PLOS ONE

RESEARCH ARTICLE

Role of institutions in promoting finance in emerging markets: A panel data analysis

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Citation: Aman A, Khan MA, Khan MA, Haider A, Oláh J, Fenyves V (2023) Role of institutions in promoting finance in emerging markets: A panel data analysis. PLoS ONE 18(3): e0280849. https://doi.org/10.1371/journal.pone.0280849

Editor: Ricky Chee Jiun Chia, Universiti Malaysia Sabah, MALAYSIA

Received: October 8, 2022

Accepted: January 9, 2023

Published: March 23, 2023

Data Availability Statement: The data underlying the results presented in the study are uploaded as supplementary material (compressed file).

Funding: The author(s) received no specific funding for this work.

Competing interests: The authors have declared that no competing interests exist.

Abstract

Differences in institutions have garnered much attention in recent years as one of the primary reasons for long-term economic performance, and a vast corpus of theoretical and empirical research demonstrates that financial development can have a substantial impact on economic and financial performance. In fast-growing emerging markets, the demand for financial services has considerably increased, which amplified the need for an efficient regulatory framework to deal with the sensitive nature of financial activities. Surprisingly, the existing literature on the impact of institutions and finance is focused on developed economies, while emerging markets are rarely focused on. Since emerging markets are becoming increasingly important as a result of the swift evolution of institutional and financial transformation, it is crucial to examine how the growth of financial markets reacts to institutional quality. This study investigates the role of institutions in promoting finance in emerging economies using the balanced panel dataset of 21 emerging market. Given the endogenous relationship between institutions and finance, the paper applies a two-stage least squares estimator to test the settler mortality hypothesis in this context. Aligned with theoretical intuition, the empirical result shows that settler mortality is a relevant instrument to institutions. Furthermore, the study performs robustness, using framework that deals with heterogeneity, and cross-section dependence. This empirical effort validates La Porta's Law and Finance Hypothesis in the context of emerging markets. The results of the study are found robust across the variety of alternative measures of institutions and finance, and standard error correction specifications. Therefore, the study offers useful insight into policy implications.

1. Introduction

Due to their constant and faster economic growth than the developed markets, emerging countries have become a crucial global growth engine during the past two decades.

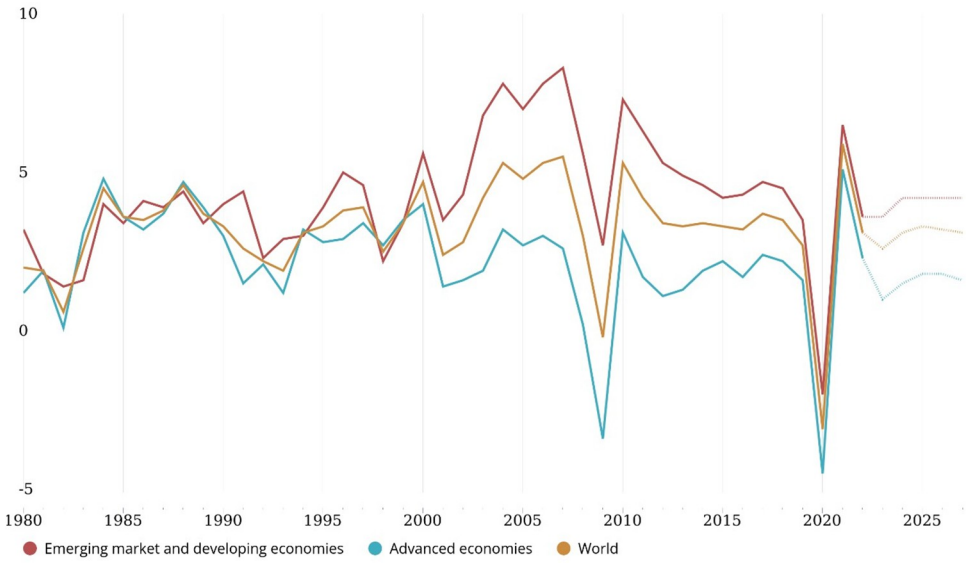

Fig 1. Real GDP annual growth (source: IMF, world economic outlook, 2022).

https://doi.org/10.1371/journal.pone.0280849.g001

Subsequently, the investment in emerging markets appears to produce substantial and diversified benefits for stakeholders, which makes these economies catchy for research. Real Gross Domestic Product (GDP) growth is depicted graphically in Fig 1 for developing markets, developed economies, and the world as a whole (see Fig 1). Compared to developed and developed economies, developing markets have consistently performed better since the year 2000. In comparison to the rest of the globe and developed markets, their annual GDP growth was 4.1% as of October 2018 [1].

Emerging markets are important because they drive growth in the global economy. The currency crisis of 1997 forced them to make their financial systems more sophisticated. Countries with the most diversified banking systems fared the best during the current global financial crisis, demonstrating the sector's criticality [2]. Since then, the global financial markets have been on an upward trajectory, and it is interesting to note that the developing economies have made a significant contribution to this boom. This unprecedented development in financial markets has led to a fundamental shift in financial structure and capital flows, with established countries seeing more cash flow to emerging markets than ever before [3]. In this scenario, the role of the financial sector becomes credible in two ways. To begin, a robust financial system acts as an inducement for multinational corporations to make investments in the country that is hosting them [4]. Second, the expansion of the economy's financial sector boosts overall economic efficiency by more wisely distributing the limited economic resources available during the expansion of the economy [5–7].

The ability to effectively allocate credit across companies, which in turn increases investment efficiency and productivity growth, is one of the many benefits of finance [7]. As a result, the definition of finance encompasses initiatives that aim to better financial products, institutions, and markets (both the banking sector and capital markets). According to Ro, Kim, and Kim [8] research, the efficiency and competitiveness of the financial market are more important factors in sustaining economic growth than the total size of the financial market. Swamy and Dharani [9] find a bidirectional association between finance and economic growth. The strength of institutions and advancements in our financial system are two crucial pillars of long-term economic growth [10]. In the same vein Kutan, and Naseem [11] argue that

financial markets promote economic growth in a situation when institutions play the role of market regulating, market stabilizing, and market-creating. Similarly, Yu, Li, and Huang [12] highlight two financial functions; financial access and financial efficiency as critical determinants of finance with the spillover effect through economic development. No wonder that financial development and financial literacy have been the most prominent research topics within finance over the last months [13]. For an economy to expand, a reliable and stable financial system is essential, and, a well-structured financial system can direct investment dollars to where they will do the most good [10].

The preceding explanation illustrates the important role that finance plays in the general success of the economy; yet, the activities that are involved in finance are susceptible to certain restrictions. These operations are directed by the institutions in order to prevent an expected misuse of financial resources. It is believed that the institutions guarantee a contextual framework within which economies either prosper or decline. Institutions make significant contributions to growth and development, and as a result, they are recognized as an essential aspect in production. Productivity and growth over the long run are mostly driven by the strength of an economy's institutions. In addition, there has been a lot of attention paid to the fact that institutions continue to be very important to the ongoing importance of stable and effective institutions for economic productivity. Institutions define how individuals arrange and carry out economic transactions. On the other hand, a lack of robust institutional infrastructure is a barrier to competitiveness and development in a number of countries [14]. In order to properly apply corporate governance norms and global business ethics, robust institutions provide the transparency, efficiency, and check-and-balance mechanisms necessary for doing so. Kutan, Samargandi, and Sohag [15] document the role of institutions in the relationship between finance and economic growth in the Middle East and North African countries. They acknowledge that financial performance has a positive impact on the growth of financial institutions.

