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Quality of Institutional Indicators and Income Inequality: A Global Panel Data Analysis of 114 Economies

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Abstract

This paper corroborates the importance of institutional quality for the eradication of income inequality and evaluates the efficacy of institutions for ameliorating inequality in different political regimes. To establish an empirical relationship, we have exploited the panel data of 114 countries from 1984 to 2018 and employed 2SLS, pooled OLS and System of Generalized Method of Moments to cope with the problem of endogeneity among regressors and to obtain consistent parameter estimates. The analysis is based on a diverse and broad array of institutional measures that are government stability, corruption, bureaucratic quality, law and order and democratic accountability. In addition, this study uses the indicators of civil liberties and political rights to measure the strength of institutions. Finally, we use 'governance index' and its different dimensions to proxy the quality of institutions. Our empirical results indicate that an improvement in indicators of institutional quality lowers income inequality; however, the strength of negative effect varies depending upon the measures of institutions. Moreover, the impact of 'governance index' and its different forms on income inequality is also negative and significant except voice and accountability. Finally, we allowed institutional quality to depend on the political regime and found that whereas income inequality moves negatively with strong institutions in democracies, it moves positively in autocracies. To the best of our knowledge, it is the first study of its kind that provides comprehensive and deeper understanding of institutional-inequality nexus using diverse institutional measures, allowing heterogeneity of political regimes and conducting Principal Component Analysis.

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1 Introduction

Social scientists are concerned for more than a century about the questions that how inequality is generated and how does it reproduce over time. Yet, income inequality has become more evident phenomenon after 1980s when developed countries also got trapped into this odious situation. In the last past half century the major causes identified for income inequality are trade, technology and labor supply. Kuznets (1955) dominated the academic literature for explaining the inverted U-shaped relationship between economic development and income inequality. But, after 1970s, the downward shift in the wage inequality in US and UK suggested that there may be other factors that drive inequality (Aghion and Williamson, 1998).

Although the literature has recognized many causes of inequality, the importance of institutions for inequality gained attention of the researchers in the last few decades. The rising inequality can be controlled by improving the existing institutions4. Long-established and profoundly influential political and social confrontations have shaped each nation's institutions and economy. Institutions such as property rights, institutions for macroeconomic stability, social insurance, and conflict management are crucial for economic growth across countries. In addition to decisive influence on economic performance, institutions are also important for income distribution. At prevailing economic conditions and resource allocation, as a consequence, some individuals and groups may benefit more than others. Therefore, the endogenous nature of institutions reflects that there exists a conflict of interest among

[4] Moe (1990) defines institutions as weapons to solve collective action problems. He states that institutions originate from individual preferences. According to North (1991) "institutions are the humanly devised constraints that structure political, economic and social interactions."

individuals and various groups over the preferences of economic institutions and distribution of resources.

A large body of the literature has explored the role of institutional quality for the growth and long run development of an economy (see Knack & Kafeer, 1995; Hall and Jones, 1999, Acemoglu et al., 2005; Ahmad and Majeed 2020; Gutiérrez-Romero, 2021). These studies suggest that strong property rights, efficient regulation of markets, effective monetary and fiscal authorities bring economic prosperity by providing a suitable scheme of incentives. In contrast, few studies have investigated the distributional consequences of institutional quality (Chong and Calderon, 2000; Sylwester, 2004; Chong and Gradstein, 2007). The available literature is neither conclusive nor comprehensive. For example, Sylwester (2004) found a negative but insignificant association between institutions and income inequality and proclaimed that strong institutions might be associated with income but they are not associated with income inequality. Chong and Calderon (2000) assert that improvements in quality of institutions deteriorate income inequality in the case of developing countries.

Institutions influence the acquisition of power among the classes of the society in terms of different preferences for redistribution of net income (Rodrik et al., 2004 and Josifidis and Supic, 2016). Exploitation of factor endowments in colonial economies worsened income distribution. The colonial elites shaped such institutional frameworks which only protected their interests (Amendola, Easaw & Savoi, 2013). For example, in Latin America and Sub-Sahara ex-colonies the institutional system in place was characterized by activities that concentrated the economic power within a few influential elites. Consequently, such an unfair distribution creates degenerative and inefficient institutions (Savoia et al., 2010). The situation did not get better even after colonlism. Acemoglu et al. (2005) summarize the fact that the essential reason for the backwardness of economies is the inefficient working of political and economic institutions. When distributive policies are biased in favor of rich, they subvert the emergence of efficient political and economic institutions so that they only facilitate the rich influential elites. In such economies

the low income groups are deprived from the exploitation of economic opportunities and they lack investment incentives. Thus, inefficient institutions are detrimental to income inequality and institutional reforms are crucial to overcome the distributional consequences.

The relationship of institutions and inequality cannot be fully appreciated without considering the role of political regimes- that is, democracy and autocracy- in place. However, there is insufficient empirical research in this regard. The available literature has considered inequality and political regimes as separate issues (econometric models contained only one of them at a time) ignoring the fact that they can be intertwined. We believe that the existence of a substantial political system matters. Because institutions are not exogenously given- they evolve over time, driven by economic and political forces.

Institutionalized democracy could continue for formulating such institution which can ensure equality. Also it can lessen the impact of elite biased institutions on inequality. The democratic regime is characterized by independent judiciary, effective political institutions, free and fair elections and institutionalized representation of minorities. These attributes of democracy provide political environment for shaping efficient institutions (Savoia et al., 2010). According to Acemoglu et al. (2005), efficient institutions provide equal opportunities to a broad cross-section of a society which leads to long term prosperity. Hence, a system of political checks and balances and effective control on executive constraints provide a tool of assurance to prevent the ruling elites from predating the resources of an economy. Therefore, there is a substantial need of further research.

This study contributes to the literature by empirically analyzing the distributive effects of institutions using diverse indicators of institutions. Furthermore, the current study aims at emphasizing the conditional impact of institutions quality on income inequality and contributes to the empirical literature by allowing the effects of institutions to depend on type of prevailing political regime in a country. For empirical analysis we use panel

data of 114 countries from 1984 to 2018 and employed 2SLS, pooled OLS and System of Generalized Method of Moments to deal with the potential problem of endogeneity. Strong institutions such as anticorruption policies, strong law and order and enhanced government stability help to reduce income inequality.

The study is structured as fallows. There are five sections of our study; first section provides the review of related literature, section 2 presents methodology, section 3 discusses the data and sources of variables, section 4 presents estimation results and discussion and section 5 concludes the paper.

2 Literature Review

The recent literature elucidates that the development of an economy depends heavily on the structure and quality of its institutions, therefore for the exceptional and surpassing performance, an economy needs good quality institutions. The new institutional approach to development economics (North, 1990) puts institutions at the center to the process of development and their relation has been extensively studied in the past (see e.g. North, 1990; Hall & Johns, 1999; Acemoglu et al., 2005; Amendola, Easaw & Savoi, 2013). Besley & Ghatak (2010) particularly emphasized the role of property rights for development. The norms and institutions of a state are responsible not only for the progress and development, but also for changing the ongoing distribution of wealth, economic rewards and their size (Chong & Gradstein, 2007; Sovoia, 2009).

