The Impact of Governance on Economic Growth: The Case of Middle Eastern and North African Countries

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Abstract

The main goal of this paper is to evaluate the impact of governance on economic growth using a group of 188 countries. Although our main focus is on the 21 Middle Eastern and North African (MENA) countries, our findings can be applied to the other countries as well. We create a "composite governance index" (CGI) that summarizes the existing six governance measurements in the Worldwide Governance Indicators (WGI), using the Principal Components Analysis (PCA) method. The first principal component derived from the WGIs explains as much as 81% of the variations in the original six WGI measurements. We then use PPP adjusted constant per capita GDP data to find that per capita GDP would rise by about 2% if the CGI increases by one unit. Using the Rule of 70, the marginal estimate further indicates a mere five-unit improvement in CGI would double the country's per capita GDP in seven years. Nonetheless, the effect of improvement of governance cannot account for the higher than expected per capita GDP in most of the oil rich MENA countries. In other words, the majority of the MENA countries have achieved fragile levels of economic growth that does not depend on sound governance.

I. Introduction

There is no doubt that improving the business climate is a major factor for attracting both national and international investors to a country, which would ultimately be reflected in increasing economic growth. Investors will drive away from a politically unstable, bureaucratic, and highly corrupted economies with inefficient and nontransparent government services. A government that is socially accountable in delivering services and responsive to the needs of its citizens will ultimately create a democratic environment leading to inclusive growth and human development.

The slow growth performances in many developing countries, especially Middle East and North African (MENA) countries, have been disappointing over the last decade. Since the second half of the 1980's, growth and development studies have started to shed the light on the importance of improving institutions of governance on economic growth. The studies of Owens (1987) and Sen (1999) show that economic and political stability has a statistical significant impact on economic growth and development.

Many scholars and researchers have confirmed the positive link of improved quality of governance on economic growth. The study of Knack and Keefer (1997) shows that both property rights and contract enforcement have positive impact on economic growth. Similarly, Campos and Nugent (1999) prove a statistically significant positive impact of governance on economic development. The work of Kaufmann, et al. (1999a and 1999b) reaches the same conclusion about the importance of governance to economic

development. Similar findings are reached in the work of Knack and Keefer (1995) and Mauro (1995).

Much research work conducted by the International Monetary Fund (IMF), the United Nations, and the World Bank shows that good governance leads to economic growth. For instance, Kaufman and Kraay (2002) evaluated the World Governance Indicators over the period 1996 to 2002 and found a positive relationship between per capita income and quality of governance.

One of the leading studies in the literature on institutions and their effect on economic performance was written by Acemoglu, et al. (2000). The paper shows that differences in economic performance among nations can be attributed to the difference in institutions. Acemoglu, et al. found that different colonization strategies have led to different types of institutions that remain today. Colonies with low mortality rates had higher European settlements and accordingly stronger institutions were built which ultimately explains differences between countries in terms of current performance. Furthermore, the work of Acemoglu, et al. (2005b) concludes that differences between countries in terms of income and economic development are explained by differences in institutions. Within the same lines, Acemoglu and Robinson (2008) show that differences in economic prosperity among nations can be explained by differences in political institutions. Their paper provides policy recommendations that suggest reforming institutions would help in poverty alleviation. Additionally, the work of Chauvet and Collier (2004) finds that developing countries with poor quality of governance will lead to less economic growth. And within the same lines, the cross sectional of study by Acemoglu and Robinson (2012) compares adjacent cities along the United States-Mexico border. They reach the conclusion that political and economic institutions underlie economic success and the degree of incentive structures and the state-market relationship is the determinant factor of cities' growth performance.

Given the previous background, the research on the link between governance and economic growth for the MENA region is relatively very thin. The World Bank's World Governance Indicator project shows that the MENA region always ranks below the average of the sample. This World Bank project seeks to measure the quality of governance in a particular nation using six metrics: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. These metrics are measured both by a governance score that ranges from -2.5 to +2.5, and a percentile rank relative to nations worldwide.

The study of Leenders and Sfakianakis (2002) shows that the Transparency International's Corruption Perceptions Index for Egypt, Morocco, Jordan, Tunisia and Libya is below the global median in terms of levels of public sector corruption. Similarly, the World Bank (2003) study shows that the MENA countries perform lower than countries with similar incomes and characteristics. In addition, Chêne (2008) shows that

based on the World Bank Governance Indicators, MENA countries perform above average in political stability, rule of law, and quality of administration, however, it performs below average for the transparency, voice accountability, and control of corruption.