We find literature on the subject matter directed to institutions and finance as determinants of economic growth [15–19], or institutions and finance in context of developed countries [3, 20–27]. Within the second strand, some of the studies are related to the African region, for example, Cherif and Dreger [22]. In this regard, the number of studies that take place within the setting of emerging markets is extremely limited. Even the published research on the topic hardly ever takes into account the significant endogeneity problem that arises from the correlation between institutions and the error component (see the empirical section for the presence of endogeneity). Since emerging markets are becoming increasingly important as a result of the swift evolution of institutional and financial transformation, it is crucial to examine how the growth of finance reacts to institutions.

Considering the knowledge gap in the literature, estimation misspecifications, and increasing economic role of institutions, this study contributes to the emerging market literature in several ways. First, to the best of our knowledge, this is the study that validates Law and Finance Theory of La Prata [28, 29], and settler mortality theorem (STM) [30], in the context of emerging markets. We find empirical support in favor of Law and Finance Theory in case of 21 emerging markets, and it is evident that sound institutions are at the core of finance in these economies. Besides, this, the settler mortality theory postulates that STM has a significant influence on institutions, which comoves with institutions. Interestingly, the empirical findings give support to the STM in emerging economies, and policymakers need to account for its substantial effect on institutions.

Second, this research makes use of a recently developed finance index [31] in the context of developing nations' economy. This all-encompassing index takes into account the many facets of the global financial system and is based on a wide range of indicators gleaned from global

financial markets and institutions regarding the extent, availability, and effectiveness of financial resources. This comprehensive index encompasses the multidimensional financial system drawn on a variety of indicators from financial markets and institutions in terms of financial depth, access, and efficiency. Consequently, it appears to be a useful measure of finance and its potential yet to be tested across various context. Svirydzenka [31] believes that the index covers most of the elements of the finical system, and it may overcome the limitations associated with traditional measures of finance. Interestingly, few recent studies [24, 32–36] have empirically used this index and found consistent results.

Third, this research uses the institutional measurement from the global competitiveness index for the first time, which is a significant step forward and one of four promising contributions of this study. The findings are consistent in providing a positive explanation for finance, despite the differences in measurement scales. These variations in measuring are important for policymakers and practitioners to grasp. Fourth, this study applies advanced techniques to deal with estimation problems. Specifically, the literature on institutions and finance fails to capture the endogeneity problem with traditional estimation procedure; this negligence often produces spurious estimation. In this regard, the study uses robust 2SLS to handle this issue. Furthermore, the heteroskedasticity and cross-sectional dependence, which are the paramount issues in the context of emerging economies due to their diverse geographical nature. Present study performs robustness using Feasible Generalized Least Square (FGLS), and Panel Corrected Standard Error (PSCE) in a methodological framework which is robust to correct such cross sectional dependence and heterogeneity [33]. This method has not been used before in analyzing the relationship between institutions and finance in emerging economies.

According to these findings, the governments of 21 developing nations need to put the following policies into effect in order to advance the growth of their financial systems: First, they should work on improving the quality of the rules that are in place by enacting sensible policies and regulations that encourage and foster the growth of the private sector. Second, in order to keep the political climate stable, they need to ensure that people are allowed to enjoy the rights and liberties guaranteed to them by the constitution, but not to an extreme degree. The commitment that policymakers have to particular public policies, such as the imposition of high tax rates on the private sector, has to be moderated as a last resort. At the same time, the strategy that seems to have the most potential is to approach financial supervision as a principal-agent problem. For this strategy to work, economics and political economy must be combined to improve both positive and normative analyses of supervisory governance. Taking these steps is necessary to make progressive financial system. The development of the financial sector has a first-order effect on the rate of long-term economic growth. Kutan [15] found that not all indicators of financial development contribute to economic expansion in the absence of high-quality institutions, but all of these indicators contribute to expansion when high-quality institutions are present. At the other end, the assumption that higher-quality finance leads to more equitable income distribution is reflected in the fact that institutional quality influences the connection between financial development and income inequality. In addition, emerging economies are on the path to economic prosperity; nevertheless, the process of development has increased the ecological footprint of these countries, and the quality of the institutions in these countries may help to limit the negative environmental repercussions of financial development. Therefore, it is imperative to fully understand the financial systematizing through which institutions may contribute to economic growth in emerging economies. According to the findings as a whole, we can draw the conclusion that high-quality institutions are the primary forces behind financial development, and that having such institutions in place fosters it.

The remainder of the work is organized as follows. The following section briefly review the relevant theoretical and empirical literature. In the third section, the data and methodological

foundations are presented. The fourth section discusses empirical findings, while the last section concludes the study.

2. Theoretical background

2.1 Law and finance

The theoretical underpinning of present work is drawn on the seminal theory of Law and Finance by La Prata [28, 29] who tossed up the coin of law and finance. La Porta et al. [28] study of 49 countries shows that countries with weaker protections for investors, as measured by the nature of the laws and how well they are enforced, have smaller and more limited capital markets. They attribute the significance of obtained results for both the stock market and the bond market, and believe that compared to common law countries, French civil law countries have the weakest protections for investors and the least developed capital markets. On the same line, La Porta et al. [29] examine the laws that protect corporate shareholders and creditors, where these laws came from, and how well they are enforced in 49 sample countries. They show that common-law countries have the strongest legal protections for investors, while French civil-law countries have the weakest. German and Scandinavian civil-law countries are in the middle [29]. Drawn on law and finance theory, present study examines the institutions and finance connection in an interesting sample of 2017 Financial Times Stock Exchange group classified 21 emerging markets.

2.2 Settler mortality hypothesis

The Settler Mortality hypothesis [30] identifies the role of institution and geography in the development of the financial sector. The initial endowment, such as geographical factors and the colony's disease environment, were claimed to have formed the formation of early institutions by settlers. Acemoglu et al. [30] note that the former colonial system is partially influenced by their experience of colonization. The theory suggests that the difference in the initial endowment has influenced the establishment of initial institutions that had sustained impact on the protection of private property rights and the development of the financial sector [37]. The Settler Mortality theory is based on three assumptions. The first assumption is that different colonization strategies of European settlers (colonizers) led to the creation of different types of institutions in colonies.

In some cases, European colonial settlers such as Australia, Canada, New Zealand, and the United States established an institution that protects private property and manages the government's power of expropriation [30]. The second assumption is that the adoption of colonization strategies by Europeans depends on the conditions of living in colonies. In regions that do not support European settlements, such as regions with high mortality due to the disease environment, Europeans tend to form extractive states [30]. Europeans are settling in colonies in a suitable living environment [37]. The last assumption is that the institutions formed during colonization exist long after independence. Beck [37] believe that the initial endowment is more critical, and the countries with a weak geographical basis (high settler mortality) have less developed institutions. A group of studies [18, 38–41] validates the Settler Mortality Theory in context of developed economies. In a nutshell, Settler Mortality hypothesis sets the theoretical foundations for presents study, and we tend to validate this theorem in an emerging market perspective.

2.3 Institutions and finance: Empirical footings

According to the research, the consolidation of larger and better financial markets is one of the mechanisms via which better institutions might influence economic development [42] and

financial sector [43]. The author indicates that, what determines the establishment of 'good' institutions, i.e. institutions that foster financial progress, appears to be of particular significance. Khan et al. [35] come to the conclusion that good institutions are a key part of the growth of financial markets in emerging markets, and they emphasise the significance of understanding the relationship between financial market development and institutions, because improving institutions can boost the financial development's growth dividend. The growth of the financial industry has been a crucial factor in economic expansion [44]. It contributes to economic prosperity by supporting the institutional framework [45]. If the financial system is established in a solid institutional framework, finance will have a greater impact on economic performance. Institutional reforms are necessary to foster economic expansion and financial gains [34, 42]. Extension of high volume of finance is not good for an economy [11]. Political stability is one of the primary conditions for the development of financial markets [46]. Several measures, including the protection of property rights, the eradication of corruption, and the reduction of ambiguity regarding the improvement of investor confidence, are essential to the financial system's effective operation, which delivers long-term economic advantages [18]. An institutional approach in which property rights, legal contracts, and market prices are transparent creates a conducive financial environment [47]. Countries with high institutional factors such as shareholder rights, creditor rights, legal protection, and institutional index tend to have better stock market performance [48]. Strong protection of property rights has a strong impact on companies' access to finance, and it confirms that corporate access to finance considerably mitigates the impact of such protection on business innovation [49].

