Institutions and human development: a panel Granger causality analysis

UNITED NATIONS
الاسكوا
ESCWA

Shared Prosperity Dignified Life

UNITED NATIONS
الاسكوا
ESCWA

Shared Prosperity **Dignified Life**

VISION

ESCWA, an innovative catalyst for a stable, just and flourishing Arab region

MISSION

Committed to the 2030 Agenda, ESCWA's passionate team produces innovative knowledge, fosters regional consensus and delivers transformational policy advice. Together, we work for a sustainable future for all.

E/ESCWA/CL6.GCP/2021/TP.3

Economic and Social Commission for Western Asia

Institutions and human development: a panel Granger causality analysis

United Nations
Beirut

The findings, interpretations and conclusions expressed in this publication are those of the authors and do not necessarily reflect the views of the United Nations or its officials or Member States.

Authors: Khalid Abu-Ismail and Phoebe W. Ishak
The authors wish to express their gratitude to Vladimir Hlásny, Terry McKinley and Selim Jahan for their helpful comments.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Links contained in this publication are provided for the convenience of the reader and are correct at the time of issue. The United Nations takes no responsibility for the continued accuracy of that information or for the content of any external website.

References have, wherever possible, been verified.

Mention of commercial names and products does not imply the endorsement of the United Nations.

References to dollars ($) are to United States dollars, unless otherwise stated.

Symbols of United Nations documents are composed of capital letters combined with figures. Mention of such a symbol indicates a reference to a United Nations document.

United Nations publication issued by ESCWA, United Nations House,
Riad El Solh Square, P.O. Box: 11-8575, Beirut, Lebanon.

Website: www.unescwa.org.

21-00385

Contents

List of tables

List of figures

Introduction

What do we mean by development and institutions and what is the most appropriate measurement framework to empirically assess them? Do good institutions cause development progress, is it the other way around or is there bidirectional causality? Is the relationship affected by a country's level of income or oil wealth? These are the questions that the authors aim to address in the present paper.

With regard to the first question, institutions are often defined as formal or informal mechanisms of societal governance. The sociologist Émile Durkheim succinctly defined institutions as "beliefs and modes of behaviour instituted by the collectivity".[1] Given that broad definition, the measurement of institutional quality will always be problematic, especially for cross-country comparisons. Fortunately, over the past three decades, efforts to measure good governance, which is the best proxy for institutional quality, have led to the emergence of several key measurement tools. In the present paper the authors use data collated by the World Bank, which maintains a database of cross-country comparable governance indicators dating back to the early 1990s.

Development is a multi-layered concept that is particularly difficult to analyse. The Cambridge English Dictionary defines development as "the process in which someone or something grows or changes and becomes more advanced". In this paper, the authors employ a broader definition consistent with a human development approach and in line with the approach adopted by the United Nations Development Programme (UNDP). Human development can be defined as "the science that seeks to understand how and why the people of all ages and circumstance change or remain the same over time", with a capability approach at its core. It follows that the appropriate measure for human development would be the Human Development Index, which is regularly monitored and published by UNDP.

The questions the authors wish to address are not new. However, previous studies focused solely focus on the relationship between institutions and economic growth, as measured by gross domestic product (GDP) per capita. A broader concept, such as human development, takes into account other social dimensions such as education and health, both of which are influenced by the prevailing institutions and can also affect the quality of those same institutions. Moreover, the feedback effect between institutions, and economic and human development may vary among countries, not only due to their different income levels, but also due to the presence or absence of natural resource endowments in those

[1] Émile Durkheim, quoted in S. Lukes, ed., Preface to the Second Edition: Rules of Sociological Method and Selected Texts on Sociology and its Method, pp. 34-47 (New York: The Free Press, 1982).

countries. A number of studies have, in fact, concluded that natural resources can weaken institutions and increase corruption.[2]

The present study revisits the causal effect between institutions and the key human development indicators that inform the Human Development Index (HDI) and its disaggregated components, namely its education, health and income indices (UNDP, 2018).The study uses annual data from 1996 to 2017, and analyses 158 countries. To tackle panel heterogeneity, the authors employ a panel Granger causality approach (Dumitrescu and Hurlin, 2012). That approach is an extension of the original time-series Granger causality test (Granger, 1969), but takes into account the heterogeneity of cross-sections. Given that the causality pattern can differ according to the level of economic development, as measured by income level, and the presence or absence of oil rents, the authors split the sample into high- and low-income country groups and into high-oil- and low-oil-dependent countries.

The study shows that there is a unidirectional causality between institutions and human development in most cases. The impact of institutions in different income-groups varies, however, depending on whether the HDI or one of its components is measured. The study also demonstrates that institutional quality is more important in driving development in all its dimensions in upper-middle-income countries. The effect of institutions, however, dissipates in promoting human development in high-income countries, but shows a weak impact in low-income countries. For economic growth, institutions are of greater importance in high-income countries. Furthermore, by looking at the effect of oil endowments, the study reveals that human development can strengthen institutions in high-oil-dependent countries. In low-oil-dependent countries, however, the causal effect is reversed.

The paper is structured as follows: Section 1 reviews relevant literature and discusses its findings. Section 2 presents the conceptual framework for the study. In Sections 3 and 4, the authors provide, respectively, an overview of the data and methodology used, while in Section 5 they provide an overview of their main findings. Section 6 sets out a number of policy implications and suggestions for further research.