Within the same lines, Han, X., Khan, H., and Zhuang, J. (2014) analyzes the governance gap and its effect on economic growth. Among many other results, the study shows that "*Middle East and North African countries with a surplus in political stability, government effectiveness, and corruption control are observed to grow faster than those with a deficit in these indicators by as much as 2.5 percentage points annually*." The study implies that governance matters to economic growth in the MENA region.

Furthermore, Mehanna, Yazbeck, and Sarieddine (2010) study the relationship between governance and economic development in 23 MENA countries over the period 1996-2005. Their study compares different challenges facing the region including education, fixed investment, presence of religious fractionalization, and governance. The study shows that improving governance is the main challenge facing the MENA countries. The study shows that voice and accountability, government effectiveness, and control of corruption exert the strongest economic impact on economic development.

Additionally, Emara, N. and Jhonsa (2014) shows that despite the low performance of most of MENA countries on almost all the six measures of World Bank Governance Indicators, their estimated levels per capita of income are relatively higher than the rest of the countries in the sample. This study concludes that most of these countries have achieved relatively high but fragile standard of living that is not based on sound governance.

According to the latest available World Governance Indicator data for the voice and accountability metric, shows that 16 of the Middle East and North Africa region's 21 largest countries by population were given a negative governance score and ranked in the 38th percentile or lower. For the political stability metric, 15 out of 21 were given a negative score and ranked in the 36th percentile or lower. For the government effectiveness metric, 12 out of 21 nations had negative scores, and 3 out of 21 ranked below the 25th percentile. For regulatory quality, 15 out of 21 had negative scores, and 6 out of 21 again ranked below the 25th percentile. For rule of law, 11 out of 21 had negative scores, and 4 out of 21 ranked below the 25th percentile. And for control of corruption, negative scores were given to 13 out of 21 nations, with 4 out of 21 ranking below the 25th percentile.

Despite the MENA governments' effort to enhance the level of governance, the World Bank's Governance Indicators show no significant change across all indicators, namely rule of law, control of corruption, government effectiveness, voice and accountability and regulatory quality for the MENA region over the period between 2007 and 2014. Of course looking at the MENA governance indicators, one can tell that the

performance between these countries has been non-uniform. Countries such as Bahrain, Cyprus, Israel, Oman, Turkey, and United Arab Emirates have performed relatively better than the rest of the MENA countries. And with no doubt, given the recent political instability in Syria, the data shows that Syria is the worst of the list of the MENA countries in terms of all governance indicators. The data shows that Yemen and Iraq are following Syria in terms of low levels of governance quality especially for the political stability index.

The Open Budget Index of 2015 [2] , which reflects governments' social accountability, shows that Saudi Arabia, Qatar, Lebanon, Iraq, Egypt, and Algeria have recorded the lowest levels with a score of "scant or none (0-20)". Furthermore, freedom of the citizens to express their opinions in political matters and the freedom of the press has been highly restricted in countries such as Egypt, Iran, and Saudi Arabia. As Pintak, L. (2011) wrote about the Arab media's poor standard of delivering services to its citizens, "A free media is not necessarily a credible media." So it's not only a matter of freedom, but it is also a matter of credibility.

In general, the extent to which citizens of the MENA region have confidence in and abide by the rules of society have been generally very weak. The rule of law index is relatively the worst for Iraq, Syria, and Yemen with an average of -1.29. Furthermore, what makes matters worse for a countries with relatively strong legal framework such as Egypt (score -0.60) is the problem of implementing such legislations. This means that the problem of governance is not only about its existence but more importantly about the mechanism through which it can be implemented to positively affect the society.

Additionally, countries such as Egypt, Algeria, Djibouti, Iraq, Syria, and Yemen suffer from relatively high levels of corruption with an average index of -1.02. Some of these countries have taken steps to fight corruption but still more efforts need to be done. For instance, Egypt has signed many international projects to fight corruption such as the MENA-OECD Task Force on Anti-Bribery, OECD Good Governance for Development in Arab Countries Initiative, the Arab Anti-Corruption and Integrity Network (ACINET), and the UNDP-POGAR project to support the Ministry of Investment in the fight against corruption (OECD, 2009). However, no significant change has happened and a lot still needs to be done from the side of the government such as developing a nationwide anti-corruption strategy.

