bank efficiency (BEF), liquidity (LQT) and bank size (BSZ), macro level economic growth (GDP), inflation (INF), trade openness (TOP), and market structure dimensions i.e., bank concentration (BCN), bank deposit to GDP (BDT) and domestic credit to private sector (DCP). The inclusion of the control variables is necessary because this study examines how institutional environments in various nations differ, and how these differences affect how EPU, and FS-Proxies interact. The abovementioned control variables are also used in the literature (Ashraf 2020; Hu and Gong 2019). In addition, the moderating effect of the quality of governance[5] (QOG) on the relationship between EPU and FS-proxies is also investigated. The QOG variable has been integrated through six dimensions as discussed in (Table 1).

3.2 Variable description and measurement

3.2.1 Financial stability (FS)

Z-score Several studies have used Z-score[6] to measure the banking sector's financial performance (Phan et al. 2021; Shabir et al. 2021; Beck et al. 2013; Saha and Dutta 2021; Fang et al. 2014; Shabir et al. 2021). Z-score is mathematically expressed as:

[1] Table 10 shows that EPU index data is only available for these countries and not for others.

[2] The availability of the EPU index and other bank-level data determines the time frame for our study sample.

[3] World Bank Global Financial Development Database (country-level) and DataStream, Bankscope (bank-level).

[4] DataStream (BankScope), and World Bank Global Financial Development Database.

[5] World Bank Global Financial Development Database.

[6] A higher Z-score suggests that banks are more sustainable, as it is inversely connected to the probability of a bank going bankrupt. A high Z-score indicates a lower risk of insolvency or increased banking stability. we use the natural logarithm of Z-Score to normalize the data.

Table 1 Variables description and source

Code	Indicators	Description	Source
Dependent variable, financial stability			
FS	Financial Stability	Financial stability (Micro and macro levels (Z-Score, NPL)	World bank global financial development database (country-level) and data stream (bank level)
Z-score	FS-Proxy	A higher Z-score suggests more bank stability	✓
NPL ratio		A higher value implies a riskier loan portfolio	✓ + Author Self Calculation based on database
Explanatory variable			
EPU	Economic policy Uncertainty	Baker et al. (2016) index constructed	https://www.policyuncertainty.com/
Moderating indicator, quality of governance			
QOG	Quality of governance	QOG is assessed by the (WGI) six components of governance, QOG- index	World Bank's Worldwide Governance Indicators, (WGI) Database. Author calculation based on WGI guide
ROL	The Rule of law	Perceptions of the extent to which agents have confidence in and abide by society's rules	✓
COC	Control of corruption	Perceptions of the extent to which public power is exercised for private gain	✓
GOE	Government effectiveness	Measures the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of developing and executing policies, and the credibility of the government's commitment to such policies	✓
PST	Political Stability	Perceptions of the likelihood of political instability	✓
RQT	Regularity quality	Measures the government's ability to develop and execute policies that promote market competition and private sector development	✓
Macroeconomic control variables			
GDP	Gross domestic product	Gross domestic product (GDPC) in $ thousand	World Bank Development Indicators (WDI) database
INF	Inflation rate	Annual Change in the Index of Consumer Prices	✓

Table 1 (continued)

Code	Indicators	Description	Source
TOP	Trade Openness,	Imports + Exports divided by GDP. For robustness' analysis	✓
Market structure control indicators			
BCN	Bank Concentration	The percentage of the assets of the top five banks to total bank assets	World Bank Global Financial Development Database
DCP	Domestic credit to the private sector	Determine the financial contribution made by the private sector	✓
BTD	Bank deposit to GDP	The claims by deposit money banks on the domestic non-financial sector as a share of GDP	✓
Bank control indicators			
BSZ	Bank size	The logarithm of the total assets value	DataStream (Bank Scope)
LIQ	Liquidity	Calculated as loans to total assets	✓
BEF	Bank efficiency		✓

Source Authors completion

$$\text{Z - score}_{it} = \frac{\text{ROA}_{it} + E_{it}/\text{TA}_{it}}{\sigma\text{ROA}_{it}}$$

ROA, return on assets, $\frac{E}{\text{TA}}$ the ratio of equity to total assets, σROA, standard deviation of the return on assets.

3.2.2 Non-performing loan (NPL) ratio

The NPL[7] ratio (Barth et al. 2004) is used to measure FS. NPL constitute an important dimension in the banking process and is a significant source of financial vulnerability globally. Low levels of NPL ratio demonstrate a stable financial system, while high levels demonstrate a fragile financial system. Increased NPL mitigates the efficiency of the assets and inevitably contributes to the breakdown of the financial system (Barth et al. 2004; Ozili 2022).

The NPL factor refers to the non-performing to gross loans ratio. It is a credit risk indicator and an indicator of asset (or loan) reliability in the banking industry (Ozili 2022). Past research has used the NPL ratio as the proportion of bank performance, and the nondiscretionary factor of loan loss provision (Ozili 2021). Several previous empirical studies have shown that high levels of problematic loans are mainly accountable for failures (Shabir et al. 2022) as well as increased risk in the banking and financial sectors (Danisman et al. 2021). NPL is measured as follows:

$$\text{NPL} = \frac{\text{Total Non - performing Loan}}{\text{Total Loans}}$$

3.2.3 Economic policy uncertainty (EPU)

The EPU[8] indicator represents the EPU index (Baker et al. 2016). Various studies have used the EPU index and used varying methods of measurement. Stock market volatility, or the degree of volatility in the relevant timeframes during a certain period, is used to measure it. The degree of uncertainty in news reporting, as well as in economic and governmental analyses, is another metric. In order to give investors a context for their financial decisions and to adopt a variety of economic plans for the future, this index was created and is being studied. Additionally, the Twitter program can be used to measure EPU by collecting and analyzing all tweets containing the words "economics" and "uncertainty" (Baker et al. 2016).

3.2.4 Quality of governance (QOG)

Higher uncertainty in the host country discourages financial development through a real option value channel. This mechanism should be strengthened when the host

[7] High value suggests a ratio of NPL to gross loan, more risky loan portfolio or high credit risk.

[8] In our study, we used the natural logarithm transformation of NPL; and the arithmetic mean approach was used to convert the monthly EPU index into an annual index, as previous studies utilized this method (Danisman et al. 2021; Hu and Gong 2019; Shabir et al. 2021).

country's government is politically unstable (or less stable) and unpredictable compared to others. We consider six dimensions of QOG[9] to analyze the part QOG plays in reducing the negative effects of EPU on FS-proxies. To prevent multicollinearity that could arise from modeling the six indicators in a single equation, this work uses the aggregate role of QOG rather than the average of the six indicators (Saha and Dutta 2021; Shabir et al. 2021). Instead, a composite QOG is generated through the principal component analysis (PCA). This is similar with Khan et al. (2020a, b), Shabir et al. (2021) and Ogbonna et al. (2022). This method confirms that the individual indicators are translated into linear combinations that explain a significant portion of their variation.

3.3 Threshold regression

Considering the latest studies on the threshold effect of QOG on several economic indicators (Khan et al. 2020a, b; Saha and Dutta 2021), this work adopts panel threshold regression approach (Hansen 2000) to explore the threshold effect of QOG on the relationship between EPU and FS (Z-score, NPL). The panel threshold estimator is widely used in various ways based on the desire to determine the level of thresholds.

3.4 Data analyses techniques

The empirical framework of this study is based on financial stability (FS) as the dependent variable, EPU as the explanatory indicator, and governance quality as the moderating variable (QOG). As control indicators, we also used gross country, bank, and market structure variables. The framework or functional form of our model is described below.

$$\mathrm{FS}_{ijt} = \int (\mathrm{EPU}, \mathrm{GQ}, \mathrm{COUNTRY}, \mathrm{BANK}, \mathrm{MARKET}) \tag{1}$$

where in Eq. 1, EPU, GQ, COUNTRY, BANK, MARKET represent economic policy uncertainty, country, bank, and market structure control variables, respectively.

