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Full Length Article

# Financial stability of Asian Nations: Governance quality and financial inclusion

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### Abstract

This study investigates the role of governance quality in maintaining financial stability and enhancing financial inclusion in Asian countries using the stakeholder theory. Composite variables were constructed for the governance quality, financial stability, and financial inclusion dimensions using principal component analysis (PCA). The impact of governance quality on financial stability and financial inclusion was analyzed using dynamic system generalized method of moments (GMM) estimations. Additionally, using Baron and Kenny's approach, the mediating role of financial inclusion in the relationship between governance quality and financial stability was examined. The results obtained were robust to various standardization techniques. This study's findings suggest that governance quality negatively affects financial inclusion but has a positive influence on financial stability. Furthermore, financial inclusion positively affects financial stability in Asia. Finally, based on the results, we conclude that financial inclusion mediates the relationship between governance quality and financial stability. Copyright © 2021, Borsa İstanbul Anonim Şirketi. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

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### 1. Introduction

The financial sector is considered an important component of the economic system. This sector can expedite capital mobilization for high-yielding projects through the financial intermediation process and can ensure the efficient allocation of financial resources between borrowers and lenders. Financial crises, such as the Asian financial crisis (1997–1998) and the global financial crisis (GFC; 2007–2008) have revealed the unfortunate aspect of global financial integration that has spillover effects on financial stability (FS) (Vo et al., 2019b).

As explained by Babar et al. (2019), FS is achieved when the financial system functions efficiently and effectively without interruption, and the financial risks are measured and sufficiently controlled to minimize the impact of systemic crises. In addition, economies around the world strive to increase financial inclusion (FI) as part of their strategy to develop the economic and financial sectors by providing access to financial services (Morgan & Pontines, 2018). FI means that every adult in the population has access to financial services at affordable costs and designed according to their needs (Le et al., 2019b).

The emerging markets in Asia are the most rapidly growing markets in the world. Nevertheless, only 33 percent of firms in Asia have access to a line of credit and loans, and only 27 percent of the population has bank accounts, meaning more than 1 billion adults have no access to formal financial services in Asia (Bhardwaj et al., 2018). Moreover, the prolonged

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trade tensions between the US and China have weakened domestic investment in Asia (Asian Development Bank, 2019). But FI can positively affect economic growth and reduce poverty, enabling the underdeveloped portion of the population access to financial institutions to create assets, accumulate savings for protection against risk, and invest in productive projects (Neamie & Gaysset, 2017).

Ultimately, to develop the financial sector, governments and policymakers in Asia have to address the issues concerning the lack of access to financial services (Le et al., 2019b). Through financial institutions, governments run different poverty alleviation programs and pursue policies for maintaining FS; they have a considerable stake in promoting FI and FS in their respective region. Furthermore, several cross-country studies have observed rapid economic growth and poverty reduction in countries with a well-developed financial system (Zulkhibri & Ghazal, 2017). In the development of a financial system, policy makers and public institutions focus on banks, such as central banks; thus, in any country, the banking industry is highly regulated. Banks are a major driving force in the modern economic system and are crucial for long-term economic growth (Babar et al., 2019). Additionally, the economic sectors are highly dependent on the banking industry for working capital and investment funds. Any disruption in the banking industry affects the economic sectors in a country.

Thus, based on the stakeholder theory, this study examines the nexus between governance quality (GQ), FI, and FS in Asian countries. According to Freeman (1984, p. 46), “a stakeholder is (by definition) any group or individual who can affect or is affected by the achievement of the organization's objectives.” Governments and their institutions design and implement regulations and policies for the financial sector that may affect them positively or negatively. At the same time, any disruption in the financial sector can affect the development programs of governments, institutions, and other sectors. The effect of disruption on the financial sector was witnessed during the subprime crisis in the US in 2007–2008. Later, the crisis had a spillover effect, not only in the US but throughout the world. Therefore, governments have a stake in the stability and development of the financial sector and increasing FI to reduce poverty. Moreover, the financial sector, including banks, are affected by the policies, regulations, and performance of public institutions. Hence, public institutions and financial institutions are stakeholders in each other.

## 2. Literature review

After the GFC of 2007–2008, several studies examined the factors that help to maintain a country's FS. Babar et al. (2019) state that scholars have not reached agreement about the elements that determine FS. In general, a financial system is considered stable when it functions efficiently and effectively without significant disruptions.

Hence, to ensure FS in a region, the intermediation process must proceed smoothly. FS is influenced by several broad factors, such as overall infrastructure, financial markets, and financial institutions. The overall infrastructure includes a

financial regulatory framework, legal system, surveillance, and oversight. In general, governments are keen to manage the financial system by hedging possible risks, implementing monetary policies, and managing FS (Schinasi, 2004). Thus, governments have a stake and the ultimate responsibility in maintaining FS through its effective governance. In short, governments manage FS in a country through its policies, regulations, and performance within a sound governance system.

Good governance is the government's actions mixed with possible strategies necessary to foster continuous progress (Huque & Jongruck, 2018). As described by Kaufmann et al. (2011), good governance is “the manner in which power is exercised in the management of a country's economic and social resources for development.”