---

[2] James Fearon and David Laitin, "Ethnicity, Insurgency, and Civil War", *American Political Science Review* 97(1), pp. 75-90 (2003); Silje Aslaksen, *Corruption and Oil: Evidence from Panel Data, mimeo*, Department of Economics, Trondheim: Norwegian University of Science and Technology (2007).

1. Literature review

The relationship between the quality of institutions and economic welfare is well established in economic and political science literature. Most cross-sectional empirical studies document a positive and statistically significant relationship between various measures of institutional quality and levels of economic development (e.g. Knack and Keefer, 1995; Mauro, 1995; Olson, 1996; Keefer and Knack, 1997; Acemoglu, Johnson and Robinson, 2001; Acemoglu, Gallego and Robinson, 2014). Other authors who have examined causation either refer to bidirectional causation between institutional quality and economic growth (e.g. Chong and Calderon, 2000; Lee and Kim, 2009; Law, Lim and Ismail, 2013; Góes, 2016) or suggest a unilateral impact from institutions on economic growth (Nawaz, 2015; Justesen, 2008). Furthermore, the pattern of causation is found to differ between developed and developing countries.[3]

Assessments of the quality of institutions have varied significantly in those studies. In contrast, development is almost exclusively measured by growth in GDP per capita. Despite the wide acceptance of that measure, however, it only captures one aspect of the broader human development process, namely income or the level of economic development. Hence, a more comprehensive measure of development is required to take into account social dimensions and indicators which, arguably, also influence the growth process. For example, proponents of endogenous growth models have recognized the role of human capital in enhancing economic growth. Subsequent empirical studies have assessed the impact of education and heath on economic growth and have demonstrated their significant importance for growth. Lorentzen and others, (2008), for example, demonstrate that higher adult mortality can reduce economic growth by shortening time horizons, reducing savings and curtailing personal investments in education. Tavares and Wacziarg (2001) show that human capital, as measured by educational attainment, is the channel through which democratic institutions can have a positive effect on growth. Other researchers find a positive association between prolonged life expectancy and growth.

On the institutional side, the degree of corruption is by far the most widely used indicator in efforts to assess the quality of institutions. The majority of empirical studies find a negative association between corruption and growth. Researchers have concluded that public corruption distorts the structure of public spending by reducing social expenditure (including spending on education, health and social protection). In the same vein, Mauro (1998) shows that corruption reduces government spending on education and Gupta, Davoodi and Tiongson (2000) report that corruption reduction results in social gains by decreasing infant mortality and primary school dropout rates. Furthermore, Rajkumar and

[3] Nawaz (2015) and Law, Lim and Ismail (2013) provide an excellent review of previous cross-section and causality studies investigating the relation between economic growth and institutions.

Swaroop (2008) find that public spending on health and education can significantly reduce infant mortality rates and increase primary education enrolment rates in countries with low rates of corruption.[4] Other studies have focused on the rule of law and democratization as measures for institutions. Barro (1996), for example, shows that the rule of law has a positive effect on growth, while Rodrik (2000) finds a positive association between democracy and manufacturing wages, and moreover finds that democratic institutions foster economic growth by promoting systemic stability and accountability. In combining both aspects, researchers have shown that democracy and the rule of law are both good for economic growth. Acemoglu and others, (2008) find a cross-country correlation between income and democracy, but no causal effect from income on democracy after controlling for country-fixed effects. On the other hand, several authors have shown that human capital also matters for institutions. For example, Van Rijckeghem and Weder (2001) find higher civil service wages and better educated civil servants reduce corruption in low-income countries, while Svensson (2005) finds that a more educated population is also more likely to report government abuses and inefficiencies.

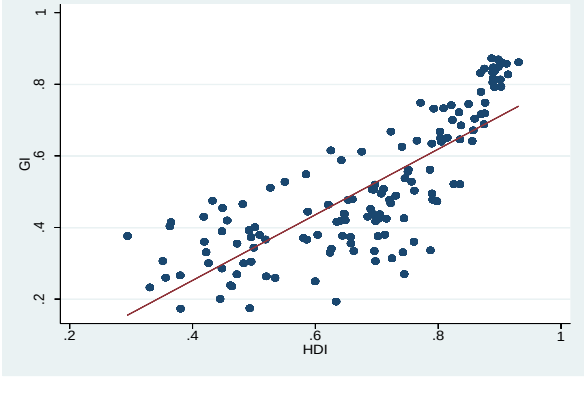
The strong association between institutional quality and income per capita or economic growth is thus a well-established fact. However, bivariate cross-country correlations cannot establish causality and could be biased because of omitted variables. Moreover, bivariate cross-country correlations do not take into account the heterogeneity of the association across different stages of income or economic development. Studies that have tackled these concerns using panel data techniques have led to the emergence of two dominant points of view. The first point of view sees bidirectional causality between institutions and economic growth (Chong and Calderon, 2000; Law, Lim, and Ismail, 2013). The second point of view, however, argues that the former has a larger influencing role on the latter (Justesen, 2008; Nawaz, 2015). However, the relationship between human development, a broader concept of development than income per capita, and institutional quality has not yet been thoroughly examined. In the following section, the authors provide a brief overview of how they view this relationship.

[4] Dreher and Herzfeld (2005) review empirical literature on the economic costs of corruption. They find that corruption negatively affects economic growth, the level of GDP per capita, investment activity, international trade and price stability. Additionally, it distorts the composition of government expenditure.