We used a log-linear formulation instead of a linear formulation for the empirical investigation and converted all parameters to natural logarithms because it provides a more reliable and consistent result. A log-linear representation of the functional form of financial stability is shown below Eq. 2:

$$\begin{aligned} \ln \mathrm{FS}_{ijt} = {} & \alpha_0 + \beta_1 \ln \mathrm{EPU}_{iJt} + \beta_2 \mathrm{GQ}_{iJt} + \beta_3 \mathrm{COUNTRY}_{Jt} + \beta_4 \mathrm{BANK}_{it} \\ & + \beta_5 \mathrm{MARKET}_{Jt} + \emptyset_J + \lambda_t + \mu_I + \varepsilon_{it} \end{aligned} \tag{2}$$

In the above model, *ln* is the natural log, *t=1-T, j=1-J* and *i=1-N,* where J reflects the number of countries, N component refers to several individual banks,

[9] To aggregate measure QOG, we apply PCA and overall, the six QOG dimensions of the WGI, which are Control of corruption, government effectiveness, the rule of law, political stability, and regularity quality, and developed a composite governance, QOG- index.

T refers to the time, while α, β, δ are considered as the estimated parameters. *lnFS* (Z-Score, NPL) is the dependent variable which is measured through Altman Z-score. The study by Shabir et al. (2021) also used the average of monthly EPU index in the form of the natural logarithm.

Furthermore, this study suggests that governance quality (QOG) may play a moderating role in addition to its direct effect on financial stability in different countries. As a result, this paper investigates QOG's conditioning role in the association between EPU and FS-proxies. To investigate the conditioning role of QOG*EPU on FS empirically, a new model is developed by including an interaction effect in Eq. (3–4), as shown below.

$$\mathrm{FS}_{ijt} = \int (\mathrm{EPU}, \mathrm{QG}, \mathrm{EPU{*}GQ}, \mathrm{COUNTRY}, \mathrm{BANK}, \mathrm{MARKET}) \tag{3}$$

$$\begin{aligned} \mathrm{FS}_{ijt} =& \alpha_0 + \beta_1 \mathrm{EPU}_{iJt} + \beta_2 \mathrm{EPU}_{ijt} * \mathrm{GQ}_{ijt} + \beta_3 \mathrm{COUNTRY}_{Jt} \\ &+ \beta_4 \mathrm{BANK}_{it} + \beta_5 \mathrm{MARKET}_{Jt} + \emptyset_J + \lambda_t + \mu_I + \varepsilon_{it}. \end{aligned} \tag{4}$$

In Eq. (3–4) $\mathrm{EPU}_{ijt} * \mathrm{GQ}_{ijt}$ represents the interaction effect of governance quality perspective.

3.5 Two-step system-GMM (SYS-GMM) and two-step sequential estimation of liner panel data model (SELPDM)

The study employs dynamic SYS-GMM method (Arellano and Bond 1991) that Blundell and Bond (1998) extended. The SYS-GMM method considers the possibility of endogeneity, and it works better for panel data with fewer time observations. Thus, dynamic techniques have been extended to empirical research, as they produce consistent empirical results over a large cross-sectional dimension (N) and a finite number of periods (T). However, uncorrected standard errors may still occur frequently in the two-step GMM estimator, despite its efficiency (Windmeijer 2005). this issue is tackled through a novel approach (i.e., SELPDM[10]'developed by Kripfganz (2017)). The traditional standard errors are no longer accurate in the SELPDM technique when the residuals from the first stage are regressed on another set of (often time-invariant) explanatory variables in the second stage. We perform the Hansen J-test of over-identifying restriction and the Arellano-Bond tests AR (1) and AR (2) for autocorrelation to assess the validity of the selected instruments. The dynamic model incorporates a period lag for the dependent component (bank stability) and assumes the following form:

$$\begin{aligned} \ln \mathrm{FS}_{ijt} =& \alpha_0 + \beta_1 \ln \mathrm{EPU}_{ijt} + \beta_2 \ln \mathrm{FS}_{ijt-1} + \beta_3 \mathrm{GQ}_{ijt} + \beta_4 \mathrm{COUNTRY}_{jt} \\ &+ \beta_5 \mathrm{BANK}_{it} + \beta_6 \mathrm{MARKET}_{jt} + \emptyset_j + \lambda_t + \mu_I + \varepsilon_{it} \end{aligned} \tag{5}$$

[10] We use the SELDPM robust techniques at the macroeconomic, bank, and market structure level. As can be seen in Appendixes tables, we didn't notice any significant changes in our outcome.

Table 2 Descriptive statistics

Variable	Obs	Mean	Std.Dev	Min	Max
Z-score	15,870	5.211	1.191	2.489	11.162
NPL	15,387	1.323	0.658	− 4.092	9.097
EPU	15,870	14.863	2.454	24.018	210.932
QOG	15,870	2.715	2.093	0	26
ROL	15,870	1.153	0.927	− 0.834	2.172
COC	15,870	0.993	0.936	− 1.836	2.740
GOE	15,870	1.474	0.935	− 0.642	2.410
PST	15,870	0.592	0.827	− 1.287	1.814
RQT	15,870	1.422	0.845	− 0.628	2.59
GDP	15,870	2.207	2.943	− 5.697	7.862
TRO	15,870	101.461	104.467	23.934	376.932
INF	15,870	2.397	2.099	− 1.311	7.514
BCN	15,870	50.986	26.611	− 0.532	89.912
BDT	15,870	76.768	71.299	0	300.181
DCP	15,870	101.302	54.261	0	190.949
LIQ	15,870	42.153	9.119	11.217	75.091
BSZ	15,870	7.572	1.484	0	10.197
BEF	15,870	0.093	0.936	− 9.275	4.527

Sample consists of 1058 banks from 23 countries from 2005 to 2019. For each variable, the number of Obs = observations, Mean, Std, Dev = Standard deviation, Min = minimum and Max = maximum is summarized

We estimate Eq. (5) using a dynamic panel data based on the two-step GMM method as a benchmark. We then check the robustness through the SELPDM approach.

4 Empirical results and discussion

4.1 Descriptive statistics

Table 2 displays descriptive statistics for the key indicators. The dataset is broken down into mean, dispersion, minimum, and maximum values. The mean FS as measured by Z-score is 5.211. According to the mean value of FS, the banking sector in the sample economies is generally stable. According to Altman and Hotchkiss (2006), a bank with a Z-score of less than 1.8 is more likely to fail, whereas a score of 3 or higher indicates stability. The Z-score standard deviation is calculated to be 1.191, implying that the Z-score will deviate from 5.191. The Z-minimum scores and maximum values are 2.489 and 11.162, respectively. The NPL data varies from − 4.092 to 9.097; the mean value is 1.323 with SD 0.658 which has greatly increased during pivotal times and major financial shocks. On the other hand, EPU index varies from 24.018 to 210.932, with an average of 14.863. This indicates that

this index has risen dramatically across the global financial crisis. The average QOG is 2.715 which ranges from 0 to 26, with a SD of 2.093. Similarly, macro level, bank level, and market structure control indicators also demonstrate significant variance around the sample means.

Table 3 summarizes the correlation study and multicollinearity test, which show how the variables are related. The coefficient values between the parameters are minimal, indicating that no multicollinearity issues exist. The variance inflation factor (VIF) and tolerance level analysis are used to validate the absence of multicollinearity. The VIF value must be less than ten, and the tolerance should be greater than 0.1. The study's findings revealed that the equation did not exhibit multicollinearity. As shown in Table 3, all of our indicators meet the VIF requirements, and the tolerance level of all parameters in our findings indicates the absence of multicollinearity

4.2 System- GMM

According to Jianguo et al (2022), two step SYS-GMM is primarily used for panel data and to mitigate various problems such as heterogeneity, endogeneity, and others. Furthermore, it is preferred to be used in cross-sectional panel data; thus, the system GMM model is used as a tool for assessing the effects of EPU on FS-proxies.

4.2.1 Regression results

Table 4 displays the system GMM estimation from Eq. (5), with the Z-score and NPL ratio serving as FS proxies in columns (1–5) and (6–10), respectively. The empirical results of the regression analysis based on the twostep SYS-GMM approach of the impact of EPU on the Z-score are provided in Table 4, columns (1–5), and show that EPU has a significant and negative effect on the Z-score. Our findings are consistent across all five model specifications. In other words, we investigated whether an increase in EPU leads to a decrease in Z-score across the 23 countries. We note that our result is statistically significant at the 1% level in the context of columns 1–3. A high Z-score value is thought to indicate that banks are less likely to fail, whereas a negative Z-score regression coefficient indicates that banks are more likely to fail as EPU increases.