The literature emphasizing the importance of institutional quality for income inequality is limited. However, in the available literature the exact relationship between inequality and institutional quality is still ambiguous. Some authors found that income inequality can be reduced by institutional quality improvements (Chong and Gradstien, 2007) whereas some others have found the opposite results (Gupta, Davoodi, & Alonso-Terme, 2002) and a nonlinear relationship is also reported (Chong and Calderon, 2000).

In an economy where political power is biased towards rich segment, institutions are structured in favor of influential

elites, therefore, they subvert the development of efficient institutions. Such economies provide the elites an unbalanced access to economic opportunities. Consequently, unequal political and economic powers enhance rent-seeking abilities of the powerful elites. This leads to unequal distribution of income. Chong and Gradstein (2007) empirically investigated the phenomenon using a sample of 121 countries from 1960 to 2000 and found that income inequality and institutional quality reinforce each other.

Technological and the economic changes have been considered responsible for unfair distribution of income for the last three decades. However, in the advanced economies the institutional inertia plays extended role for the dynamics of income inequality. Josifidis, Supic & Pucar (2017) took a sample of 21 OECD countries from 1990 to 2010 and asserted that institutional inertia has pronounced effect on inequality than difference in the power of working class and elites. Thus, the improvements in fast moving institutions, economic institutions, can control the rising inequality.

In low-income countries, due to incapability and less skillfulness of the poor to acquire respectable and handsome salary jobs, the poor people, which largely constitute country's population, get involve into the informal sector and earn money through illegal transactions in underground markets. The institutional reforms such as enhanced control of corruption and strong law and order in developing economies may exacerbate inequality because the reforms may incur high cost on such particular segment of an economy and inhibit their earning opportunities. Thus, leaving a major chunk of population unemployed. However, in the long run, better policies and strong institutions help to reduce income inequality until the informal economy adopts new policies and becomes the part of the system as a formal sector. Chong and Calderon (2000) empirically confirm this mechanism using a sample of 62 countries for the year 1960 and found an inverted U-shaped relationship between inequality and institutional quality.

A formal sector, being the part of system, is most likely to get the direct benefits from institutional reforms such as control of corruption. Higher levels of corruption can lead to altered patterns investment in physical capital which ultimately results in deterioration of income inequality. In such countries growth rates are affected due to the reduction of productivity of existent resources. Therefore, the distortion of incentives and misallocation of resources lead to slow growth paths and ultimately hurting the poor with unfair distribution of income. Gyimah-Brempong (2002) explored the impact of corruption on income inequality. Using a set of 21 African countries from 1993 to 1999 and found that higher levels of corruption can worsen income inequality.

Prevalence of rampant corruption has distributional consequences (Gupta et al., 2002). Corruption favors and facilitates the wealthy and powerful people and aggravates income inequality (Andres & Ramlogan-Dobson, 2011). Gupta et al. (2002) also corroborated positive association of corruption and inequality. Gyimah-Brempong & de Camacho (2006) suggest that reducing the level of corruption in Asian and OECD countries can improve the distribution of income. Corruption could be "degenerative" or "developmental" type. Most of the countries in Africa and Latin America have degenerative type of corruption which aggravates income inequality more pronouncedly than the developmental corruption in Asian countries. Therefore, countries should formulate different policies depending upon the type of corruption.

Blancheton and Chhorn (2021) explored the association between institutional quality and income inequality for eight Asia and Pacific economies over the period 1988-2014. Their findings confirm a negative impact of institutional quality on income inequality in the long run. Contrary to them, Huynh (2021) found mixed impact of institutional quality on income inequality in 36 Asian economies from 2000 to 2018. Their findings reveal that initially institutional development increases inequality, however, after a certain threshold level of institutional quality, inequality tends to fall. Kunawotor et al. (2020) investigated the impact of institutional quality on inequality for Africa over the period 1990-

2017. Overall, they declare insignificant impact of institutional quality on income inequality. However, they show institutional quality in terms of control of corruption can help to alleviate inequality in Africa. Hung et al. (2020) explore the association between government quality and income inequality for Vietnam over the period 2006-2017. Their finds confirm that higher government quality helps to mitigate income inequality in Vietnam.

Efficacy of institution quality may be affected by the type of political regimes. Democracies correspond to variant rules and procedures for the selection of leaders, conflict management, to make and implement public decisions and allocate resources (Schmitter & Karl, 1991). Democracy being characterized by accountability makes it more credible and certain, both of which are crucial for providing a surpassing business environment. According to the theorem of a median voter, the enhanced pressure from the lower income group makes possible the distribution of gains and returns from rich to poor (Bassetto and Benhabib, 2006; Benhabib & Przeworski, 2006). As a result of participation of marginalized people in the economic activity and policy making process, in democracy, income inequality reduces, because citizens always prefer redistributive policies. Likewise, institutions found in democracies prompt competition and encourage innovation by ensuring private property and intellectual rights, providing incentive for investment and ease the entry to economic activity, and judicial independence. Thus, driving the economy towards inevitable prosperity (Bassiouni, 1998).

Contrary autocratic regimes are mainly characterized with a high concentration of power. The political organizations which are strong enough to implement property rights and maintain a monopoly of violence can also go against similar rights of ownership of common people. Governments are the main custodians of power that ensure shaping and implementing such policies (e.g., Redistributive policies) that increase the productivity and efficiency of a society and an ideal government spends more on the provision of public goods and services. Olson (p. 143, 1991) states that "… for a given level of income in a

society, every dollar the autocrat spends on public goods for the society is a dollar less that he can spend for his own purposes." Therefore, redistribution of income, a core function of the government, from rich to poor is more profound in democracies than in autocracies (see Olson, 1993; Ahmad, 2017).

The aforementioned literature provides evidence for the enduring importance of quality of institutions for the fair and equal distribution of gains and returns. Also, how features of a political system encourage efficient institutions and prevalence of strong institutions help to reduce income inequality. In the current study we use institutional quality measures from the Political Risk Service' International Country Risk Guide. The subcomponents include "Government Stability", "Corruption" "Law and Order", "Democratic Accountability" and "Bureaucratic quality". Overall institutional quality is the average of all five components. More precisely the institutional quality Index used by Knack and Kafeer (1995), Hall and Jones (1999), Chong and Calderon (2000), Chong and Gradstien (2007), Perera and Lee (2013). We also use governance indicators to proxy institutional quality i.e., "government effectiveness", "control of corruption", "regulatory quality", "rule of law", "voice and accountability" and "political stability". Governance index is calculated by taking simple average of all six components. Other indicators of institutional quality incorporated in this study are civil liberty and political rights.