As such, overall, FS could be influenced by a country's GQ. Furthermore, the lack of access to finance faced by the less fortunate segment of the population, which does not have any means of saving and investment, has a negative impact on poverty alleviation and economic growth (Neamie & Gaysset, 2017). Therefore, several studies consider FI a significant determinant of FS.

Various studies have attempted to measure FI with different variables. For example, Sarma (2008) develops a multidimensional index to measure FI, comprising three significant dimensions: accessibility, availability, and use of financial services. However, the accessibility and availability dimensions have similarities, which creates potential multicollinearity (Le et al., 2019b; Wang & Guan, 2017). Meanwhile, Demircuc-Kunt and Klapper (2012) surveyed 150,000 adults in 148 countries in 2011 and built a Global Findex database, which provides information about FI from a micro perspective. The main limitation of this database is that it is published only once every three years; the latest available data are for 2017. Therefore, for panel data analysis, this study follows the approach of Le et al. (2019b) to measure FI, as data are available for consecutive years.

### 2.1. Underpinning theory

This study was based on the stakeholder theory. The financial sector, especially the banking industry, is highly regulated in any regime. Governments, through their institutions, make and implement policies to regulate the banking industry. Any government policies, laws, and regulations directly affect the banking industry. Moreover, governments strive to maintain FS, as any destabilization in the financial sector can directly affect it. The relevance of the stakeholder theory in the governance and financial sector nexus is demonstrated by different governments' use of bailout packages to the financial institutions to rescue them from bankruptcy. For instance, the US government announced a bailout package of \$2.7 trillion in 2008, which was 18 percent of the US gross domestic product for that year, whereas the UK government announced a package of \$1.5 trillion, 69 percent of the country's gross domestic product (GDP) for the same year (King, 2019). Heath and Norman (2004) state that it

is “astounding how seldom” the government is discussed in the literature on the practical implications of the stakeholder theory. Nevertheless, some studies use the stakeholder theory in studies on the government and financial institutions (Flak & Rose, 2005; Lam & Yap, 2019; Nie et al., 2019).

## 2.2. Relationship between FI and FS

Yangdol and Sarma (2019) explain that improving financial access to an entire region creates opportunities for generating income and ensuring the availability of financial services that help individuals perform economic activities and manage risks. FI enhances the economic welfare of society, which is essential for a growing economy. Moreover, Morgan and Pontines (2018) find that greater FI maintains FS by reducing credit and the likelihood of default by financial institutions. Several recent studies also discuss the positive impact of FI on FS (Ahamed & Mallick, 2019; Le et al., 2019b; Vo et al., 2019a, 2020).

Nonetheless, researchers have diverse opinions regarding FI's impact on FS. For example, Khan (2011) explains how FI affects FS, in which attempts to increase FI can lower lending standards, which was the adverse effect of the subprime crisis in the US. Bhattarai (2015) supports this narrative by suggesting excessive financing as the real cause of the financial crisis that started in 2008 and affected advanced economies, such as the US, Japan, and member countries of the European Union.

## 2.3. Relationship between GQ and FI

GQ is a vital factor in the development of the financial sector in a country (Sayılır et al., 2018). In their study on thirty-seven Asian countries, Park and Mercado (2018) find a significantly positive impact of the rule of law (a dimension in the Worldwide Governance Indicators [WGI]) on FI. Ajide (2017) also notes the positive impact of the rule of law, in addition to regulatory quality and the control of corruption, on FI. Meanwhile, Zulkhibri and Ghazal (2017) show that good governance and economic freedom amortize financial markets' imperfections.

Alhassan et al. (2019) analyze the negative impact of political instability on growth in the financial sector, lowering FI in the Middle Eastern and North African (MENA) region. Hence, the decrease in governance efficiency can hamper FI. Countries need a high-quality institutional environment through good governance that promotes FI by enabling a large percentage of the population to access financial intermediaries (Eldomiati et al., 2020).

Some studies have suggested an inverse relationship between GQ and financial sector performance. For example, Bougategf (2017) report the positive impact of lower GQ on the performance of financial institutions. Examining the impact of bad governance in Nigeria, Aburime (2009) finds that increased corruption has a significantly positive impact on performance by financial institutions.

## 2.4. Relationship between GQ and FS

Cieślak and Goczek (2018) find that, in the absence of good governance, corruption negatively affects a country's growth. Because of the lack of control over corruption, investors withdraw their investments and move to countries with good governance. Sayılır et al. (2018) explore the significantly positive impact of GQ on a country's financial development. They explain that financial development enhances efficiency and effectiveness in the financial market and the financial intermediation processes that help in achieving FS. Moreover, the quality of institutions and governance affects financial development and economic growth. Good governance significantly enhances development in the banking industry (Law & Azman-Saini, 2012), which raises the use of financial services (Eldomiati et al., 2020) and hence contributes to economic growth (Sethi & Acharya, 2018).

However, other research suggests that a lack of good governance, such as the existence of corruption, positively affects economic development in a country; this notion is known as “greasing the wheels” (Hoinaru et al., 2020). For instance, Jiang and Nie (2014) empirically document evidence in China, where they find continuous growth in GDP despite the prevalence of government corruption. They also report that firm profitability increased after rigid regulations were relaxed (Jiang & Nie, 2014). Similarly, Williams and Kedir (2016) show the positive impact of corruption on firm growth and productivity in forty African countries.