2. Conceptual framework and research questions

According to Abu-Ismail, Kuncic and Sarangi (2016), the relationship between institutions and human development should be viewed as a dynamic process that unfolds across time and space. Therefore, one can expect different patterns of associations depending on countries' level of development. In addition, the authors note there are considerable differences in the relationships between institutional quality on the one hand and income, education and health on the other, with education and health generating stronger positive associations with institutional quality than income per capita. The implication, consistent with the literature on endogenous growth, is that institutions may affect economic growth through their impact on human capital. In particular, Abu-Ismail, Kuncic and Sarangi (2016) argue that three specific patterns of causal relationships may emerge.

Figure 1. Human development and institutional quality in various countries



Source: Abu-Ismail and others (2016).

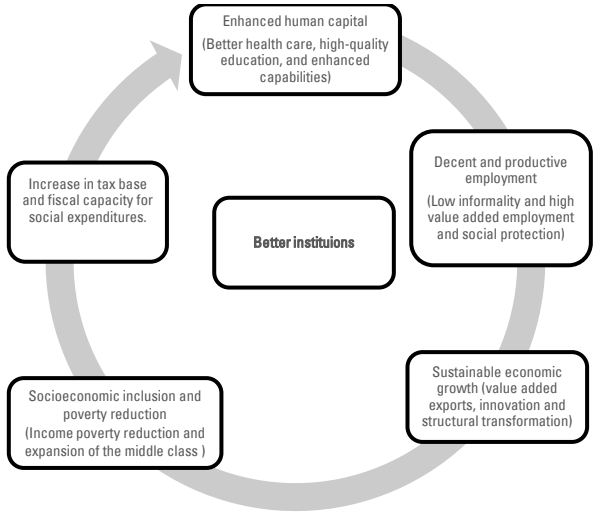
The first pattern is found where low levels of human development coincide with low levels of institutional quality. At that stage, the relationship is unclear and marginal improvements in human capital or economic growth have a limited effect on institutional quality and vice versa. For example, if a large share of a country's population is illiterate or suffers from malnutrition, a unit increase in educational attainment rates or calorie intake per day will have only a minimal impact on governance. The same is true for institutions: an improvement in institutional quality is unlikely to give rise to a sustainable impact on human development. As such, a weak empirical association and causal link is expected. This is particularly the case in least developed countries and is illustrated in the wide dispersion of points in the lower right quadrant of figure 1, above, which represent countries with both low levels of human development and institutional quality.

As countries develop, a second pattern evolves and human development occurs in tandem with improvements to institutions. This is the case for the majority of developing countries that have surpassed critical minimum levels of human development and institutional quality, thus allowing for a stronger and more synergistic link between those variables. In those countries, any marginal increase in human development will produce a corresponding increase in the quality of

institutions and vice versa. After a certain level of human development and institutional quality is achieved, however, the correlation weakens once more and any marginal improvement in human development or institutional quality will have limited spillover effects. As such, a third pattern emerges in which both human development and governance approach a certain limit. In such situations, the statistical relationship between both variables is at its strongest level but it becomes difficult to achieve further improvements in terms of institutional quality or human capabilities. Thus, the causal link tends to be weak. This pattern is seen in richer, politically stable and highly developed countries.

It is important to highlight however that this narrative does not make any hypotheses regarding the direction of causality. It merely suggests that there is an association between human development and institutional quality. The question we are concerned with in this paper is different as we aim to understand the direction of causality in the evolution of the relationship between human development and institutional quality. The following two questions are important in that regard: in which of the three phases should we expect institutions or human development to play a more important deterministic or driving role, and why? Given the distortions created by the wealth that can be generated from the exploitation of countries' natural resources, in what ways can we expect the relationship between these two variables to change for resource-rich countries?

Figure 2. An illustrative diagram of causal links between human development and institutional quality



Source: Authors, on the basis of information contained in Rethinking multidimensional inequality (Economic and Social Commission for Western Asia (ESCWA), 2019).

To answer these questions, it is useful to provide an illustrative example of an inclusive development process. Common sense would suggest that to develop institutions in the first place, a minimum level of human capital investment is required. If this human capital is not, primarily, the result of exogenous institutions (as a result of colonial interventions, as explained in Acemoglu, Johnson and Robinson (2001)), then it is logical to assume that indigenous institutions will be created in least developed countries. This is demonstrated in figure 2 above, in which a virtuous circle begins with human capital instigating the development process. Human capital is enhanced through the provision of basic health care and education. According to human capital

growth theories, this initial investment will translate into higher economic growth via the channel of decent and productive employment. If the growth process is inclusive, it will lead to poverty reduction and an expansion of the middle class, thus broadening the tax base and empowering public investment, which will, moreover, reduce the risk of political instability. In turn this promotes further human development and economic growth. Human development is thus a prerequisite and an outcome of this interactive process. There is an assumption, however, that a minimum level of human development is needed to give rise to an autonomous inclusive development process in the initial stage of development. Institutional quality drives that process, affecting all its aspects and is therefore a cross-sectoral determinant.

In line with this conceptual understanding, the authors have sought to answer the following three questions:

1. What is the direction of causality between human development and institutions in general?
2. Does the direction of causality differ between country groups according to their level of development, as postulated above, with human development causing development in the initial phases and the causal link reversing as countries become richer and more developed?
3. Are there exceptions to this pattern? Most notably, does the trend apply to resource-rich countries?