In addition, regardless of whether country or bank data is used, the coefficient of EPU on NPL is positive and statistically significant in columns 6–10. Overall, the EPU has a significant economic impact on FS. According to one definition, increasing uncertainty in the unit standard deviation contributes to a decrease in the FS. As anticipated by previous research and theoretical models (Karadima and Louri 2021; Phan et al. 2021; Shabir et al. 2021; Vural-Yavaş, 2020), a rise in EPU will have a negative impact on bank stability. The EPU has a statistically and economically significant negative effect on FS. In our study, we also examined the impact of EPU on the NPL ratio, which shows that the NPL ratio is statistically significant and positively affected by the EPU across all columns (6–10), indicating that the EPU reduces lenders' willingness or capacity to repay their loans. A higher EPU promotes stock market and currency devaluation, which boosts firm's costs for external

Table 3 Correlation matrix, and test for Multicollinearity

Indicators	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	VIF	Tolerance
(1) Z-score	1.000																	2.108	0.475
(2) NPL	−0.158**	1.000																3.012	0.334
(3) EPU	−0.767	−0.492	1.000															4.325	0.232
(4) ROL	0.680*	−0.759*	0.428	1.000														2.689	0.372
(5) PST	0.347	0.218*	0.318	0.087	1.000													2.834	0.353
(6) GEF	0.528**	−0.308*	0.173*	0.009*	1.108	1.000												1.257	0.796
(7) COC	0.507**	−0.728*	0.027*	0.074	0.037*	0.084	1.000											3.935	0.255
(8) RQT	0.428*	−0.243*	0.627*	0.017*	0.009	0.073	0.057	1.000										1.476	0.678
(9) GDP	0.728*	−0.728	−0.249*	0.172*	0.307	0.082	0.009	0.373*	1.000									4.489	0.224
(10) TOP	0.327*	−0.720*	−0.507	0.083*	0.127*	0.089*	0.097*	−0.637*	0.018*	1.000								3.315	0.303
(11) INF	−0.583*	−0.271*	0.638*	0.173*	0.573*	0.173*	0.729*	−0.093*	−0.147*	−0.086*	1.000							3.427	0.292
(12) BCN	−0.576*	−0.728*	−0.539*	0.527*	0.478*	0.639*	0.749*	0.556	−0.418*	0.718*	−0.189*	1.000						2.251	0.445
(13) BDT	0.254	−0.827*	0.327*	0.322	0.472*	0.428	0.247*	0.523*	0.078*	−0.745	−0.473*	0..116*	1.000					1.076	0.939
(14) DCP	−0.752*	−0.357*	−0.312	−0.528	−0.239	0.721	0.126	−0.317*	−0.172	−0.259	−0.472*	0.236	0.109	1.000				2.364	0.424
(15) LQT	0.658*	−0.564*	−0.342*	0.275	−0.009*	0.341	0.528	0.087	0.637	0.472	−0.527	0.326	−0.425	−0.428	1.000			3.092	0.325
(16) BSZ	0.725*	−0.687*	−0.528*	0.428	0.327*	0.247	0.328	0.412	0.246	0.427	−0.812	0.235	0.429	0.108*	0.247*	1.000		1.309	0.764
(17) BEF	0.527*	−0.638	−0.748*	0.247	0.018*	0.523*	0.081	0.058*	0.128	0.428*	0.325	−0.595*	0.523	0.327	0.125*	0.187*	1.000	1.091	0.917

***, ** and * indicates that the coefficient is significant at level 1%, 5%, and 10% respectively

Table 4 The Impact of EPU and QOG on FS-Z-Score (Two-step system GMM estimations)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	Z-score	Z-score	Z-score	Z-score	Z-score	NPL	NPL	NPL	NPL	NPL
$Z\text{-score}_{t-1}$	0.714***	0.614***	0.351***	0.300***	0.350***					
	(9.13)	(11.56)	(8.41)	(3.63)	(4.44)					
NPL_{t-1}						−5.321**	−4.823***	−7.423***	−3.853**	−5.468***
						(−2.01)	(−13.21)	(−9.17)	(−2.65)	(−3.99)
EPU	−0.063***	−0.095*	0.092***	−0.052**	−0.067**	0.098**	0.563*	0.209***	0.013*	0.613**
	(−9.65)	(−1.67)	(−7.57)	(−2.16)	(−2.11)	(2.24)	(1.24)	(7.21)	(1.49)	(2.08)
QOG	0.071***	0.024***	0.016*	0.037**	0.019***	6.188***	−5.806**	−6.694***	−5.699**	−8.027***
	(9.34)	(7.60)	(1.51)	(2.29)	(7.46)	(−14.67)	(−2.11)	(−9.47)	(−2.34)	(−11.85)
ROL	0.632***					0.934***				
	(13.02)					(17.24)				
PST		0.925***					0.847***			
		(5.32)					(11.57)			
GEF			0.278**					−0.349***		
			(2.16)					(−13.96)		
COC				0.365***					−0.783**	
				(9.024)					(−2.17)	
RQT					0.853***					−0.938***
					(3.96)					(−13.57)
GDP	−0.006*	−0.008*	−0.009	−0.008**	−0.009	0.236**	0.252*	0.229	0.241	0.147
	(−1.16)	(−1.08)	(−0.23)	(−2.03)	(−0.25)	(2.50)	(1.11)	(0.25)	(0.20)	(0.02)
TOP	0.074	0.012	0.142*	0.062	0.019*	−0.001	−0.002*	−0.003*	−0.002	−0.007**
	(0.35)	(0.50)	(1.51)	(0.75)	(1.98)	(0.81)	(1.97)	(1.61)	(1.32)	(2.50)
INF	−0.009**	−0.010***	−0.008**	−0.009***	−0.008**	0.432***	0.452***	0.427***	0.424***	0.454***
	(−2.72)	(−3.92)	(−2.43)	(−3.69)	(−2.54)	(3.88)	(4.17)	(3.69)	(3.85)	(3.75)

Table 4 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
BCN	0.024***	0.015**	0.051**	0.097***	0.017**	0.014**	0.018***	0.014**	0.016***	0.016**
	11.57)	(2.82)	(9.42)	(9.02)	(2.12)	(2.34)	(3.35)	(2.46)	(7.85)	(2.32)
BDT	0.018***	0.028*	0.018***	0.001	0.028**	0.009**	0.010**	0.009***	0.009**	− 0.010***
	(7.11)	(1.55)	(11.04)	(0.37)	(2.10)	(3.60)	(2.31)	(12.06)	(2.00)	(5.16)
DCP	− 0.027***	− 0.005	− 0.021**	− 0.017*	− 0.047**	0.006***	0.004**	0.010***	0.006**	0.011***
	(3.09)	(1.22)	(2.72)	(1.61)	(2.38)	(3.31)	(2.89)	(3.09)	(2.18)	(3.43)
LQT	0.065	0.060*	0.077**	0.056**	0.069	− 0.291*	− 0.286**	− 0.845**	− 0.222***	− 1.022*
	(1.44)	(1.50)	(2.65)	(1.81)	(1.43)	(− 1.67)	(− 2.17)	(− 2.50)	(− 3.14)	(− 1.54)
BSZ	0.121**	0.113***	0.072**	0.103*	0.091**	0.178**	0.171**	− 0.182**	− 0.211***	0.053*
	(2.23)	(3.56)	(1.96)	(1.56)	(2.16)	(2.14)	(2.09)	(− 2.14)	(− 3.38)	(1.55)
BEF	0.912***	0.975***	0.966***	1.005***	1.089***	− 4.114*	− 4.218*	1.760*	− 3.852*	− 4.544*
	(4.11)	(4.24)	(4.16)	(4.16)	(4.66)	(− 1.60)	(− 1.60)	(1.83)	(− 1.57)	(− 1.56)
Constant	0.137***	2.016**	4.073**	5.030***	6.042**	− 21.016***	− 15.331**	− 10.098***	− 13.396***	− 14.037**
	(9.59)	(2.18)	(2.04)	(17.45)	(2.62)	(− 11.79)	(− 2.68)	(− 21.91)	(− 7.31)	(− 2.01)
Observations	15,870	15,870	15,870	15,870	15,870	15,672	15,672	15,672	15,672	15,672
Cross sections	23	23	23	23	23	23	23	23	23	23
Time Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hansen J p-value	0.186	0.165	0.550	0.174	0.728	0.326	0.278	0.138	0.256	0.347
AR (2) p-value	0.914	0.957	0.901	0.475	0.857	0.867	0.568	0.778	0.844	0.697

Source The authors' estimations. The robust t-statistics are reported in the parenthesis. ***, ** and * indicate that the coefficient is significant at 1%, 5%, and 10% respectively

finance and bank loans (Ashraf 2020), resulting in lower investment (Gulen and Ion 2015), increased volatility in financial flows and asymmetric information between enterprises and lenders (Brogaard and Detzel 2015).