3 Data and Econometric Modelling

The main objective of this study is to analyze the impact of quality of institutions on income inequality and in addition how much sensitive are these institutions to the type of political regime prevailing in the country. Following the literature (Chong and Calderon, 2000; Chong and Gradstien, 2007; Perera and Lee, 2013), the empirical models for income inequality formulated as:

$$gini_{it} = \alpha_0 + \alpha_1 Ins_{it} + \alpha_2 X_{it} + \alpha_i + \varepsilon_{it} \quad (1)$$

The models for institution quality components are;

$$gini_{it} = \alpha_0 + \alpha_1 gs_{it} + \alpha_2 X_{it} + \alpha_i + \varepsilon_{it} \quad (1.1)$$

$$gini_{it} = \alpha_0 + \alpha_1 cor_{it} + \alpha_2 X_{it} + \alpha_i + \varepsilon_{it} \quad (1.2)$$

$$gini_{it} = \alpha_0 + \alpha_1 br_{it} + \alpha_2 X_{it} + \alpha_i + \varepsilon_{it} \quad (1.3)$$

$$gini_{it} = \alpha_0 + \alpha_1 law_{it} + \alpha_2 X_{it} + \alpha_i + \varepsilon_{it} \quad (1.4)$$

$$gini_{it} = \alpha_0 + \alpha_1 dem_{it} + \alpha_2 X_{it} + \alpha_i + \varepsilon_{it} \quad (1.5)$$

Where $\boldsymbol{i}$ denotes the cross section of 114 countries and t denotes the time span of 1984 to 2018. The variables are scaled from 0 to 6. Following Chong and Calderon, (2000), the focused variable Institutions (Ins) is the simple average of five components of PRS group of International Country Risk Guide: government stability (gs), corruption, bureaucratic quality (bq), law and order (law) and democratic accountability (dem).

The additional set of institutional quality variables from WGI are abbreviated as government effectiveness (ge), control of corruption (corr), regulatory quality (rq), rule of law (rule), voice and accountability (va) and political stability (ps). Gini is the proxy for income inequality and X is the vector of control variables. Whereas control variables used in the study are log of GDP per capita (lpcy), secondary school enrollment ratio (sch), agriculture value added (agr), and population growth (popg). We have also computed average measure of institutional quality using principal component analysis and named the variables PCA1 for ICRG measures and PCA2 for WGI measures.

When political bias is in favor of rich elites of the society weak institutions and income inequality reinforce each other (Chong and Gradstein 2007). In democracy, people in power are accountable to more individuals therefore enhanced pressure leads to economic redistribution. Therefore, we also use the above equations for two subsets of the data (democratic regimes vs. autocratic regimes) and investigate the role of political regime in institution-inequality nexus. Polity2 score greater than zero depicts democratic political regime or governance while polity2 score less than zero shows autocratic political regime.

The choice of suitable estimation technique is essential for obtaining efficient estimates. To measure the impact of institutional quality on income inequality, we employ panel data estimation techniques. Since panel data estimations allow to combine different time periods for different cross-sections and provide more reliable and robust results, hence, it is considered as

an efficient analytical method. Before continuing further, we must consider the possibility of endogeneity between quality of institutions and income inequality. Endogeneity could arise due to omitted variable(s), measurement error (especially measurement error in independent variable) and simultaneity (reverse causality).

A popular Method to cope with problem of endogeneity is Generalized Method of Moments (GMM). It is an extension of instrumental variable (IV) technique. To use GMM, it is not necessary for model to be homoscedastic and serially independent. In addition, GMM obtains parameter estimates by maximizing the objective function that contains the moment restriction that the correlation between error term and lagged regressor is zero. The GMM, principally, takes into account, time series dimensions of the data, country or region specific effects and the probability that all independent variables are endogenous. Moreover, to deal with the problem of endogeneity Anderson and Hsiao (1982) and Arellano and Bond (1991) propose to use instrumental variables. However, Anderson and Hsiao (1982) use one instrument for one endogenous variable whereas Arellano and Bond (1991) allow using all valid lags of all independent variables as instrumental variables. The estimation techniques employed in study to investigate the relationship are 2 Stage Least Squares, Pooled OLS, GMM and System GMM.

To address the issue of endogeneity we have used instrumental variable technique 2SLS on the cross-sectional data following Tebaldi and Mohan (2010). An instrument is the exogenous variable that is highly correlated with endogenous variable and uncorrelated with error term (hence uncorrelated with inequality).

The existing empirical literature on the institutions suggests that much of variation in the quality of current institutions is explained by geographical and historical factors (Acemoglu et al. 2001; La Porta et al. 1999; Klerman et al. 2009).

Geography, colonization and institutions are linked closely to each other. The process of colonization was greatly

affected by geography of the land being colonized which in turn effected the type of institutions to be established there (Acemoglu et al., 2001).

For example, Acemoglu et al. (2001) argued that European adopted different type of institutional policies in different colonies. Colonies which were subject to infectious diseases such as malaria were considered disadvantageous by Europeans. These colonies discouraged the creation of institutions in them which promote property rights and were used by Europeans as extractive states.

While in geographically advantageous colonies, those with better environment, Europeans set up property rights and European-type institutional structure. Furthermore, Acemoglu et al. (2001) argue that early institutions form the basis for current institutions and economic performance.

Similarly, La Porta (1999) suggests that country's current institutional structure has important ties with the historical factors such as legal origin. The geographic related factors such as distance from the equator and ethno-linguistic heterogeneity are also important to the establishment of current institutions. Mauro (1995) explains that many economists argue about the fact that failure of government to ensure strong institutions is a huge hurdle to the investment, entrepreneurship and innovation. Low security of property rights, inept and insincere bureaucracies and high levels of corruption slow down the pace to achieve desired levels of investments for economic growth.

4 Results and Analysis

This study uses cross-sectional and panel data of 114 countries from 1984 to 2018. We use data from International Country Risk Guide (ICRG), World Development Indicators (WDI) and Polity IV. For income inequality we will use Gini Coefficient (also used by Chong and Calderon, (2000); Chong and Gradstein, (2007); Perera and Lee, (2013) drawn from World Bank. Similarly for institution quality we will use mostly used measures of ICRG; government stability, corruption, law and order, bureaucratic quality and democratic accountability. These

measures were first used by Knack and Kafeer (1995), Hall and Johns (1999) and Chong and Gradstein (2007) and Perera and Lee (2013). In addition, we use 6 different measures of institutional quality from the database of Worldwide Governance Indicators (WGI), published by World Bank, that are - "government effectiveness", "control of corruption", "regulatory quality", "rule of law", "voice and accountability" and "political stability"- and indicators of "civil liberty" and "political rights" from freedom house. The control variables GDP per capita, agriculture value added, and secondary school enrollment ratio and population growth rate are selected following Chong and Calderon (2000). The definitions, measurement and scale of all variables are presented in Table A4 of appendix.

Table 1 shows some important and basic statistics of the data. Slovenia has the lowest income inequality (23.7) while highest income inequality observed is in South Africa (64.8). Average quality of institution for full sample is 3.79. Government stability ranges from 0 to 6 and average government stability score for whole sample is 3.87. Corruption ranges from 0 to 6. Mean corruption score for whole sample is 2.95. Bureaucratic quality ranges from 0 to 6. Mean of bureaucratic quality for whole sample is 3.6. Minimum score is 0 and maximum score is 6. Law & Order and Democratic accountability range from 0 to 6. Lowest score is 0 while highest score is 6 for both variables.