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[2] The Open Budget Initiative monitors the availability of seven key budget documents: Pre-Budget Statement, Executive's Budget Proposal, Enacted Budget, In-Year Reports, Mid-Year Reports, Mid-Year Review, Year-End Report, and Audit Report. The index also records the presence of Citizens' Budgets.

Against the above background this study seeks to provide a comprehensive index of governance and estimate its impact on economic growth. Specifically, this study will attempt to answer the following questions: How does economic growth change as the comprehensive index of governance changes? Which component of governance is more important in explaining variations of economic growth among different countries? How these results are interpreted for the MENA region?

This study is organized as follows: Section II presents the regression model and the methodology of the principal component analysis. Section III discusses the data set used. Section IV analyzes the estimation results. Section V concludes this study. Section VI includes the references. Finally, the appendix appears after Section VI.

II. Empirical Specification

(i) Regression Model
Following Kaufmann and Kraay (2002), our regression model is presented below:

$$pgdp_i = \alpha + \beta * gov_i + e_i \qquad (1)$$

Where pgdp is the log per capita income, gov is the governance index, e represents all the other factors not included in this parsimonious equation, and finally the subscripts i represents the country. The estimate of β will provide information on the marginal contribution of improving governance to the per capita gdp growth in the long run.

We present the construction of composite governance index (CGI) using the Principal Component Analysis (PCA) method in this section. Statisticians and data scientists have long adopted this data reduction PCA method in their work. However, it's not popular in economists' empirical tool bag yet.

(ii) Principal Components Analysis
Given a data matrix X with p variables and n observations, we can write it as the following:

$$X = \begin{bmatrix} X_{1,1} & . & . & X_{1,p} \\ X_{2,1} & . & . & X_{2,p} \\ . & . & . & . \\ X_{n,1} & . & . & X_{n,p} \end{bmatrix}; \text{ where } i = 1\ldots n, j = 1\ldots p. \qquad (2)$$

Geometrically, the goal of the PCA is to project the data matrix X from p dimensions to a smaller dimension k, where k << p, meanwhile keeping as much information (i.e., variance maximization) as possible in this dimension-reduced data

matrix with the size n by k^3. Specifically, the PCA method replaces a large number of correlated variables $(X_1, \ldots, X_p)$ with a smaller number of uncorrelated variables (Principal Components; $PC_1, \ldots, PC_k$).

Mathematically, the first principal component is a linear combination of X_1 to X_p observed variables that accounts for the largest variance among them:

$$PC_1 = a_1X_1 + a_2X_2 + \ldots + a_pX_p \tag{3}$$

In equation (3) the vector of coefficient a_j ($j = 1\ldots p$) is termed loading vector and is normalized to avoid inflating the variance of PC_1. By the same token, the second principal component (PC_2) is another linear combination of X variables that accounts for the largest variance among them, however, with a constraint; PC_2 is required to be orthogonal to PC_1. Theoretically, we are able to track as many principal components as the number of variables (p of them) in the data matrix X. But in practice, we search for a much smaller number of principal components (PCs) that is able to capture as much as information from the original set of X variables. We present the algorithm for deriving PCs in the following section.

(ii) Algorithm to derive PCs
The algorithm to uncover PCs is based on the singular value decomposition (SVD) method (I.T. Jolliffe, 2002). While there is no specific rule to select the number of PCs, we use four criteria to determine the appropriate number of PCs; they are Kaiser-Harris's stopping rule (criteria), Cattell's Scree test, Parallel analysis and Percent of cumulative variance (see J. Brown, an internet source on this topic).

First, capital letter W is used to denote the variance-covariance matrix. Where W is related to data matrix X in the following form; $W = \dfrac{X^T X}{n-1}$, a p*p matrix and the superscript "T" is the transpose operator. Since W is a symmetric matrix it can be diagonalized as follows:

$$W = V\Omega V^T \tag{4}$$

In equation (4), V is a matrix of eigenvectors and Ω is diagonal matrix with the eigenvalues. The matrix V is essential in deriving PCs and it's also termed Principal Axes. Apply the SVD method to X and we can obtain the following:

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[3] Two excellent references that cover Principal Components Analysis method are "An Introduction to Statistical Learning/ with Applications in R" & "R in Action".

$$X = U\Sigma V^T \tag{5}$$

As mentioned earlier, X is the data matrix with dimension n by p. U and V are both orthogonal squared matrix with dimension n and p, respectively. Σ is diagonal with diagonal entries that represent singular values.