We used the most relevant principal components analysis (PCA) of the overall quality of governance index to determine QOG's moderating role. In Models (2)–(5), the positive relationship between institutional quality and Z-score is generally recognized at 1% significance levels, whereas for NPL, QOG is statistically and positively significant at 1% in columns (6)–(8). (10). According to our findings, FS is highly correlated with non-performing loans at banks with low QOG. This demonstrates that improving QOG in terms of ROL, PST, COC, GOE, and RQT leads to greater financial stability. Good QOG can reduce moral hazard issues and adverse lender selection, improve lending conditions, and ensure loan payback (Khan et al. 2020a, b; Shabir et al. 2021).

Our empirical findings also look into the significance of control variables. We discovered that, regardless of the use of macro-level indicators such as GDP, the EPU has a negative and weak influence on Z-scores, while having a negligible positive impact on NPL. The empirical evidence suggests that GDP growth has a negative impact on FS. As economic uncertainty increased, investors postponed future investments. This eventually leads to a negative shock to output, which causes economic growth to slow. Our findings are in line with previous research (Boulanouar et al. 2021; Wen et al., 2021). Furthermore, TOP has a positive impact on FS-proxies. Furthermore, the consumer price index (annual percentage) is used as a proxy for inflation, with a negative impact on the Z-score but a positive impact on the NPL. Furthermore, lower inflation rates increase customers' purchasing power, resulting in higher spending. During low-inflation periods, banks' cash flow improves, increasing their liquidity and assisting them in avoiding unexpected losses. In essence, an inverse relationship has been discovered between INF and FS-proxies. This is consistent with previous studies by Khan et al. (2020a, b) and Shabir et al (2021, 2022). Banking sector efficiency (BEF) refers to the use of several efficiency measures in the banking industry, such as return on assets, return on equity, and net interest margin, in terms of bank control indicators. Given the possibility of significant interaction among such ratios, we use PCA to generate an efficiency index based on the efficiency ratios chosen. Consistent with (Shabir et al. 2021; Phan et al. 2021), our findings indicate that banking sector efficiency has a positive or negative impact on bank stability.

In terms of liquidity, we discovered that liquidity has a negative but insignificant effect on bank stability. Our findings suggest that large, profitable, well-capitalized banks and institutions with larger portfolio structures improve bank stability and mitigate the negative impact of EPU on bank risk. At the same time, the bank size coefficient is both positive and statistically significant. This implies that a larger bank is more financially secure than a smaller bank. The results are also consistent with Al-Shboul et al. (2020) and Shabir et al. (2021). Furthermore, when market structure factors such as bank concentration (BCN) and bank deposit to total assets (BDP) are considered, both indicators have statistically significant and positive effects on Z-score in columns 1 and 4 and NPL in columns 2 and 5. This positive influence indicates that competition promotes

financial stability. Finally, we find that DEP has a statistically insignificant influence on FS. Our findings back up previous research on the relationship between FS and market structure (Phan et al. 2021; Yin 2019). The Hansen J statistic demonstrates that the issue of over-instrumentation has been mitigated. Furthermore, the results of the Arellano-Bond test (AR2) show that there is no second-order autocorrelation.

4.2.2 The moderating of governance quality: QOG*EPU on Z-Score and QOG*EPU on NPL ratio

Table 5 shows the regression results with the QOG interaction term to investigate the role of governance in the EPU-FS (Z-Score, NPL) nexus. We use all possible interactions between aggregated and disaggregated QOG indicators. We discovered a positive relationship between QOG and the FS in the overall effect of GOQ-Z-Score (Z-score). The effects of the governance adjustment are responsible for the significant negative relationship between EPU measures and FS. With a value of 5%, the EPU coefficient is negative and significant when the conditioning role is introduced. A spike in uncertainty results in a statistically significant drop in Z-Score. Furthermore, the individual moderating effect of QOG dimensions, as well as the positive and statistically significant coefficient of the interaction term between EPU and the government stability measure, imply that a more stable government can reduce the negative effect of uncertainty on FS. Columns (1), (2), (3), and (5) show the results of a similar analysis in which the role of law is replaced by the quality measures of political stability, government effectiveness, and regularity. While the individual effect of COC is positive in column (5), the interaction term coefficient of COC*EPU-FS is negative. Furthermore, the results show that there is significant moderation of QOG over the relationship between EPU and Corruption Control.

According to the table, the EPU has a statistically significant and positive influence on the NPL ratio across all models, indicating that the EPU reduces lenders' ability to pay off their loans while demonstrating an inverse relationship between NPL and QOG. The output of the SYS-GMM approach was tested by measuring the lagged dependent indicator of the SYS-GMM result. We observe that once institutional quality is regulated, the positive relationship between EPU measures and the NPL ratio remains stable. If an interaction concept is introduced, the channels are intended to observe the ability of good governance to reduce the positive influence on EPU's NPL. At 5%, the EPU coefficient is positive and significant. This implies that QOG is vital in reducing the positive impact of EPU on the NPL ratio.

4.3 Panel threshold analysis

In Table 6, we investigate the role of QOG as a threshold in the relationship between EPU-FS. We investigate the impact of overall QOG and its various dimensions (i.e., ROL, PST, GEF, COC, and RQT) on the relationship between EPU and FS-proxies.

Table 5 Moderation role of QOG*EPU on FS-Z-score

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	Z-Score	Z-Score	Z-Score	Z-Score	Z-Score	NPL	NPL	NPL	NPL	NPL
$ZSCORE_{t-1}$	0.332***	0.319***	0.357***	0.323**	0.357***					
	(9.39)	(11.23)	(7.50)	(2.27)	(13.49)					
NPL_{t-1}						−3.061***	−3.129***	−2.802**	−3.016**	−2.702**
						(−11.21)	(−9.14)	(−2.19)	(−2.08)	(−2.17)
EPU	−0.057**	−0.068*	−0.051**	−0.089**	−0.028**	0.015*	0.018**	0.015*	0.013	0.025**
	(−2.73)	(−1.62)	(−2.15)	(−2.92)	(−2.13)	(1.73)	(2.00)	(1.72)	(1.49)	(2.66)
ROL	0.589***					2.635*				
	(3.012)					(1.53)				
EPU * ROL	0.314**					1.136**				
	(2.045)					(2.08)				
PST		2.213***					3.521***			
		(3.462)					(13.14)			
EPU * PST		0.309**					−2.128			
		(2.118)					(−0.25)			
GEF			1.391***					−4.75**		
			(3.399)					(−2.05)		
EPU * GEF			−0.298**					5.204*		
			(2.082)					(1.98)		
COC				0.416*					−3.647***	
				(1.394)					(−9.08)	
EPU * COC				−0.085					2.361*	
				(0.078)					(1.63)	
RQT					2.366***					−2.654
					(3.374)					(0.99)