Table 1
Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Dependent Variable: Income inequality					
Gini	825	39.59	9.61	23.7	64.8
Independent Variable: Institutional Quality					
		a. ICRG			
Institution Quality	825	3.79	0.94	1	5.75
Govt. Stability	825	3.87	0.82	0.92	5.75
Corruption	825	2.95	1.22	0.00	6.00
Bureaucrat Quality	825	3.6	1.59	0.00	6.00
Law & Order	825	3.88	1.34	0.00	6.00
Dem Accountability	825	4.65	1.42	0.50	6.00
		b. WGI			

Control of corruption	825	-0.03	1.01	-1.87	2.47
Government Effectiveness	825	-0.01	0.99	-2.45	2.44
Regulatory Quality	825	-0.01	1.00	-2.65	2.26
Rule of Law	825	-0.03	1.01	-2.61	2.10
Voice and Accountability	825	-0.03	1.00	-2.31	1.80
Political Stability	825	-0.04	0.99	-3.31	1.96
Governance Index	825	-0.01	0.92	-2.45	1.97
c. Freedom House					
Civil Liberty	905	3.65	1.93	1.00	7.00
Political Rights	905	3.70	2.22	1.00	7.00
d. Polity IV					
Political Regime	905	1.53	7.34	-10.00	10.00
Control variables					
GDP per capita	825	17260.48	21166.62	297	111968
Agriculture	825	8.77	8.35	0.27	56.72
School	825	86.63	24.67	5.34	164.81
Pop. Growth Rate	825	0.94	1.10	-2.26	5.63
Instrumental variables					
legal origin UK	825	0.33	0.47	0.00	1.00
legal origin French	825	0.43	0.50	0.00	1.00
legal origin Socialist	825	0.18	0.38	0.00	1.00
legal origin German	825	0.03	0.18	0.00	1.00
legal origin Scandinavian	825	0.03	0.16	0.00	1.00
Latitude	825	0.29	0.19	0.01	0.72

Source: Authors' calculations

Table 2 shows that correlation between income inequality and average institutional quality is negative (-0.48); the better the quality of institutions lower will be the income inequality. Gini index has negative correlation with all components of institutional quality from ICRG i.e., government stability (-0.35) corruption (-0.42), bureaucratic quality (0.41), law and order (-0.57), democratic accountability (-0.26) hence any improvement in quality of institutions drives inequality to lower levels. Political regimes are also negatively (-0.10) correlated.

Table 2
Correlation Analysis

Variables	Gini
Dependent Variable: Income inequality	
Gini	1
Independent Variable:	
1. Institutional quality	
a. ICRG	
Institution	-0.4848
Govt. Stability	-0.3527
Corruption	-0.4233
Bureaucratic Quality	-0.4194
Law and Order	-0.5784
Democratic Accountability	-0.2694
b. WGI	
Control of Corruption	-0.4008
Government Effectiveness	-0.4054
Regulatory Quality	-0.3408
Rule of Law	-0.4284
Voice and Accountability	-0.2484
Political Stability	-0.2370
Governance Index	-0.3662
c. Freedom House	
Civil Liberty	0.1349
Political Rights	0.1131
2. Political Regime	
Polity2	-0.1042
Control Variables	
Agriculture	0.1538
School	-0.4366
GDP per capita	-0.4989
Population Growth	0.4744

Source: Authors' Calculations

5 Results and Discussion

Tables 3 and 4 present results of 2 Stage Least Squares method. Table 3 presents first stage results of 2 Stage Least Squares method. In the first stage regressions we use initial values

of institutional variables, investment, each country's legal origin[5] and latitude as instrumental variable for institutional quality. La Porta et al., (1999) divided the legal traditions into common law, French and German civil law, Scandinavian and socialist law. The manifestations of these laws for example the socialist law is to create institutions that back them to extract resources without considering the economic interest of its people and maintain their power. Latitude is used because the temperate zone have better climate and high agriculture productions which helped in the development of their economies and possibly the efficient institutions (as cited by La Porta et al., 1999). For a single endogenous variable in the equation, the rule of thumb is that the F-statistics of regression of endogenous variable on instrumental variables should be greater than 10 (Stock et al., 2002). We can see from the Table 5.1.a F-statistics for our all models is greater than 10.

In Table 4 we provide results of IV estimator 2SLS. Column 1 of the table 4 shows results for overall quality of institutions however, Columns 2 to 6 present results of institutional quality measures. Overall institutional quality and its components show a negative association with the levels of inequality except democratic accountability. All variables exert significant impact except democracy. From column 2 to 6 of the Table 5 one unit improvement in govt. stability, corruption control, bureaucratic quality, law and order and democratic accountability reduce the levels of income inequality by 6.1, 1.9, 2.3, and 4.2 units, respectively. Thus, we can say that improving the quality of institutions help to alleviate income inequality (Chong & Calderon, 2000; Gyimah-Brempong, 2002; Gyimah-Brempong and de Gyimah-Brempong, 2006, Chong & Gradstein, 2007).

We obtained Sargan over-identification test for validity of instruments. Null hypothesis of the test is validity of instruments which must be accepted. The Sargan test is insignificant at 5% level of significance for model 1, 1.1 and 1.4 respectively, which

[5] Taken from La porta et al., (1999)

means that the instruments are valid for 4 of our models including the main model.

Table 3
2SLS 1st Stage Regression; Endogenous Variables on Exogenous Variables

	(1) Institution Quality	(2) Govt. Stability	(3) Corruption	(4) Bureaucrat Quality	(5) Law & Order	(6) Democracy Account.
Initial Institution	0.461*** (0.0356)					
Initial govt. stability		0.217*** (0.0425)				
Initial Corruption			0.465*** (0.0489)			
Initial Bureaucracy				0.567*** (0.0487)		
Initial law & order					0.454*** (0.0511)	
Initial Democracy						0.612*** (0.0548)
FDI net Inflows	0.0129** (0.00526)	0.0174** (0.0107)	0.0179*** (0.00574)	0.00705 (0.00752)	0.0202** (0.00976)	0.0149*** (0.0100)
legal origin UK	-0.240* (0.129)	-0.0181 (0.315)	-0.667*** (0.191)	-0.394** (0.157)	-0.165 (0.259)	-0.116 (0.193)
legal origin French	-0.229* (0.124)	0.0291 (0.316)	-0.659*** (0.186)	-0.579*** (0.143)	-0.325 (0.243)	0.153 (0.192)
legal origin Socialist	-0.668*** (0.146)	0.136 (0.325)	-1.320*** (0.217)	-0.793*** (0.186)	-0.560** (0.241)	-0.658* (0.351)
legal origin Scandinavian	-0.0764 (0.0868)	-0.385 (0.317)	0.312** (0.149)	-0.323*** (0.0998)	-0.0472 (0.200)	0.0518 (0.126)
Latitude	1.216*** (0.284)	0.465 (0.525)	1.191*** (0.364)	1.025*** (0.386)	2.197*** (0.585)	1.314** (0.529)
Constant	2.223***	5.982***	1.723***	1.256***	1.771***	1.341***

	(0.195)	(0.410)	(0.264)	(0.212)	(0.294)	(0.305)
Observations	114	114	114	114	114	114
R^2	0.794	0.371	0.766	0.732	0.697	0.621
F	256.4	12.74	201.5	171.0	212.3	137.1