Democracy promotes finance, especially the banking sector, but this merger does not seem to be evident to the stock market [50], while bureaucratic quality is actively involved in the development of bond markets [51]. Improving political and civil liberties have enhanced the benefits of finance by having a positive impact on South Asian economic growth [16]. Andrianova, Demetriades, and Shortland [52] describe the vital role of the government as a political institution that creates massive trade monopolies, thereby enabling the emergence of financial systems around the world. According to panel statistics, a low level of corruption has a favorable and considerable impact on market capitalization and transaction volume [21]. Political institutions determine the ability of the government to implement a policy that strengthens good governance [53]. Jain, Kuvvet, and Pagano [54] argued that bribery is heavily influenced by the country's financial market. Countries with exceptionally high levels of transparency have significantly lower levels of information asymmetry and transaction costs than even the most corrupt countries.

In general, the body of research on the institutional impact on finance can be split into two distinct streams of thought. In the first place, attention is given to the impact that institutions and finance have on economic growth (see, for instance, [15–18, 42]. While, second, investigates the institutional determinants of finance in development economies [3, 21–27, 55]. Some of the researchers in the second group concentrated their attention on the African region and looked into the ways in which corruption affects the growth of stock markets in this part of the world [22, 23].

The developed nations are emphasized by some other researchers, especially Li et al. [26], who draw the conclusion that creditor rights have a favorable influence on the growth of equities markets across a group of 45 developed countries. In the context of the United States, Khan, Khan, and colleagues [24] deduce that there is a positive connection between institutions and finance. In a similar vein, Law and Azman-Saini [25] research with a selection of industrialized nations demonstrates that institutions are having a favorable connection with the growth of the banking sector. The authors concluded that metrics of stock markets do not

correspond with institutions. According to Yartey [3], the institutional elements were extremely important to the determinants of stock markets in emerging nations throughout the period of 1990–2004.

The study used traditional estimators, which lacks the power to account for endogeneity issue, and in addition since 2004 much has happened. A study by Khan, Kong, et al. [55] is an exception who includes ethnic diversity as an instrument for institutions. Nevertheless, every instrument carries unique features and capacity to influence the institutions; we incline to test *STM* as an instrument for institutions, which is to the best of our knowledge not tested in the scenario of emerging economies. Therefore, the study is worthwhile in contributing to the literature on emerging markets in the connection of institutions and finance using a sample of 21 emerging economies.

The following hypothesis can be derived from the debate.

Hypothesis: *1"Institutions seem to have a positive impact on finance in emerging markets."*

3. Method

3.1 Data and variables

Based on the Financial Times Stock Exchange (FTSE) country classification review, September 2017, our panel comprises 21 emerging economies. The list is sample countries may be found at following link http://www.ftse.com/products/downloads/FTSE-Country-Classification-Update-2017.pdf. The study utilizes maximum available dataset for the period 1984 to 2021. The dependent variable – finance is measured form the financial development index maintained by the *International Monetary Fund*. Few studies [24, 32–36] have used this comprehensive index in different context and find consistent results.

The independent variable, institutions is measured by several proxies, among which World Bank–World Governance Indicators, and International Country Risk Guide, Political Risk Service indicators, are commonly used in the literature. This study utilized the World Bank–World Governance Indicators, as core measure of institutions. The data coverage is from 1996 to 2021 with missing values for 1997, 1999, and 2001 which are provided by replicating the immediate previous year value with the understanding that institutions change after a long time. We follow related literature [24, 25, 56], to generate these indices, as they argue that the individual components have high inter-correlations. Therefore, the averaging mechanism provides a comprehensive index, that represents the similar attributes of these indicators [25, 55]. Aligned with [55] the institutional measure by World Governance Indicators is an aggregation of *"i) voice and accountability*, *ii) political stability*, *iii) regulatory quality*, *iv) the rule of law*, *v) corruption and vi) government effectiveness"*. These indicators are scaled between -2.5 to 2.5. A low score indicates the worse institutional framework, and high score denotes that institutions are stable. For main analysis aggregate index is used, while robustness is tested with each of the six individual indicators of this measure.

For robustness testing, aligned with the related literature [15, 24, 35, 57] the alternative measure of institutions is sourced from *International Country Risk Guide* published by *Quality of Government* (ICRG) for the period from 1984 to 2021. This measure consists of the mean value of; "i) *bureaucracy quality*, *ii) corruption*, *iii)*, and *v) law and order"*. The index ranges between 0–1; the higher score shows superior institutional performance while low vice versa. We tested the robustness, using institutional measure from the *Global competitiveness index which is maintained by the World Economic Forum* (GCI), and data is available from 2006. This measure of GCI scaled from 1–7. The high score is a sign of sound (best) institutions and low shows the weak (worst) institutions. We downloaded data for GCI (2006–2021) from the

World Economic Forum, Global Competitiveness report and this is the first pillar of this report generated based upon 21 subdimensions including investors property right, intellectual property rights, judicial independence, efficiency of legal framework, ethical behavior of firms, and others (for details on other subdimensions, please visit https://www.weforum.org/reports/the-global-competitiveness-report-2016-2017-1/).

There are number of other variables those are reportedly used in the institutions–finance literature, and to avoid omitted variable bias and to provide relatively realistic estimation it is common to include the control variables. Moreover, overlooking controls may result in over estimation of institutions effect on finance. Therefore, in line with the related literature trade openness, economic growth, inflation, exchange rate, interest rate spread, foreign direct investment, economic freedom, investment, and foreign portfolio investment as controls over finance [24, 25, 35, 55, 58–60].

Among these controls, the trade openness, foreign direct investment, foreign portfolio investment, and economic freedom are considered as important controls with the spirit of neo-liberalism policies. Removing barriers on cross-border capital movement is a common policy agenda of nee-liberalism (so-called capital account liberalization) [61]. According to a composite index that gauges the extent to which countries implemented competition to stimulate economic growth, there has been a strong global trend toward neoliberalism during the 1980s [61].

Economic theory leaves no doubt about the potential benefits of capital account liberalization, sometimes termed financial openness [62]. It can channel global savings to their most productive users. Developing nations with limited capital can borrow to finance investment, boosting economic development without increasing saving. Economic expansion is a complex function of financial openness, and foreign direct investment, which might involve the transfer of technology or human resources, does appear to increase growth over the long run [63]. In contrast, the effects of other flows, such as portfolio investment and banking and especially hot, or speculative, debt inflows, do not appear to stimulate growth or permit the country to better share risks with its trading partners [63].

Political regimes, such as democracy or autocracy may have implications of financial development, thus, we captured political regimes' effect in form of taking polity2 as control in our estimation. According to Francis [64], the political regimes affect the size of securities markets but not their liquidity. The democratic transitions lead to beneficial economic results, and the relationship between a young democracy and financial development is negative and turns positive when democracies mature, indicating less investment uncertainty [65]. Financial turmoil that began in Thailand in July 1997 quickly engulfed the rest of East Asia, with repercussions felt as far away as Latin America and Eastern Europe by 1998 [66], and, a number of Asian countries were hit by this unprecedented crisis [67]. Therefore, we added a dummy for Asian Financial Crisis 1997 (AFC1997) in estimation to control for the potential effect of AFC1997. Similarly, the financial markets around the world were severely impacted by the Great Recession of 2007–2008, the worst economic downturn since the Great Depression. The crisis, which was triggered by the bursting of the U.S. housing bubble, caused the demise of Lehman Brothers (then one of the world's largest investment banks), nearly brought down many other major financial institutions and businesses, not only in U.S. but whole world and necessitated unprecedented bailouts from the respective government. Restoring normalcy took about a decade, during which time millions of jobs and billions of dollars in income were lost. Weak monetary policy was a major contributor to the enormous market volatility in 2007–08. Since banks were given permission and even encouraged to engage in excessive leverage and maturity transformation, this mistake was compounded by faulty regulatory frameworks [68]. While technological advancements were a factor in the uncontrolled expansion of credit and

investment, the speculative wagers on rising asset prices would not have been conceivable without easy access to capital and excessive leverage [68]. To account for its effect on financial development, we consider it as a dummy (GFC2008) into our estimation.