Table 5 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
EPU * RQT					0.377***					2.104**
					(3.076)					(2.49)
BCN	−0.238**	−1.312	0.014	0.214	−0.017*	0.013**	0.019***	0.013**	0.016***	0.014**
	(2.18)	(0.97)	(1.00)	(1.19)	(1.77)	(2.13)	(3.54)	(2.41)	(2.97)	(2.19)
BDT	−0.018*	−0.009*	−0.016*	−0.089*	0.024*	−0.008**	−0.010***	−0.009**	−0.009**	−0.010***
	(−1.82)	(−1.64)	(1.77)	(−1.55)	(1.77)	(−2.29)	(−3.20)	(−2.89)	(−2.88)	(−3.99)
DCP	−0.024***	−0.014**	−0.025***	−0.019**	−0.018***	0.006**	0.003**	0.010**	0.005***	0.011**
	(−3.24)	(−2.85)	(−3.82)	(−2.12)	(−3.62)	(2.43)	(2.64)	(2.03)	(3.10)	(2.41)
LQT	−0.070*	−0.065**	−0.072**	0.063*	−0.068**	−0.173*	−0.174**	−0.257	0.294	−0.455
	(−1.53)	(−2.39)	(−2.55)	(−1.54)	(−2.39)	(1.50)	(−2.10)	(−0.15)	(0.17)	(−0.25)
BSZ	0.017**	0.081**	0.072**	0.001*	0.023**	0.141	0.120	0.181	0.154	0.054
	(2.10)	(2.29)	(2.24)	(1.53)	(2.08)	(0.91)	(0.77)	(1.17)	(0.99)	(0.37)
BEF	0.909***	0.983***	0.904***	1.000***	1.014***	−3.557	−3.454	2.565	−3.923	−4.957
	(4.18)	(4.45)	(3.98)	(4.32)	(4.37)	(−0.52)	(−0.49)	(0.34)	(−0.58)	(−0.64)
Deposit Fund	0.025	0.024*	0.018*	0.023*	0.034	−1.407*	−1.416*	−0.270	−1.301	−0.929
	(0.90)	(1.86)	(1.54)	(1.83)	(1.12)	(−1.68)	(−1.74)	(−0.27)	(−1.59)	(−1.06)
Constant	7.164***	6.027***	5.052**	9.067***	2.021***	−17.503**	−11.290***	−21.034***	−17.596**	−11.506
	(5.24)	(3.31)	(2.18)	(11.92)	(7.29)	(−9.07)	(−7.39)	(−13.92)	(−2.10)	(−1.29)
Observations	15,870	15,870	15,870	15,870	15,870	15,672	15,672	15,672	15,672	15,672
Cross sections	23	23	23	23	23	23	23	23	23	23
Time Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hansen J p-value	0.230	0.193	0.552	0.196	0.665	0.448	0.340	0.347	0.312	0.193
AR (2) *p*-value	0.758	0.617	0.421	0.345	0.241	0.666	0.644	0.660	0.349	0.543

Source The authors' estimations. The robust t-statistics are reported in the parenthesis. *, **, *** 10%, 5% and 1% significance, respectively

Hansen's (2000) panel threshold regression technique was used, and the results are shown in Table 6. The statistical significance of the threshold is determined using the Hansen (2000) bootstrap technique with 500 replications and a 10% trimming percentage. In the EPU-FS relations, we established a single significant threshold for the aggregate QOG and its dimensions (i.e., ROL, PST, GEF, COC, and RQT), as shown in the first row of Table 5. We specifically looked at threshold values of 6.00, 4.00, 5.00, 6.04, 3.06, and 7.23, which are significant at the 1% level for QOG, ROL, PST, GEF, COC, and RQT, respectively. This implies that the effect of EPU on FS is significantly negative only after a certain level of QOG is reached. The threshold impact of QOG on the link between EPU and FS is confirmed as a result of these findings.

Furthermore, we divided our sample into poor QOG, ROL, PST, GEF, COC, and RQT regimes (when QOG and its indicators, i.e., ROL, PST, GEF, COC, and RQT scores less than or equal to the threshold) and better QOG, ROL, PST, GEF, COC, and RQT regimes (when QOG and its indicators, i.e., ROL, PST, GEF (when QOG and its dimension i.e., ROL, PST, GEF, COC and RQT scores is greater than the threshold). We re-estimated our models for each subsample using the same settings as before to test the robustness of our determined threshold. According to the findings, effective QOG is critical in minimizing the negative effects of EPU on FS. As the QOG improves, the negative impact diminishes. Our findings are consistent with those of (Khan et al. 2020a, b; Shabir et al. 2021), who found that stronger QOG and an effective institutional environment are critical for fostering significant financial development, boosting economic growth, and improving banking system stability. As a result, we discovered strong evidence of the threshold impact of QOG on the EPU and FS relationship in cross-country analyses. As a result, regulators and policymakers should establish and maintain QOG levels above the stated threshold to avoid the negative effects of EPU on FS.

4.4 Global financial crises (GFC-2007–2009)

The banking sector is vulnerable to a number of risks, which could lead to a global financial crisis. Table 7 investigates and analyses whether EPU has a different impact on bank stability before, during, and after the GFC. We replicate the prior findings of Khan et al. (2020a, b); Phan et al. (2021) and Shabir et al. (2021). We divided our entire sample into three subsample periods in this regard. (That is, before the GFC in 2007, during the GFC in 2008, and after the GFC in 2009). We believe that our findings are resistant to the effects of the GFC. Many studies have found that the GFC had an impact on FS (Phan et al. 2021; Shabir et al. 2021). After adjusting for the effects of the GFC, we discovered that the direction, statistical significance, and economic significance of the EPU's impact remained constant in Table 7. These findings show that EPU has a consistent negative impact on financial stability across all three subsamples (post, during, and before the GFC), with the effect being especially strong during the GFC. The post-GFC environment amplifies the negative effects of EPU on FS. One of the primary causes of this devastation is a decline in the availability of sufficient capital and bank liquidity to absorb potential losses. This downturn is attributed to the increased loan defaults due to the declined cost of commercial and residential property (Rosman et al. 2014).

Table 6 Panel threshold results

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	QOG	QOG: ROL	QOG:PST	QOG: GEF	QOG: COC	QOG: RQT
Threshold	6.00***	4.00***	5.00***	6.04***	3.06***	7.23***
EPU ≤ **TH-1**	−1.238***	−0.044***	−0.027***	−0.025**	−0.034***	−0.082**
	(−3.08)	(−2.99)	(−3.48)	(−2.36)	(−3.77)	(−2.49)
EPU > TH-1	0.624***	0.668***	0.459***	0.168***	0.256***	0.549***
	(11.76)	(9.97)	(4.02)	(3.97)	(5.37)	(9.14)
Constant	23.418***	26.758***	22.457***	22.987***	23.475***	23.589
	(44.08)	(94.87)	(40.58)	(86.27)	(41.33)	(43.95)
Observations	15,870	15,425	15,802	15,368	15,802	15,802
F	187.72***	53.24***	49.95***	21.14***	164.06***	145.32***
Cross-sections	23	23	23	23	23	23

Source The authors' estimations. The robust t-statistics are reported in the parenthesis. *, **, *** 10%, 5% and 1% significance, respectively

Post-adjustment adjusting GFC findings (using country level data). We add a dummy indicator for the GFC effects in the estimated model. The entire sample period is categorized into three subsample groups (i.e., pre-2007, crisis-2008, and post-2009). The robust t-statistics are reported in the parenthesis. *, **, *** 10%, 5% and 1% significance, respectively.

4.5 Robustness with alternative methods

This section investigates the robustness of our preliminary results using a variety of relevant extensions to validate the results of the EPU, QOG, Z-score, and NPL ratio and to confirm the accuracy of the Sys-GMM stated in Tables 4 and 5. Tables 4 and 5 show the results of our SYS-GMM model, while Tables A-1 and A-2 in the Appendix show the results of our SELPDM (for robustness purposes). All AR (2) and Hansen tests are not statistically significant, indicating that our findings are trustworthy and unbiased (Roodman 2006).We also follow the latest similar research (Bermpei et al. 2018; Phan et al. 2021; Saha and Dutta 2021; Shabir et al. 2021).

We use country-level indicators to test the robustness because Z-Score estimation and NPL are dependent on country-level variables. In Tables 4 and 5, we evaluate our model using data from macroeconomic indicators to back up our previous findings. Overall, the findings in Table 8 are consistent with those in Tables 4 and 5. Our robustness tests show that our significant results are consistent. The robustness tests back up our main findings. As a result, the results show that the FS, EPU, and QOG are resistant to different regression specifications.