Source: Author's Calculations
Standard errors in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

Table 4
2SLS regression of income inequality and institution quality

Variables	(1) Gini	(2) Gini	(3) Gini	(4) Gini	(5) Gini	(6) Gini
GDP per capita	0.899	-0.840	-0.265	-0.284	0.848	-1.067
	(1.292)	(1.088)	(1.352)	(1.314)	(1.183)	(1.326)
Agriculture	-0.293***	-0.352***	-0.322***	-0.335***	-0.258**	-0.352***
	(0.104)	(0.0999)	(0.109)	(0.107)	(0.101)	(0.109)
School	-0.0986**	-0.0890*	-0.105**	-0.109**	-0.0973**	-0.103**
	(0.0483)	(0.0474)	(0.0505)	(0.0503)	(0.0467)	(0.0514)
Pop. Growth	2.848***	1.981*	3.164***	3.034***	1.983*	2.965***
Rate	(1.037)	(1.032)	(1.097)	(1.085)	(1.017)	(1.108)
Institution Quality	-4.671*** (1.228)					
Govt. Stability		-6.131*** (1.371)				
Corruption			-1.996** (0.992)			
Bureaucrat Quality				-2.338** (1.067)		
Law & Order					-4.261*** (0.883)	
Dem Accountability						-0.914 (0.909)
Link test	(0.20)	(0.75)	(0.06)	(0.07)	(0.20)	(0.18)
Ramsey RESET Test	1.95 (0.20)	3.30 (0.05)	2.36 (0.08)	2.48 (0.07)	1.95 (0.13)	5.27 (0.02)
Sargan Test	0.0573	0.586	0.056	0.06	0.682	0.002
Constant	57.34***	101.5***	54.44***	54.33***	55.34***	59.42***

	(10.20)	(13.26)	(11.25)	(11.13)	(9.878)	(11.06)
Observations	114	114	114	114	114	114
R^2	0.445	0.469	0.394	0.398	0.483	0.377
F	17.33	19.09	14.02	14.26	20.14	13.05

Source: Author's Calculations
Standard errors in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

We have performed some post-estimation tests namely the functional form tests, Saran test and test of normality. The results obtained from post- estimation tests are reported in the bottom rows of Table 4. The model has correct functional form as p-value of hat square is greater than 0.05. P-values of Sargan test indicate that selected instruments are exogenous.

Table 5 contains OLS results of institutional quality measures from ICRG and Freedom. Column 1 of Table 5 presents a linear, negative, and significant relationship of institutional quality and income inequality. The result can be interpreted as one unit improvement in the quality of institutions reduces income inequality by more than two folds i.e., 2.304 units for averaged quality of institutions. PCA for the ICRG measures exert even stronger impact (-4.8). The negative relationship of institutional quality is in line with the studies of Persson & Tabellini (1994); Chong & Calderon (2000); Gyimah-Brempong, (2002); Sylwester, (2004); Gyimah-Brempong & de Gyimah-Brempong (2006); Chong & Gradstein (2007); Savoia et al. (2010); Josifidis et al. (2017).

Columns 2 to 6 of Table 5 show the results for the ICRG components employed for quality of Institutions. Regressions of individual components of ICRG give mixed results. However, variables of freedom house (column 8 and 9) that are, civil liberty and political stability inversely impact income inequality. A cross check for the robustness of results is performed using governance indicators from WGI. Estimation results are presented in Table A1. We find similar results from governance indictors.

Table 5
Institution Quality and Income Inequality (ICRG and Freedom House)

	(1) Gini	(2) Gini	(3) Gini	(4) Gini	(5) Gini	(6) Gini	(7) Gini	(8) Gini	(9) Gini
Log GDP	-3.506***	-5.016***	-3.750***	-4.082***	-2.114***	-5.174***	-2.114***	-4.092***	-4.098***
	(0.501)	(0.419)	(0.523)	(0.499)	(0.445)	(0.448)	(0.445)	(0.405)	(0.402)
Agriculture	-0.640***	-0.668***	-0.608***	-0.658***	-0.544***	-0.669***	-0.544***	-0.621***	-0.615***
	(0.0573)	(0.0584)	(0.0595)	(0.0577)	(0.0539)	(0.0580)	(0.0539)	(0.0500)	(0.0498)
School	-0.070***	-0.063***	-0.070***	-0.063***	-0.065***	-0.063***	-0.065***	-0.091***	-0.093***
	(0.0197)	(0.022)	(0.0199)	(0.0198)	(0.0183)	(0.0200)	(0.0183)	(0.0183)	(0.0182)
Pop. Growth Rate	2.991***	2.972***	3.248***	3.107***	2.479***	2.977***	2.479***	2.729***	2.663***
	(0.293)	(0.299)	(0.303)	(0.299)	(0.275)	(0.298)	(0.275)	(0.296)	(0.296)
Institutional Quality	-2.304***								
	(0.436)								
Govt. Stability		0.00292							
		(0.163)							
Corruption			-1.234***						
			(0.311)						
Bureaucrat Quality				-1.321***					
				(0.390)					
Law & Order					-3.234***				
					(0.254)				
Dem Accountability						0.230			
						(0.234)			
PCA1							-		

							4.735***		
							(0.372)		
Civil Liberty								-0.321**	
								(0.161)	
Political Rights									-0.472***
									(0.133)
Constant	89.66***	92.97***	85.02***	87.54***	78.88***	93.35***	67.08***	87.39***	88.07***
	(3.761)	(4.060)	(4.241)	(4.075)	(3.619)	(3.785)	(4.001)	(3.778)	(3.709)
Observations	825	825	825	825	825	825	825	905	905
R^2	0.403	0.383	0.394	0.391	0.485	0.383	0.485	0.335	0.341
Adjusted R^2	0.399	0.379	0.391	0.387	0.481	0.380	0.481	0.331	0.338
F	110.6	101.5	106.6	105.2	154.0	101.8	154.0	90.58	93.16

Source: Author's Calculations
Standard errors in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

Table 6 reports the results of GMM regression. The effect of institutional quality on income inequality remains consistently negative and significant. The coefficient on institutional quality implies that one unit improvement in the quality of institutions reduces income inequality by 3.26 units for averaged quality of institutions. The size of coefficient is large as compared to results obtained using OLS implying that OLS underestimated the effect of institutional quality on income inequality. P-values of Hansen test implies that instruments are exogenous and the results are not suffering from the potential problem of endogeneity.