The data on all the variables used in this study are compiled brodly from World Bank Governane Indiators, Internaiton Monetary Fund, World developmen indicators, Quality of government, Freedom House, and Bank of international Settlement. In annexure A, the description of all the variables is provided.

Informed Consent and Ethical Statement *"The informed consent and ethical statement are not applicable to this research, because it used/analysed secondary published data publicly available, and in addition, there is no human/animal interviewed/experimented."*

3.2 Econometrics model

In order to investigate how the institutions, influence finance in 21 developing economies, we begin by estimating ordinary least square regressions to serve as the baseline model. The following equation is used for all estimators;

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 K_{it} + u_{it} \tag{1}$$

In Eq (1) Y is the dependent variable, finance. X_{it} is explanatory variable – institutions, and K is the matrix of the controls over Y such as economic growth, openness, inflation, effective exchange rate, interest rate spread, foreign direct investment, economic freedom, investment, foreign portfolio investment, Polity2, and dummies for Global and Asian Financial Crisis 2007–08, and 1997. Where, i and t stand for the countries and years used as references respectively. The estimation provided by Eq (1) has two issues to contend with. The first is the correlation between explanatory variable–institutions and the error term, while the second is the predicted correlation between institutions and the dependent variable-finance. The endogeneity problem is caused by these two issues, and as a result, the estimation is unreliable and biased. To deal with this problem we use two-stage least square regression (2SLS). This approach works with an instrumental variable which should have two characteristics; i) it should significantly influence the explanatory variable, and ii) should not explain the dependent variable. The estimation is undertaken in two stages. In the first stage, the explanatory variable which is endogenous covariate is regressed on all the exogenous variables in the model including instrumental variable. The predicted value ($\hat{X}$) from this regression is obtained using first-stage regression in Eq (2) which is plug into second-stage regression in Eq (3) as under:

Stage 1: Regress X_{it} on Z_i to obtain $\hat{X}$, (where X_{it} is explainatory variable institutions):

$$\hat{X}_{it} = \partial_0 + \partial_1 Z_i + \partial_2 K_{it} + u_{it} \tag{2}$$

Stage 2: Regress Y_{it} on the predicted value from the first stage:

$$Y_{it} = \gamma_0 + \gamma \hat{X}_{it} + \gamma_2 K_{it} + u_{it} \tag{3}$$

Here Z_i is the instrument, used for institutions, and K_{it} is the vector of controls already explained in the previous paragraph. In accordance with the previous literature, and established in Settler Mortality hypothesis, we have used *STM* as a tool for institutions [30]. It measures the effects of local diseases on people without genetic or acquired immunity. Acemoglu et al., [30] use the mortality rates of colonial settlers as a means of institutions in colonial areas. They constructed powerful institutions to preserve property rights and establish the rule of law during a time when the colonists faced relatively few health concerns, but they prioritized

rapidly focusing resources on other areas. This instrument has seen considerable application in previous research [69–73], however, these studies are pertaining to the developed regions. As a result, the measure of instrument that we employ is a log of STM. The STM appears to be a reliable instrument because of the possible influence it has on the institutions rather than the finance.

3.3 Performing robustness analysis

When testing for robustness, we make use of different measures of both the independent and dependent variables. As was indicated before, the first one is sourced from the quality of the government to apply alternative measure of institutions. In this same line, we did robustness testing using a relatively new measure of institutions from the World Economic Forum (global competitiveness report), which includes data coverage from 2006 to 2021.

The traditional bank-based and stock market-based alternative measurements of finance are taken into consideration as part of the other robustness study. The literature makes extensive use of these measurements. For instance, some measures that are based on the stock market are the market capitalization ratio, the total value traded ratio, and the turnover ratio [25, 55, 74]. Bank-based measures include domestic credit to the private sector, domestic credit provided by the financial sector, and broad money [25, 40, 55, 75]. The results are incorporated in Table 5.

4. Empirical results

The descriptive statistical characteristics of all of the variables that were included in our sample are presented in Table 1. The variables are defined in terms of a unit of measurement, the source of the data, the mean value, the minimum value, the maximum value, and the standard deviation, in that order. There is a range of 252 to 798 in the observations. In order to facilitate comprehension, the dependent variable, finance, has been rescaled to equal 100. The mean value represents the center value for each series, while the standard deviation illustrates the degree of variation from the mean value for each variable in turn. It would appear that the general properties of the variables are reliable for further estimation.

The definitions of all of the variables and the different data sources may be found in S1 Appendix.

Table 1. Summary statistics.

Variable	Source	Measurement	Mean	Min	Max	Std. Dev.
Finance	IMF	Index rescaled to 100	3.527	-4.344	6.201	.834
Institutional quality	ICRG	Index (0–1)	.542	.111	.944	.139
Effective exchange rate	BIS	Rate	91.835	41.983	129.113	16.09
Economic growth	WDI	Ratio to GDP	2.441	-6.255	11.333	3.502
Economic freedom	FRH	Index	6.188	2.47	9	1.059
Inflation	WDI	Ratio to GDP	23.1	9.375	45.74	6.037
Foreign direct investment	WDI	Ratio to GDP	2.45	-.821	9.732	2.121
Foreign Portfolio investment	WDI	Ratio to GDP	-6.789	-36.71	28.709	20.173
Interest rate spread	WDI	Rate	8.484	-7.318	53.843	11.234
Investment	WDI	Ratio to GDP	11.91	-18.275	66.094	16.733
Trade openness	WDI	Ratio to GDP	59.793	12.352	135.866	30.116
Settler mortality	QoG	Rate	4.112	2.741	5.136	.68
Polity2	QoG	Score	6.5532	.4167	10	2.8357

https://doi.org/10.1371/journal.pone.0280849.t001

Table 2. Matrix of correlations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Institutional quality	1.000									
(2) *Foreign direct investment*	0.247	1.000								
(3) Investment	0.127	0.185	1.000							
(4) Inflation	0.048	-0.300	-0.148	1.000						
(5) Foreign Portfolio investment	-0.027	0.143	-0.032	-0.095	1.000					
(6) Interest rate spread	-0.147	-0.130	-0.232	0.565	-0.089	1.000				
(7) Effective exchange rate	-0.164	-0.041	0.089	-0.280	0.108	-0.160	1.000			
(8) Economic growth	0.006	0.138	0.273	-0.183	0.018	-0.165	0.069	1.000		
(9) Trade openness	0.280	0.247	0.043	-0.212	0.153	-0.344	-0.014	0.030	1.000	
(10) Economic freedom	0.167	0.353	0.098	-0.552	0.138	-0.344	0.221	0.171	0.422	1.000

https://doi.org/10.1371/journal.pone.0280849.t002

Table 2 presents the correlation matrix pertaining to institutions (ICRG), and all-controlling variables. Interestingly, none of the pairs of variables are strongly correlated. This implies that their relationship is well within the tolerance level that indicates no evidence of multicollinearity. Therefore, we proceed to perform further estimation using 2SLS.

Table 3 reflects the findings of the OLS model used as the baseline estimator. It takes into account the influence that institutions have on finance throughout the group of 21 rising economies. whereas models (2) and (3) investigate the influence of other ways of measuring institutions on finance. The findings from each model demonstrate unequivocally that institutions play a constructive role in emerging economies' financial systems. This inference bolsters the need for additional research that is more in-depth and takes a more sophisticated approach. As a result, we make use of an instrumental variable method within the context of 2SLS. The results are given and discussed in the section that can be found in facing table.

