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# Nexus of governance, macroeconomic conditions, and financial stability of banks: a comparison of developed and emerging countries

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## Abstract

The study aims to explore the impact of governance and macroeconomic conditions on financial stability in developed and emerging countries. The study sample comprised 122 countries from 2013 to 2020, and a comprehensive set of variables was used to construct the financial stability index (FSI). The results of the two-step system GMM analysis, robust with D–K regression, indicate that interest rate, GDP growth, voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, and control of corruption have a positive and statistically significant impact on financial stability. However, inflation, money supply, and the rule of law have adverse and insignificant effects on financial stability. Notably, the findings vary between developed and emerging countries due to differences in governance and macroeconomic conditions and their role in financial stability. The study concludes that regulatory governance and macroeconomic conditions are crucial for financial stability. These outcomes are significant for central banks, academia, and policymakers, as they emphasize the need for stable financial systems and sustainable, balanced growth through governance and macroeconomic conditions.

**Keywords:** Financial stability of banks, Macro-economic condition, Governance, Economic freedom, Two-step system generalized method of moments (GMM)

**JEL Classification:** E5, G21, E6, G18, F12

## Introduction

Financial system problems have demonstrated strong links between the health of the real economy and financial stability. Traditionally, the core objective of any central bank is to maintain monetary stability in a country. Recently, central banks are focusing on attaining financial stability only from financial profitability, as the primary objective (Elsayed et al. 2023). Central banks have adopted various strategies to achieve the country's financial stability goals. Some countries established separate institutions for prudent supervision and maintaining financial stability. However, many countries amended

the objectives of the current regulator and governance (Llewellyn 2006; Global Financial Stability Report 2009).<sup>1</sup> The financial stability objectives of central banks have gained attention due to the unnecessary expansion of large financial institutions, which can be attributed to poor governance, macroeconomic conditions, and high competition. These banking industry activities reduce the profitability of banks (Yuanita 2019). This situation may motivate bank management or compel them to maintain or increase profit and stability. According to Xu et al. (2019), banks' sources of profitability should be closely monitored to ensure that banks' ability to maintain their financial stability is not compromised. On the other hand, strict banking restrictions might obstruct the nation's economy from growing sustainably. Therefore, Klingelhofer and Sun (2019) suggested a multi-instrument framework for achieving financial stability objectives. The macro-prudential system can be the best instrument to achieve financial stability without economic slowdown. Similarly, Evanoff et al. (2017) highlighted that Basel III had introduced a new standard for capital management requirements, creating new policy and governance challenges that must be addressed. Mabkhot and Al-Wesabi (2022) have emphasized that a strong banking system is key for ensuring continued financial stability, as banks play a crucial role in financing businesses and maintaining stability in a country's real economy. They have also noted that only a few studies have focused on the link between macroeconomics, world governance factors, and financial stability. These studies have focused on a single country or indicator such as NPL (non-performing loan), or Z-Score based on the standard deviation of ROA (return on assets). However, studies have yet to explore a global perspective and compare developed and developing countries to better understand the overall picture.

An economic policy based on low-interest rates can lead to increased bank risk-taking, ultimately harming financial stability, a noteworthy goal that policymakers strive to achieve. Banks can mitigate their exposure to interest rate changes by implementing hedging strategies, allowing central banks to adjust interest rates. Past studies have shown that these strategies play a significant role in achieving financial stability and are commonly utilized by financial institutions to manage residual risk, also known as money supply basis residual risk (Elsayed et al. 2023). The inflation rate is a crucial indicator of macroeconomic stability in any economy. A high rate can harm countries with high debt levels, and reduce competition in global markets. While inflation targeting (IT) is a widely recognized framework in monetary policy, the relationship between inflation and financial stability in emerging market countries has yet to be extensively researched (Mishra and Dubey 2022). Therefore, neglecting financial stability (institutional balance sheet) effects in policy advice is key to understanding policy makers' environment. Some studies focus on macroeconomic policy factors; however, those exploring the use of comprehensive measures for financial stability are less prominent (Arnold 2022; Elsayed et al. 2023). Hence, the role of macroeconomic conditions in financial stability is still debatable (Wibowo et al. 2022).

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<sup>1</sup> For this debate see Llewellyn (2006), several supervisory agencies were merged in UK in 1999 and the Financial Services Authority (FSA) was created. In particular the single agency model is adopted by the UK, Korea, Iceland, Denmark, Latvia, Sweden, and Hungary but not universally. Also see Global Financial Stability Report (2009).

Governance indicators, including regulatory governance, corruption, the rule of law, government effectiveness, political stability, and accountability, are crucial to the nexus between macroeconomic conditions and financial stability. However, a significant problem is that these indicators vary considerably between developed and emerging countries. Additionally, emerging economies face GDP growth, money supply, and inflation challenges. Therefore, improving the governance environment is essential for maintaining a stable financial sector in emerging economies. Macroeconomic improvements must accompany better regulatory governance, corruption control, the rule of law, accountability, and political stability. A balanced approach can enhance the sustainable financial stability of banks within the financial system. Future studies should examine the development of governance indicators about financial stability, as this relationship can be scrutinized using a larger dataset across different geographic contexts. According to the stakeholder theory, good governance requires government actions and possible strategies that encourage steady growth and stability (Malik et al. 2022). Hence, the relationship of financial stability with governance indicators and macroeconomic conditions an important research topic, which can elucidate the factors contributing to a stable financial system and sustainable economic growth.

The available research on the banking system of advanced and emerging countries concentrates mainly on the internal financial performance and profitability, along with their bank-level determinants, pertaining to a single country (Wibowo et al. 2022). However, the effect of external factors on financial stability has largely been ignored. In addition, the low profitability of banks becomes a challenge for the financial stability of banks in advanced countries (Global Financial Stability Report 2016). Therefore, profitability should accompany financial stability due to the significant exposures of banks. Bezemer (2010) proposed a method for evaluating financial stability and encouraging economic accounting. De Haan and Vlahu (2015) differentiated financial institutions from non-financial institutions, based on three points, i.e., capital requirement, regulation, and business nature. They also differ in terms of the size of exposure and their impact on the financial system. Therefore, a comprehensive financial stability index is needed, comprising bank stability and financial performance. Developed and emerging economies vary due to different macroeconomic conditions and governance environments, requiring different policy actions. Kiemo et al. (2019) also suggested that the study of the financial stability concept is necessary, especially over the last decade, due to changes in the financial landscape, deregulation, and innovation in financial sectors. Moreover, Ullah et al. (2021a, b) recommended that future research determine the direction of banks' financial stability at the regional and national levels, to control crime, and encourage sustainable progress and steadiness in the financial sector. It is crucial to determine the force behind value creation, and understand how it affects bank stability with governance and macroeconomic conditions indicators. Therefore, there exists a research gap in comprehending the intricate relationship between external factors and the financial stability of banks. Hence, further research must investigate the interaction of different governance indicators and macroeconomic conditions with financial stability.

This study aims to investigate the impact of (1) macroeconomic conditions and (2) governance indicators on the financial stability of banks across a sample of 122 countries.

It also compares the role of governance and macroeconomic condition on financial stability in developed and emerging countries. This study contributed in numerous ways. **First**, to enrich the literature, this study makes an innovative contribution by categorizing the sample into developed and emerging countries, comprising 34 developed and 88 emerging countries, for the period of 2013–2020. Comparing with past studies, we note that Salisu and Adediran (2020) focused solely on Africa, while Elsayed et al. (2023) studied only four Gulf Cooperation Council (GCC) countries using the NARDL method. Mabkhot and Al-Wesabi (2022) also focused on the GCC countries, considering a single indicator, the Z-Score, for macroeconomic and financial stability analysis. Moreover, Wibowo et al. (2022) examined the fiscal and monetary policy mix on economic growth only in the Islamic Conference (OIC) countries. Hence, it is crucial and contributive to understand how these external factors, both, collectively and separately, impact the financial system's stability in comparisons of emerging and developed countries at a global level.

**Secondly**, this study significantly contributes to using a broader set of financial stability index indicators. Previously, studies used single indicators for financial stability, e.g., Mishra and Dubey (2022) used the Zscore focused solely on inflation, and utilized a single financial stability indicator, Z-score, for a sample of 64 emerging countries. However, they did not consider other important macroeconomic indicators, such as interest rates and money supply, as well as governance factors, thereby limiting the scope and depth of their study. Furthermore, Xu Hu and Das (2019) used the ROE and examined only the link between profitability and financial stability in the US, Europe, and advanced economies, highlighting the need to study the nexus between macroeconomics, governance factors, and financial stability at the global scale. Specifically, this study constructed a financial stability index based on six indicators, including profitability, capital requirements, and the nature of the business. This study provides fresh and comprehensive evidence of the methodology, literature, and theory of the financial conditions of developed and developing countries. Stability of the financial system is particularly essential for several reasons: (1) The financial sector is the primary source of growth and development in developing countries. (2) Due to the underdevelopment of financial markets, banks are the primary source of deposits and financing. (3) Bank instruments are the most acceptable mode of payment. (4) Deregulation or liberalization policies in many emerging countries have enhanced freedom in the management of banks (Arun and Turner 2004; Svartzman et al. 2021). This study uses six indicators, namely, Return on Assets (ROA), Return on Equity (ROE), Capital adequacy, Ratio of capital to the asset, Non-Performing Loans/Total Loans, and Bank Provisions to Non-Performing Loans (NPLs). These serve to indicate a country's institutional insolvency and resilience and reflect its banks' risk-weighted credit exposures. Therefore, financial stability is crucial for the financial system, as it is the primary source of growth and development in developing countries, and banks are the most acceptable mode of implementing financial transactions.

**Thirdly**, this study empirically measures the impact of independent variables, i.e., macroeconomic factors, namely GDP growth, inflation, interest rate, and money supply, and governance indicators, namely regulatory quality, political stability, government effectiveness, and control of corruption, voice, and accountability, the rule of law and

absence of violence/terrorism, on the dependent variable, financial stability, to highlight the insights into the theory and existing literature index. Moreover, advanced econometrics methods were applied, including system-GMM and D–K standard error fixed effect. The findings reveal that interest rate, GDP growth, government effectiveness, control of corruption, regulatory governance, the rule of law, voice & accountability, and political stability & absence of terrorism have a significant and positive impact on financial stability in the sample countries. However, inflation, money supply, and the rule of law had adverse effects. Apart from that, developed countries showed similar results, albeit with some differences. In contrast, emerging countries demonstrated that interest rate, GDP growth, government effectiveness, political stability, control of corruption, regulatory quality, voice & accountability, and absence of violence/terrorism had a significant and positive influence on the financial stability of banks. However, inflation, money supply, and the rule of law negatively impacted the financial stability of banks in emerging countries from 2013 to 2020. Hence, the study contributes to the literature by using comprehensive indicators and advanced econometric methods to provide fresh evidence on the relationship between macroeconomic and governance factors, and financial stability. As such, it fills a fundamental gap in the literature. **Fourth**, for policy formulation, changes in economic conditions and governance are more critical than detecting the financial soundness or crises in a country. Therefore, this study provides enhanced policy implications, considering the current needs of developing countries, as following the policies of advanced countries would not serve the purpose. By doing so, this study expands the base approach of existing knowledge by enabling a deeper exploration of the distinct roles played by macroeconomic and governance indicators in shaping the financial stability of banks in diverse economic contexts.