Table 6
GMM Regression of Institution Quality and Income Inequality (ICRG and Freedom House)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Gini	Gini	Gini	Gini	Gini	Gini	Gini	Gini	Gini
Log GDP	-2.620***	-5.081***	-3.863***	-3.945***	-1.927***	-5.187***	-1.927***	-4.065***	-4.086***
	(0.639)	(0.491)	(0.644)	(0.538)	(0.541)	(0.524)	(0.541)	(0.457)	(0.459)
Agriculture	-0.618***	-0.688***	-0.623***	-0.658***	-0.533***	-0.678***	-0.533***	-0.619***	-0.614***
	(0.0611)	(0.0608)	(0.0655)	(0.0612)	(0.0599)	(0.0624)	(0.0599)	(0.0572)	(0.0576)
School	-0.077***	-0.069***	-0.073***	-0.073***	-0.068***	-0.068***	-0.068***	-0.093***	-0.096***
	(0.0221)	(0.0229)	(0.0225)	(0.0225)	(0.0201)	(0.0226)	(0.0201)	(0.0217)	(0.0216)
Pop. Growth Rate	3.078***	2.997***	3.347***	3.108***	2.510***	3.003***	2.510***	2.705***	2.626***
	(0.423)	(0.438)	(0.448)	(0.444)	(0.377)	(0.434)	(0.377)	(0.383)	(0.383)
Institutional Quality	-3.263***								
	(0.519)								
Govt. Stability		-0.191							
		(0.219)							
Corruption			-1.175***						
			(0.340)						
Bureaucrat Quality				-1.411***					
				(0.361)					
Law & Order					-3.449***				
					(0.290)				
Dem						0.193			

Accountability						(0.250)			
PCA1							-5.048***		
							(0.425)		
Civil Liberty								-0.300*	
								(0.164)	
Political rights									-0.508***
									(0.128)
Constant	84.39***	95.77***	86.19***	87.37***	78.25***	94.17***	65.68***	87.29***	88.34***
	(4.196)	(4.048)	(4.820)	(4.156)	(3.916)	(3.907)	(4.613)	(3.787)	(3.785)
Observations	809	809	809	809	809	809	809	900	900
R^2	0.421	0.389	0.403	0.398	0.502	0.390	0.502	0.336	0.342
Adjusted R^2	0.417	0.385	0.399	0.394	0.499	0.386	0.499	0.332	0.339
chi2	544.4	374.1	455.8	437.8	845.1	376.5	845.1	346.5	364.4
Hansen's J	0.76	0.29	1.53	6.37	1.68	0.05	1.60	0.06	0.30
P-values	(0.38)	(0.59)	(0.22)	(0.05)	(0.19)	(0.82)	(0.19)	(0.80)	(0.58)

Source: Author's Calculations
Standard errors in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

Following Arrelano and Bond (1991) System GMM is used solve the problem of endogeneity. The results of Table 7 illustrate that improvements in the quality of institutions alleviates income inequality. Column 1 of Table 7 indicates that one unit improvement in the quality of institutions decreases income inequality by 2.122 units. Corruption, bureaucratic quality and law and order negatively impact income inequality. The impact of government stability and democratic accountability on income inequality, however, is insignificant. Yi (2013) and Josifidis et al. (2017) demonstrate that democracies are not necessarily associated with low income inequality. Hansen (1982) developed a method which give efficient estimates and tackles endogeneity even in the presence of heterogeneity. Hansen P-value for all

models is greater than 0.05, thus we cannot reject the null hypothesis of valid instruments. Probability value of AR2 is also important as it indicates the presence or absence of serial autocorrelation. According of our results there is no serial auto correlation as p-value of our all models is greater than 0.05 as it is a good thing.

Table 7
System-GMM Regression of Institutions on Income Inequality

	(1) Gini	(2) Gini	(3) Gini	(4) Gini	(5) Gini	(6) Gini	(7) Gini	(8) Gini	(9) Gini
Log GDP	-3.168**	-4.040***	-2.703*	-2.666**	-0.0592	-4.654***	-0.853	-2.881**	-3.600**
	(1.490)	(1.439)	(1.494)	(1.302)	(1.276)	(1.619)	(1.414)	(1.252)	(1.447)
Agriculture	-0.835***	-0.738***	-0.615***	-0.642***	-0.600***	-0.555***	-0.616***	-0.539***	-0.605***
	(0.178)	(0.155)	(0.165)	(0.116)	(0.168)	(0.183)	(0.173)	(0.153)	(0.178)
School	-0.171**	-0.152**	-0.137**	-0.136***	-0.245***	-0.0422	-0.196***	-0.124**	-0.106*
	(0.0682)	(0.0720)	(0.0638)	(0.0474)	(0.0557)	(0.0692)	(0.0658)	(0.0504)	(0.0557)
Pop. Growth Rate	2.967***	3.078***	3.172***	3.476***	1.628**	3.698***	1.658*	2.776***	3.241***
	(1.031)	(1.079)	(1.164)	(0.966)	(0.782)	(1.052)	(0.847)	(0.975)	(1.075)
Institutional Quality	-2.122**								
	(0.878)								
Govt. Stability		0.00672							
		(0.197)							
Corruption			-1.431**						
			(0.693)						
Bureaucrat Quality				-1.539*					
				(0.827)					
Law &					-				

Order					3.132*** (0.635)				
Dem						0.216 (0.566)			
Accountability									
PCA1							-4.173*** (0.919)		
Civil Liberty								-0.449 (0.379)	
Political rights									-0.510* (0.304)
Constant	96.26*** (10.99)	92.32*** (11.42)	82.03*** (11.99)	81.08*** (9.897)	76.81*** (9.386)	85.21*** (12.28)	70.66*** (10.83)	82.62*** (10.77)	85.92*** (11.69)
Observations	825	825	825	825	825	825	822	893	893
Hansen	0.682	0.804	0.739	0.868	0.777	0.746	0.890	0.814	0.678
AR (1)	0.267	0.469	0.416	0.787	0.943	0.251	0.677	0.186	0.136
AR (2)	0.445	0.350	0.618	0.494	0.286	0.339	0.416	0.859	0.742

Source: Author's Calculations
Standard errors in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

In order to analyze difference in the impact of institution quality on income inequality in different political regime we regressed income inequality on institution quality in different political regimes i.e., democracies and autocracies. In the column 1 and 2 of the Table A2, we can see a significant difference in coefficient's magnitude and direction of institution quality in autocracies and democracies. One unit improvement in the quality of institutions eradicates inequality by 2.549 units in democracies whereas it aggravates income inequality 2.083 units in autocracy. Similarly, components of institution quality also show a

remarkably different and significant result in different political regime.

Democracy is characterized by independent judiciary, effective political institutions, free and fair elections and institutionalized representation of minorities. These attributes of democracy provide political environment for shaping efficient institutions (Savoia et al., 2010). According to Acemoglu et al. (2005) efficient institutions provide equal opportunities to a broad cross-section of a society which leads to long term prosperity. Hence, a system of political checks and balances and effective control on executive constraints provide a tool of assurance to prevent the ruling elites from predating the resources of an economy. Hence, based on the above arguments and results of our regressions we can say that institutional improvements in democratic regimes have profound impact on income inequality as compared to autocratic ones.

6 Conclusion

The widening gap among rich and poor in terms of income poses severe threats to the wealth spread, education, health and many other social aspects among nations. Also, in the today's world the nations are facing downfalls due to state's failure for the provision of the public services such as education, healthcare and governments incapability to absorb the educated and skilled youth. It is necessary condition for a nation that its citizens are treated equally in all aspects of life to prosper both economically and morally. Income inequality is not a coincidence, but it evolves over the time due to incompetent people having authority to form inefficient policies for the whole nation and abuse of nation's assets for their own personal gains. Given the importance of institutions authors proclaim that institutions are the important tools to solve collective action problems such as enforcement rules for the redistribution and make every individual better-off.