3. Data used

The authors analysed data from 158 countries for the period 1996–2017. The quality of institutions was measured using the Worldwide Governance Indicators (WGI) (World Bank, 2018), as outlined by Kaufmann, Kraay and Mastruzzi (2010). These comprise six indicators, each capturing a different dimension of institutional quality. For the purpose of this paper, the authors focused on dimensions assessing the effectiveness of the three branches of government, namely the judiciary, the executive and the legislative branches. Three indicators were therefore selected, each corresponding to one particular branch. The indicator on the rule of law measures the effectiveness of the judiciary; the government effectiveness indicator measures the quality of the executive, and the voice and accountability indicator measures the quality of the legislative authorities.[5] Each indicator was converted into a score of between 0 and 1, with higher values indicating better governance. In addition to analysing the impact of each indicator separately, a single aggregated indicator was obtained by taking the geometric average of the three aforementioned indicators. In contrast to previous studies, the authors used a geometric average instead of a simple average because the former is not affected by fluctuations in the sample and/or the presence of extreme values. This was particularly important in this study, as some countries can score high on one dimension, but score poorly on another. Using the simple mean ensures that the aggregated index is driven by the highest single score. The geometric mean, on the other hand, takes into account the relationship among all indicators.[6] This approach also ensures consistency between the methodology for computing the Human Development Index and the institutional quality index. Because WGI indices were made available every two years between1996 and 2002, and were then calculated on an annual basis, missing observations were filled in by averaging two years' values for the years 1996, 1998, 2000 and 2002.[7] Table 1 provides the conceptual definition of each indicator.

Economic growth is measured by (log) real GDP per capita at 2010 constant United States dollars and derived from the World Development Indicators, developed by the World Bank (World Bank, 2018). The measure for human development is the Human Development Index (HDI) (UNDP, 2018), and specifically the HDI health dimension, expressed as life expectancy at birth; the education dimension, expressed as the mean years of schooling for adults aged 25 years and over, and the expected years of schooling for children of school-entering age; and the standard of living dimension, expressed as gross national income per capita. The aggregate HDI scores range from 0 to 1, with higher values indicating higher development

5 See Abu-Ismail and others (2016) for a general discussion on the particular significance of these three indicators.

6 Figure 3 in the annex to this report provides an overview of correlation among the three indictors.

7 The same approach is used by Law, Lim and Ismail (2013). They point out that institutions are rather slowly changing with small year-to-year variation, which suggests that it is reasonable to take average values for missing data plots.

status in a country. Given that the HDI combines income and human capital dimensions in a single index, there might be some concern that the final reported number is skewed towards the highest score for one of the dimensions. For example, a country with a high level of economic affluence that, nonetheless, lags behind in terms of its health and educational progress may be awarded a lower overall HDI score than a country with equal scores for all three dimensions. In addition to the aggregate HDI index, the authors also formulated a separate compound index encompassing the health and education sub-indices, dubbed the human capital index, in order to distinguish between human capital and economic growth effects. Table 2 provides an overview of the study statistics.

Table 1. Definitions of the three institutional indicators used in the present study (selected from the World Governance Indicators, 2018)

Indicator	Definition
Rule of law	This captures perceptions of 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.
Government effectiveness	This captures perceptions of the quality of public services, the quality of the 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.
Voice and accountability	This captures perceptions of 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 the extent of media freedom.

Table 2. Descriptive statistics

Variable	No.	Mean	Standard deviation	Min	Max
HDI	2760	0.68	0.17	0.24	0.95
Human capital	2760	0.68	0.16	0.21	0.95
Real GDP per capita ($, constant 2010) (log)	2760	9.12	1.23	6.21	11.56
Institutions index	2760	0.51	0.19	0.11	0.90
Government effectiveness	2760	0.11	0.99	-2.06	2.44
Rule of law	2760	0.03	1.01	-2.13	2.10
Voice and accountability	2760	0.03	0.96	-2.23	1.80

To capture differences among countries that have achieved different levels of development, countries were placed in three income subgroups according to their World Bank income classifications. The first subgroup included low- and lower-middle income countries. The second subgroup included upper-middle income countries, and the third subgroup included high-income countries. Furthermore, to capture differences stemming from countries' capacity to exploit their natural resources, the authors also categorized countries as either high-oil- or low-oil-dependent on the basis of whole-period-average oil exports share of GDP. A country was defined as high- (low-) oil-dependent, if its share of oil exports over GDP was above (below) the sample mean. In the study, a high-oil-dependent country was defined as a country in which oil exports contribute at least 3 per cent of GDP.[8]

[8] Going beyond the 3 per cent threshold significantly reduces the sample size in the regression restricted to high oil-dependent countries.

4. Methodology

To examine the causal relationship between institutions and economic development, the authors employed a panel Granger causality approach (Dumitrescu and Hurlin, 2012). That approach is an extension of the original time-series Granger causality test (Granger, 1969), but takes into account the heterogeneity of cross-sections. The causality test for heterogeneous panels is performed by estimating the following regression:

$$Y_{i,t} = \alpha_i + \sum_{k=1}^{p} \gamma_i^k \, Y_{i,t-k} + \sum_{k=1}^{p} \beta_i^k \, X_{i,t-k} + \varepsilon_{i,t}.$$

where X and Y are two stationary variables observed for t=1,...,T periods and i= 1,..., N individuals, α_i is the individual fixed effect, p is the lag length, which is identical for all panel units, and $\varepsilon_{i,t}$ is the error term. The Granger non-causality is then tested under the following null hypothesis:

$$H_0: \beta_i^k = 0 \quad \forall \, i = 1, \ldots, N.$$

which assumes that there is no causal relationship running from X to Y for all cross-section units. The alternative hypothesis, on the other hand, assumes X causes Y in at least one cross-section unit and is specified as:

$$H_A: \beta_i^k \neq 0 \quad \exists \, (i, k).$$

Hence, it follows that if the test statistic is not significant, this indicates that X is not causing Y for all individual panel units. Whereas, if the null hypothesis is rejected, there is evidence for a causal relationship for at least one country.