The remaining part of the study is arranged as follows; the second section presents a short literature review on financial stability and its determinants: the third section describes the measures of financial stability, the construction of the financial stability index, all the variables used, and the econometric methodology. Next, the fourth section demonstrates the results and compares findings with past literature, while the fifth and last section presents the conclusion and recommendations.

## **Literature review and hypothesis development**

### **The concept of financial stability**

Financial stability is rooted in the theories of Hyman Philip Minsky and Keynes. They reported that financial system crises, along with their determinants, are due to swings in a fragile financial system. The Minsky theory got media attention in the late 2000s, during the subprime mortgage crisis. The financial instability hypothesis (FIH) was developed by Minsky; he highlighted capitalist economies and helped understand cyclical instability (Mishkin 1999). FIH depends on an increase in inflationary credit to fuel its unsustainable success (Mulligan 2013). Mishkin (1999) and later Ullah et al. (2021a, b) described that financial instability has two main causes: fiscal classification and the difficulty in collecting money from savers for investment purposes. As the business cycle continues to expand, increasingly leveraged enterprises expose the financial sector to higher risk, lowering actual risk-adjusted returns throughout the economy as speculative and financial sectors take a greater market share. As the business cycle's expansion phase

progresses, cautiousness in lending and borrowing is gradually abandoned, and higher leverage levels are considered normal (Mulligan 2013).

The financial system's ability to ensure an effective distribution and assurance of financial resources without disturbances is termed financial stability (Alsamara et al. 2019). Moreover, the financial stability of banks is the ability of the financial system to effectively handle risks, allocate resources, and absorb shocks (Houben et al. 2004; Ullah et al. 2021a, b). The financial sector enables monetary policy transmission because financial stability and monetary policy, based on macroeconomic conditions, are intimately connected (Arnold 2022). Financial stability is problematic and needs to be clarified because of the multilateral nature of vague regulation, fiscal policy, disbursement and settlement systems, and financial markets (Ullah et al. 2022). Financial stability objectives can be achieved through macro-level channels (Wymeersch 2008). However, the relationship between macroeconomic channels and financial stability must be explored thoroughly. Financial stability is believed to be a critical policy action area, especially in view of the financial crises faced during the last decade, after 2007–2008, and recently, during the Covid-19 pandemic. Moreover, macroeconomic conditions are related to financial stability as the stability of the banking system has a significant association in the less restricted financial sector; however, macroeconomic disturbances are negatively associated with the stability of banks (Mohr and Wagner 2013; Atellu and Muriu 2021).

Shiow-Ying and Jean (2013) studied the concept of financial stability of banks in emerging countries. They found that banks' risk reduces due to changes in the economic environment and market power, which endorse the financial stability viewpoint. Central banks should play their role in the financial stability of banks and maintain macroeconomic conditions, such as low inflation and efficient monetary policy transmission. A substantial role played by the central bank can help mitigate financial and economic crises efficiently (Cocriş and Nucu 2013; Nguyen et al. 2021). This support in mitigating financial crises will help a country improve macroeconomic conditions and the governance level of banks, which, in turn, will enhance financial stability. Governance and stability are crucial, and any form of bank failure may severely impact the entire financial system (Mutarindwa et al. 2021). Financial stability is affected by many external factors, and the literature theory on some important aspects is presented below.

### **Macroeconomic factors affecting financial stability of banks**

The stability of the financial sector is closely related to macroeconomic conditions. Macroeconomic conditions play a significant part in the financial stability of the banks through a two-level impact, i.e., short-term and long-term. Macroeconomic variables are sensitive to exogenous shocks in a highly competitive environment (Andres and Arce 2012; Ullah et al. 2020). Therefore, the financial stability of banks and macroeconomics are related concepts, however, plenty of research gaps exist in highlighting their connection, which need to be addressed in detail (Swamy 2014; Wibowo et al. 2022). The empirical literature showed mixed results on the role of macroeconomic factors in financial stability.

### ***Inflation and financial stability***

Of late, the issue of excessive inflation has been prevalent globally, causing serious concerns for policymakers. However, it has slowed down in developed economies, while being slightly restrained in developing economies, recently. Although less-developed countries had an average inflation rate of 12.7 percent in 1981, it was reduced to 4.6 percent in 2013. In contrast, average inflation in developed countries fell from 11.9 percent in 1981 to 1.4 percent in 2013; in 2022, it was 9.8 percent (World Bank Report 2022). Mishkin (1999) proposed that the financial instability hypothesis found that macroeconomic conditions, such as monetary policy and inflation, are related. The interest rate is a tool to control inflation, which is important for financial stability. Monnin and Jokipii (2010) identified the relationship between the inflation rate and the financial stability of banks. They found no significant association between the two in 18 OECD economies. On the other side, Dhal et al. (2011) studied inflation and financial stability in India and found that macroeconomic factors, including inflation at a high level, could have adverse effects on financial stability. A successful and robust financial sector requires a steady macroeconomic environment, with stable and low inflation rates, as a crucial prerequisite (Didier and Schmukler 2014; Ullah et al. 2020). High inflation rate reflects the potential risk to the bank's financial stability (Alsamara et al. 2019).

According to Mulligan (2013), the eventual outcome of negative economic growth is supportive of both the FIH and ABC theory if the increase in the price level throughout an unsustainable expansion is either driven by endogenous increases in liquidity demand, or indirectly by increases in risk tolerance. Previous studies ignore the comparison of inflation and financial stability of banks, and the relationship between developed and emerging countries; therefore, this study tries to fill this gap based on the theory. Therefore, based on the literature, the following research hypothesis is proposed:

Hypothesis ( $H_1$ ): *Higher inflation hurts the financial stability of banks.*

### ***Interest rate and financial stability***

The Austrian Business Cycle (ABC) theory and Hyman Minsky's Financial Instability Hypothesis (FIH) are related to and supportive of each other due to the negative correlation between interest rates and the number and market value of speculative enterprises across various industries (Mulligan 2013). Financial institutions would have rejected the responsibility arrangements currently accepted by them for themselves and their clients if expectations had been more realistic. Corporations become less liquid when their debt-to-equity ratios increase, making them more susceptible to increases in interest. Even in the absence of any efforts by the monetary authorities to restrain the boom, the general decline in liquidity and the rise in interest paid on highly liquid securities resulted in a market-based increase in interest rates. Though, since predicted returns from speculative investments typically surpass current interest rates significantly, the increase in credit costs does not affect the boom. As a result, the elasticity of demand for credit concerning interest rates decreases (Keen 2013).

Moreover, Anjom and Karim (2016) defined the interest rate as a measure of cost and borrowing, because it increases, and shows reduced purchasing power and stability during high inflation. Rajha (2017) found that lending interest rates weaken the loan-paying

ability of borrowers in the relationship between interest rates and non-performing loans, one of the measures of financial stability. Apostolakis and Papadopoulos (2019) found a negative correlation between financial stability and macroeconomic factors, such as interest rates. However, some studies found that granular relations between the instability of the banking sector and macroeconomic fluctuations exist (Bremus and Buch 2015; Önder and Özyıldırım 2019).

Financial stability is promoted by interest rates based on target inflation (Elsayed et al. 2023). Interest rates, directly or indirectly, help maintain banks' financial stability. Therefore, it is necessary to explore banks' interest rates and financial stability (Juhro 2022). There is a considerable difference in financial stability and macroeconomics in developing and developed countries (Swamy 2014; Wibowo et al. 2022). Hence it is important to fill this gap, especially the comparison of developed and developing countries. Therefore, based on the literature, a research hypothesis is as follows;

Hypothesis ( $H_2$ ): Higher bank interest rates improve banks' financial stability.

#### ***Money supply and financial stability***

The impact of global liquidity on the international financial stability of banks is a crucial topic for academics and policymakers alike because policymakers are concerned about money supply as part of the financial development link towards financial stability. These may include the concept that "financial conditions" have generally eased in the global economy (Caruana 2013). When there is excess liquidity, the ensuing risk may impact either asset prices or financial stability (financial imbalances of the money supply), or both (Borio et al. 2014; Hölzl 2021). Global liquidity is a mechanism for generating interactions and spillovers between the comprehensive fiscal, and local monetary policy. The issue of global liquidity is cyclical and needs a structural solution, based on the financial stability theory (Ullah et al. 2022). According to ABC theory, which only considers the expansion of monetary assets, it is impossible to concurrently raise investment and consumption without an exogenous injection of new credit because increasing investment spending would reduce saving and vice versa. In other words, credit growth provides the extra money needed for the concurrently rises in consumption and investment, which are unsustainable. Because credit growth lowers interest rates and increases the money available for lending, even a lack of increased saving urges businesses to borrow more (Mulligan 2013). Therefore, based on the literature, the following research hypothesis is proposed:

Hypothesis ( $H_3$ ): Higher money supply hurts the financial stability of banks.

#### ***GDP growth and financial stability***

The FIH is re-explained in light of the Austrian Business Cycle (ABC) theory. As per Minsky's FIH, unsustainable affluence develops endogenously as long stretches of economic expansion increase the willingness of both, borrowers and lenders to engage in doings for which they consistently underestimate the actual risk to financial stability. Hence, stability with growth and protracted prosperity naturally leads stakeholders to drive a wedge between ex-ante apparent risk-adjusted returns and gradually underestimate risk, determining the lender and borrower behavior and actual ex-risk-adjusted



returns. Credit expansion accelerates and aggravates this process. The ABC theory suggests the origin of the business cycle (Mulligan 2013).