We reported index instance of QOG for the second robustness check as an alternative measure of QOG indicator, and our main findings are consistent as evidence in Table 9. We use PCA to combine the five QOG dimensions (ROL, COC, GEF, ROQ, and PST) into a single QOG index. This is consistent with the results of the robustness test performed by (Khan et al. 2020a, b). The significance of the sources of heterogeneity is related to the impact of various forms of QOG on bank stability. Table 9 displays the

Table 7 Global financial Crises (GFC, 2007–2009)

	(1)	(2)	(3)
Variables	Pre-2007 GFC	During-2008 GFC	Post-2009 GFC
EPU	−0.009***	−0.005**	−0.010**
	(−5.37)	(−2.62)	(−02.17)
QOG	0.627***	0.459	0.322***
	(5.27)	(0.25)	(9.07)
GDP	0.287	0.147	0.039
	(0.27)	(0.09)	(0.10)
TOP	0.086**	−0.285	0.342*
	(2.65)	(−0.52)	(1.89)
INF	−0.073*	−0.0.97**	−0.63***
	(−1.08)	(−2.68)	(11.27)
BCN	−0.043**	−0.096*	0.019**
	(−2.19)	(−1.77)	(2.36)
BDT	0.067**	−0.062***	0.037**
	(2.38)	(13.01)	(−2.01)
DCP	0.009***	0.007***	0.003**
	(7.27)	(5.09)	(2.69)
Constant	5.267***	5.968***	5.518***
	(13.17)	(17.58)	(9.93)
Observations	345	298	345
cross-section	23	23	23
Time effect	Yes	Yes	Yes
Country effect	Yes	Yes	Yes
Hansen J *p*-value	0.415	0.567	0.426
AR (2) *p*-value	0.817	0.761	0.617

Source The authors' estimations. The robust t-statistics are reported in the parenthesis. *, **, *** 10%, 5% and 1% significance, respectively

PCA estimation results. in line with those of (Dutta and Saha 2020; Khan et al. 2020a, b). Our findings show that adequate governance quality and an institutional environment are critical for promoting economic development and the stability of the banking sector. The robustness tests validated our main findings, indicating that QOG is a significant moderating variable in the relationship between EPU and FS (Z-score, NPL).

5 Conclusion and policy recommendations

The EPU index is currently a hot topic among policymakers worldwide, as they seek to protect their financial markets and banking systems from the numerous shocks (expected and unexpected), black swan events (unforeseen events) when investing in diverse assets around the world. This work investigates the relationship between EPU and Financial Stability (FS) (i.e., Z-scores and non-performing loans (NPL))

with the mediating variable of governance quality through a 23-country panel data from 2005 to 2019.

Essentially, our findings show that EPU has a significant and negative influence on FS (as measured by Z-score), while it has a significant and positive influence on FS (proxied by NPL ratio). This demonstrates that during periods of significant EPU, banks' asset allocation decreases while their risk aversion increases. Government effectiveness, political stability, and regulatory stability all have a significant and positive impact on the moderating effect. Empirical evidence suggests that QOG can be used to mitigate the negative impact of EPU on FS-proxies. Because many countries have weak institutions, their financial stability will be jeopardized as economic uncertainty rises. As a result, the region's economies must strive for economic stability while maintaining good governance. Without stronger governance, economic stability cannot guarantee financial stability.

Our research findings have significant policy implications. Policymakers must recognize the importance of improved QOG measures in attracting financial stability based on successful government policies. Our research also helps to shape appropriate policies for preserving financial stability and mitigating the negative effects of EPU on FS-proxies. The government should be aware of how frequent regulatory initiatives can impact bank risk at the macro and market structural levels. However, at the bank level, these risk assessment factors can also help financial managers develop appropriate policies to understand how banks respond to EPU. The implications of this research are also important for financial analysts and policymakers because they will be able to determine the effects of EPU on countries' FS. Furthermore, financial managers should pay closer attention to EPU shocks, which are expected to occur more frequently following the COVID-19 pandemic due to increased inflation as a result of supply disruptions in the global economy, leading to increased uncertainty in the market, government policies, and regulatory framework. Furthermore, as a result of the increased EPU shocks, financial managers must update their credit risk management indicators more consistently in response to anticipated and unexpected changes in economic policies. When lending to lenders in the real economy, lenders must strike a balance between profitability and acceptable risk-taking.

Although this work adds significantly to the small pool of literature on the subject, it has its own limitations. The EPU index is only available to major developed economies and not to developing economies. Furthermore, the EPU index does not consider other factors that may have an impact on EPU, such as general elections, trade conflicts, and the oil price crisis. Finally, due to linguistic differences, the EPU index is primarily based on text-searching newspaper articles, which may raise concerns about comparability when studying EPU in different economies.

Appendix: Estimation of Z-Score as dependent at country level (SELPDM)

See Tables 8, 9 and 10

Table 8 Impact of economic policy uncertainty, institutional quality on financial stability

Variables	(1) OLS Z-score	(2) SELPDM Z-score	(3) OLS NPL	(4) SELPDM NPL
$Z\text{-score}_{(t-1)}$		0.453***		
		(7.66)		
$NPL_{(t-1)}$				0.093***
				(9.24)
EPU	−0.024***	−0.024**	0.147***	0.183**
	(−14.08)	(−2.07)	(13.24)	(2.49)
QOG	0.166***	0.221***	−4.024***	−5.126**
	(6.76)	(5.97)	(−12.01)	(−2.41)
EPU*QOG	0.014**	0.027*	−0.321***	−0.589***
	(2.55)	(1.84)	(−9.21)	(−11.54)
GDP	0.109***	0.136***	−0.093***	−0.632***
	(6.08)	(8.99)	(−4.25)	(−9.21)
TOP	0.253***	−0.386***	−0.214*	−0.536**
	(4.45)	(−8.78)	(−1.08)	(−2.47)
INF	−0.069	−0.060*	0.048**	0..059***
	(−1.20)	(−1.92)	(2.53)	(7.21)
BCN	−0.091	0.122	−0.523*	−0.239*
	(−0.51)	(0.67)	(1.59)	(1.63)
BDT	0.150*	0.180***	−0.965***	−0.529***
	(1.60)	(4.17)	(−11.24)	(−7.21)
DCP	−0.138**	−0.142***	0.563*	0.832**
	(−2.57)	(−4.67)	(1.56)	(2.08)
Constant	6.278***	4.767***	−2.896**	−5.389***
	(6.08)	(4.87)	(−2.49)	(−14.25)
Observations	300	300	300	296
Cross sections	23	23	23	23
Time Effect	Yes	Yes	Yes	Yes
Country Effect	Yes	Yes	Yes	Yes
F test	186.3	16.07	076.24	13.28
Hansen J *p*-value		0.493		0.257
AR(2) *p*-value		0.854		0.645

Source The authors' own estimations. The robust t-statistics are reported in the parenthesis. The robust t-statistics are reported in the parenthesis. *, **, *** 10%, 5% and 1% significance, respectively

Table 9 Robustness with an alternative measure of QOG (QOG_IQ)

Variables	(1) OLS Z-score	(2) SELPDM Z-score	(3) OLS NPL	(4) SELPDM NPL
Z-score $_{t-1}$		0.569***		
		(9.52)		
NPL_{t-1}				0.876***
				(11.24)
EPU	−0.067***	−0.049**	0.169***	−0.103***
	(−9.21)	(−2.49)	(−13.24)	(−5.42)
QOG-IQ	0.485***	0.253***	0.672***	0.529***
	(7.09)	(11.97)	(10.52)	(9.57)
EPU*QOG-IQ	0.367**	0.679***	0.763**	0.409**
	(2.36)	(3.98)	(2.20)	(2.01)
GDP	4.321***	7.214***	−0.894***	−0.539***
	(19.52)	(11.10)	(−5.26)	(−9.07)
TOP	0.508***	−3.521***	−0.492***	−0.836***
	(14.98)	(−3.09)	(−5.83)	(−11.25)
INF	−0.689*	−0.529**	1.263*	0.983**
	(−1.69)	(−2.38)	(1.25)	(−1.51)
BCN	0.986	0.428	−0.869	−0.486
	(−0.69)	(0.67)	(−0.39)	(−0.09)
BDT	0.907*	0.423***	−0.297**	0.864***
	(1.25)	(9.17)	(−2.41)	(−9.18)
DCP	−0.693**	−0.867***	0.536*	0.843**
	(−2.57)	(−13.67)	(1.06)	(2.27)
Constant	23.257***	48.256***	−15.368***	−52.276***
	(7.08)	(3.87)	(−7.254)	(−5.27)
Observations	300	300	300	298
Cross sections	23	23	23	23
Time effect	Yes	Yes	Yes	Yes
Country effect	Yes	Yes	Yes	Yes
Hansen J *p*-value		0.228		0.459
AR(2) *p*-value		0.812		0.693