## 2.5. Significance of the study

The literature review reveals that several studies suggest that GQ is related to FS and FI and that FI is related to FS. Nonetheless, very few studies have empirically investigated the relationships between these variables and, more specifically, the mediating role of FI.

This study contributes to the literature by applying the stakeholder theory to the nexus among GQ, FI, and FS. It also contributes by investigating the possible mediating role of FI in the relationship between GQ and FS. The findings will benefit Asian policy makers by showing that in order to increase FI and FS, GQ must be improved through public institutions. Nevertheless, to improve GQ, continuous regulatory oversight is essential to avoid unnecessary processes and restrictions that discourage the inclusion of entities into the formal financial system.

## 3. Data and methodology

### 3.1. Data description

This study examines GQ's relationships with FS and FI in Asia and the possible mediating role of FI by creating composite variables using principal component analysis (PCA). The period and number of countries were selected based on the available data from 2009 to 2017. The panel comprised

forty Asian countries, as presented in Table S1 (in the Supplementary Materials, available online).

The data for the bank  $z$ -score, the ratio of credit to deposits, the ratio of liquid assets to deposits, and the ratio of short-term funding were obtained from the Global Financial Development Database (GFDD) provided by the World Bank. In addition, the data for governance indicators were collected from the World Bank's WGI, and FI data came from the International Monetary Fund's Financial Access Database. The selected governance, FI, and FS variables, along with the control variables, are listed in Table 1, and Table 2 presents the statistical description of this study's variables.

### 3.2. Methodologies

As shown in Table 1, the variables have different measurements and scales. Thus, this study uses PCA to maximize the variance. However, because the variables have different variances, PCA loads more severely on large variances (Table 2). Consequently, before running the PCA, this study follows the approach of Le et al. (2019a, 2019b, 2020) in standardizing the variables, as follows:

$$\text{Standardised variable by } z\text{-transformation} = \frac{A_i - \bar{A}}{SD}$$

where  $\bar{A}$  is the mean of the population, and SD is the standard deviation of the population.

In addition to  $z$ -transformation, in the robustness and sensitivity analysis of the results, this study follows the approach of Le et al. (2019a, 2019b) and standardizes the variables using the min-max and softmax techniques, as follows:

$$\text{Standardized variable by min-max} = \frac{A_i - A_{min}}{A_{max} - A_{min}}$$

where  $A_{max}$  is the maximum datapoint, and  $A_{min}$  was the minimum.

$$\text{Standardized variable by softmax} = \frac{1}{1 + \exp^{-V}}$$

where  $V = \frac{A_i - \bar{A}}{SD}$ .

Through the min-max approach, the maximum and minimum values are obtained to form a scale. The min-max approach measures performance by considering the best and worst performance. By contrast, the softmax technique, also known as the normalized exponential, decreased the outliers in the dataset without removing them. Softmax standardization is a reasonable approach because outliers, which are crucial, are retained in the dataset, and, at the same time, the significance of the data is maintained in the standard deviation of the mean (Le et al., 2019a, 2019b).

Ahamed and Mallick (2019) argue that the bank  $z$ -score is a comprehensive and impartial indicator of FS that measures banks' riskiness. In addition, the bank  $z$ -score is widely used to measure banks' probability of default (Lepetit et al., 2021). In general, the bank  $z$ -score measures the capacity of a country's banking system to absorb shocks (Vo et al., 2019a). Furthermore, the bank  $z$ -score is broadly employed as a measure of FS (Ahamed & Mallick, 2019; Bai et al., 2019; Morgan & Pontines, 2018; Rashid, 2020). The bank  $z$ -score is calculated as follows:

$$\text{Bank } Z\text{-Score} = \frac{ROA + EQA}{\sigma(ROA)}$$

Table 1  
Variables considered in the study (2009–2017).

Variables	Measurement	Indicators	Source
GOV1	Governance	Voice and Accountability	WGI
GOV2	Governance	Political Stability, Absence of Violence/Terrorism	WGI
GOV3	Governance	Government Effectiveness	WGI
GOV4	Governance	Regulatory Quality	WGI
GOV5	Governance	Rule of Law	WGI
GOV6	Governance	Control of Corruption	WGI
FIN1	Financial Inclusion	Number of commercial bank branches per 100,000 adults	FAS
FIN2	Financial Inclusion	Number of ATMs per 100,000 adults	FAS
FIN3	Financial Inclusion	Institutions of Commercial Banks	FAS
FIN4	Financial Inclusion	Outstanding deposits with commercial banks (% of GDP)	FAS
FIN5	Financial Inclusion	Outstanding loans from commercial banks (% of GDP)	FAS
FST1	Financial Stability	Bank Z-Score	GFDD
FST2	Financial Stability	Bank credit to bank deposits	GFDD
FST3	Financial Stability	Liquid assets to deposits and short-term funding	GFDD
CV1	Control Variable	Annual GDP Growth	WDI
CV2	Control Variable	Population Growth	WDI
CV3	Control Variable	Broad Money (M2) to GDP	WDI

Note: Data Sources: Governance indicators from the World Bank's Worldwide Governance Indicators (WGI) Database. Financial inclusion indicators from the IMF's Financial Access Survey (FAS) Database. Financial stability indicators from the World Bank's Global Financial Development Database (GFDD). Control variables from the World Bank's World Development Indicators (WDI) Database. GOV: Governance quality indicator. FIN: Financial inclusion indicator. FST: Financial stability indicator. CV: Control variable.