A study by Monnin and Jokipii (2010) found a positive impact of real GDP output on financial stability in 18 OECD countries. A cross-country study by Manu et al. (2011) reported on financial and economic growth by applying the fixed-effect method. They found that banks' financial stability indicators, capital advocacy, asset quality, and liquidity have a significant positive relationship with GDP growth, leading to financial stability in Africa. Therefore, they suggest that stable macroeconomic growth is necessary for financial stability and the financial system which need to study in detail. Moreover, Noman et al. (2018) used macroeconomic variables, i.e., annual GDP growth rate and inflation rate, through the proxy annual percent change of the average consumer price index with financial stability. They found that the increase in financial stability (volatility and domestic credit) overlaps with GDP. GDP growth indicates macroeconomic stability and favors the country's ability to service its debt. Therefore, future work may need to fill this identified gap considering FIH theory (Mishra and Dubey 2022). Ullah et al. (2022) showed that macroeconomic conditions such as GDP growth significantly impact financial stability in emerging economies, leading toward the regulatory governance and economic growth theory. Therefore, based on the literature, the following research hypothesis is stated:

Hypothesis ( $H_4$ ): *GDP growth improves the financial stability of banks.*

#### **Governance factors affecting financial stability**

Good governance is the "manner in which power is wielded for managing the country's economic and social development, growth and stability." The governance environment is one of the most important indicators for the financial stability of banks and financial systems (Malik et al. 2022). The World Bank has outlined six indicators to measure the governance environment in a country. These are explained one by one, as follows:

#### ***Voice and accountability and financial stability***

Globally, transnational players create accountability regulations to address transparency and freedom of expression in private and public sectors (Wilhelm 2002). It is considered as one of the worst issues currently, and the biggest barrier to social and economic advancement, by the most important international players who create and frequently collaborate closely on such policies and strategies, i.e., "INGOs" (international non-governmental organizations) like "WB" (World Bank), "IGOs" (intergovernmental organizations), and the "TI" (Transparency International) (Jakobi 2018). Moreover, freedom of expression is universal (Wedel 2002). Therefore, voice and accountability are essential factors for financial stability, as per stakeholders' theory, because negative freedom of expression also has some drawbacks, such as causing financial instability, which need to be addressed. Moghadam (2013) and Elnahass et al. (2022) claimed that voice and accountability contribute positively to banking stability. He found that economic freedom through voice and accountability to entrepreneurs may create jobs and businesses and ultimately help stabilize banks.

On the other hand, Mohr and Wagner (2013) also found a significant relationship between economic freedom factors and financial stability by considering voice and

accountability as the economic freedom index indicator. They found that the banking system's financial soundness is significantly associated with an open, and less restricted banking sector. However, economic freedom, using the proxy of voice and accountability, is negatively correlated with the stability of banks. Asteriou et al. (2016) found mixed results on the impact of voice and accountability, an indicator of economic freedom, on financial stability at an aggregate level, depending on the stability measures used. Yevdokimov et al. (2018) found that voice and accountability (economic freedom) significantly impact banks' stability despite different methods in 11 EU countries. In addition, Ullah et al. (2022) found a significant positive effect of the voice and accountability indicator on banks' financial stability, indicating that economic freedom leads to banks' financial stability, following the stakeholders' theory. Based on the literature, we propose the following research hypothesis:

Hypothesis ( $H_3$ ): *Voice & Accountability improve the financial stability of banks.*

#### **Political stability and financial stability**

Max Weber's political theories hold that the government's legal use of physical force is essential to maintain political stability. The government loses the authority of law enforcement when it cannot fulfill the basic requirements of citizens, such as security and the capacity to obtain food and shelter, resulting in political instability. A failed state is thought to be characterized by political instability (Magalhães 2022). The influential Mancur Olson theory reported the significance of institutional and political factors in explaining how nations rise and fall because of variations in economic growth rates. According to Goldsmith, the theory of Olson is summarized as follows: Olson's argument indicates that political stability and instability are dichotomous: instability must reach a certain level to upend distributional coalitions. This impact might not be triggered by lower degrees of uncertainty. There are four types of political systems because of the discontinuous nature of stability. Each type is anticipated to have a distinctive growth pattern, such as persistently slow growth demonstrated by Type 1, which describes chronically unstable situations. Furthermore, Type 2, the dependably steady ones, ought to expand reasonably fast, but eventually begin to decline. In addition, Type 3 of political systems is about accelerating growth rate, stabilizing, and settling into a new pattern of political order. Last, Type 4 of political systems suggest regimes with deteriorating stability. Although Olson doesn't offer a specific forecast concerning these unstable systems, it can be assumed that their growth rates will drastically decrease (Evan and Bolotov 2021). Aisen and Veiga (2013), using the advanced system GMM econometrics method for panel data, observed that political instability negatively affects economic growth activities. Their outcomes revealed that political instability lowers sustainable growth rates significantly, leading to financial instability. Mabkhot and Al-Wesabi (2022) stated that political instability significantly affects the efficiency of banks by considering profitability indicators, which also play a significantly positive role in the financial stability of banks in the MENA region. However, the relationship between political instability and financial stability has not been explored yet; therefore, this research attempts to do that. The literature on political and financial stability is explored; therefore, this study fills this gap in developed and emerging countries. Based on the stakeholder theory literature, we propose the following research hypothesis:

Hypothesis ( $H_6$ ): *Political stability & absence of terrorism improves the financial stability of banks.*

#### **Government effectiveness and financial stability**

The quest for government performance or effectiveness has become more intense with recent regular and extensively accepted reforms (Ingraham and Moynihan 2000; Malik et al. 2022). Few studies have compared the domestic government's effectiveness or evaluated the perceived effectiveness of an entire nation's government (Rainey 2003; Elnahass et al. 2022). Government management and regulatory authorities must take note of new trends or financial innovations, in view of new risks that can lead to financial instability (Bleich and Dombret 2015). This can contribute to good governance as government effectiveness which can improve financial stability, as per institutional theory. Governance determines the proficiency and efficacy of the government, which depends on the effectiveness of the higher authorities, thereby leading to institutional financial system stability (Flückiger et al. 2019).

On the other hand, Francesco et al. (2019) claimed that effectiveness, as part of governance, refers to the functions of the government to formulate and implement the active policy and rules in the country. This can help to achieve the financial stability of the institutions. Based on the public administration and economic growth theory literature, a research hypothesis is proposed to fill the gap in literature and policy in developed and developing countries:

Hypothesis ( $H_7$ ): *Government effectiveness improves the financial stability of banks.*

#### **Regulatory quality and financial stability**

Financial institutions must fulfill the regulatory requirements, financial procedures, and specific legislation guidelines to maintain financial system integrity for management to control scandals. Financial institutions are regulated for the protection of investors and other stakeholders. The regulatory framework can help to manage the financial crisis and institutional instability as the regulator enforces compliance assurance and regulations on market stakeholders. Regulatory governance is an essential factor for a stable financial system and improves the financial stability of banks (Sivakumar 2011; Ullah et al. 2022). Dhal et al. (2011) also supported and stated that an innovative regulatory framework strengthens many sectors, especially the banking sector, causes financial stability through liquidity, enhances capital requirement and may threaten macroeconomic stability. According to Jordana and Rosas (2014), regulatory agencies and their autonomy in the banking sector are significant for the financial system's stability. At the same time, Sharma and Vashishtha (2007) stated that regulators' weaknesses are highlighted whenever a financial crisis happens. The financial system is a continuous process that may cause financial stability or instability. Also, Zingales (2015) and Ullah et al. (2022) noted that history shows that every financial crisis causes changes in the regulator, or the introduction of a new regulatory body, which helps to boost financial stability. Based on the literature, a research hypothesis is proposed as follows:

Hypothesis ( $H_8$ ): *Better regulatory quality positively contributes towards, and improves, the financial stability of banks.*

### ***Rule of law and financial stability***

According to Dicey (1908) and Fuller (1969), legal scholars proposed that the rule of law necessitates; (1) the concept of legal equality, i.e., that everyone is treated equally under the law. (2) transparent, steady, non-retroactive, and long-lasting rules, and (3) generic principles that apply universally to a sizable population. If implemented, all these rules can maintain a stable financial system. Ensuring the rule of law can be recognized as high quality of governance quality, and is much more vigorous in developed, than in developing countries; this can boost financial stability (Kaufmann et al. 2010; Samarasinghe 2018; Boulanouar et al. 2021). Based on the literature, the following research hypothesis is proposed:

Hypothesis ( $H_9$ ): *Better rule of law improves the financial stability of banks.*

### ***Control of corruption and financial stability***

Corruption is one of the major social evils, which raises questions about governance accountability in both, the public and private sectors. It is one of the main hurdles to financial stability, economic growth, and progression in all disciplines. The government plays a role in governance to implement effective corruption control policies (Francesco et al. 2019). Corruption and public services, as governance indicators, are interrelated (Mucollari 2018). This can be considered from the perspective of financial instability. Gallup (2019) reported that developing countries face many obstacles to financial stability and growth, e.g., corruption, low investment in local and foreign political stability, law & order situation, transparency holding in the offices, and many more. It is also well recognized that corruption alone does not impede an economy's growth, especially in resource-rich countries. The Chinese government uses a combination of intelligence and corruption to govern the country better. Malik et al. (2022) stated the negative impact of corruption on a country's growth, leading to instability, because investors may shift their investment to countries with better governance practices, if corruption exists. However, Hoinaru et al. (2020) reported the "greasing the wheels" notion and stated that corruption positively affects economic development, which leads to financial stability. Based on the literature, we propose the following research hypothesis:

Hypothesis ( $H_{10}$ ): *Control of corruption improves the financial stability of banks.*

## **Research methodology, data, and econometric model**

### **Research design and data**

This study attempts to determine the macroeconomic and governance factors that affect the financial stability of banks. Therefore, it empirically measures the impact of independent variables, i.e., macroeconomic factors (such as inflation, interest rates, money supply, and GDP growth), and governance indicators (such as government effectiveness, control of corruption, regulatory governance, the rule of law, voice & accountability,

political stability and absence of terrorism) on the dependent variable, i.e., financial stability, in the full sample, and also compares the outcomes for advanced and emerging countries.

This study is based on macro level data, comprising 122<sup>2</sup> countries, including 34 developed and 88 emerging countries, spanning from 2013 to 2020 balanced panel. The focus on developed and emerging countries is due to the differences in their economic development and financial systems. Developed countries typically have well-established financial systems and stable macroeconomic conditions, while emerging countries often face more significant macroeconomic challenges with underdeveloped financial systems. This comprehensive approach enables a more nuanced understanding of the external factors that impact financial stability across various economic contexts, providing insights relevant to ongoing policy debates on promoting financial stability in both, developed and emerging economies. Furthermore, this study employs a quantitative research design that compares developed and emerging countries through numerical data and exhibits a theory and deductive research relationship that aligns with an objectivist social reality conception and a natural science approach. In finance, macroeconomics institutional, international, and regional studies, using time series and balanced panel data has become customary to support policy decisions through empirical research. Balanced panel data are popular due to recent developments in software, such as Stata, which allow for sophisticated computations (Karabiyik et al. 2019). The large panel dataset used in this study is advantageous due to its greater variability and efficiency in controlling for individual heterogeneity and reducing collinearity among variables. This dataset can accurately detect and measure statistical effects through the panel, which other approaches cannot (Wooldridge 2010). In short, studying developed and emerging countries in secondary data research is crucial for gaining valuable insights into economic and institutional factors, identifying best practices for improving financial stability, understanding challenges and opportunities from globalization, and comprehending the interrelationships between various factors that affect financial stability and resilience globally.