To test for causality from institutions on economic development and vice versa, the authors used the following two specifications:

$$Dev_{i,t} = \alpha_i + \sum_{k=1}^{p} \gamma_i^k \, Dev_{i,t-k} + \sum_{k=1}^{p} \beta_i^k \, Inst_{i,t-k} + \varepsilon_{i,t}.$$

and

$$Inst_{i,t} = \alpha_i + \sum_{k=1}^{p} \gamma_i^k \, Inst_{i,t-k} + \sum_{k=1}^{p} \beta_i^k \, Dev_{i,t-k} + \varepsilon_{i,t}.$$

with Dev standing for the development indicator employed, i.e. (log) GDP per capita, HDI and human capital. $Inst$ is the geometric average of the three WGI indicators and each indicator separately. Following the convention in VAR analysis, the lag length was chosen based on the Akaike information criteria (AIC) with a maximum number of four lags.[9]

The authors' approach improves upon the current literature in several ways. First, using annual data instead of averaged observations allows for an exploration of the evolution of the dynamics of the relationship over different time

[9] The authors use the recently introduced STATA command *xtgcause* (Lopez and Weber, 2017) to implement their empirical strategy. One advantage of using this package is that it offers the possibility of automatically selecting the number of lags to include in the model by minimizing the Akaike, the Bayesian, or the Hannan-Quinn information criterion, an option that was not available in previous software packages. The authors are aware that the unavailability of that option might have led to inaccurate results in previous studies.

lags, which might not appear in averaged data. Additionally, averaging over fixed intervals does not guarantee an effective elimination of business cycle fluctuations given the arbitrariness of the length of the interval. Moreover, taking into account the heterogeneity of cross sections is very demanding when estimating the causal relationship. Homogeneity of slope parameters is a very unlikely assumption in this case, as the middle- and low-income countries carry a high degree of (within) heterogeneity. In the approach adopted by Dumitrescu and Hurlin (2012), the non-causality test is performed at first for each individual unit, then the overall test statistic is computed as the average of the N individual statistics. Thus, controlling for heterogeneity leads to better estimates of the relationship compared to other approaches, such as Generalized Method of Moments (GMM), which may yield inconsistent parameters unless slope coefficients are homogeneous.

5. Main findings

Applying the VAR analysis requires the panel data series to be stationary as a pre-requisite. In other words, the data series must not contain unit roots. To ensure this, the authors employed two panel unit root tests: the Im, Pesaran and Shin procedure and the panel augmented Dickey-Fuller (ADF) unit root tests. Both tests were under the null hypothesis that all panels contain a unit root. Table 3 presents the results of the panel unit root tests conducted for the measures of institutions and development at levels and first differences. The results indicated that the tests fail to reject the null hypothesis of non-stationarity for the level variables, both with and without a trend. In contrast, the tests on the first difference rejected the null hypothesis of non-stationarity at 1 per cent significance level and pointed to the absence of unit-root in at least one country. The authors therefore conducted their analysis on the stationary first differenced variables I(1).

Table 3. Panel unit-root tests

Model	Im-Pesaran-Shin		ADF	
	(1)	(2)	(3)	(4)
	No Trend	Trend	No Trend	Trend
Level				
Institutions	-2.17	-0.97	0.05	3.20
GDP per capita (log)	5.06	0.63	3.94	2.26
Human Development Index	2.63	2.01	4.19	4.04
Human capital	0.33	1.55	4.50	2.89
First difference				
Institutions	-29.26***	-26.56***	-8.58***	-5.53***
GDP per capita (log)	-19.50***	-16.19***	-5.34***	1.06
Human Development Index	-21.64***	-19.21***	-5.19***	-1.88**
Human capital	-20.55***	-17.89***	-4.93***	3.58***

Note: Institutions is defined as the geometric mean of three WGI indicators: government effectiveness, rule of law and voice and accountability. The number of lags was determined by the Akaike information criterion with a maximum number of three lags. Significantly different from zero at *90% confidence, **95% confidence, ***99% confidence.