Table 2

The statistical description of variables considered in the study.

Variables	Obs	Mean	Std. Deviation	Min	Max	Units
GOV1	360	-0.577	0.781	-2.124	1.109	-2.5 (weak) to 2.5 (strong)
GOV2	360	-0.480	1.061	-2.942	1.615	-2.5 (weak) to 2.5 (strong)
GOV3	360	0.087	0.895	-1.915	2.271	-2.5 (weak) to 2.5 (strong)
GOV4	360	0.027	0.878	-1.711	2.261	-2.5 (weak) to 2.5 (strong)
GOV5	360	-0.150	0.866	-1.896	1.861	-2.5 (weak) to 2.5 (strong)
GOV6	360	-0.212	0.931	-1.663	2.217	-2.5 (weak) to 2.5 (strong)
FIN1	347	15.642	11.273	1.623	60.277	Numbers
FIN2	352	53.271	57.858	0.449	313.204	Numbers
FIN3	356	67.432	128.976	3	1007	Numbers
FIN4	352	75.772	73.722	10.025	477.350	Percentage
FIN5	356	60.493	53.023	3.039	347.461	Percentage
FST1	358	15.351	9.689	2.032	57.161	Probability
FST2	337	111.285	115.018	19.676	878.839	Percentage
FST3	360	30.352	16.247	6.750	97.640	Percentage
CV1	360	4.189639	4.751228	-27.99	25.26	Percentage
CV2	360	1.737583	1.41662	-0.89	11.04	Percentage
CV3	360	87.13708	69.56594	18.04	396.19	Percentage

Source: Authors' calculations.

where ROA (return on assets) is the average annual return on year-end assets, EQA is the ratio of equity to assets, and  $\sigma(\text{ROA})$  is the standard deviation of ROA. As suggested by [Le et al. \(2019b\)](#), the ratio of credit to bank deposits, the ratio of liquid assets to deposits, and the percentage of short-term funding were also included in the FS cluster. These two variables can indicate vulnerabilities in the banks' stability, hence, their inclusion in the stability index can enhance its explanatory power ([Shen & Chen, 2014](#)).

[Kaufmann et al. \(2011\)](#) state that WGI has been widely used to measure GQ. The WGI is based on six broad dimensions: voice and accountability, political stability, absence of violence or terrorism, government effectiveness, regulatory quality, and rule of law and control of corruption. Studies that use these variables include [Huque and Jongruck \(2018\)](#), [Ahamed and Mallick \(2019\)](#), and [Asongu and Odhiambo \(2020a, 2020b\)](#).

Asia is a highly heterogeneous continent, with a varied population and GDP per capita ([Bhardwaj et al., 2018](#)). We use GDP growth rate as a control variable as it might affect FS ([Kim et al., 2018](#); [Le et al., 2019b](#); [Sharma, 2016](#)). Additionally, as suggested by [Pham and Doan \(2020\)](#), the ratio of broad money (M2) to GDP is incorporated as a control variable to proxy for the size of the financial sector. Lastly, population growth is included as a control variable ([Han & Melecky, 2013](#)) because an increase in the population size might increase the number of users of formal financial services.

### 3.2.1. Principal component analysis (PCA)

The PCA is a dimensionality reduction technique for a multivariate dataset ([Bartholomew, 2010](#)) that transforms a large set of data to be represented by a small number of variables ([Dray & Josse, 2015](#)). This technique is also useful to transform a highly correlated group of variables into an uncorrelated group of indicators ([Asongu & Nnanna, 2019](#)).

Before running the PCA for GQ, we performed Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure

of sampling adequacy (see [Table S2](#), available online). The results of Bartlett's test of sphericity were significant ( $p < 0.001$ ) and appropriate for factor analysis ([Hair et al., 2006](#); [Tabachnick et al., 2007](#)), which confirmed that the PCA correlation matrix was an identity matrix. A KMO value of more than 0.5 is generally considered suitable, and, based on the results, the KMO value for the governance indicators was 0.875, which is considered satisfactory.

After the initial tests, we ran PCA on a rotation solution for the six governance indicators. The components can be retained when the eigenvalue is more than 1.0, the variance explained by the initial eigenvalue is more than 10 percent, or the components represent a cumulative variance of more than 60 percent ([Banda & Kumarasamy, 2020](#)). Thus the results obtained (refer [Table S2](#), available online) for the governance indicators showed that PC1, PC2, PC3, and PC4 had sum of squares (SS) loadings of more than 1.0 and represented a variance of approximately 32.87 percent, 23.64 percent, 22.61 percent, and 19.24 percent, respectively, with a cumulative variance of 98.40 percent.