Secondary data and country-level annual data for the financial stability index are collected, from the financial soundness indicators of the International Monetary Fund (IMF) database and financial reports of each country. Macroeconomic conditions are measured in terms of GDP growth (proxy of annual GDP present change growth), inflation (annual consumer price index), real interest rate (annual percentage change), and money supply (proxy of credit growth, which is estimated as domestic credit to the private sector as a percentage of GDP). Data on these variables are collected from the

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<sup>2</sup> Sample Advanced Countries: Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong SAR, Iceland, Ireland, Israel, Italy, Italy, Japan, Korea, Latvia, Luxembourg, Malta, Netherlands, Norway, Portugal, San Marino, San Marino, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States.

Sample Emerging Countries: Afghanistan, Albania, Algeria, Argentina, Armenia, Bangladesh, Belarus, Bhutan, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burundi, Cambodia, Cameroon, Central African Republic, Chad, Chile, China, Colombia, Congo, Costa Rica, Croatia, Djibouti, Dominican Republic, Ecuador, El Salvador, Equatorial Guinea, Fiji, Gabon, Georgia, Ghana, Guatemala, Guinea, Honduras, Hungary, India, Indonesia, Kazakhstan, Kenya, Kosovo, Lebanon, Lesotho, Lithuania, Macao, Macedonia, FYR, Madagascar, Malawi, Malaysia, Maldives, Mauritius, Mexico, Moldova, Myanmar, Namibia, Nepal, Nigeria, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Romania, Russia, Rwanda, Samoa, Saudi Arabia, Seychelles, Solomon Islands, South Africa, Sri Lanka, Tajikistan, Tanzania, Thailand, Tonga, Trinidad and Tobago, Turkey, Uganda, Ukraine, United Arab Emirates, Uruguay, Uzbekistan, Vanuatu, Vietnam, West Bank and Gaza, and Zambia.

International Monetary Fund (IMF). Moreover, governance is assessed by the society's existing rules and regulations, especially the quality of property rights contract execution. Moreover, regulatory governance is measured as the quality of regulatory frameworks—data of governance indicators collected through World Governance Indicators (WGI), World Bank.

This study sample utilizes strongly balanced panel data, which were selected based on data availability for the whole period, and all indicators of financial stability and other variables from 2013. Another reason for the sample selection is the global financial integration of the Belt and Road Initiative (BRI), which has changed the geographic and financial structure of many countries. As the initiative began in 2013 and has had a global impact, this study considers the availability of key variables in a strongly balanced panel dataset and the occurrence of the BRI in 2013. Additionally, statistics reflecting the value of the period from 2013 to 2020 are presented in this study.

### **Measuring and constructing financial stability index**

Financial stability is a multifaceted concept and requires a comprehensive framework for measurement. Houben et al. (2004) stated that financial stability is a multifaceted and challenging multidimensional concept. However, historical data of stability or composite benchmark indicators can be developed and the most suitable measure is the financial stability of banks. Therefore, Mohr and Wagner (2013) divide the financial stability concept into three streams. These streams are: (i) the banking crisis dummy variables approach during a specified period; (ii) based on CAMELS-like measures; (iii) composite indicators, which further endorse other studies, such as Ullah et al. (2022), and Houben et al. (2004), which suggested that in the case of policy objectives, financial stability measurement through an inclusive composite index is the best. Moreover, they suggest that measuring through single variables is not advisable. Similarly, Akram et al. (2007) also proposed that composite indices representing the continuous economic state, can be better indicators of financial stability, instead of an extreme phenomenon crisis, using a dummy variable of yes or no.

Moreover, Morales and Estrada (2010) established the financial stability index in Colombia to measure financial fragility endogenously. They used the probability of default (PD) for measuring financial stability, based on the credit risk, capital risk, liquidity, and variables, such as ratios of non-performing credit to the portfolio, the ratio of net loan losses to total loan portfolio, return on asset (ROA) and return on equity (ROE). Similarly, Masciandaro et al. (2013) recommended constructing an aggregate indicator of banking financial stability of banks, with emphasis on financial soundness. In developing the concerns measures, they used the macro-prudential dimension of the financial stability approach; they found that increase in the financial stability index means improved banking stability.

Morales and Estrada (2010) tried to develop the FSI, based on the individual type of institutions. Developing an index for various institutions enables a thorough and specific analysis of financial systems. Thach et al. (2019) also developed an aggregate financial stability index for Vietnam, recommending it as the best tool for policymakers to forecast financial stability. Therefore, a composite index of the financial stability of banks in the country needs to be developed using different indicators (Ullah et al. 2022).

**Table 1** Construction of financial stability of banks

Sr. #	Indicators	Weights	Impact
1	Capital to Asset Ratio	1/6	+
2	Capital adequacy	1/6	+
3	Bank provisions to non-performing loans (NPLs)	1/6	+
4	Non-Performing Loans/Total Loans	1/6	–
5	Return On Assets (ROA)	1/6	+
6	Return On Equity (ROE)	1/6	+

Source: The author collected data from Financial Soundness Indicators, IMF database from 2013–2020

The financial stability of banks index can be constructed using different indicators. Therefore, Martens and Raza (2009) provide step-by-step guidance on developing an index. They highlight four stages of index construction. The first stage is the selection of variables for the index. Kočíšová (2016) and Ullah et al. (2022) suggested six variables for the index representing the financial stability of banks and IMF financial soundness indicators used for the financial stability index. These include six indicators, with two representing financial performance, i.e., Return on Assets (ROA) and Return on Equity (ROE).

ROA and ROE protect and promote institutions and investments. The two indicators relate to capital requirements like Capital adequacy and the Ratio of capital to the asset. Capital adequacy comprised regulatory capital to risk-weighted assets and regulatory Tier 1 capital to risk-weighted assets. Capital adequacy expresses a country's banks' risk-weighted credit exposures, which reflect national circumstances. In contrast, the ratio of capital to assets indicates a country's institutional insolvency and resilience to the extent that its banks can deal with unexpected losses to avoid institutional default risk. The remaining two variables are related to business, like Non-Performing Loans/Total Loans and Bank provisions to non-performing loans (NPLs). They reflect a country's banks' credit performance depth and risk level because institutions consider non-repayment by the debtor or delay in due payment by borrowers. Also, it can repossess assets pledged as collateral or sell off the loans to collection agencies. Non-performing loans (NPLs) reduce the earnings level of institutions, cause losses, and affect stability. The second challenge is assigning weights to different indicators. This study follows Morris (2010), Mohr and Wagner (2013), Kočíšová (2016), and Ullah et al. (2022), using data from the Global Financial Stability Report (2018). It assigns equal weights to all indicators in the index, and the expected sign of Non-Performing Loans/Total Loans is negative. The remaining indicators have a positive sign and contribute to financial stability. They expressed that NPL is linked with the economic situation of a country. The loan quality significantly affects business stability and success. The third step in index construction was the normalization of data, as suggested by Morris (2010), Mohr and Wagner (2013), Kočíšová (2016), and Ullah et al. (2022). The data were normalized using the following formula, while the construction of the Financial Stability of Banks is depicted in Table 1.

$$I = \frac{I - \min(I)}{\max(I) - \min(I)}. \quad (1)$$

where  $I$  is the original variable,  $\min(I)$  is the minimum value of  $I$ , and  $\max(I)$  is the maximum value of  $I$ .

This formula transforms the financial stability index variables into 0 and 1. It transforms variables by dividing each observation by a benchmark or reference value. This approach is commonly used when we involve financial ratios and other variables where a reference value is readily available. This study deemed empirical normalization more appropriate because financial stability ratios are commonly expressed as financial assets to liabilities ratios. Therefore, a reference value, such as GDP or total financial assets, is readily available and can be used to normalize the ratios. This normalization approach is more intuitive and relevant in the context of financial stability analysis.

Moreover, empirical normalization allows for a more accurate representation of the data as it reflects the underlying economic and financial structure of the sample countries. Statistical normalization, on the other hand, may need to account for these structural differences and may lead to misinterpretation of results. Therefore, based on the nature of financial stability ratios and the availability of reference values, empirical normalization was considered a more suitable normalization approach for this study. Besides that, for the overall variable data normalization, we used the winsor2 cuts (1 99) data normalization process in STATA-15.

#### **Econometric methodology: two-step system generalized method of moments (Sys-GMM) and robustness with D–K regression method**

In this study, we employed two-step sys-GMM statistical models to test data empirically, and D–K regression method, by using Stata 15, for robustness, because these methods are advanced and robust for estimating parameters in panel datasets. To begin, sys-GMM regulates autocorrelation; second, the differentiation and outcomes of the study's panel dataset are more effectively examined. It uses moment conditions that are functions of parameters and the data, and their expectation is zero at their parameters' real value. Two-step- system GMM is the most appropriate method when the dependent variable's distribution is not known. The lag value of FSI is used in GMM to convert it to a dynamic model, thereby avoid the problem of autocorrelation in static regression models. Thus, GMM provides more efficient and accurate estimates by minimizing the lag effect of its dependent variable, i.e., financial stability, allowing for more accurate long-term forecasting. Sys-GMM is a dynamic panel data estimator for the long run and controls the endogeneity of the lagged dependent variable, i.e., financial stability index, unobserved panel heterogeneity, omitted variables bias, measurement errors, and autocorrelations. Endogeneity is a severe problem in banking studies; therefore, Sys-GMM is suitable when the number of cross-sections ( $N$ ) is greater than the period ( $T$ ). In this study,  $N = 122$ , while  $T = 8$ . Hence, this study is an excellent case to use the dynamic sys-GMM approach developed by Arellano and Bond (1991) and Roodman (2009). This study applied the Arellano–Bond (AR) test for zero autocorrelation in first-differenced as the failure to reject the null hypothesis of no second-order relationship implies that the original error term is serially uncorrelated. If the AR (2)  $p$ -value is  $> 0.05$ , while the AR (1)  $p$ -value is  $< 0.05$  the Sys-GMM moment conditions are correctly specified. Moreover, Hansen's (1982) J-Statistics tests the null hypothesis of the overall validity of the instrument used, which should be a smaller number of groups, and failure to reject the



null hypothesis show support for the choice of this instrument (Roodman 2009; Ullah et al. 2021b).