Source The authors 'own estimations. When we use QOG IQ as an alternative measure of QOG for robustness, the OLS and SELPDM results are reported in this table. The robust t-statistics are noted in the parenthesis. The robust t-statistics are reported in the parenthesis. *, **, *** 10%, 5% and 1% significance, respectively

Table 10 23-Economies list

Australia, Brazil, China, Canada, Colombia, Chile, France, Germany, Greece, Hong Kong (SAR, China), Italy, Ireland, India, Japan, S-Korea, Mexico, Netherlands, Russia, Spain, Singapore, Sweden, United Kingdom (UK), United States (US)

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References

Albulescu CT, Demirer R, Raheem ID, Tiwari AK (2019) Does the U.S. economic policy uncertainty connect financial markets? Evidence from oil and commodity currencies. Energy Econ 83:375–388. https://doi.org/10.1016/J.ENECO.2019.07.024

Al-Shboul M, Maghyereh A, Hassan A, Molyneux P (2020) Political risk and bank stability in the middle East and North Africa Region. Pacific-Basin Finance J 60:101291. https://doi.org/10.1016/J.PACFIN.2020.101291

Altman EI, Hotchkiss E (2006) Corporate financial distress and bankruptcy: predict and avoid bankruptcy, analyze and invest in distressed debt, 3rd edn. Wiley, New York. https://doi.org/10.1002/9781118267806

Al-Thaqeb SA, Algharabali BG (2019) Economic policy uncertainty: a literature review. J Econ Asymmetries 20:e00133. https://doi.org/10.1016/J.JECA.2019.E00133

Arellano M, Bond S (1991) Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Rev Econ Stud 58(2):277. https://doi.org/10.2307/2297968

Ashraf BN (2020) Policy uncertainty and bank liquidity hoarding: international evidence. SSRN Electron J. https://doi.org/10.2139/ssrn.3574193

Baker SR, Bloom N, Davis SJ (2016) Measuring economic policy uncertainty. Quarterly J Econ. https://doi.org/10.1093/qje/qjw024

Bakhsh S, Yin H, Shabir M, Ali K (2022) China Trade with belt and road countries: the role and impact of institutions. China Econ J. https://doi.org/10.1080/17538963.2021.1994709

Barth JR, Caprio G, Levine R (2004) Bank regulation and supervision: what works best? J Financ Intermed 13(2):205–248. https://doi.org/10.1016/J.JFI.2003.06.002

Beck T, de Jonghe O, Schepens G (2013) Bank competition and stability: cross-country heterogeneity. J Financ Intermed 22(2):218–244. https://doi.org/10.1016/J.JFI.2012.07.001

Belke A, Dubova I, Osowski T (2018) Policy uncertainty and international financial markets: the case of brexit. Appl Econ 50(34–35):3752–3770. https://doi.org/10.1080/00036846.2018.1436152

Berger AN, Guedhami O, Kim HH, Li X (2022a) Economic policy uncertainty and bank liquidity hoarding. J Financ Intermed 49:100893. https://doi.org/10.1016/J.JFI.2020.100893

Berger AN, Guedhami O, Kim HH, Li X (2022b) Economic policy uncertainty and bank liquidity hoarding. J Financ Intermed 49:100893. https://doi.org/10.1016/J.JFI.2020.100893

Bermpei T, Kalyvas A, Nguyen TC (2018) Does institutional quality condition the effect of bank regulations and supervision on bank stability? Evidence from emerging and developing economies. Int Rev Financ Anal 59:255–275. https://doi.org/10.1016/J.IRFA.2018.06.002

Blundell R, Bond S (1998) Initial conditions and moment restrictions in dynamic panel data models. J Econom 87(1):115–143. https://doi.org/10.1016/S0304-4076(98)00009-8

Botshekan MH, Takaloo A, Abdollahi Poor MS (2021) Global economic policy uncertainty (GEPU) and non-performing loans (NPL) in Iran's banking system: dynamic correlation using the DCC-GARCH approach. J Money Econ 16(2):187–212. https://doi.org/10.52547/jme.16.2.187

Boulanouar Z, Alqahtani F, Hamdi B (2021) Bank ownership, institutional quality and financial stability: evidence from the GCC region. Pacific-Basin Finance J 66:101510. https://doi.org/10.1016/J.PACFIN.2021.101510

Brogaard J, Detzel A (2015) The asset-pricing implications of government economic policy uncertainty. Manage Sci 61(1):3–18. https://doi.org/10.1287/mnsc.2014.2044

Canh NP, Binh NT, Thanh SD, Schinckus C (2020) Determinants of foreign direct investment inflows: the role of economic policy uncertainty. Int Econ 161:159–172. https://doi.org/10.1016/j.inteco.2019.11.012

Chi Q, Li W (2017) Economic policy uncertainty, credit risks and banks' lending decisions: evidence from Chinese commercial banks. China J Account Res 10(1):33–50. https://doi.org/10.1016/J.CJAR.2016.12.001

Choi S, Furceri D, Yoon C (2021) Policy uncertainty and foreign direct investment. Rev Int Econ 29(2):195–227. https://doi.org/10.1111/roie.12495

Cui X, Wang C, Liao J, Fang Z, Cheng F (2021) Economic policy uncertainty exposure and corporate innovation investment: evidence from China. Pacific-Basin Finance J 67:101533. https://doi.org/10.1016/J.PACFIN.2021.101533

Danisman GO, Demir E, Ozili P (2021) Loan loss provisioning of us banks: economic policy uncertainty and discretionary behavior. Int Rev Econ Financ 71:923–935. https://doi.org/10.1016/J.IREF.2020.10.016

Dou Y, Li Y, Dong K, Ren X (2022) Dynamic linkages between economic policy uncertainty and the carbon futures market: does Covid-19 pandemic matter? Resour Policy 75:102455. https://doi.org/10.1016/j.resourpol.2021.102455

Dutta KD, Saha M (2020) Nexus of governance, macroprudential policy and financial risk: cross-country evidence. Econ Chang Restruct. https://doi.org/10.1007/s10644-020-09301-9

Fang Y, Hasan I, Marton K (2014) Institutional development and bank stability: evidence from transition countries. J Bank Finance 39(1):160–176. https://doi.org/10.1016/J.JBANKFIN.2013.11.003

Gulen H, Ion M (2015) Policy uncertainty and corporate investment. Rev Financ Stud. https://doi.org/10.1093/rfs/hhv050

Hansen BE (2000) Sample splitting and threshold estimation. Vol. 68

Hou X, Gao Z, Wang Q (2016) Internet finance development and banking market discipline: evidence from China. J Financ Stab 22:88–100. https://doi.org/10.1016/J.JFS.2016.01.001

Hu S, Gong Di (2019) Economic policy uncertainty, prudential regulation and bank lending. Financ Res Lett 29:373–378. https://doi.org/10.1016/J.FRL.2018.09.004

Jianguo D, Ali K, Alnori F, Ullah S (2022) The nexus of financial development, technological innovation, institutional quality, and environmental quality: evidence from OECD economies. Environ Sci Pollut Res. https://doi.org/10.1007/s11356-022-19763-1

Junttila J, Vataja J (2018) Economic policy uncertainty effects for forecasting future real economic activity. Econ Syst 42(4):569–583. https://doi.org/10.1016/J.ECOSYS.2018.03.002