When the STM is employed as an instrument, the results of the 2SLS analysis of the impact of institutions on finance are displayed in Table 4. The results of the first stage of regression on model 1 show that a one-unit change in STM has a negative effect on the institutions by 0.2362. The findings are in line with what has been previously shown [30]. The inference to be drawn from this is that, during the process of formulating policy, decision-makers need to take into consideration the fundamental connection that STM has with institutions. The results of the second model shows that the presence of institutions has a beneficial effect on the finance of emerging economies. In order to avoid the effect of the omitted variable bias, we take into account a number of controls over finance, and the results demonstrate that the majority of the controls are strongly associated with finance. We use the Durbin and Wu-Hausman statistics to test endogeneity so that we may determine whether or not the instrumental regression approach is sound. The assumption underlying the null hypothesis is that the variables are exogenous. The p-values that correspond to the Durbin and Wu-Hausman statistics are used to test this hypothesis. When the p-value is statistically significant, as it is in our situation, we decide against accepting the null hypothesis. As a result, we are to accept the alternative hypothesis (Durbin stat = 38.1543; Wu-Hausman stat = 40.3434), which holds that institutional variable is endogenous in the institutions and finance nexus in the emerging market scenario. Additional post-testing in the form of Eigen statistics indicates the robustness of the instrument that is utilised for institutions. The assumption underlying the null hypothesis is that the instrument is unreliable; this assumption is tested using critical values. In this model Eigen F-statistics 56.2285 ensures that STM is a valid and strong instrument for institutions in emerging economies. As a result, the empirical data lend credence to the selection of instrumental regression as the suitable estimator.

Table 3. Institutions and finance—OLS result.

	(1)	(2)	(3)
Variables	**Finance**	**Finance**	**Finance**
Institutions (WGI)	0.203***		
	(.0301)		
Institutions (ICRG)		0.632***	
		(.2097)	
Institutions (GCI)			0.1285***
			(.0251)
Foreign direct investment	-.0229***	-.0034	-.0094
	(.0062)	(.0137)	(.0071)
Investment	.0066***	-.0155***	.0066**
	(.0022)	(.0046)	(.0025)
Inflation	-.0059***	-.0181***	-.0269***
	(.0015)	(.0022)	(.0037)
Portfolio investment	0.000	.0009	.0009
	(.0006)	(.0013)	(.0007)
Interest rate spread	.0042**	.007**	.0063***
	(.0017)	(.003)	(.0024)
Effective exchange rate	.0001	.0026	-.0082***
	(.0011)	(.0017)	(.0016)
Economic growth	-.0017	.0397***	-.0029
	(.0041)	(.0076)	(.0052)
Trade openness	.0014***	.0009	.0025***
	(.0005)	(.001)	(.0006)
Economic freedom	.0472*	.1695***	-.103***
	(.0246)	(.0334)	(.0357)
Polity2	-.0247***	-.02*	-.0159**
	(.0054)	(.0105)	(.0063)
GFC2008	.0877**	.07	.0329
	(.0371)	(.0945)	(.0371)
Constant	3.4157***	2.3947***	4.731***
	(.1846)	(.2679)	(.272)
Observations	546	798	336
R-squared	0.2666	0.300	0.3552
F-stat	16.1425	28.0386	14.8244

Standard errors are in parentheses.

*** $p < .01$

** $p < .05$

* $p < .1$.

https://doi.org/10.1371/journal.pone.0280849.t003

4.1 Robustness with alternative measures

In accordance with what was covered in section 3, we carry out one of the robustness tests concerning the influence of alternative institutional measure on finance. In the first half of the robustness section, various measures of determining institutions are tested in two separate models, and Table 5 provides confirmation of the findings. Model 1, and 3 shows the first stage results, while second stage results are reported in model 2, and 3 for each of the alternative measures of institutions respectively. In both cases (model 2, and 4), the statistically

Table 4. Impact of institutions on finance - 2SLS results.

	1st stage	*2nd stage*
Variable	**Institutions *(WGI)***	***Finance***
	(1)	***(2)***
Settler mortality	-.2362***	
	(.0312)	
Institutions *(WGI)*		.7569***
		(.1133)
Foreign direct investment	.0783***	-.0559***
	(.01)	(.0115)
Investment	.0167***	.012***
	(.0032)	(.0026)
Inflation	0	-.0088***
	(.0032)	(.0028)
Portfolio investment	.0017**	-.001
	(.0009)	(.0007)
Interest rate spread	.0064***	.0037**
	(.0021)	(.0018)
Effective exchange rate	-.0011	-.0029**
	(.0015)	(.0013)
Economic growth	-.0069	-.0055
	(.0072)	(.0063)
Trade openness	.0049***	.0019**
	(.0007)	(.0009)
Economic freedom	.1736***	-.1346***
	(.0378)	(.0378)
Polity2	.0783***	-.0559***
	(.0085)	(.0125)
GFC2008	-.1603***	.1674***
	(.0537)	(.049)
Constant	-1.6272***	5.1437***
	(.2857)	(.3641)
Observations	338	338
R-squared	.6783	.3517
F-statistics/Chi2	57.10	253.2637
Durbin		38.1543 [0.000]
Wu-Hausman		40.3434 [0.000]
Eigenvalue statistic		56.2285

Note: Standard errors are in parentheses.

*** $p < .01$

** $p < .05$

* $p < .1$.

https://doi.org/10.1371/journal.pone.0280849.t004

substantial and positive coefficient of institutions contents that the institutions in developing economies help to boost finance (H1). These findings are in line with what has been found in earlier research on the hypothesis that quality institutions boost finance by acting as a check on corrupt practices and preventing officials at all levels from misusing financial resources [50, 76, 77]. Because the findings under model 2, and 4 are consistent with the leading results provided in Table 3, we are able to draw the conclusion that alternative measures of institutions,

Table 5. Robustness with alternative measures of institutions -2SLS results.

	1st stage	*2nd stage*	*1st stage*	*2nd stage*
Variables	**Institutions *(ICRG)***	***Finance***	**Institutions *(GCI)***	***Finance***
	(1)	***(2)***	***(3)***	***(4)***
Settler mortality	-.0568***		-.4303***	
	(.0086)		(.0509)	
Institutions *(ICRG)*		3.0739***		
		(.5776)		
Institutions *(GCI)*				.3555***
				(.0541)
Foreign direct investment	.0089***	-.0265**	.0298*	-.0062
	(.0027)	(.0113)	(.0167)	(.0076)
Investment	.0045***	.0058*	.0426***	.0097***
	(.0009)	(.0032)	(.0051)	(.0025)
Inflation	.0032***	-.0207***	.0289***	-.0239***
	(.0004)	(.0027)	(.0069)	(.0034)
Portfolio investment	.0005*	-.0008	-.0013	.0008
	(.0002)	(.0009)	(.0014)	(.0007)
Interest rate spread	-.0016***	.0151***	-.0036	.0143***
	(.0005)	(.0024)	(.0041)	(.0019)
Effective exchange rate	.001***	-.0052***	.0067**	-.0092***
	(.0003)	(.0015)	(.0028)	(.0013)
Economic growth	.0049***	-.0144**	-.0263**	-.0067
	(.0017)	(.0069)	(.0127)	(.006)
Trade openness	.0001	.0036***	.0051***	.004***
	(.0002)	(.0007)	(.0012)	(.0007)
Economic freedom	.0279***	.0637**	.254***	-.1311***
	(.0064)	(.0295)	(.0779)	(.037)
Polity2	.0075***	-.0325***	.006	-.0182**
	(.0021)	(.0101)	(.0164)	(.0076)
GFC2008	-.0274	.1713**	.0131	-.0297
	(.0174)	(.0679)	(.0728)	(.0333)
Constant	.2711***	2.1335***	1.846***	3.8995***
	(.0649)	(.2024)	(.5257)	(.2412)
Observations	494	494	208	208
R-squared	.3322	.1093	.5584	.7038
F-statistics/Chi2	19.9406	310.01	20.5492	443.21
Durbin		22.6345 [0.000]		2.62895 [0.1049]
Wu-Hausman		23.3978 [0.000]		2.48339 [0.1167]
Eigenvalue statistic		66.8907		71.3200

Note: Standard errors are in parentheses.