### Econometric model

The theoretical framework is based on the standard economic growth model's extended version, following a basic Cobb–Douglas production function. An econometric two-step system GMM dynamic model is explained as follows;

$$FSI_{i,t} = \beta_0 + \beta_1(FSI)_{i,t-1} + \beta_2(INFL)_{i,t-} + \beta_3(IR)_{i,t} + \beta_4(MS)_{i,t} + \beta_5(GDPG)_{i,t} + \beta_6(PS)_{i,t} + \beta_7(V\&A)_{i,t} + \beta_8(GE)_{i,t} + \beta_9(PS)_{i,t} + \beta_{10}(RL)_{i,t} + \beta_{11}(CC)_{i,t} + \mu \quad (2)$$

An econometric D–K regression standard error fixed effect model can be written as follow;

$$FSI_{i,t} = \beta_0 + \beta_1(INFL)_{i,t-} + \beta_2(IR)_{i,t} + \beta_3(MS)_{i,t} + \beta_4(GDPG)_{i,t} + \beta_5(PS)_{i,t} + \beta_6(V\&A)_{i,t} + \beta_7(GE)_{i,t} + \beta_8(RG)_{i,t} + \beta_9(RL)_{i,t} + \beta_{10}(CC)_{i,t} + \mu \quad (3)$$

While *FSI* Financial Stability Index, *INFL* Inflation, *IR* Interest Rate, *MS* Money Supply, *GDPG* GDP growth, *PS* Political Stability and Absence of Violence/Terrorism, *V&A* Voice and Accountability, *GE* Government Effectiveness, *RG* Regulatory Governance, *RL* Rule of Law, *CC* Control of Corruption), and  $\mu$  error term.

### Robustness check

We employed a different D–K fixed effect standard error approach to test for more robustness. It is one of the most effective methods for addressing spatial data dependency, serial dependency, and heteroscedasticity. It also deals with the robust estimator's cross-sectional dependence (CD). This approach includes the weighted autocorrelation and heteroscedasticity compatible estimator (HAC) values between the variables and residuals, together with a stranded error. The panel equilibrium and unbalanced values are handled by D–K, which also includes all forms of temporal and cross-sectional dependence (CD) (Ullah et al. 2021a, b).

## Results and discussion

This study focuses exclusively on the external factors affecting the financial stability of banks in 122 countries constituting the entire sample, further conducting a comparison between 34 advanced and 88 emerging countries.

### Baseline results

#### Results of unit root

The stationarity in data series is an inherited problem of longitudinal data; Therefore, it was checked through the second-generation panel unit root tests. Table 2 presents the CIPS (cross-sectional augmented IPS test of Im et al. (2003) unit root test results proposed by Pesaran (2004). The null hypothesis for CIPS explains that the data series have unit roots, and the alternative hypothesis indicates the significant stationarity of the data. Results indicate that *FSI*, *GDP* growth, *GE*, and *RQ* variables are stationary at the level and accept the  $I(0)$ . At the same time, inflation, *IR*, *MS*, *V&A*, *PS*, *RL*, and *CC* are

**Table 2** Pesaran CIPS unit root test (Source: Authors Estimations)

Sr	CIPS with trend and constant (C and CT)			
	Variables	Level	1st difference	Decision order
(1)	FSI	− 3.279 ***	−	I(0)
(2)	INFL	− 2.221	− 3.257***	I(1)
(3)	IR	− 1.379	− 2.258**	I(1)
(4)	MS	− 1.583	− 2.802**	I(1)
(5)	GDPG	− 2.557*	− 3.601***	I(0)
(6)	V & A	− 2.509	− 2.967***	I(1)
(7)	PS	− 1.874	− 3.879**	I(1)
(8)	GE	− 2.841**	−	I(0)
(9)	RQ	− 2.699**	−	I(0)
(10)	RL	− 2.397	− 3.522***	I(0)
(11)	CC	− 2.862	− 3.3245***	I(1)

\*\*\*, \*\*, \* indicate significance at 1%, 5%, and 10% levels, respectively

FSI Financial Stability Index, INFL Inflation, IR Interest Rate, MS Money Supply, GDPG GDP growth, PS Political Stability and Absence of Violence/Terrorism, V&A Voice and Accountability, GE Government Effectiveness, RG Regulatory Governance, RL Rule of Law, CC Control of Corruption). Terms here after onwards

**Table 3** Descriptive summary (Source: Authors Estimations)

Variables	Obs	Mean	Std. Dev	Min	Max
FSI	976	0.442	0.056	0.050	0.660
INFL	976	0.122	0.078	0.000	1.000
IR	976	0.434	0.086	0.000	1.000
MS	976	0.135	0.135	0.000	1.000
GDPG	976	0.646	0.059	0.000	1.000
V & A	976	0.578	0.244	0.000	1.000
PS	976	0.639	0.215	0.000	1.000
GE	976	0.505	0.237	0.000	1.000
RQ	976	0.553	0.209	0.000	1.000
RL	976	0.510	0.248	0.000	1.000
CC	976	0.459	0.242	0.000	1.000

stationary at the first level difference. Reported results of CIPS indicate that the unit root test's null hypothesis is rejected; therefore, the alternate hypothesis is accepted. Hence, all variables are stationary at a level and first difference, which leads to the dynamic nature model (i.e., dynamic two-step system) being fit to use and can further advance the models' different results. The outcomes of the CIPS test are shown in Table 2 below.

### Results of Descriptive Statistics

Table 3 summarizes all sample countries' observations, mean, and standard deviation, with minimum and maximum values. The number of observations is 976 for all the variables, which confirms that the dataset is a strongly balanced panel. At the same time, the mean and minimum values show the data's normal distribution and central tendency. Standard deviation to the mean value indicates that values variation has a normal level of dispersion around the mean and that the values tend to be close to the whole sample's

mean. The maximum and Std. Dev. values confirm the variability of the data, which can be seen in Table 3 below.

#### ***Results of correlation analysis- full sample***

Table 4 demonstrates the relationship between financial stability and factors related to macroeconomics and governance for the complete sample, consisting of 122 countries, of which 34 are advanced, and 88 are emerging. When a study consists of several variables, the correlation matrix is used. A larger value highlights a stronger correlation, while a lower value indicates a weaker correlation. A correlation is a strong or weak association between two variables. The foremost resolution of a correlation matrix is to notice multicollinearity problems among regressors, as multicollinearity glitches may unfavorably affect the accuracy of the results, rendering them misleading and biased. They suggest that correlation values should be less than 80% (Fan et al. 2020, Ullah et al. 2021a, b). Hence, Table 4 results and values clearly show that no abnormal values or multicollinearity exists in this matrix. The correlation matrix results for the complete sample show that financial stability is significant and positively correlated with inflation, IR, and GDPG. However, financial stability is significant and negatively correlated with GE, CC, RQ, ROL, V&A, and PA. Besides that, MS shows a positive, but insignificant relationship with financial stability. The detailed results in Table 4 are depicted below.

#### ***Results of emerging sample correlation analysis***

Table 5 displays the correlation between the financial stability composite, macroeconomic conditions, and governance factors in the sample of emerging countries. The overall emerging countries sample shows no multicollinearity issue, as all the values are below 80%, as explained above. Therefore, the data values in the matrix indicate no abnormal values or multicollinearity. Results show that PS has a significant and positive relationship with FSI in emerging countries at the significance level of 1%, while inflation, MS, and RQ show significant, but negative correlations with FSI at the significance levels of 10%, 1%, and 5%. Moreover, results demonstrate that FSI is positively, but insignificantly, correlated with IR, GDPP, CC, and PS. Also, FSI is negatively, but insignificantly, correlated with RQ, V&A, RL, and GE in emerging economies. Table 5 depicts the detailed correlation matrix results of emerging economies.

#### ***Results of advanced countries sample correlation analysis***

Table 6 demonstrates the correlation between financial stability and macroeconomic and governance factors of advanced countries sample for the 34 countries. Advanced countries' results show that financial stability positively correlated with inflation, MS, GDP growth, PS, GE, RQ, RL, and CC at different significance levels. However, FSI is negatively and insignificantly correlated only with IR in developed countries. Moreover, there is an insignificant and positive relationship between V&A and FSI in developed countries. The correlation matrix shows that the variables are not multicollinear. The detailed results are depicted in Table 6.

**Table 4** Pairwise correlations results of full sample (Source: Authors Estimations)

Variables	1	2	3	4	5	6	7	8	9	10	11
(1) FSI	1.000										
(2) INFL	0.109***	1.000									
(3) IR	0.162***	-0.002	1.000								
(4) MS	0.003	-0.067**	0.000	1.000							
(5) GDPG	0.238***	0.086***	0.058*	0.035	1.000						
(6) V&A	-0.334***	-0.290***	-0.144***	-0.043	-0.231***	1.000					
(7) PS	-0.155***	-0.313***	-0.182***	0.038	-0.171***	0.456***	1.000				
(8) GE	-0.339***	-0.371***	-0.278***	0.189***	-0.180***	0.377***	0.523***	1.000			
(9) RQ	-0.341***	-0.372***	-0.218***	0.167***	-0.187***	0.490***	0.357***	0.434***	1.000		
(10) RL	-0.347***	-0.345***	-0.244***	0.129***	-0.194***	0.334***	0.465***	0.557***	0.921***	1.000	
(11) CC	-0.299***	-0.322***	-0.240***	0.137***	-0.177***	0.480***	0.547***	0.529***	0.573***	0.455***	1.000

\*\*\*  $p < 0.01$  (1%), \*\*  $p < 0.05$  (5%), \*  $p < 0.1$  (10%)

**Table 5** Pairwise correlations results emerging countries (Source: Authors Estimations)

Variables	1	2	3	4	5	6	7	8	9	10	11
(1) FSI	1.000										
(2) INFL	-0.064*	1.000									
(3) IR	0.055	-0.098***	1.000								
(4) MS	-0.208***	-0.158***	-0.073*	1.000							
(5) GDPG	0.042	0.012	-0.013	-0.035	1.000						
(6) V&A	-0.017	-0.111***	0.071*	0.039	-0.075**	1.000					
(7) PS	0.117***	-0.203***	-0.062*	0.067*	-0.072*	0.489***	1.000				
(8) GE	-0.023	-0.242***	-0.133***	0.363***	-0.011	0.557***	0.606***	1.000			
(9) RQ	-0.083**	-0.247***	-0.039	0.285***	-0.059	0.607***	0.480***	0.548***	1.000		
(10) RL	-0.027	-0.194***	-0.063*	0.262***	-0.027	0.671***	0.603***	0.588***	0.411***	1.000	
(11) CC	0.024	-0.177***	-0.076**	0.228***	-0.019	0.578***	0.675***	0.527***	0.406***	0.591***	1.000

\*\*\*  $p < 0.01$  (1%), \*\*  $p < 0.05$  (5%), \*  $p < 0.1$  (10%)