Table 4 shows the panel Granger causality results based on the full sample and sub-income groups. Panel A shows the results for the causality running from institutions to the three selected development measures, while panel B shows the results for the causality running from development to institutions. The lag length determined by the Akaike information criterion (AIC) is 1 lag for all model specifications chosen from a maximum number of three lags.[10] Column 1 shows the results when measuring development using the Human Development Index (HDI) and columns 2 and 3 examine the causality when using human capital and (log) GDP per capita, respectively. Throughout the three models, the significant point estimates imply that institutions support human development and GDP per capita growth in at least one country. However, if sub-income groups are tested, a range of patterns are observed: the unidirectional causal relationship is maintained for low-income countries, but only for HDI. Upper-middle-income countries show the most significant results for this causation with respect to all three development measures. For high-income countries, the causal effect is only significant for economic growth.[11]

Table 4. Panel Granger causality

	A. Institutions → development		
	(1)	(2)	(3)
	HDI	Human capital	GDP per capita (log)
Institutions			
Full sample	2.67***	1.27	1.90*
Low-income	1.61*	-0.93	1.27
Upper-middle-income	2.23**	1.74**	2.64***
High-income	0.88	1.33	2.14**
	B. Development → institutions		
Institutions			
Full sample	-0.49	-0.88	-1.81*
Low-income	0.18	-0.32	0.15
Upper-middle-income	-1.17	-0.75	-1.60
High-income	0.01	-0.49	-1.80*

Note: Institutions is defined as the geometric mean of three WGI indicators: government effectiveness, rule of law and voice and accountability. Low-income countries include both low-income and lower-middle-income countries, in line with the World Bank income classification scheme. The number of lags was determined by the Akaike information criterion with a maximum number of four lags. Number of observations (countries) for full sample: 2760(158); for low-income: 1040(52); for upper-middle: 740(37); for high-income: 980(49). Significantly different from zero at *90% confidence, **95% confidence, ***99% confidence.

[10] The authors also ran the study with 4 year lags and the results remained quantitatively and qualitatively the same.

[11] The authors also checked their results using the geometric average of the six WDI indicators as their measure for institutions and the results, which are available upon request, remained robust.

The results of the analysis reveal that, on average, a unidirectional causal effect exists between institutions and development. Furthermore, the statistical significance for causality is stronger for HDI than for GDP (1 per cent vs. 10 per cent significance level), showing that institutions have a stronger association with human development than with growth alone, and that the two measures indeed capture different aspects of development. With regard to income levels, the findings suggest that institutions play a stronger role in driving human development in middle-income countries relative to low- and high-income countries. This is because middle-income countries possess the minimum level of human capital required to invest in institutions in order to reach sustainable levels of human development. For low-income countries, institutions have limited capacity to lead human development because of their low levels of human capital. In high-income countries, institutions and human development have reached their highest levels, making it difficult for either to improve – let alone cause – the other. Nonetheless institutions and human development are mutually reinforcing in high-income countries. The results are in line with the outcomes expected by Lee and Kim (2009), Law, Lim and Ismail (2013) and Chong and Calderon (2000), who also find that institutions promote economic growth (measured in terms of GDP per capita) more in middle-income than in high-income countries. One should note that low-income countries represents the largest group in the study sample, followed by middle-income countries and then upper-income countries. Hence, the overall impact in the full sample is likely to be driven, primarily, by the first group of countries.

Table 5 sets out the results of the analysis of subinstitutional indicators, namely government effectiveness, rule of law and voice and accountability for the full sample and the three-income groups. Columns 1 to 3 show the results when measuring development using HDI, human capital and GDP per capita, respectively. In column 1, the results show a similar unidirectional causal relationship running from institutions to human development, as is the case with the compound index, with government effectiveness, and voice and accountability significantly driving the relationship. In column 2, voice and accountability show a significant one-way causal impact on human capital compared to the non-significant effect reported with the compound index. This suggests that institutions are important in the development of human capital and that the relationship is mainly driven by the voice and accountability indicator. Column 3 shows that institutions have an insignificant causal effect on GDP per capita, which is consistent with the weak significance reported with the compound index. This suggests that institutional qualities, when combined, should have a stronger impact on development than each will individually. The results from the subgroups of countries also confirm the unidirectional causal effect running from institutions to development. For low-income countries, the rule of law shows the most significant causal effect on human capital and HDI, despite the non-significance of the average index. In upper-middle-income countries, the unidirectional causal effect of institutions on development is driven by the rule of law. Voice and accountability is of greatest importance for high-income countries in driving human development, although all institutional indices have an impact on economic growth.

Table 5. Panel Granger causality – subinstitutional indices

		Causality patterns	
	(1)	(2)	(3)
	HDI	Human capital	GDP per capita (log)
Full sample			
Government effectiveness	→	≠	≠
Rule of law	≠	≠	≠
Voice and accountability	→	→	≠
Low-income			
Government effectiveness	≠	≠	≠
Rule of law	≠	→	≠
Voice and accountability	≠	≠	≠
Upper-middle-income			
Government effectiveness	≠	≠	≠
Rule of law	→	≠	→
Voice and accountability	≠	≠	≠
High-income			
Government effectiveness	≠	≠	→
Rule of law	≠	≠	→
Voice and accountability	→	→	→

Note: Institutions is defined as the geometric mean of three WGI indicators: government effectiveness, rule of law and voice and accountability. X→Y indicates X Granger causes Y; X≠Y indicates X does not Granger cause Y. Low-income countries include both low-income and lower-middle-income countries, in line with the World Bank income classification scheme. The number of lags was determined by the Akaike information criterion with a maximum number of four lags.

Table 6 provides an overview of causality patterns for two subgroups, namely low-oil- and high-oil-dependent countries. The aggregate institutional index and sub-indices again demonstrate a unidirectional causality pattern in both subgroups. However, the direction of the causality differs. In low-oil-dependent countries, the direction of the causality is from institutions to human development. The significant causal effect of the aggregate institutional index is government effectiveness and voice and accountability. Interestingly, voice and accountability exerts a significant causal effect on human capital and economic growth, despite its negligible effect of the aggregate index. In high-oil-dependent countries, the causal effect, in contrast, runs from human development to institutions. The impact is statistically significant

for government effectiveness and the rule of law. Nonetheless, a causal effect running from government effectiveness to GDP per capita is apparent, suggesting that this particular institutional dimension can play an important role in promoting economic growth.