*** $p < .01$

** $p < .05$

* $p < .1$.

https://doi.org/10.1371/journal.pone.0280849.t005

such as from quality of government and global competitiveness report, are reliable when it comes to explaining finance in emerging nations.

The influence of institutions on several alternative measures of finance is investigated in the second robustness test. For this reason, the study takes into consideration six different metrics

Table 6. Robustness with traditional measures of finance (2SLS result).

	Bank-based measure of Finance			*Stock market-based measure of Finance*		
Variable	***Finance:BRM***	***Finance:DCB***	***Finance:DCP***	***Finance:MCP***	***Finance:STV***	***Finance:STO***
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Settler mortality	-.0568***	-.0568***	-.0568***	-.0568***	-.0568***	-.0568***
	(.0086)	(.0086)	(.0086)	(.0086)	(.0086)	(.0086)
Institutions *(ICRG)*	4.3727***	6.0457***	6.4315***	9.6028***	12.6071***	-.2497
	(.7889)	(.9935)	(1.0572)	(1.4882)	(2.2802)	(1.0873)
Foreign direct investment	-.044***	-.0683***	-.0698***	-.089***	-.1885***	-.0819***
	(.0154)	(.0194)	(.0206)	(.029)	(.0445)	(.0212)
Investment	.0009	-.0036	.0059	-.0198**	.0078	.039***
	(.0043)	(.0054)	(.0058)	(.0082)	(.0125)	(.006)
Inflation	-.0196***	-.0208***	-.0203***	-.0328***	-.0697***	-.0178***
	(.0037)	(.0046)	(.0049)	(.0069)	(.0106)	(.0051)
Portfolio investment	-.0034***	-.0026	-.0026	-.0052**	-.004	.0021
	(.0013)	(.0016)	(.0017)	(.0024)	(.0036)	(.0017)
Interest rate spread	.012***	.0115***	.0171***	.013**	.0331***	.0067
	(.0033)	(.0041)	(.0044)	(.0062)	(.0095)	(.0045)
Effective exchange rate	-.0091***	-.0104***	-.0097***	-.0178***	-.0303***	-.0078***
	(.0021)	(.0027)	(.0028)	(.004)	(.0061)	(.0029)
Economic growth	-.0125	-.0336***	-.0142	-.0374**	-.0424	.0006
	(.0094)	(.0119)	(.0127)	(.0178)	(.0273)	(.013)
Trade openness	.0056***	.0058***	.0081***	.0056***	.0063**	.0009
	(.001)	(.0012)	(.0013)	(.0019)	(.0029)	(.0014)
Economic freedom	-.0048	-.1103**	.0049	-.1798**	-.4977***	-.2849***
	(.0403)	(.0508)	(.054)	(.0761)	(.1165)	(.0556)
Polity2	-.1168***	-.0929***	-.0903***	-.044*	-.1653***	-.0907***
	(.0137)	(.0173)	(.0184)	(.0259)	(.0396)	(.0189)
GFC2008	.2057**	.164	.1374	.3049*	.8029***	.3898***
	(.0932)	(.1173)	(.1248)	(.1757)	(.2692)	(.1284)
Constant	3.3351***	3.5287***	1.719***	2.7348***	3.6975***	6.0722***
	(.277)	(.3488)	(.3712)	(.5225)	(.8005)	(.3817)
Observations	494	494	494	494	494	494
R-squared	0.1920	0.189	.1703	0.2583	0.2967	.2627
Chi2	237.8762	120.1169	208.0277	110.994	88.9929	289.3323
Durbin	109.899[0.000]	97.2049[0.000]	49.6742[0.000]	110.3460[0.000]	118.5410[0.000]	10.7568[0.0010]
Wu-Hausman	137.909[0.001]	118.0780[0.000]	53.8860[0.000]	138.6320[0.000]	152.1790[0.000]	10.7292[0.0011]
Eigenvalue statistic	57.5957	57.5957	57.5957	57.5957	57.5957	57.5957

Note: Standard errors are in parentheses.

*** $p < .01$

** $p < .05$

* $p < .1$.

https://doi.org/10.1371/journal.pone.0280849.t006

of finance, three of which are based on banks and three on stock markets. The robustness results of the impact of institutions on alternative traditional metrics of finance are illustrated in Table 6. Models 1 through 3 analyze the influence of institutions on bank-based metrics, whereas models 4 through 6 investigate the influence of institutions on stock market-based metrics. The findings of all of these estimators are consistent with the main results reported in

Table 4, with the exception of the last stock market-based measure of finance (STV), which does not satisfy the endogeneity test but validates the strength of the instrument.

Interestingly the overall results support the rationale of using the most comprehensive measure of finance proposed by IMF [31]. This comprehensive index encompasses most of the attributes of the multidimensional financial system. The traditional measures lack in this regard and represent only a few attributes of the complex system [31].

It is interesting to note that the overall results support the reasoning of employing the most exhaustive measure of finance recommended by the IMF [31]. This exhaustive index takes into account the majority of the characteristics that constitute the multifaceted financial system. The traditional metrics are deficient in this regard and only account for a small number of the complex system's characteristics [31]. Literature over recent years [24, 32–36] uses this index to under various studies to capture finance, and found consistent estimation. The authors feel that the constraint that is inherent in traditional measurements that are employed in the field of literature can be circumvented by using this particular financial metric as an appropriate alternative. Our investigation reveals that the findings are in line with the primary findings presented in Table 6.

4.2 Robustness with subdimensions of institutions (WGI)

Table 7 shows the results of impact of subdimensions of institutions on finance in emerging markets. These dimensions include six indicators from WGI namely, *"i) voice and accountability*, *ii) political stability*, *iii)* regulatory quality, iv) the rule of law, v) corruption and vi) government effectiveness". Across all the estimated model from 1 through 6, the subdimensions of institutions from world governance indicators promote the finance in sample emerging markets, with different magnitude. Importantly, when it comes to voice and accountability, regulatory quality, rule of law, and control over corruption, these governance indicators have a bigger effect on finances than they do on other things. Still, government effectiveness, political stability, and the lack of corruption are all positive factors that affect finance in emerging markets, but they don't explain as much as the other four indicators.

4.3 Robustness with additional controls

Considering the importance of neo-liberalism, political regimes, and global and Asian financial crisis, additional controls are sequentially introduced into estimation. The results are reported in Table 8. Model one is estimated to have a base for inclusion of additional controls. In second model political regime is included and proxies by polity2, and interestingly the estimation has improved in terms of coefficient (0.641 to 0.810) of institutions, as well as R-square (17.7% to 23.6%). In third model aligned with the spiritual of neo-liberalism, trade openness, and freedom are introduced to capture the openness, and freedom effect. The results indicate that inclusion of both variables has slightly reduced the coefficient of institutions, but R-square has further improved (from 23.6% to 27.2% to 31.9% respectively). Financial crisis has destructed the financial and economical states of the world, and emerging markets are equally effected. To capture the effect of financial crises global financial crisis of 2008, and Asian financial crises of 1997 are included in the model as dummies. As expected, both dummies are found negatively influencing the finance in emerging markets, and explanatory power of institutions has slightly declined, but power of econometric models (5–6) has enhanced (increase in R-square) from 31.4% to 35.2%, and from 35.2% to 41.9%. Drawn on the improvement in R-square from (1–6) models, it is inferred that neo-liberalism, political regime, and economics and financial crisis are important determinants of finance in emerging markets, and these must be included as controls while finance related variable is estimated as dependent variable.