**Table 6** Pairwise correlations results of advanced countries (Source: Authors Estimations)

Variables	1	2	3	4	5	6	7	8	9	10	11
(1) FSI	1.000										
(2) INFL	0.127**	1.000									
(3) IR	-0.035	0.149**	1.000								
(4) MS	0.266***	0.148**	0.348***	1.000							
(5) GDPG	0.482***	-0.053	0.034	0.144**	1.000						
(6) V & A	0.019	-0.037	-0.285***	-0.303***	-0.108*	1.000					
(7) PS	0.148**	0.089	0.088	0.054	0.093	0.380***	1.000				
(8) GE	0.314***	0.113*	0.009	0.363***	0.200***	0.318***	0.487***	1.000			
(9) RQ	0.443***	0.120**	0.009	0.358***	0.314***	0.267***	0.422***	0.646***	1.000		
(10) RL	0.345***	0.115*	-0.053	0.263***	0.188***	0.514***	0.531***	0.518***	0.555***	1.000	
(11) CC	0.283***	0.106*	-0.028	0.251***	0.153**	0.500***	0.524***	0.522***	0.520***	0.543***	1.000

\*\*\*  $p < 0.01$  (1%), \*\*  $p < 0.05$  (5%), \*  $p < 0.1$  (10%)

**Table 7** Results of external factors affecting financial stability (GMM Full Sample Countries) (Source: Authors Estimations)

Variables	(1)	(2)
	Two-step Sys-GMM	D–K S.E. Fixed Effect
	FSI	FSI
Financial Stability Index (t – 1)	0.806*** (0.003)	
Inflation	– 0.021*** (0.001)	– 0.059*** (0.012)
Interest Rate	0.006* (0.002)	0.038** (0.016)
Money Supply	– 0.002 (0.002)	– 0.028 (0.029)
GDP Growth	0.066*** (0.002)	0.075*** (0.013)
Voice & Accountability	0.004*** (0.001)	0.032* (0.023)
PA &AV	0.010*** (0.001)	0.059*** (0.014)
Government Effectiveness	0.004 (0.004)	0.004 (0.025)
Regulatory Quality	0.003 (0.002)	0.011 (0.029)
Rule of Law	– 0.044*** (0.003)	– 0.095*** (0.030)
Control of Corruption	0.018*** (0.002)	0.027** (0.026)
Constant	0.048*** (0.002)	0.275*** (0.023)
Time Effect (i:year)	YES	YES
Observations	854	854
R-squared		0.368
AR1	– 4.064	
AR1 <i>p</i> -value	0.00004.82	
AR2	– 0.746	
AR 2 <i>p</i> -value	0.456	
Sargan Test	336.3	
Hansen Test	109.8	
Hansen ( <i>p</i> -value) Test	0.219	
No. of Instruments J-Statistics	43	
Wald test-CHI2	467,487	
Wald test-CHI <i>p</i> -value	0	
Number of countries	122	122

Robust Standard errors in parentheses, \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$  indicate significance at 1%, 5%, and 10% levels, respectively, Used Stata `outreg2`, `xtabond2` command— (Roodman 2009)

### Results of the two-step Sys-GMM and D–K regression method analysis

#### Result of all sample countries

Table 7 depicts the results of external factors affecting the financial stability index (FSI) in the entire sample of 122 countries through a two-step sys-GMM and D–K

fixed effect regression method. The sys-GMM panel technique is a suitable estimator in this case, given that there are more groups than time. This estimator is particularly useful in dynamic panel models with a correlation between the explanatory variable and the error term. The two-step sys-GMM method addresses endogeneity issues related to the lagged dependent variable, measurement errors, unobserved panel heterogeneity, and omitted variable bias. Therefore, this study's dynamic sys-GMM panel estimator is appropriate for the data analysis. The outcomes in Table 7, Column (1) show that J-statistic (instruments) is 43 with a Wald test  $p$ -value of 0.000, indicating that the model is fit. Therefore, this study fails to reject the null hypothesis and confirms that sys-GMM is a valid instrument for this study. The study further applied the Arellano-Bond (AR) test to determine the presence of autocorrelation in the first-differenced results. The AR (1) test results showed a value of  $-4.064$ , indicating the presence of first-order autocorrelation and serial correlation. However, the AR (2) test showed a value of  $-0.746$ , suggesting the absence of second-order correlation and the failure to reject the null hypothesis. The results in Table 7 indicate that the original error term is serially uncorrelated. The moment conditions were correctly specified, as evidenced by the  $p$ -value of AR (2) being greater than 0.05. Additionally, the Hansen test  $p$ -value falls within the recommended range of 0.10 to 0.30, as Roodman (2009) suggested.

The results of the sys-GMM in Colum (1) show that GDP growth, voice & accountability, PA & AV, and control of corruption variables are positive and significant for financial stability at a significance level of 1%, while interest rate is significant at 10%. At the same time, inflation shows a significant, but negative impact on financial stability at the significance level of 1%. Moreover, government effectiveness and regulatory quality show a positive, but insignificant impact, while money supply negatively impacts financial stability. These results endorse Mohr and Wagner's (2013) findings and conclusions. The financial stability index has a significant and positive effect on banks of a dynamic nature at the significance level of 1%. In Column (2), the robustness and validity of the results through the D–K regression confirm the two-step sys-GMM findings indicating outcomes reliability. The outcomes of the full sample are displayed in Table 7 below.

#### ***Emerging countries sample results***

Table 8 shows the results of external macroeconomic and governance factors affecting financial stability in developing countries through the two-step sys-GMM and D–K regression method in emerging countries. After using several baseline models, such as OLS, dynamic OLS, fixed effect, and dynamic fixed-effect models, we utilized the dynamic panel sys-GMM estimator as the primary method. The results in Column (1) indicate that the J-statistic, which is used to determine the suitability of instruments, is 33. This suggests that the sys-GMM is the best method, since the number of groups exceeds the number of instruments. To further validate our findings, we conducted an Arellano-Bond (AR) test to determine whether there is zero autocorrelation in the first-differenced. The results show that the AR (1) value is  $-3.383$  with a  $p$ -value of less than 5%, indicating first-order autocorrelation and serial correlation. However, the AR(2) value is  $-0.673$ , indicating no second-order correlation, and the null hypothesis cannot be rejected since the  $p$ -value is greater



**Table 8** Results of external factors affecting financial stability (emerging countries sample) (Source: Authors Estimations)

Variables	(1)	(2)
	Two-step Sys-GMM	D-K S.E. Fixed Effect
	FSI	FSI
Financial Stability Index (t – 1)	0.807*** (0.014)	
Inflation	– 0.024*** (0.001)	– 0.027** (0.011)
Interest Rate	0.012** (0.003)	0.007* (0.010)
Money Supply	– 0.027*** (0.003)	– 0.027** (0.011)
GDP growth	0.048*** (0.003)	0.043*** (0.016)
Voice and Accountability	0.007** (0.002)	0.007** (0.007)
PA&AV	0.006** (0.002)	0.005* (0.007)
Government Effectiveness	0.022*** (0.004)	0.024** (0.016)
Regulatory Quality	– 0.010** (0.005)	– 0.014* (0.013)
Rule of Law	– 0.042** (0.006)	– 0.039** (0.019)
Control of Corruption	0.015*** (0.003)	0.014** (0.014)
Constant	0.060** (0.007)	0.066*** (0.016)
Time Effect (i:year)	YES	YES
Observations	616	616
R-squared		0.765
AR1	– 3.383	
AR1 <i>p</i> -value	0.000718	
AR2	– 0.673	
AR 2 <i>p</i> -value	0.501	
Sargan Test	426.7	
Hansen Test	78.39	
Hansen( <i>p</i> -value) Test	0.181	
No. of Instruments J-Statistics	33	
Wald test-CHI2	21,547	
Wald test-CHI <i>p</i> -value	0	
Number of countries	88	

Robust Standard errors in parentheses, \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$  indicate significance at 1%, 5%, and 10% levels, respectively, Used Stata `outreg2`, `xtabond2` command— (Roodman 2009)

than 5%. This indicates that the moment requirements are provided correctly, the initial error term is serially uncorrelated. Therefore, we can conclude that the sys-GMM is a valid instrument for this study. The results in Colum (1) show that interest rate (5%), GDP growth (1%), government effectiveness (1%), control of corruption

(5%), regulatory governance (5%), rule of law (5%), voice & accountability (5%), political stability & absence of terrorism (5%) are significantly and positively influencing the financial stability of banks at different significance levels. At the same time, macroeconomic conditions, like inflation, money supply, and the rule of law impair the financial stability of banks at the significance levels of 1%, 1%, and 5%, respectively. Besides, outcomes of the two-step sys GMM are supported by the robustness check and validity of the results obtained from the D–K regression. D–K regression confirms the results of two-step sys-GMM, indicating outcomes reliability in Column (2) of Table 8 below.

#### **Advanced countries sample results**

Table 9 displays the results for external factors affecting financial stability in advanced countries, obtained using the two-step-system GMM and robust D–K regression method. When dealing with large samples and a small period of data, the dynamic panel sys-GMM estimator provides more accurate results. In dynamic panel models, where the explanatory variable and error term are related, the two-step sys-GMM method controls for the endogeneity of the lagged dependent variable. This method also accounts for measurement errors, unobserved panel heterogeneity, and omitted variable bias. Therefore, we employed a dynamic GMM panel estimator. Column (1) of the two-step sys-GMM method has J-statistic instruments = 24, indicating that it is valid for this study's sample of advanced countries.

Furthermore, we conducted an Arellano–Bond (AR) test to determine if there was zero autocorrelation in the first-differenced data. The results showed first-order autocorrelation and serial correlation, as AR (1) had a  $p$ -value of less than 5%. However, the fact that the AR(2)  $p$ -value was greater than 5% suggested that the null hypothesis failed to reject the absence of second-order correlation, indicating that the moment conditions were correctly stated, the initial error term was serially uncorrelated. The Hansen test's value adhered to the Roodman (2009) standard, with a  $p$ -value between 0.10 to 0.30. Additionally, the Wald test's  $p$ -value demonstrated that the model was suitable for use.

Sys-GMM outcomes in Column (1) show that GDP growth and regulatory quality impact statistically significantly and positively on the financial stability of banks at the significance level of 1%, which means that a current change will improve the level of financial stability in advanced countries. Also, the money supply and the rule of law significantly impact financial stability at the significance level of 10%, indicating a positive change. At the same time, political stability (PA) shows a positive, but insignificant effect on financial stability. In contrast, inflation, interest rate, and government effectiveness and control of corruption have an adversely negative and significant effect on financial stability at the significance levels of 1%, 10%, and 1%, respectively. However, voice & accountability, and control of corruption depict a negative and insignificantly harmful effect on the financial stability of banks in advanced countries. The results of advanced sample countries were validated and confirmed through the D–K regression, shown in Column (2), indicating that all variables have similar key findings with sys-GMM, as demonstrated below in Table 9.