The fact that a different causality pattern is apparent for high-oil-dependent countries is in line with the rentier State theory, which postulates that oil rents provide leaders with sufficient fiscal space to invest in social and economic development, while also curtailing civil and political freedoms. In such contexts, the role of institutions is likely to be significantly constrained while priority will be given to human development. For low-oil-dependent countries, institutions matter more for human development and growth. Furthermore, for that particular group of countries, steps taken to enhance civil and political freedoms can have a positive impact on all aspects of development.

Table 6. Panel Granger causality – oil-dependent countries

	A. Institutions → development		B. Development → institutions	
	High-oil-dependent	Low-oil-dependent	High-oil-dependent	Low-oil-dependent
	(1)	(2)	(3)	(4)
HDI				
Institutions	≠	→	≠	≠
Government effectiveness	≠	→	→	≠
Rule of law	≠	≠	→	≠
Voice and accountability	≠	→	≠	≠
Human capital				
Institutions	≠	≠	≠	≠
Government effectiveness	≠	≠	≠	≠
Rule of law	≠	≠	≠	≠
Voice and accountability	≠	→	≠	≠
GDP per capita (log)				
Institutions	≠	≠	≠	≠
Government effectiveness	→	≠	≠	≠
Rule of law	≠	≠	≠	≠
Voice and accountability	≠	→	≠	≠
Number of observations	480	2 280	480	2 280
Number of countries	24	114	24	114

Note: Institutions is defined as the geometric mean of three WGI indicators: government effectiveness, rule of law and voice and accountability. X→Y indicates X Granger causes Y; X≠Y indicates X does not Granger cause Y. The number of lags was determined by the Akaike information criterion with a maximum number of four lags.

6. Conclusion

This study revisits the question of causality between institutions and economic development on the premise that development is a broad concept that encompasses more than just income growth. The authors used three different measures of development: the Human Development Index (HDI), human capital and real GDP per capita and examined the causal effect between development and institutions by means of the panel Granger causality test in 158 countries disaggregated by income level. The authors also examined whether the presence of natural resource endowments can drive that causal effect.

A unidirectional causality was found to run from institutions to economic development at all stages of economic development. Countries in different income groups, however, experience different effects depending on the measure of economic development used. Better institutions lead to economic development in terms of HDI in low-income countries, whereas institutions are more important for economic growth as measured by GDP per capita in high-income countries. The quality of institutions has an impact on all aspects of economic development in middle-income countries. Furthermore, by looking at the impact of oil endowments, the authors found that economic development promotes government effectiveness and rule of law in high-oil-dependent countries. In low-oil-dependent countries, the causal effect is reversed, with institutions leading economic development, particularly the voice and accountability dimension.

These findings suggest that policies to accelerate growth should take into account not only countries' different stages of development, but focus on the particular aspect of development that policymakers wish to promote (such as income growth or human capital). Focusing on GDP per capita and regarding it as the most important aspect of development may divert attention away from the need to strengthen countries' human capital, which could, potentially, have a more significant long-term impact. Policymakers should therefore focus on the type of institutions they wish to strengthen and consider whether countries' economies are natural resource-driven when formulating development policies.

Annex

Figure A1 illustrates the correlation among the three institutional indicators used in the study. Figure A1.A shows that there is very strong correlation between the rule of law and government effectiveness (R2=0.96). Hence, countries with a very high score for the rule of law indicator also score highly for government effectiveness. The relationship is weaker when it comes to voice and accountability and its relationship with the other two indicators. In figure A1.B, countries with a high score for voice and accountability also score well for government effectiveness (R2=0.80). However, that positive association is weaker for countries with average or low scores for voice and accountability. Some of those countries score highly for government effectiveness but low scores for voice and accountability, or vice versa. The same pattern is seen in figure A1.C, in which voice and accountability is plotted against the rule of law ((R2=0.83). Despite the general positive relationship in that regard, many countries deviate significantly from the main regression line.

Figure A.1 Correlation among institutional indicators

References

Abu-Ismail, Khalid, Aljaz Kuncic and Niranjan Sarangi (2016). Governance-adjusted Human Development Index: The case for a broader index and its implications for Arab States. E/ESCWA/EDID/2016/WP.3.

Acemoglu, Daron, Simon Johnson and James Robinson (2001). The Colonial Origins of Comparative Development: An Empirical Investigation. *American Economic Review* 91, No. 5 (December), pp. 1369-1401.

Acemoglu, Daron and others (2008). Income and democracy. *American Economic Review* 98, No. 3 (June), pp. 808-842.

Acemoglu, Daron, Francisco Gallego and James Robinson (2014). Institutions, Human Capital and Development. *American Economic Review* 6 (January), pp. 875-912.

Barro, Robert (1996). Democracy and Growth. *Journal of Economic Growth* 1 (March), pp. 1-27.

Chong, Alberto and Cesar Calderon (2000). Causality and Feedback between Institutional Measures and Economic Growth. *Economics & Politics* 12, No. 1 (March), pp. 69-81.

Dreher, Axel and Thomas Herzfeld (2005). The Economic Costs of Corruption: A Survey and New Evidence Social Science Research Network. Available at: ssrn.com/abstract=734184. Accessed on 23 May 2021.