We constructed the composite variable of GQ using the weights of each dimension derived via PCA ([Ahamed & Mallick, 2019](#)). By assigning weights to each original variable, we constructed a new composite variable through weighted averaging. The assigned weights can be derived from past studies or current data using PCA ([Song et al., 2013](#)). Eq. (1) measures GQ as follows:

$$GQ_{it} = GPC1_{it} * 0.3287 + GPC2_{it} * 0.2364 + GPC3_{it} * 0.2261 + GPC4_{it} * 0.1924 \quad (1)$$

where  $GQ$  is the governance quality of Asian country  $i$ , at year  $t$ ,  $GPC1$ ,  $GPC2$ ,  $GPC3$ , and  $GPC4$  are the retained components of the governance indicators with the results from rotated PCA solutions. The weights assigned to each component were

obtained from a rotated PCA solution, which represented the percentage of variance explained by the components.

We also constructed variables for FI and FS using a rotated PCA solution. Bartlett's test of sphericity and the KMO measure of sampling adequacy confirm PCA's suitability for FI and FS, as reported in Table S2 (available online). The results show that for FI, FIPC1, FIPC2, FIPC3, and FIPC4 had SS loadings of more than 1.0, and those components represented a variance of 37.44 percent, 20.20 percent, 20.09 percent, and 20.02 percent, respectively, with a cumulative variance of 97.70 percent. Based on Le et al. (2019b), we retained all the components of FS. As noted earlier, the result of Bartlett's test of sphericity for all the PCA solutions was less than 0.01, indicating that the components used to create the composite variables were correlated. The composite variables of FI and FS, respectively, are calculated with Eqs. (2) and (3), as follows.

$$FI_{it} = FIPC1_{it} * 0.3744 + FIPC2_{it} * 0.2020 + FIPC3_{it} * 0.2009 + FIPC4_{it} * 0.2002 \quad (2)$$

$$FS_{it} = FSPC1_{it} * 0.3333 + FSPC2_{it} * 0.3333 + FPC3_{it} * 0.3333 \quad (3)$$

where  $FI$  is the composite variable of FI and  $FS$  is the composite variable of FS, in Asian country  $i$ , at year  $t$ . FIPC1, FIPC2, FIPC3, and FIPC4 and FSPC1, FSPC2, and FSPC3 are the retained components of FI and FS, respectively. The weights assigned to the components were obtained from the rotated PCA solutions, representing the percentage of variance explained by the components for their respective variables. For robustness testing and sensitivity analysis of the estimations, we determined the results of PCA estimates based on different standardization techniques (see Table S2, available online).

### 3.2.2. Generalized method of moments (GMM)

We need to rule out the potential for biased results due to endogeneity problems in the data (Ahamed & Mallick, 2019). Some studies on GQ have reported the existence of endogeneity in their data and have used the generalized method of moments (GMM) to address this issue (Asongu & Nnanna, 2019; Asongu & Odhiambo, 2020a, 2020b). The endogeneity concern arises primarily due to the omitted variable problem, but, GMM eliminates the need for an external instrumental variable because GMM generates an internal instrumental variable. In economics and finance, the lagged values of a dependent variable usually explain the values of the current years and are used as an instrumental variable. These lagged values can yield better estimates than fixed effects if no strictly exogenous variables for the model are known (Arellano & Bond, 1991). In this study, the lagged values of the previous year yield satisfactory results, as confirmed by the post-estimation tests of Sargan and Arellano-Bond (see Table 3).

The results in Table S4 (available online) confirm the presence of the endogeneity problem, and the results in Table

S5 (available online) show the existence of heteroskedasticity and autocorrelation. Therefore, the use of an instrumental technique with a two-step GMM estimator (Roodman, 2009), an extension of Arellano and Bover (1995), is suitable for extracting the exogenous components of the variables and reducing concerns about endogeneity problems (Ahamed & Mallick, 2019).

Tchamyou (2019, 2020) provides several reasons to adopt GMM. First, the adoption of GMM requires that the number of cross-sections exceed the number of years, as in this study ( $n = 40$  and  $t = 9$ ). Second, because of the panel nature of the dataset, we also consider cross-country differences. Third, to address unobserved heterogeneity, we use time-invariant variables, and last, we use an instrumentation process to address reverse causality and simultaneity issues. Additionally, two-step GMM is preferred as it controls heteroskedasticity better than the one-step method (Tchamyou, 2020). This study uses the system-GMM technique because of its superiority over difference-GMM in yielding accurate results (Blundell & Bond, 1998).