**Table 9** Results of external factors affecting financial stability (advanced countries sample) (Source: Authors Estimations)

Variables	(1)	(2)
	Two-step System GMM	D-K S.E. Fixed Effect
	FSI	FSI
Financial Stability Index (t – 1)	0.863*** (0.040)	
Inflation	– 0.114*** (0.018)	– 0.210** (0.048)
Interest Rate	– 0.129* (0.069)	– 0.092** (0.084)
Money Supply	0.007* (0.004)	0.027* (0.029)
GDP Growth	0.112*** (0.021)	0.102*** (0.026)
Voice and Accountability	– 0.007 (0.008)	– 0.024 (0.081)
PS &AV	0.001 (0.007)	0.016 (0.038)
Government Effectiveness	– 0.068*** (0.016)	– 0.057* (0.044)
Regulatory Quality	0.077*** (0.022)	0.110** (0.048)
Rule of Law	0.027* (0.014)	0.070** (0.051)
Control of Corruption	– 0.001 (0.010)	– 0.038 (0.045)
Constant	0.024* (0.032)	0.258* (0.093)
Time Effect (i:year)	YES	YES
Observations	238	238
R-squared		0.572
AR1	– 3.423	
AR1 <i>p</i> -value	0.000618	
AR2	– 0.110	
AR 2 <i>p</i> -value	0.912	
Sargan Test	133.6	
Hansen Test	25.40	
Hansen( <i>p</i> -value) Test	0.161	
No. of Instruments J-Statistics	24	
Wald test-CHI2	57,709	
Wald test-CHI <i>p</i> -value	0	
Number of countries	34	34

Robust Standard errors in parentheses, \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$  indicate significance at 1%, 5%, and 10% levels, respectively, Used Stata `outreg2`, `xtabond2` command— (Roodman 2009)

### Discussion of results for complete sample

In the case of the sys-GMM panel estimator validated through D–K standard error fixed effect regression in Table 7, the effect of the macroeconomic factor, inflation, on the financial stability coefficient indicates that on an average, *ceteris paribus*, a

percent increase in inflation will reduce the financial stability by 0.021% at the significance level of 1%. Hence, inflation and financial stability exhibit a stable relationship, supporting FIH and ABC theory. The finding is in line with Dhal et al. (2011), who find that high-level inflation could adversely affect financial stability in India. The second variable is the interest rate, a percent increase in which will result in a 0.006% increase in financial stability at the significance level of 10%. Hence, interest rate and financial stability exhibit an inelastic relationship. The money supply effect on the financial stability coefficient is  $-0.002$ , which means a percent increase in the former will cause a 0.002% reduction in the latter. Hence, the two variables exhibit an inelastic relationship. These results align with those of Monnin and Jokipii (2010), who did not find a significant association between the macroeconomic variable and financial stability. The outcomes are also supported by the finding of Apostolakis and Papadopoulos (2019). The next macroeconomic variable is GDP growth. Its impact on the bank's financial stability indicates that a percent increase in GDP growth will result in a 0.066% increase in financial stability at the significance level of 1%. Thus, GDP growth and financial stability demonstrate an elastic association, and the results confirm and endorse Mohr and Wagner's (2013) findings on macroeconomic conditions.

The effect of governance factor, voice and accountability, on financial stability coefficient is 0.004, which means a percent increase in voice and accountability will result in a 0.004% increase in financial stability at the significance level of 1%. Hence, voice and accountability exhibit an elastic relationship with financial stability and validate the proposed hypothesis and findings of Mohr and Wagner (2013) on economic freedom being associated with financial stability. Further, a percentage change in political stability and absence of violence is associated with a 0.010% increase in financial stability at the significance level of 1%. Thus, on average, *ceteris paribus*, political stability has an elastic association with financial stability. The next variable is government effectiveness. Its impact on the bank's financial stability indicates that a percent increase will result in a 0.004% increase in financial stability. Hence, it exhibits an inelastic relationship. Regulatory quality exhibits an elastic relationship, with a percent change causing a 0.003% increase in financial stability. The effect of the rule of law on the financial stability coefficient is  $-0.044$ . It means that, on average, *ceteris paribus*, a percentage change in the rule of law is associated with a 0.044% reduction in financial stability at the significance level of 1%. Hence, the rule of law and financial stability exhibits an inelastic relationship. Results align with the findings of Moghadam (2013) and Yevdokimov et al. (2018) that governance indicators indicating economic freedom contribute positively to banking stability. The last variable is control of corruption, a percent increase in which will result in a 0.018% decrease in financial stability at a significance level of 1%, indicating an inelastic association. Overall results of regulatory quality, rule of law, political stability, government effectiveness, voice and accountability, and control of corruption, with financial stability endorse FIH and institutional theory, and are in line with the results of Asteriou et al. (2016) at an aggregate level, depending on the stability measures used.

Overall findings of this study endorse the conclusion of Wymeersch (2008) that financial stability objectives can directly or indirectly be achieved through macro-level channels. Also, the study outcomes are supported by the results of Mohr and Wagner (2013), which endorse that macroeconomic conditions, economic freedom factors, and

regulatory governance regarding the financial stability of the banking system have a significant association with the less restricted financial sector. However, disturbances of macroeconomic freedom and governance factors, like corruption, have a negative link with the stability of banks by concluding that less banking stability results from freedoms in the institutional environment. Also, this study confirms the conclusion of Swamy (2014) that financial stability and macroeconomic factors are interconnected concepts and validates Andres and Arce's (2012) view that the macroeconomics and economic freedom factors are sensitive to exogenous shocks in a highly competitive environment.

### **Results of comparison between emerging and developed countries**

#### ***Results discussion of emerging countries***

The emerging markets sample includes 88 countries, and the analysis results are presented in Table 8. In Column (1), the results of the two-step sys-GMM model, rendered robust through D–K regression, show that in the case of the emerging countries' sample, the coefficient of the effect of interest rate on the financial stability of banks coefficient is 0.012. This indicates that a percent increase in interest rate will result in a 0.012% increase in financial stability at the significance level of 5%. Hence, interest rate and financial stability exhibit an elastic relationship. The next variable is GDP growth. Its impact on the bank's financial stability means that a percent increase in GDP growth will effect a 0.048% increase in financial stability at the significance level of 1%. Hence, GDP growth and financial stability exhibit an elastic relationship. Therefore, the findings suggest that in the less controlled financial sector, macroeconomic conditions related to the financial stability of the banking system have a significant association, as endorsed by Mohr and Wagner (2013). This also confirms the conclusion of Swamy (2014) that financial stability and macroeconomic factors are interconnected concepts.

The effect of inflation on financial stability indicates that on average, *ceteris paribus*, a percent increase in inflation will reduce the financial stability by 0.024% at the significance level of 1%. Thus, inflation and financial stability exhibit an unstable association. The money supply effect on the financial stability coefficient is  $-0.027$ . On average, *ceteris paribus*, a percent increase in money supply will reduce the financial stability by 0.027% at the significance level of 1%. Therefore, money supply and financial stability exhibit an unstable relationship. Hence, the findings suggest that disturbances of macroeconomic factors in emerging countries have a negative link with the stability of banks by concluding that banking stability declines due to freedom in the institutional environment, as endorsed by Mohr and Wagner (2013). It also validates Andres and Arce's (2012) view that macroeconomic factors are sensitive to exogenous shocks in a highly competitive environment. The overall findings, regarding macroeconomic factors in emerging countries and financial stability, endorse the conclusion of Wymeersch (2008) that financial stability objectives can directly or indirectly be achieved through macro-level channels. These results support FIH and ABC theory.

Moreover, the effect of the governance factor, voice and accountability, on financial stability demonstrates that a percent increase in the former will result in a 0.007% increase in the latter, at the significance level of 5%, on an average, *ceteris paribus*. Thus, voice and accountability exhibit an elastic association with financial stability. Regarding the effect of political stability and the absence of violence, a percent increase will raise

financial stability by 0.006% at the significance level of 5%, indicating an elastic relationship between them. The next variable is government effectiveness, a percent increase in which will result in a 0.022% increase in financial stability at the significance level of 1%. Hence, it exhibits an elastic association. Lastly, a percent change in the control of corruption will affect a 0.015% increase in financial stability at the significance level of 1%, thereby indicating an elastic relationship between the two.

Overall, the findings pertaining to emerging countries suggest that governance factors, which are also part of economic freedom factors related to the financial stability of the banking system, have a significant association in the less restricted financial sector of emerging countries, as reported by Mohr and Wagner (2013). However, results show that the effect of the rule of law on the financial stability coefficient is  $-0.042$ . It means, on average, *ceteris paribus*, a percentage change in the rule of law will reduce the financial stability by 0.042% at the significance level of 5%. Thus, the rule of law and financial stability exhibits an unstable relationship, thereby endorsing the remarks of Mohr and Wagner (2013), that the economic freedom factor, rule of law, has a negative link with the stability of banks. This leads to the conclusion that in emerging countries, low banking stability is the result of freedom in the institutional environment. Regulatory quality exhibits a negative and unstable relationship with financial stability at the 1% significance level. The first-year lagged value of financial stability has a powerful and positively significant effect on the financial stability of banks in emerging countries.

#### ***Discussion of results for advanced countries***

The developed markets sample includes 34 countries, and the analysis results through sys-GMM and robust D–K regression are presented in Table 9. Column (1) depicts that, on average, *ceteris paribus*, a percent increase in inflation will reduce the financial stability by 0.114% at the significance level of 1%. Hence, inflation and financial stability exhibit an unstable association. The second variable is the interest rate, and the coefficient of its effect on the financial stability of banks is  $-0.129$ ; this indicates that a percent increase in interest rate will reduce the financial stability by 0.129% at the significance level of 10%. Hence, the interest rate and financial stability exhibit an unstable relationship. Therefore, results endorse Andres and Arce's (2012) view that short-term macroeconomic variables are sensitive to exogenous shocks in a highly competitive environment. It is also observed that a percent increase in money supply, which also refers to the effect of financial development, will result in a 0.007% increase in financial stability at the significance level of 10%, on an average, *ceteris paribus*. Thus, money supply and financial stability exhibit an elastic association. The next variable is GDP growth, and the results indicate that a percent increase will increase the financial stability by 0.112% at the significance level of 1%. Therefore, GDP growth and financial stability display an elastic association. Thus, the results validate the conclusion of Swamy (2014) that financial stability and macroeconomic factors are interconnected concepts.

Additionally, regulatory quality presents an elastic relationship with financial stability, a percent increase in the former leading to a 0.077% increase in the latter at the 1% significance level. These results confirm the conclusion of Mohr and Wagner (2013) that in the less controlled financial sector, macroeconomic conditions and regulatory governance are significantly associated with the financial stability of the banking system.