Institution quality interferes with the very crucial and core function of government that is distribution of income. In the current study we used cross-sectional as well as panel data for empirical analysis. Our dataset consists of 114 countries and spans over the time period 1984 to 2018. We employed 2SLS for cross-

sectional analysis and pooled OLS and SYS-GMM for panel data estimations. Estimation results of 2SLS, OLS and GMM demonstrate that overall institutional quality has found to be consistent with the conventionally accepted view (inverse) about its association with income inequality also, the results are robust and significant. Improvements in the quality of institutions such as reduced corruption; reduced rent extracting abilities translates into increased social spending and spending on public services such as education and healthcare improve the living standards of every individual, thus making everyone better-off, this leads to reduction of income inequality.

OLS regression results for the countries having democratic political system vs. countries having autocratic political systems illustrates that income inequality moves negatively (-2.549) with improvements of institutional quality in democracies, it moves positively (2.083) in autocracies. On one hand the attributes of democratic political systems such as the public officials are answerable to the public-enhanced accountability and transparency- , citizens participation in the policy making process- citizens prefer the redistributive policies-, competition among politicians - spend more tax revenue on public services and fair allocation of funds - , public protection of property rights and enforcement of contracts, translate into the reduction of income inequality as Charron & Lapuente, (2010) suggests that quality of government is highest in strong democratic political systems. On the other hand, the highest level of effectiveness of institutions cannot be achieved in authoritarian states because the system is always in the subordination of predatory nature of dictators also the ruling class wants to stay in power.

Nevertheless, there are some limitations in the study. In our study the no. of observation in regressions dropped to low levels. This may be because of unavailability of income inequality data. Secondly, we did not incorporate the results of static panel data model (random effect) because we could not get the expected results from these models. Third, the use of combine polity2 score. Although it provides an easy way to differentiate the countries according to the regime type in place, however it lacks the details on the level of democratization. As a result, the empirical results

obtained would be better with a more distinct threshold level in the distributive impact of democracy. Future research can address the institutions-inequality nexus and political regimes may consider the aspect of democracy threshold analysis because it can provide an important understanding into the necessary level of political regime (democracy) an economy should attain to provide a sound ground for the emergence of strong and efficient institutions for fair distribution of income.

Some policy implications can be proposed from the results of this study. Poor quality of institutions is not a curse passing on generations, it changes over the time. For example, it is possible that clean (less corrupt) countries can become less clean (corrupt) and many corrupt countries can control the levels of corruption. Therefore, our research is good news for the countries that want to improve quality of institutions, it takes time but, it is possible.

According to results the two institutions -that are corruption and law and order- are most crucial to lower income inequality. Bureaucratic reforms can be considered as a tool of anti-corruption policy agenda. Bureaucratic reforms may start from the adjustment of the pay structure. In the corrupt countries the public officials are paid less than their colleagues in the private sector. Therefore, they may complement their salaries with bribes. Thus, the higher the public sector wages one expects lower corruption.

Reforms for strong law and order may reduce the possibility of corruption to occur and increase the probability to detect the corrupt acts. Also, they may provide the measures to penalize corrupt acts not as an ordinary crime but as an extraordinary crime. Human development may contribute to the establishment and persistence of strong institutions by reducing the trends of social tolerance for poor institutions such as corruption and weak law and order. Reduced social tolerance can be achieved by educating the nation. Therefore, a government should make policies for better education. A well-educated nation is well-aware and more concerned about its future.

A strong political system is essential for the implementation of institutional reform policies. Government should provide a strong political system which ensures egalitarian distribution of income through efficient institutions. Also, governments should increase its efforts to ensure the provision of public goods such as strong law and order, reduced corruption and investors' rights. As a result, a state can have low crime rates, improved tax compliance and enhanced investment, all of which translate into the fast growing economy with lessened differences among sectors of the economy. Ultimately, there will be lower income inequality.

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Appendix

Table A1

Institutional Quality and Income Inequality (WGI)

	(1) Gini	(2) Gini	(3) Gini	(4) Gini	(5) Gini	(6) Gini	(7) Gini	(8) Gini
Log GDP	-3.228***	-2.412***	-3.678***	-2.037***	-4.855***	-3.404***	-2.894***	-3.678***
	(0.583)	(0.578)	(0.521)	(0.571)	(0.505)	(0.469)	(0.575)	(0.521)
Agriculture	-0.598***	-0.587***	-0.638***	-0.551***	-0.662***	-0.622***	-0.602***	-0.637***
	(0.0601)	(0.0581)	(0.0576)	(0.0586)	(0.0576)	(0.0570)	(0.0584)	(0.0576)
School	-0.087***	-0.089***	-0.091***	-0.092***	-0.086***	-0.097***	-0.092***	-0.091***
	(0.0205)	(0.0203)	(0.0206)	(0.0202)	(0.0207)	(0.0205)	(0.0205)	(0.0206)
Pop. Growth	2.764***	2.728***	2.572***	2.639***	2.615***	2.325***	2.605***	2.567***
	(0.303)	(0.296)	(0.299)	(0.293)	(0.300)	(0.302)	(0.297)	(0.300)
Corruption	-1.451***							
	(0.475)							
Government		-2.775***						
Effectiveness		(0.545)						
Regulatory			-1.262**					
Quality			(0.495)					
Rule of Law				-2.963***				
				(0.483)				
Voice and Accountability					0.650			
					(0.472)			
Political Stability						-2.034***		
						(0.420)		
Governan							-	

ce							2.269***	
							(0.571)	
PCA2								-1.271**
								(0.495)
Constant	78.13***	71.50***	83.29***	67.93***	92.90***	81.13***	76.06***	83.30***
	(5.348)	(5.163)	(4.536)	(5.131)	(4.426)	(4.135)	(5.087)	(4.533)
Observations	805	805	805	805	805	804	805	804
R^2	0.339	0.353	0.337	0.362	0.333	0.351	0.345	0.337
Adjusted R^2	0.335	0.349	0.333	0.358	0.329	0.347	0.340	0.333
F	82.07	87.05	81.23	90.52	79.85	86.19	84.00	81.15

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A2
Institutional Quality and Income Inequality in Autocracy and Democracy