Table 7. Robustness with subdimensions of institutions (WGI).

	(1)	(2)	(3)	(4)	(5)	(6)
	Finance	**Finance**	**Finance**	**Finance**	**Finance**	**Finance**
Settler mortality	-.2362***	-.2362***	-.2362***	-.2362***	-.2362***	-.2362***
	(.0312)	(.0312)	(.0312)	(.0312)	(.0312)	(.0312)
Institutions (WGI_VA)	2.1201***					
	(.5745)					
Institutions (WGI_RQ)		1.1843***				
		(.2728)				
Institutions (WGI_RL)			.9017***			
			(.1744)			
Institutions (WGI_CC)				.6355***		
				(.1059)		
Institutions (WGI_GE)					.5237***	
					(.0685)	
Institutions (WGI_PS)						.4756***
						(.0806)
Foreign direct investment	-.0441**	-.1086***	-.0641***	-.0688***	-.0289***	-.0307***
	(.0192)	(.0277)	(.0162)	(.0146)	(.0083)	(.0108)
Investment	.0165***	.0168***	.0164***	.0179***	.0079***	.0046
	(.0047)	(.004)	(.0033)	(.0029)	(.0025)	(.0035)
Inflation	-.0074	-.0035	-.0158***	-.0106***	-.0071***	-.006*
	(.005)	(.0044)	(.0039)	(.0031)	(.0024)	(.0031)
Portfolio investment	-.0003	-.0015	-.0011	-.001	-.001	-.0006
	(.0013)	(.0011)	(.001)	(.0008)	(.0006)	(.0008)
Interest rate spread	.0047	-.0008	.0108***	.0054***	.0074***	-.0038
	(.0033)	(.0032)	(.0025)	(.002)	(.0016)	(.0027)
Effective exchange rate	.0049	-.0047**	-.0028	-.0047***	-.0045***	-.0001
	(.0031)	(.0021)	(.0017)	(.0015)	(.0012)	(.0016)
Economic growth	-.0071	.0051	-.0084	-.008	-.0011	-.0055
	(.0114)	(.0103)	(.0081)	(.007)	(.0056)	(.0072)
Trade openness	.0053***	-.0004	.0002	.0038***	.0015*	.0016
	(.0011)	(.0018)	(.0014)	(.0008)	(.0008)	(.001)
Economic freedom	-.114*	-.338***	-.1332***	-.1235***	-.0613**	-.1583***
	(.0657)	(.0905)	(.0486)	(.0411)	(.0295)	(.0448)
Polity2	-.5045***	-.0537***	-.0423***	-.0292***	-.0188**	.0034
	(.141)	(.0191)	(.0143)	(.0108)	(.0076)	(.0084)
GFC2008	.2799***	.1872**	.1798***	.1587***	.1242***	.1927***
	(.1019)	(.0762)	(.0635)	(.0535)	(.0409)	(.0565)
Constant	7.0824***	6.4927***	5.0438***	4.8786***	4.3777***	4.9929***
	(1.1236)	(.83)	(.4579)	(.3737)	(.2489)	(.3948)
Observations	325	325	325	325	325	325
Chi2	73.1916	101.318	143.6921	193.6319	314.1568	187.0299

Standard errors are in parentheses.

*** $p < .01$

** $p < .05$

* $p < .1$.

https://doi.org/10.1371/journal.pone.0280849.t007

Table 8. Robustness with additional controls.

	(1)	(2)	(3)	(4)	(5)	(6)
	Basic	Political regime	Openness	Freedom	Global Financial Crisis 2008	Asian Financial Crisis 1997
variables	Finance	Finance	Finance	Finance	Finance	Finance
Institutions (WGI)	.6411***	.8102***	.7788***	.7712***	.7569***	.7645***
	(.081)	(.0992)	(.1228)	(.1181)	(.1133)	(.1078)
Foreign direct investment	.0143***	.011***	.0116***	.0124***	.012***	.0123***
	(.0028)	(.0027)	(.0028)	(.0027)	(.0026)	(.0025)
Investment	-.0034	-.0054*	-.005*	-.0077***	-.0088***	-.0056**
	(.0031)	(.003)	(.0029)	(.0028)	(.0028)	(.0027)
Inflation	.0001	-.0009	-.001	-.0008	-.001	-.0007
	(.0008)	(.0008)	(.0008)	(.0007)	(.0007)	(.0007)
Portfolio investment	.0033*	.005***	.0058***	.0039**	.0037**	.0041**
	(.0019)	(.0019)	(.0018)	(.0019)	(.0018)	(.0017)
Interest rate spread	-.0009	-.0028**	-.0028**	-.0024*	-.0029**	-.0016
	(.0015)	(.0014)	(.0014)	(.0013)	(.0013)	(.0012)
Effective exchange rate	.0065	-.0058	-.0062	-.0043	-.0055	-.0048
	(.0072)	(.0067)	(.0066)	(.0065)	(.0063)	(.006)
Economic growth	-.0692***	-.0683***	-.0675***	-.0551***	-.0559***	-.0499***
	(.0136)	(.013)	(.0131)	(.0118)	(.0115)	(.0106)
Trade openness		-.0767***	-.0727***	-.0552***	-.0559***	-.0532***
		(.0121)	(.0148)	(.0127)	(.0125)	(.0116)
Economic freedom			.001	.0019**	.0019**	.0022***
			(.001)	(.0009)	(.0009)	(.0008)
Polity2				-.1379***	-.1346***	-.1844***
				(.039)	(.0378)	(.0386)
GFC2008					-.1674***	-.1188***
					(.049)	(.0459)
AFC1997						-.3041***
						(.0521)
Constant	3.7414***	4.5502***	4.4458***	5.1189***	5.1437***	5.3132***
	(.1503)	(.1965)	(.2583)	(.3723)	(.3641)	(.3559)
Observations	338	338	338	338	338	338
R-squared	.1772	.2362	.272	.3139	.3517	.4194
Chi2	115.4926	124.6424	224.6415	238.3781	253.2637	291.7871

Standard errors are in parentheses.

*** $p < .01$

** $p < .05$

* $p < .1$.

https://doi.org/10.1371/journal.pone.0280849.t008

4.4 Robustness with alternative estimators

The independence of the sections indicates that the error terms are not cross-correlated, and the zero-error covariance is a fundamental issue in panel unit root tests. Chang [78] argued that distributions derived from panel unit root tests might not be valid if this assumption is relaxed. Instead, it could be very complex depending on different nuisance parameters, which leads to correlations between the individual units. As reported in Cerrato and Sarantis [79], cross-sectional dependence can be caused by several factors, such as model misspecification or common shock. If the cross-sectional dependence is not considered, this can lead to biased

Table 9. Diagnostic testing.

Pesaran's LM test for Cross section independence	2.572**
Modified Wald test for heteroscedasticity	21758.18***
Wooldridge autocorrelation test	319.87***

Note: This Table shows the cross section independence, heteroscedasticity, and autocorrelation test results.
LM = Lagrange Multiplier.
*, **, and *** indicate level of significance at 10%, 5% and 1% respectively. H0: cross-sectional independence.

https://doi.org/10.1371/journal.pone.0280849.t009

results [80]. Since the emerging economies are from different demographics and geographic background, this is important to account for the cross-section dependence. Therefore, we test the cross-sectional dependence in panel-data models by Pesaran tests for cross-sectional dependence [80]. Furthermore, we perform a modified Wald statistic for group-wise heteroscedasticity in a fixed-effect model, and Wooldridge test for serial correlation. The estimator is afflicted by cross-sectional dependency, heteroscedasticity, and autocorrelation, as seen in Table 9.