Following the Baron and Kenny (1986) method for mediation analysis, we constructed four regression models. In the first step, FS was regressed against GQ (Eq. (4)). In the second step, FI was regressed on GQ (Eq. (5)). Subsequently, in the third step, we analyzed the relationship between FI and FS, as shown in Eq. (6). In the fourth step, the dependent variable (FS) was regressed simultaneously on the independent variable (GQ) and mediator (FI), as shown in Eq. (7). To examine the sensitivity to control variables, Eq. (8) was specified to regress FS on GQ and FI in the presence of control variables. Eqs. (7) and (8) were estimated separately to ensure the robustness of results (Le et al., 2020). All these equations were analyzed using the dynamic system-GMM estimation technique.

$$FS_{i,t} = \sigma_0 + \sigma_1 FS_{i,t-1} + \sigma_2 GQ_{i,t} + n_i + \xi_1 + \varepsilon_{i,t} \quad (4)$$

$$GQ_{i,t} = \sigma_0 + \sigma_1 GQ_{i,t-1} + \sigma_2 FI_{i,t} + n_i + \xi_1 + \varepsilon_{i,t} \quad (5)$$

$$FS_{i,t} = \sigma_0 + \sigma_1 FS_{i,t-1} + \sigma_2 FI_{i,t} + n_i + \xi_1 + \varepsilon_{i,t} \quad (6)$$

$$FS_{i,t} = \sigma_0 + \sigma_1 FS_{i,t-1} + \sigma_2 FI_{i,t} + \sigma_3 GQ_{i,t} + n_i + \xi_1 + \varepsilon_{i,t} \quad (7)$$

$$FS_{i,t} = \sigma_0 + \sigma_1 FS_{i,t-1} + \sigma_2 FI_{i,t} + \sigma_3 GQ_{i,t} + \sigma_4 CV1_{i,t} + \sigma_5 CV2_{i,t} + \sigma_6 CV3_{i,t} + n_i + \xi_1 + \varepsilon_{i,t} \quad (8)$$

where.

$FS_{i,t}$  = FS of country  $i$  at time  $t$  (Eq. (3)).

$\sigma_0$  = a constant.

$FI_{i,t}$  = a composite variable of FI (Eq. (2)).

$GQ_{i,t}$  = a composite variable of GQ (Eq. (1)).

CV1 = control variables of annual GDP growth.

CV2 = population growth.

CV3 = broad money (M2) to GDP.

$n_i$  = country-specific effect.

$\xi_t$  = time-specific constant.

$\varepsilon_{i,t}$  = an error term.

Table 3

Dynamic system generalized method of moments (GMM) estimations results (standardized using z-score techniques).

	Financial stability (DV) (Eq. (4))	Financial inclusion (DV) (Eq. (5))	Financial stability (DV) (Eq. (6))	Financial stability (DV) (Eq. (7))	Financial stability (DV) (Eq. (8))
DV Lag1	119.85*** [0.00765]	173.05*** [0.004902]	127.40*** [0.00643]	92.00*** [0.00846]	39.30*** [0.0208]
Governance (IV)	11.67*** [0.01439]	-28.57*** [0.003844]		4.76*** [0.01379]	2.71*** [0.0210]
Financial inclusion (IV)			8.78*** [0.02573]	7.08*** [0.02457]	5.11*** [0.02408]
Constant	4.66*** [0.00569]	-1.69* [0.004509]	-3.75*** [0.000]	-1.64* [0.0105]	-1.82*** [0.00912]
GDP Growth (CV)					5.56*** [0.00466]
Population Growth (CV)					12.51*** [0.00268]
Broad money (M2) to GDP (CV)					1.72 [0.12687]
Sargan Test					
$\chi^2$	25.84	36.57251	31.09153	29.25021	28.89316
Prob > $\chi^2$	(0.8417)	(0.3502)	(0.6109)	(0.6996)	(0.7161)
A.B Test Order 1					
z	-3.6167	-1.5911	-3.596	-3.5984	-3.4535
Prob > z	(0.0003)	(0.1116)	(0.0003)	(0.0003)	(0.0006)
A.B Test Order 2					
z	-0.801	-1.1356	-1.504	-1.5319	-1.6664
Prob > z	(0.4227)	(0.2561)	(0.1259)	(0.1256)	(0.9491)
Observations	296	307	287	287	281
Instruments	37	37	37	38	41
Prob > $\chi^2$	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Note: Standard errors are in [ ]. \*, \*\*, \*\*\* denote statistical significance at 10%, 5%, 1% levels, respectively. A.B Test: Arellano-Bond Test. Prob > Chi2: For Overall Model. IV: Independent Variable. DV: Dependent Variable. CV: Control Variable.

Source: Author's Calculations.

### 3.2.3. Mediating role of FI

As discussed in Section 2, past studies have shown the relationship between GQ and FS (Cieřlik & Goczek, 2018; Eldomiaty et al., 2020; Law & Azman-Saini, 2012; Sethi & Acharya, 2018). Other papers have reported the relationship between GQ and FI (Ajide, 2017; Alhassan et al., 2019; Park & Mercado, 2018; Zulkhibri & Ghazal, 2017). Studies such as Ahamed and Mallick (2019), Vo et al. (2019a), Le et al. (2019b), and Van et al. (2020) explore the relationship between FI and FS. Based on these prior studies, reasonable grounds exist to investigate the possible mediating role of FI in the relationship between the GQ in a country and FS.

To investigate the mediating role, we followed the Baron and Kenny (1986) method for mediation analysis, as explained in Section 3.2.2. Three conditions must be filled to confirm the mediating role of FI (Iankova et al., 2019; Shin, 2018; Wang & Jiang, 2019). These three conditions are (1) the GQ of a country must significantly affect the FI, (2) the FI must significantly affect the FS, and (3) after controlling for the FI, the GQ becomes either less significant or insignificant.