Dependent variable: Gini Coefficient												
	ICRG average		Government stability		Corruption		Bureaucratic Quality		Law and Order		Dem. Accountability	
Variables	Democracy Polity2>0	Autocracy Polity2<0	Democracy Polity2>0	Autocracy Polity2<0	Democracy Polity2>0	Autocracy Polity2<0	Democracy Polity2>0	Autocracy Polity2<0	Democracy Polity2>0	Autocracy Polity2<0	Democracy Polity2>0	Autocracy Polity2<0
Institution Quality	-2.549***	2.083**	0.242	0.177	-1.338***	2.132***	-1.350***	-0.622	-3.109***	0.750	-0.654***	1.219**
	(0.423)	(1.024)	(0.159)	(0.367)	(0.301)	(0.760)	(0.362)	(1.584)	(0.251)	(0.627)	(0.234)	(0.608)
log GDP	-4.854***	2.143	-6.725***	1.978	-5.253***	0.930	-5.726***	1.956	-3.460***	2.040	-6.281***	2.017
	(0.511)	(1.690)	(0.420)	(1.769)	(0.525)	(1.667)	(0.489)	(1.775)	(0.463)	(1.727)	(0.442)	(1.686)
Agriculture	-0.772***	-0.0834	-0.836***	-0.156	-0.755***	-0.137	-0.823***	-0.190*	-0.650***	-0.141	-0.835***	-0.133
	(0.0610)	(0.104)	(0.0613)	(0.104)	(0.0634)	(0.0930)	(0.0610)	(0.106)	(0.0580)	(0.100)	(0.0611)	(0.0967)
School	-0.0398**	-0.186***	-0.0290	-0.190***	-0.0372*	-0.148***	-0.0303	-0.190***	-0.0369**	-0.192***	-0.0310	-0.181***
	(0.0193)	(0.0428)	(0.0198)	(0.0446)	(0.0195)	(0.0440)	(0.0195)	(0.0447)	(0.0179)	(0.0439)	(0.0196)	(0.0430)
Pop. Growth Rate	4.571***	0.458	4.615***	0.304	4.847***	-0.368	4.734***	0.184	3.889***	0.446	4.619***	0.247

	(0.296)	(0.658)	(0.304)	(0.689)	(0.306)	(0.665)	(0.304)	(0.674)	(0.282)	(0.687)	(0.302)	(0.648)
Constant	100.9***	25.13*	104.4***	34.27**	96.75***	37.44***	100.4***	37.67***	88.48***	32.35**	105.6***	31.31**
	(3.786)	(14.80)	(3.952)	(15.30)	(4.293)	(13.19)	(4.051)	(13.97)	(3.718)	(14.42)	(3.754)	(13.88)
Observations	759	71	759	71	759	71	759	71	759	71	759	71
R^2	0.538	0.311	0.517	0.270	0.528	0.346	0.524	0.269	0.598	0.283	0.520	0.310
Adjusted R^2	0.534	0.258	0.514	0.213	0.524	0.296	0.521	0.212	0.595	0.228	0.517	0.257
F	175.0	5.863	161.0	4.799	168.2	6.882	165.8	4.777	223.6	5.126	163.3	5.831

Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3
Fixed Effects Regression of Institution Quality and Income Inequality (WGI indicators of Institutional quality)

	(1) Gini	(2) Gini	(3) Gini	(4) Gini	(5) Gini	(6) Gini	(7) Gini	(8) Gini
Log GDP	-6.913***	-6.855***	-7.264***	-7.006***	-7.078***	-6.916***	-6.831***	-7.288***
	(0.693)	(0.701)	(0.708)	(0.696)	(0.688)	(0.691)	(0.698)	(0.709)
Agriculture	-0.0948**	-0.093**	-0.098**	-0.0999***	-0.119***	-0.094**	-0.094**	-0.098**
	(0.0382)	(0.0383)	(0.0380)	(0.0383)	(0.0384)	(0.0380)	(0.0381)	(0.0381)
School	-0.0199*	-0.0200*	-0.0174	-0.0188*	-0.024**	-0.0214*	-0.0212*	-0.0173
	(0.0112)	(0.0112)	(0.0112)	(0.0112)	(0.0112)	(0.0112)	(0.0113)	(0.0112)
Pop. Growth	0.157	0.145	0.0622	0.126	0.174	0.181	0.175	0.0631
Rate	(0.251)	(0.250)	(0.252)	(0.250)	(0.248)	(0.249)	(0.251)	(0.252)
Control of Corruption	-0.365							
	(0.522)							
Government		-0.402						

Effectiveness		(0.526)						
Regulatory			0.911**					
Quality			(0.438)					
Rule of Law				0.493				
				(0.562)				
Voice and					-1.773***			
Accountability					(0.526)			
Political						-0.740**		
Stability						(0.313)		
Governance							-0.850	
							(0.710)	
PCA2								-0.913**
								(0.438)
Constant	102.8***	102.3***	105.4***	103.4***	105.4***	102.9***	102.3***	105.6***
	(6.095)	(6.146)	(6.188)	(6.112)	(6.084)	(6.076)	(6.111)	(6.194)
Observations	805	805	805	805	805	804	805	804
Rho	0.969	0.969	0.967	0.967	0.973	0.970	0.970	0.967
sigma_u	11.28	11.25	10.93	10.90	12.08	11.42	11.45	10.95
sigma_e	2.020	2.020	2.014	2.020	2.004	2.013	2.019	2.015

Table A4
Definition, measurement and sources of variables

Variables	Definition	Scale	Source
Gini index	The distribution of income among individuals or households within an economy deviates from a perfectly equal distribution.	0-100	WDI, (2020)
Institutions Quality	Average of ICRG Components	0-6	ICRG, (2020)
Government Stability	Assessment of the government's ability to carry out its declared programs and to stay in office.	0-6	ICRG, (2020)
Corruption	Assessment of corruption within the political system. Most common is the financial corruption by people in public offices demanding illegal payments	0-6	ICRG, (2020)
Law an Order	A measure that assesses the strength and impartiality of the legal system and observance of the law.	0-6	ICRG, (2020)
Democratic Accountability	A measure of free and fair elections and responsive of government is to its people.	0-6	ICRG, (2020)
Bureaucracy Quality	Quality to absorb the shocks that tends to minimize revisions of policy when governments change.	0-6	ICRG, (2020)
Control of Corruption	The extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	-2.5 to 2.5.	ICRG, (2020)
Government Effectiveness	The quality of public services, civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.	-2.5 to 2.5.	ICRG, (2020)
Regulatory Quality	The ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	-2.5 to 2.5.	ICRG, (2020)
Rule of Law	The extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	-2.5 to 2.5.	ICRG, (2020)

Voice and Accountability	The extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.	-2.5 to 2.5.	ICRG, (2020)
Political Stability	The likelihood of political instability and/or politically-motivated violence, including terrorism.	-2.5 to 2.5.	WGI, (2020)
Political Rights	Political Rights refer to free and fair elections, the existence of elected rulers, competitive political parties and other political groups, strong opposition, and the minorities are well represented in politics and government.	1-7	Freedom House, (2020)
Civil Liberty	Civil Liberties refer to freedom of expression, assembly, association, education, and religion, established and fair legal system that ensures the rule of law, and equal opportunity for everyone in the country.	1-7	Freedom House, (2020)
Combined polity score	A combined polity score shows the quality of the political regime. Min Polity2 score (-10) shows perfect autocracy whereas max polity2 score (+10) shows perfect democracy.	-10 - +10	Polity IV, (2017)
School enrollment, secondary	It is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown.	% gross	WDI, (2020)
Agriculture, value added	The net output of agriculture sector after adding up all outputs and subtracting intermediate inputs	(% of GDP)	WDI, (2020)
GDP per capita	GDP per capita is gross domestic product divided by midyear population.	Constant 2010 US$	WDI, (2020)
Population growth rate	It is the exponential rate of growth of midyear population from year previous to current year.	% annual	WDI, (2020)