Estimators of the panel data are given the names feasible generalized least square (FGLS) and panel corrected standard error (PCSE) respectively. This is done so that the standard error, serial correlation, and cross-section dependence can be corrected. Both the FGLS and the PCSE are reliable methods for adjusting the standard error and the cross-sectional dependence. Table 10 contains the findings, which provide a sound justification for the constructive influence that institutions have on the financial sector.

5. Discussion

In this section the obtained results are discussed in context of significance of institutions and finance, and their role in overall economic wellbeing aligned with theoretical and empirical literature. We find that better institutions help foster finance in chosen emerging economies, which are generally in agreement with the theoretical and empirical literature [28, 29, 35, 43, 71]. On theoretical lines, this study is the first effort which validates the classical Law and Finance theory [28, 29] in the context of emerging markets, coupled with Acemoglu et al., [30] *STM* theorem. This implies that *STM* as an essential instrument for institutions to capture relatively a realistic estimation in the connection of institutions and finance.

On the empirical side, we find overall consistent support for our findings. See, for example, Yartey [3] argues that the development of good quality institutions such as law and order, efficient bureaucracy, and democratic accountability is therefore crucial for stock market development in emerging economies. Khan et al. [43] believe that better institutions are essential for financial development. We also find similar arguments by others, see for example [35, 42, 43, 55]. Khan et al. [35] document that growth benefits of financial development may only be yield, once effective and transparent institutions are available. Similarly, Kutan et al. [15] recommend that institutions and financial development are important driver of economic growth. In contrast, few studies such as, [43] find negative effect of rule of law on financial development, while it is explaining finance positively in our sample of 21 emerging economies.

Institutions have received much attention in recent years, especially due to its role in promoting economic growth in emerging economies [42]. Given that institutions and finance are a source of economic growth [8, 9, 15, 35, 42, 55], emerging economies are in a challenging phase of developing their institutional and financial environment, with different institutional level and financial capacity. Consequently, policymakers need to understand the crucial role of the institutional framework in securing sustainable economic growth. Similarly, Yu, Li, and

Table 10. Impact of institutions on finance–alternative estimators' results.

	FGLS	PCSE
Variables	***Finance***	***Finance***
	(1)	***(2)***
Institutions	.5109**	.5109*
	(.199)	(.2672)
Foreign direct investment	-.006	-.006
	(.0135)	(.0091)
Investment	-.0138***	-.0138***
	(.0044)	(.0044)
Inflation	-.0181***	-.0181***
	(.0022)	(.0029)
Portfolio investment	.0014	.0014
	(.0013)	(.0012)
Interest rate spread	.0062**	.0062**
	(.0029)	(.0028)
Effective exchange rate	.0032*	.0032*
	(.0017)	(.0016)
Economic growth	.041***	.041***
	(.0075)	(.0112)
Trade openness	.0011	.0011
	(.001)	(.0008)
Economic freedom	.1529***	.1529***
	(.0315)	(.021)
Constant	2.3502***	2.3502***
	(.265)	(.311)
Observations	798	798
R-squared		2965
Wald stat	336.29	379.49
Cross sections	21	21

Note: Standard errors are in parentheses.

*** $p < .01$

** $p < .05$

* $p < .1$.

https://doi.org/10.1371/journal.pone.0280849.t010

Huang [12] proclaim that efficient and accessible financial markets lay down the elementary foundations through which economic development takes place. Furthermore, among the emerging group, some low-income countries suffer from high levels of corruption and the questionable rule of law, which hinder their economic development [25]. Therefore, we recommend policy attention to curb the mounting corruption and to improve the rule of law for sustainable economic and financial development. Importantly, policy measures to inject more finance to economy need careful attention, because too much finance tends to retard economic growth [11]. One possible way to enhance economic growth through the banking sector can be achieved by bank-diversification because countries with significant bank diversification have also been the most resilient to the recent global crisis [2].

The banking sector may suffer from poor governance, for example in relationships banking, where loans to relatives are favored at the expense of purely commercial borrowing by more productive and therefore more profitable borrowers [40]. A stronger regulatory framework

would help improve the governance of banks and other financial institutions in developing countries. Poor governance of equity can lead to inefficient and unfair practices, such as insider trading, which few privileged benefits at the expense of other shareholders [40]. However, institutional issues are the root causes of poor economic performance; poor policies may merely be one of the routes via which they exert their influence [42]. Under industrial policy that supports efficient banking sectors, authorities should develop monetary instruments that help speed up financial development [81], and policymakers should also consider financial development as one of the factors that can lead to effective monetary policy through interest rate channel [82]. Eldomiaty [83] show that stock market volatility can be mitigated and reduced through effective law enforcement and effective regulation. However, the high level of corruption leads to active equity trading, coupled with high volatility, which in turn leads to a high cost of equity financing. Again, the key to improving governance is a strong and effective regulatory framework. There is a strong correlation between a strong institutional environment and financial development, especially in the banking industry [25]. However, there is not a consistent linear trend between stock market growth and institutional support [25]. Improved institutions and expanded financial development are key to fostering sustainable economic expansion over the long term [10]. On a broader level, our findings validate the classical Law and Finance theory [28, 29], and findings are consistent with the related literature [10, 35, 42, 43] suggesting that good governance and institutions play a vital role in the finance of emerging countries. Particularly, the control of corruption, law and order, political stability, government effectiveness, voice and accountability, and regulatory quality are important to foster the development of the financial sector in emerging countries, while investment, economic freedom, trade openness, inflation, political regimes, and financial and economic crisis are crucial factors for the financial activities of emerging countries. Policy recommendations are drawn from the empirical findings, with a focus on improving the legitimacy of institutions by means of a transparent and completely unified institutional structure.

Conclusions

In recent years, debate on institutions have received significant attention as one of the key determinants of long-term economic success, and a wide body of theoretical and empirical research suggests that financial development can have a significant impact on economic performance. Considering this phenomena, in this paper, we examine how institutions are important in explaining finance in 21 emerging markets from 1984 to 2021. We used Financial Times Stock Exchange Group 2017 emerging markets classification to test our research question. Choosing sample of emerging markets, is underpinned by the important role of this cluster in global paradigm. These markets are in developing cadre with respect to major economic, financial, and institutional pillars. The empirical findings of the study show that better institutions are important for boosting the finance in emerging markets. Our evidence of emerging economies has far greater economic policy implications because respective financial systems among these economies are yet not fully developed within the global financial frontier. These economies are engaged in combating the deep roots of corruption. As a result, the risk of their high funding is much lower than the developed economies, and financial systems have much room to improve their fundamental function of efficient capital allocation. Our primary finding for emerging countries on the importance of institutions and finance is intuitively plausible and meaningful; as a result, it proves that STM is a relevant and significant instrument for institutions while testing the law and finance theorem. In addition, the findings are consistent and robust to alternative measures of i) institutions e.g., institutions (ICRG, institutions (WGI), and institutions (GCI), ii) finance and, iii) estimators which are capable to deal with

endogeneity (2SLS), and standard error (FGLS, and PCSE). It implies that governance and institutions are important for banking sector, which still dominates the financial systems of emerging countries, and for capital and bond markets. The role of quality institutions is essential in fast-growing emerging markets. We argue that academicians, policymakers, and researcher need to understand the significant role of institutions to configure the effective financial system and to ensure sustainable economic development. This study tries to find out how the quality of institutions affects financial development in emerging markets as a whole. If one takes the analysis down to the micro level, one might find out interesting senario about each country's policy agenda. This is because the institutions and finance in each market may not be the same.

Supporting information

S1 Data.
(RAR)

S1 Appendix. Definition of main variables.
(DOCX)

Acknowledgments

We acknowledge the technical comments by Dr. Muhammad Atif Khan during the analysis of this paper, which were very useful in choosing the correct model.

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