To further analyze the mediating role of FI, following Wang and Jiang (2019), we performed Sobel's (1982) test to examine whether the indirect impact of GQ on FS through FI (mediator) is statistically significant. The Sobel (1982) test was conducted as follows:

$$Sobel = \frac{ab}{(a^2S_b^2 + b^2S_a^2 + a^2 + b^2)^{1/2}}$$

where.

$a$  = the coefficient for the association between GQ and FI.

$S_a$  = the standard error of  $a$ .  $ab$  = the coefficient for the association between FI and FS.

$S_b$  = the standard error of  $b$ .

### 3.2.4. Robustness checks

In addition to other estimation methods, we also considered various steps to ensure that results are robust to the sample selection and alternative measures. In this context, we took the following actions and re-estimated the models.

First, we redesigned the sample by deleting some observations. In each step, we repeated the estimations by removing the following countries.

- Turkey and Cyprus, because of their particular geographic location between Asia and Europe
- Afghanistan, because of its political and governance instability
- China, because it is one of the biggest Asian economies
- Oil-rich countries, such as Iraq, Kuwait, Russia, and the United Arab Emirates.

We also analyzed the sample by removing 1 percent of the observations from the top and the bottom. At the same time, to achieve robustness to alternative measures, we derived an alternate proxy for governance quality (GQA) through PCA from variables from the Heritage Foundation database used in several recent studies (Dialga & Vallée, 2018; Ullah, 2020). The Heritage Foundation provides data for the key aspects of the country's overall condition that governments influence through policy controls. The four main pillars are government size, regulatory efficiency, the rule of law, and the degree of market openness (Dialga & Vallée, 2018). The results for robustness checks are reported in Table S6 (available online), and further description and results for an alternate proxy GQA estimation are presented in Table S7 (available online).

#### 4. Empirical findings

As shown in Table 3, this study considers various relationships to enhance the robustness and sensitivity analysis (Vo et al., 2020). For the same reason, Eqs. (7) and (8) were estimated separately, that is, with and without control variables. The results after the variables are standardized with the min-max and softmax techniques are reported in Table S3 (available online). Tables S6 and S7 (available online) report the results from various checks performed to ensure the robustness of the estimations. These results showed a similar pattern that validated the robustness of the estimations (Le et al., 2019b). The second column of Table 3 lists the findings for regressing FS on GQ (Eq. (4)), while the third column demonstrates the impact of GQ on FI (Eq. (5)). In the fourth column of Table 3, estimates are presented for the relationship between FI and FS (Eq. (6)), whereas in the last two columns, results for Eqs. (7) and (8) are given.

In terms of model specification, we conducted an endogeneity test on different models (Table S4, available online), and other diagnostic tests were conducted as reported in Table S5 (available online). The results confirm the existence of endogeneity, heteroskedasticity, and autocorrelation problems in our models. Based on these diagnostic tests, system-GMM estimation is a suitable technique for this study. In all the estimations, the lagged dependent variable is statistically significant, which shows that the empirical results derived from the dynamic panel are reliable (Le et al., 2016). Further, all the regressions specified by Eqs. (4)–(8) are conducted with the first lag of the dependent variable. No further lag was deemed necessary because models with first lagged values yield satisfactory statistics for the Arellano-Bond and Sargan post-estimation tests. Extant literature on GQ also shows that the GMM model with first lagged values estimates satisfactory results (Asongu & Nnanna, 2019; Chinoda & Kwenda, 2019).

In the second column (Table 3), the positive impact of GQ on FS is highly significant. GQ positively contributes to financial development and stability, and financial development further boosts the financial market's efficiency and the financial intermediation process, which in turn augments FS (Sayılır et al., 2018). At the same time, bad governance reduces the return on investment, which causes investors to

move their investments to other countries and induces capital flight (Cieślak & Goczek, 2018). Therefore, GQ has a positive impact on FS, which supports the “sand in the gears” view that contradicts the “grease the gears” notion (Yakubu, 2019) in the Asian context. The results also demonstrate more broadly that to achieving economic prosperity requires continuous improvement in institutional and regulatory quality, along with political stability and control of corruption. The established institutions enable the financial system to absorb shocks and maintain FS in a region.

Next, the third column in Table 3 shows that GQ has a negative impact on FI. This finding supports the conclusion drawn by Zulkhibri and Ghazal (2017), in which some aspects of GQ are negatively related to FI. Meanwhile, Aaberge et al. (2017) discovered a transitory increase in savings by households in China during an upsurge in political uncertainty. Extant literature also reports on the significant negative impact of control of corruption on borrowing from formal financial institutions (Eldomiaty et al., 2020) and that tightening regulations can negatively affect FI (Anarfo & Abor, 2020). Nevertheless, it cannot be inferred that GQ is not good for FI. To increase FI, regulations must be designed in a way that supports population inclusiveness in the formal financial system.