Karadima M, Louri H (2021) Economic policy uncertainty and non-performing loans: the moderating role of bank concentration. Finance Res Lett 38:101458. https://doi.org/10.1016/J.FRL.2020.101458

Khan MA, Khan MA, Ali K, Popp J, Oláh J (2020a) Natural resource rent and finance: the moderation role of institutions. Sustainability. https://doi.org/10.3390/su12093897

Khan MA, Gu L, Khan MA, Oláh J (2020b) Natural resources and financial development: the role of institutional quality. J Multinatl Financ Manag. https://doi.org/10.1016/j.mulfin.2020.100641

Law SH, Azman-Saini WNW (2012) Institutional quality, governance, and financial development. Econ Governance 13(3):217–236. https://doi.org/10.1007/s10101-012-0112-z

Ndou E, Mokoena T (2019) Do companies' cash holdings impact the transmission of economic policy uncertainty shocks to capital formation?. In: Inequality, output-inflation trade-off and economic policy uncertainty. Springer International Publishing, Cham, pp. 453–470

Ogbonna OE, Ogbuabor JE, Manasseh CO, Ekeocha DO (2022) Global uncertainty, economic governance institutions and foreign direct investment inflow in Africa. Econ Chang Restruct. https://doi.org/10.1007/s10644-021-09378-w

Ozili PK (2021) "Economic policy uncertainty: are there regional and country correlations? Int Rev Appl Econ. https://doi.org/10.1080/02692171.2020.1853075

Ozili PK (2022) Economic policy uncertainty, bank nonperforming loans and loan loss provisions: are they correlated? Asian J Econ Bank. https://doi.org/10.1108/ajeb-10-2021-0119

Phan DH, Iyke BN, Sharma SS, Affandi Y (2021) Economic policy uncertainty and financial stability–is there a relation? Econ Modell 94:1018–29. https://doi.org/10.1016/j.econmod.2020.02.042

Rasoulinezhad E, Taghizadeh-Hesary F (2022) Role of Green finance in improving energy efficiency and renewable energy development. Energ Effi 15(2):14. https://doi.org/10.1007/s12053-022-10021-4

Ren X, Zhang X, Yan C, Gozgor G (2022) Climate policy uncertainty and firm-level total factor productivity: evidence from China. Energy Economics 113:106209. https://doi.org/10.1016/j.eneco.2022.106209

Roodman D (2006) An index of donor performance. SSRN Electron J. https://doi.org/10.2139/ssrn.982950

Rosman R, Wahab NA, Zainol Z (2014) Efficiency of Islamic banks during the financial crisis: an analysis of middle Eastern and Asian Countries. Pac Basin Financ J 28:76–90. https://doi.org/10.1016/J.PACFIN.2013.11.001

Saha M, Dutta KD (2021) Does governance quality enhance the efficacy of macroprudential policy? Econ Lett. https://doi.org/10.1016/j.econlet.2021.109886

Schiantarelli F, Stacchini M, Strahan PE (2020) Bank quality, judicial efficiency, and loan repayment delays in Italy. J Financ 75(4):2139–2178. https://doi.org/10.1111/jofi.12896

Sha Y, Kang C, Wang Z (2020) Economic policy uncertainty and mergers and acquisitions: evidence from China. Econ Model 89:590–600. https://doi.org/10.1016/J.ECONMOD.2020.03.029

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 J 68:101610. https://doi.org/10.1016/J.PACFIN.2021.101610

Shabir M, Jiang P, Hashmi SH, Bakhsh S (2022) Non-linear nexus between economic policy uncertainty and bank lending. Int Rev Econ Financ 79:657–679. https://doi.org/10.1016/J.IREF.2022.02.016

Shen H, Hou F, Peng M, Xiong H, Zuo H (2021) Economic policy uncertainty and corporate tax avoidance: evidence from China. Pacific-Basin Finance J 65:101500. https://doi.org/10.1016/J.PACFIN.2021.101500

Subramaniam Y, Loganathan N (2022) Uncertainty and technological innovation: evidence from developed and developing countries. Econ Chang Restruct. https://doi.org/10.1007/s10644-022-09402-7

Tabash MI, Farooq U, Ashfaq K, Tiwari AK (2022) Economic policy uncertainty and financing structure: a new panel data evidence from selected Asian economies. Res Int Bus Financ 60:101574

Taghizadeh-Hesary F, Yoshino N (2016) Monetary policy, oil prices and the real macroeconomic variables: an empirical survey on China, Japan and the United States. China Int J 14(4):46–69. https://doi.org/10.1353/chn.2016.0040

Taghizadeh-Hesary F, Phoumin H, Rasoulinezhad E (2022) COVID-19 and regional solutions for mitigating the risk of SME finance in selected ASEAN member states. Econ Anal Policy 74:506–525. https://doi.org/10.1016/j.eap.2022.03.012

Tang Wenjin, Ding Saijie, Chen Hao (2021) Economic uncertainty and its spillover networks: evidence from the Asia-Pacific countries. Pacific-Basin Finance J 67:101539. https://doi.org/10.1016/J.PACFIN.2021.101539

Tao S, Mengqiao Xu (2019) The impact of economic policy uncertainty on bank credit scale—an empirical study based on dynamic panel system GMM model. Open J Bus Manag 07(02):616–632. https://doi.org/10.4236/ojbm.2019.72042

Taskinsoy J (2019) Higher capital and liquidity regulations of Basel standards have made banks and banking systems become more prone to financial and economic crises. SSRN Electron J. https://doi.org/10.2139/ssrn.3401378

Tran QT (2019) Economic policy uncertainty and corporate risk-taking: international evidence. J Multinatl Financ Manage 52–53:100605. https://doi.org/10.1016/J.MULFIN.2019.100605

Uddin A, Chowdhury MAF, Sajib Sanjay Deb, Masih Mansur (2020) Revisiting the impact of institutional quality on post-GFC bank risk-taking: evidence from emerging countries. Emerg Markets Rev 42:100659. https://doi.org/10.1016/J.EMEMAR.2019.100659

van Duuren T, de Haan J, van Kerkhoff H (2020) Does institutional quality condition the impact of financial stability transparency on financial stability? Appl Econ Lett 27(20):1635–1638. https://doi.org/10.1080/13504851.2019.1707762

Vural-Yavaş Ç (2020) Corporate risk-taking in developed countries: the influence of economic policy uncertainty and macroeconomic conditions. J Multinatl Financ Manag 54:100616. https://doi.org/10.1016/J.MULFIN.2020.100616

Wang X, Li J, Ren X (2022) Asymmetric causality of economic policy uncertainty and oil volatility index on time-varying nexus of the clean energy, carbon and green bond. Int Rev Financ Anal 83:102306. https://doi.org/10.1016/j.irfa.2022.102306

Wen J, Khalid S, Mahmood H, Yang X (2021) Economic policy uncertainty and growth nexus in Pakistan: a new evidence using NARDL model. Econ Change Restructuring. https://doi.org/10.1007/s10644-021-09364-2

Windmeijer F (2005) A finite sample correction for the variance of linear efficient two-step GMM estimators. J Economet 126(1):25–51. https://doi.org/10.1016/J.JECONOM.2004.02.005

Yaya OS, Abu N, Ogundunmade TP (2021) Economic policy uncertainty in G7 countries: evidence of long-range dependence and cointegration. Econ Chang Restruct 54(2):541–556. https://doi.org/10.1007/s10644-020-09288-3

Yin H (2019) Bank globalization and financial stability: international evidence. Res Int Bus Financ 49:207–224. https://doi.org/10.1016/J.RIBAF.2019.03.009

Yu B, Li C, Mirza N, Umar M (2022a) Forecasting credit ratings of decarbonized firms: comparative assessment of machine learning models. Technol Forecast Soc Chang 174:121255

Yu H, Lv W, Liu H, Wang J (2022b) Economic policy uncertainty and corporate bank credits: evidence from China. Emerg Mark Financ Trade 58:3023–3033

Zhang W, Zhang X, Tian X, Sun F (2021) Economic policy uncertainty nexus with corporate risk-taking: the role of state ownership and corruption expenditure. Pacific-Basin Finance J 65:101496. https://doi.org/10.1016/J.PACFIN.2021.101496