Further, as observed, a percent increase in voice and accountability will lower the financial stability of banks by 0.007%. Hence, voice and accountability exhibit a stable relationship with financial stability. The next variable is government effectiveness, a percent increase in which will reduce financial stability by 0.068% at the significance level of 1%. Hence, it exhibits a stable relationship, endorsing Mohr and Wagner's (2013) remark that disturbances of economic freedom through governance indicators are negatively linked with banks' stability. The effect of political stability and the absence of violence is that a percent change in this variable is associated with a 0.001% increase in financial stability. Hence it has an elastic relationship with financial stability. Considering the effect of the rule of law, on average, *ceteris paribus*, a percentage change in it will increase the financial stability by 0.027% at the significance level of 10%. Hence, the rule of law and financial stability exhibits an elastic relationship. The last variable is the control of corruption, and its effect on the bank's financial stability coefficient is  $-0.001$ , showing a partially negative impact, thereby impairing banks' financial stability.

#### **Overall comparison and summary of findings**

The correlation analysis of all countries in the sample indicates that financial stability positively correlates with inflation, interest rate, money supply, and GDP growth, but is negatively correlated with government effectiveness, control of corruption, regulatory governance, the rule of law, voice & accountability, political stability & absence of terrorism. However, applying the correlation technique after segregating the sample emerging countries, we observe that financial stability is positively correlated with interest rate, GDP growth, control of corruption, and political stability & absence of violence/terrorism, but negatively correlated with the other variables. Conversely, the results of the advanced countries' sample confirm that financial stability correlates positively with inflation, money supply, GDP growth, government effectiveness, control of corruption, regulatory governance, the rule of law, voice & accountability, political stability & absence of terrorism, but negatively only with interest rates.

The study applied a system-GMM estimator as the primary method. The reported results, robust and confirmed through D-K standard error fixed-effects, indicate that interest rate, GDP growth, government effectiveness, control of corruption, regulatory governance, the rule of law, voice and accountability, political stability and absence of terrorism, all have a significant and positive effect on financial stability in all countries in the sample. In contrast, inflation, money supply, and the rule of law have adverse and insignificant effects. Findings of developed countries showed that money supply, GDP growth, government effectiveness, regulatory quality, the rule of law, absence of violence/terrorism, and political stability have a significant and positive impact. In contrast, inflation, interest rate, and corruption control have adverse effects. On the other hand, findings of emerging countries depict that interest rate, GDP growth, government effectiveness, political stability, control of corruption, regulatory quality, voice and accountability, and absence of violence/terrorism have a significant and positive influence on the financial stability of banks. However, inflation, money supply, and the rule of law are observed to have impaired the financial stability of banks in emerging countries from 2013 to 2020. Therefore, this study fails to reject the null hypothesis, and shows that system-GMM is a valid instrument for this study, as validated and confirmed by D-K regression.

The first-year lagged value of financial stability has a powerful and positive influence on banks' financial stability.

### **Conclusion, policy implications, and future work**

In conjunction with the governance environment, the role of macroeconomic conditions in determining financial stability still needs to be more conclusive in the literature. Key governance indicators, such as regulatory governance, the rule of law, corruption, and political stability, are important factors to be considered alongside macroeconomic conditions. However, the crucial problem is a significant difference in governance indicators between developed and emerging countries. Emerging economies require support with GDP growth, inflation, and money supply. Therefore, these countries must improve their governance environment to maintain financial sector stability. This study aims to investigate the external macroeconomics and governance factors affecting the financial stability of banks in 122 countries, including 34 advanced and 88 emerging countries, for the period from 2013 to 2020. The study uses strongly balanced panel secondary data from the World Bank and IMF. Many studies in the banking sector rely on OLS or panel fixed/random effect models, which may lead to incorrect inferences due to the endogeneity problem. Therefore, this study employs system GMM and D–K regression to address autocorrelation, serial correlation, and endogeneity issues.

This study found that governance and macroeconomic conditions primarily influence dynamic financial stability. The global sample findings indicate that macroeconomic conditions (interest rate, GDP growth) and governance factors (voice and accountability, political stability and absence of violence/terrorism, and control of corruption) have a positive and statistically significant impact on financial stability, while inflation, money supply, and the rule of law affect it adversely. The study's findings highlight the variation in the relationship between macroeconomic conditions, governance, and financial stability while comparing developed and emerging countries. This variation can be attributed to the differences in the quality of governance and macroeconomic conditions in these countries, which significantly impact the financial stability of their respective banking sectors. Therefore, policymakers need to recognize these differences and customize their policies accordingly to achieve the objective of financial stability in their respective countries. The relationship between interest rates and financial stability was negative in emerging countries and positive in developed countries, due to lower interest rates in the latter. Additionally, better regulatory governance and competition in the banking sector are essential for a financially sound banking system. The study also highlighted that inflation is a key driver of monetary policy actions in the aftermath of crises, and countries with low inflation targeting should use it as a full-fledged tool for monetary policy. Overall, achieving financial prosperity requires steady improvement in regulatory and institutional quality, including control of corruption, accountability, and political stability through effective governance. The study's findings endorse the importance of these factors in achieving financial stability.

It is recommended that emerging countries consider reasonable interest rates to boost industry and entrepreneurship, similar to developed countries. Stable inflation can help predict returns and fasten inflation expectations, leading to better consumption and investment, and therefore, improved financial stability. The study supports the ABC



theory and Minsky's FIH view that considering the impact of inflation benefits debtors at the expense of money lenders. Inflation can also hasten and exacerbate the transition from hedge to speculative to Ponzi finance. The study's findings are consistent with the "complementarity view" regarding inflation targeting and financial stability, suggesting that inflation targeting can significantly improve the stability of the banking sector and the external economy, without negatively affecting overall financial stability. Nations with insubstantial inflation-targeting policies should consider implementing full-fledged policies for positive spillover effects on financial stability. It is important to consider the link between macroeconomic conditions and governance to ensure financial stability. This can be achieved through sound fiscal policies that promote sustainable public finances and responsible borrowing, and monetary policies that aim for low inflation and stable interest rates.

Better governance, including control of corruption and political stability, should accompany macroeconomic improvements. Price stability can benefit low-income people and improve financial stability, while a balanced approach can benefit banks. Considering financial stability as a key factor, monetary policy authorities should add it as a goal. Financial stability could be more fragile in emerging market economies, due to over-reliance on foreign capital flows. To achieve macroeconomic objectives and stability, central banks should choose a monetary policy position without sacrificing financial stability. However, the twin macroeconomic and financial stability objectives offer trade-offs, and misguided policy-making can harm low-income people. Stringent and redundant regulations can prevent financial stability, while ease in supervision can cause financial instability. As stakeholder theory suggests, developing countries should prioritize improving governance and macroeconomic conditions to maintain financial stability. This study has contributed to understanding the financial stability of banks at the country level by exploring a comprehensive set of factors, including external macroeconomic and governance elements, to capture a complete picture of the financial stability index of banks. Governments should establish effective macro-prudential policies to manage systemic risks in the financial system, including monitoring asset price bubbles, enforcing credit standards, and promoting financial innovation. Developing countries must prioritize establishing institutional frameworks, strengthening regulatory and supervisory capacity, and enhancing transparency and accountability. Proposed frameworks can be studied from the experiences of developed countries. Financial stability in developed and emerging (underdeveloped) countries requires a sustained commitment to good governance, sound macroeconomic policies, and effective regulatory frameworks. Therefore, the study findings are useful for central banks, academia, and policymakers to plan sustainable growth and stability.

The study has a few limitations that need to be acknowledged. Firstly, the data used in this study cover the period from 2013 to 2020, and are based on a sample of 122 countries, out of which only 34 are developed countries. Additionally, the study had to rely on data from 2013 due to the availability of balance data and a significant global event, like the Belt and Road Initiative. These limitations should be considered while referring to the results of this study and future research gaps. Moreover, this study includes six essential factors related to financial stability: profitability ratios, regulatory capital, ratio of non-performing to total loans, banks' provision for total non-performing loan, and

banking capital ratio, which help promote institutional investments, credit risk, insolvency, and resilience. This study did not consider liquidity specifically as a measure, because capital adequacy, and capital also indicate the bank's ability to absorb potential losses; however, not considering, specifically, the liquidity ratio, in the financial stability index, is a limitation of the study.

Meanwhile, there are several areas for further research. Firstly, liquidity must be considered alongside the financial stability index, due to the significant exposures of banks. Hence, it would be worthwhile to compare data normalization processes by calculating the deviation from the average and, for instance, through the standard score  $z_j = (x_j - (\bar{x}_j)) / \sigma_j$  formula, including liquidity factor in the financial stability index, by applying a cluster approach for emerging and developed countries, as well as at the income level. The normalized data of  $j$  indicator;  $x_j$ —the datum of  $j$  indicator on some date;  $(\bar{x}_j)$ —the average datum of  $j$  indicator calculated on some sample of banks;  $\sigma_j$ —the root mean square of a set of  $j$  indicators. Also, the construction of the Financial Stability Index of Banks can consider the distance between the datum of the  $j$  indicator on some date and its benchmark. This way, essential economic gaps between countries and the banking sector can be compared to provide a better picture. Secondly, future studies may explore sustainable finance by using financial stability and sustainability indicators, like adjusted net saving relationship with FinTech, macroeconomic conditions, and governance indicators, by comparing the income level because post-analyses COVID-19 pandemic. Thirdly, the homogeneity of macroeconomic conditions among emerging and developed countries needs to be studied, as there are countries with significant gaps in macroeconomic conditions. Fourthly, future studies may explore the nexus between banks' uncertainty, corporate governance, risk management, and financial stability. Finally, the GCC countries are part of the global market for oil and gas, and this fact needs to be included more in the overall analyses, which is an area for further research. Overall, these areas of research can improve our understanding of financial stability, and contribute to the policymaking decisions of central banks and governments.

#### Abbreviations

FSI	Financial Stability Index
GDP	Gross Domestic Product
OECD economies	Organization for Economic Cooperation and Development
INGOs	International non-governmental organizations
IGOs	Intergovernmental Organizations
TI	Transparency International
IMF	International Monetary Fund
WGI	World Governance Indicators
PD	The probability of default
ROA	Return on asset
ROE	Return on equity
NPLs	Non-performing loans
Sys-GMM	Two-step system generalized method of moments
INFL	Inflation
IR	Interest rate
MS	Money supply
GDPG	GDP growth
PS	Political stability and absence of violence/terrorism
V&A	Voice and accountability
GE	Government effectiveness
RG	Regulatory governance
RL	Rule of law
CC	Control of corruption

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**Author contributions**

All authors have participated in the process, read and agreed to the published version of the manuscript. All Authors contributed. Responsibilities are as follows; SU: conceptualization; methodology; writing—original draft preparation validation; formal analysis; writing—review and editing; AU: conceptualization; writing—original draft preparation; formal analysis; writing—review and editing; MZ: conceptualization; methodology; writing—original draft preparation validation.

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