Dumitrescu, Elena-Ivona and Christophe Hurlin (2012). Testing for Granger non-causality in heterogeneous panels. *Economic Modelling* vol. 29, No. 4 (July), pp. 1450-1460.

Easterly, William (2002). The Cartel of Good Intentions: The Problem of Bureaucracy in Foreign Aid. *Journal of Policy Reform* 5 (October), pp. 223-250.

Góes, Carlos (2016). Institutions and Growth: a GMM/IV Panel VAR Approach. *Economics Letters*, vol. 138, issue C, pp. 85-91.

Granger, Clive (1969). Investigating Causal Relations by Econometric Models and Cross-Spectral Methods. *Econometrica* 37, No. 3 (August), pp. 424-438.

Gupta, Sanjeev, Erwin Tiongson and Hamid Davoodi (2000). Corruption and the Provision of Health Care and Education Services. *International Monetary Fund* Working Paper 00/116 (June).

Justesen, Mogens (2008). The effect of economic freedom on growth revisited: New evidence on causality from a panel of countries 1970-1999. *European Journal of Political Economy* vol. 24, No. 3, pp. 642-660.

Kaufmann, Daniel, Aart Kraay and Massimo Mastruzzi (2010). The Worldwide Governance Indicators: Methodology and Analytical Issues. *Hague Journal on the Rule of Law*, No. 3(2) (September), pp. 220-246.

Knack, Stephen and Philip Keefer (1995). Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures. *Economics and Politics* vol. 7, No. 3 (November), pp. 207-227.

Keefer, Philip and Stephen Knack (1997). Why don't Poor Countries Catch Up? A Cross-National Test of Institutional Explanation. *Economic Inquiry* vol. 35(3) (July), pp. 590-602.

La Porta, Rafael and others (1999). The Quality of Government. *Journal of Law, Economics and Organization* 15, No.1, pp. 222-279.

Law, Siong Hook, Thong Cheen Lim and Normaz Wana Ismail (2013). Institutions and economic development: A Granger causality analysis of panel data evidence. *Economic Systems* 37, No. 4 (December), pp. 610-624.

Lee, Keun and Byung-Yaon Kim (2009). Both Institutions and Policies Matter but Differently for Different Income Groups of Countries: Determinants of Long-Run Economic Growth Revisited. *World Development* 37, No. 3 (March), pp. 533-549.

Lorentzen, Peter, John McMillan and Romain Wacziarg (2008). Death and Development. *Journal of Economic Growth* 13 (2), pp. 81-124.

Mauro, Paolo (1995). Corruption and Growth. *The Quarterly Journal of Economics* vol. 110, No. 3 (August), pp. 681-712.

Mauro, Paolo (1998). Corruption and the composition of government expenditure. *Journal of Public Economics* vol. 69, No. 2 (June), pp. 263-279.

Nawaz, Saima (2015). Growth effects of institutions: A disaggregated analysis. *Economic Modelling* vol. 45 (February), pp. 118-126.

Olson, Mancur (1996). Distinguished Lecture on Economics in Government: Big Bills Left on the Sidewalk: Why Some Nations are Rich, and Others Poor. *Journal of Economic Perspectives* vol. 10, No. 2 (spring), pp. 3-24.

Rajkumar, Andrew and Vinaya Swaroop (2008). Public spending and outcomes: Does governance matter? *Journal of Development Economics* vol. 86, No.1, pp. 96-111.

Rodrik, Dani (2000). Institutions for high-quality growth: What they are and how to acquire them. *Studies in Comparative International Development* vol. 35, No. 3 (fall) pp. 3-31.

Svensson, Jakob (2005). Eight Questions about Corruption. *Journal of Economic Perspectives* vol. 19, No.3 (summer), pp. 19-42.

Tanzi, Vito and Hamid Davoodi (1997). Corruption, Public Investment, and Growth. Working Paper No. WP/97/139. Washington, D.C.: International Monetary Fund.

Tavares, Jose and Romain Wacziarg (2001). How democracy affects growth. *European Economic Review* 45 (August), pp. 1341-1378.

UNDP (2018). Human Development Data Center database, data from 2018. Available at: hdr.undp.org/en/data.

United Nations Economic and Social Commission for Western Asia (ESCWA) (2019). *Rethinking inequality in Arab countries.*

Van Rijckeghem, Caroline and Beatrice Weder (2001). Bureaucratic corruption and the rate of temptation: do wages in the civil service affect corruption and by how much? *Journal of Development Economics* vol. 65, No.2 (August), pp. 307-331.

World Bank (2018). *World Development Indicators* (data for 2018). Available at: databank.worldbank.org/data/reports.aspx?source=world-development-indicators#.

This study analyses the relationship between institutions and human development by means of the panel Granger causality test in 158 countries disaggregated by income level. The authors find a unidirectional causality between institutions and human development at all income levels. However, their results show that the impact of institutions on human development varies in accordance with countries' level of human development, their income levels and the extent to which their economies are dependent on the oil sector. Strong institutions can promote human development in low- and middle-income countries, whereas institutions are more important for economic growth in high-income countries. Furthermore, in confirmation of the existence of rentier economies, the authors find a reverse causality between human development and institutions in countries whose economies are particularly dependent on their oil industries. In low-oil-dependent countries, the causal effect is unidirectional from institutions to human development.

21-00385