In addition, FI has a positive and highly significant relationship with FS in Asian countries. FI channels financial resources that boost economic activities and maintain FS (Ahamed & Mallick, 2019; Le et al., 2019b; Vo et al., 2021; Vo et al., 2019a). The increase in FI improves banks' customer base and diversifies their balance sheet activities that reduce liquidity risks, credit stress, and the probability of default (Morgan & Pontines, 2018). Asian countries should include a policy to increase FI in their financial development strategy for the welfare of the population to raise FS. Higher FI helps governments to improve the income by extending economic opportunities.

As part of the mediation analysis, the relationship between all the variables was found to be highly significant, which provides strong evidence that FI has a mediating role in the relationship between GQ and FS. Moreover, the results for the model in Eq. (7) also show the role of FI as a mediator because after it is added, the beta value of GQ on FS falls compared to its previous value (from  $b = 11.67$ ,  $p = 0.000$  to  $b = 4.76$ ,  $p = 0.000$ ). These findings confirm the partial mediating role of FI. Furthermore, the Sobel (1982) test reveals that the relationship between GQ and FS is significantly mediated by FI (Sobel test = 102.596,  $p < 0.001$ ). The results after the inclusion of control variables in the model in Eq. (8) show that GQ and FI have a significant and positive relationship with FS.

Contrary to Smaoui and Salah (2012), Căpraru and Ilnatov (2014), Thiagarajan (2018), and Le et al. (2019b), we find a significant and positive impact of GDP growth on FS and a highly positive impact of population growth on FS. These findings are supported by Nyoni and Bonga (2017) and Azam et al. (2020). Meanwhile, the broad money (M2) to GDP has an insignificant impact on FS.

We conducted the Sargan and Arellano-Bond tests to ascertain the accuracy of the GMM estimates. The Sargan test



confirms the results with instrumental conditions, indicating that the instrumental variables are valid and exogeneous. Moreover, based on the Sargan test, as reported in [Tables 3 and S3](#) (available online), the findings are robust ([Vo et al., 2020](#)). The Arellano-Bond test detects autocorrelation in the data, however, it was subsequently addressed by the dynamic system-GMM estimations in the second step.

Our findings can be summarized by saying that GQ has a negative relationship with FI and a positive relationship with FS, but FI has a positive impact on FS. These findings have economic significance because they show that not all aspects of GQ should be focused on FI and FS. For instance, if an economy is increasing financial access to boost economic activity in a region, it should ease strict financial regulations. A flexible financial system encourages participation in the formal financial system. Attempts at leniency in implementing strict laws to foster economic growth can be observed in various administrations' amnesty schemes. For example, many non-Asian countries, including Argentina, Australia, France, Honduras, Ireland, Italy, Mexico, New Zealand, and Switzerland, have introduced amnesty programs ([Ibrahim et al., 2017](#)). Hence, Asian economies also need to ease regulations to increase financial inclusion in Asia and prolong FS.

## 5. Conclusion

This study investigates the relationship of GQ with FI and FS using the stakeholder theory, with a sample of Asian countries, as Asia is the most rapidly growing region in the world economically. We also examine the mediating role of FI. The study finds significant results about the relationship between GQ, FI, and FS. In the Asian region, GQ and FI have a significant and positive relationship with FS, but GQ has a negative effect on FI.

Nevertheless, based on this negative result, we do not recommend discouraging an increase in GQ. Instead, to avoid unnecessary bureaucratic processes that may discourage public participation in the formal financial system, Asian countries need to reconsider their policies, rules, and regulations. Regulators are encouraged to design rules that increase financial activities and facilitate the inclusion of entities into the formal financial system. In addition, the negative impact of rigid regulations on FI can be mitigated if FS is maintained over the long term. Because regulators are concerned about FS, a stable financial system encourages policy makers to ease regulations, which will ultimately expand FI ([Anarfo & Abor, 2020](#)).

Furthermore, our findings infer that GQ is crucial for FS in Asia. A coordinated approach to create a balance between increasing financial activities and their supervision is required to foster economic growth. Unnecessary and strict regulations can prevent financial efficiency. However, loose supervision can result in financial instability in a region. Therefore, there is a need to maintain FS in Asia by improving GQ and increasing FI.

This study is based on the stakeholder theory in the domain of GQ, FI, and FS. [Dahan et al. \(2015\)](#) state that governments are usually seen as ordinary stakeholders, without considering their essential role in the nexus between business, society, and

government. Only a few studies have applied the stakeholder theory from the government perspective. In contrast, many studies examine firms using this theory. Therefore, we contribute to the stakeholder theory by exploring the responsibility and role of governments in increasing their citizens' well-being and maintain FS through public institutions. Increasing FI will expand public access to formal financial services, such as insurance and loans, on competitive terms.

Despite the significant relationships, the resultant beta for FI has a low magnitude. This finding hints that other channels might exist between GQ and FS, so they need to be explored. More specifically, future studies should examine the impact of GQ on FS by analyzing other relevant mediators. Moreover, we find a negative relationship between GQ and FI. This relationship could be scrutinized further with a larger dataset. The data collected for this study were from 2009 to 2017, and the unavailability of data prevented us from obtaining a higher number of observations. Therefore, future studies might be able to gather more data. Finally, another future research direction would be to conduct the same study but in a different geographic context.

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## Conflict of interest

The authors declare no conflict of interest.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.bir.2021.05.005>.

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