There is a relationship between equation (4) and (5), that is:

$$W = \frac{X^T X}{n-1} = \frac{(U\Sigma V^T)^T (U\Sigma V^T)}{n-1} = \frac{V\Sigma^2 V^T}{n-1} \tag{6}$$

Comparing equation (4) to (6), it can be seen that the square of singular values (from Σ) is actually the eigenvalues derived from the diagonalization of W (or $X^T X$).

Denote the eigenvalues λ_j (j = 1…p). The size of each λ to the sum of all λs accounts for the proportion of variances in the original data matrix X that can be captured by the corresponding principal component. If we rearrange λ in a descending order from λ_1 to λ_p, λ_1 and the corresponding eigenvector (or first principal component PC_1) accounts for the largest proportion of variances in X. In practice, correlation of matrix X is applied before deriving PCs to avoid scaling problem. To this end, the principal components are derived by post-multiplying data matrix X with the principal axes V. Alternatively, PCs can also be derived using the following equation:

$$XV = U\Sigma V^T V = U\Sigma \tag{7}$$

According to equation (7), principal components (PCs) can be obtained using either one of the following outcome:

$$PCs \Rightarrow XV \equiv U\Sigma \tag{8}$$

III. Data

The cross-sectional data set is obtained from the World Bank's World Development Indicators covering 188 countries for the years 2009 and 2013, with special focus on 21 MENA countries[4]. The reason to choose these two specific years for this study is to make a comparison about the governance change before and after the Arab Spring that have

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[4] There are 22 MENA countries that include Algeria (DZA), Bahrain (BHR), Cyprus (CYP), Djibouti (DJI), Egypt (EGY), Iran (IRN), Iraq (IRQ), Israel (ISR), Jordan (JOR), Kuwait (KWT), Lebanon (LBN), Libya (LBY), Morocco (MAR), Oman (OMN), Qatar (QAT), Saudi Arabia (SAU), Syria (SYR), Tunisia (TUN), Turkey (TUR), United Arab Emirates (ARE), West Bank and Gaza (WBG), and Yemen (YEM). Syria is excluded in this study due to missing WGI data.

started in Tunisia in 2010. For governance indicators, the Worldwide Governance Indicators is used which have been published annually since 1998. The data of the Worldwide Governance Indicators is compiled at the World Bank by Kaufmann, Kraay, and Zoido-Lobatón (1999) and Kaufmann, Kraay, and Mastruzzi (2005). These indicators are based on some 30 opinion and perception-based surveys of various governance measures from investment consulting firms, non-government organizations, think tanks, governments, and multilateral agencies classified into six dimensions including government effectiveness, political stability, control of corruption and regulatory quality, voice and accountability, and rule of law[5]. Data on GDP per capita in 2005 purchasing power parity terms is sourced from the World Development Indicators.

IV. Empirical Outcomes & Findings

We first report the loadings of the six principal components and the corresponding eigenvalues in Table 1. How many principal components are needed to capture the most variances in X? Kaiser–Harris criterion suggests retaining components with eigenvalues that are greater than one. In the Cattell Scree test, the eigenvalues λs are plotted against their component numbers p. If a big bend is revealed, the components above this bend will be kept. In Figure 1, the blue line flattens out after the second component which is where the bend appears. In the Parallel analysis, a series of λs are obtained based on simulation. If the eigenvalues obtained from X are greater than the average of simulated λs, the corresponding principal components are selected. The cross symbols "x" in Figure 1 represent all the six eigenvalues. The three criteria presented in Figure 1 all indicate the first principal component should be selected; the cross symbol at the top left corner. While we do not show the percent of cumulative variance graphically, a quick computation using the eigenvalues presented at the bottom of Table 1, we can find that the first PC explains about 81%[6] of variances from the original data set, X.

We transform the original WGIs to a single composite governance index using the following computational process:

$$PC_1 = X*L_1 \tag{9}$$

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[5] The detailed definition of each indicator is provided in the appendix.

[6] $\dfrac{4.8735}{4.8735 + 0.5509 + 0.3394 + 0.1414 + 0.0493 + 0.0455} = 0.8122$ or 81.22%

$$CGI = \frac{PC_1}{max(PC_1)} *100 \hspace{3cm} (10)$$

In equation (9), it shows that the first principal component is obtained by multiplying both data matrix X and the first loading L_1 (the first column in red ink in Table 1). The Composite Governance Index (CGI) is the PC_1 rescaled by dividing the largest element in the PC_1. The histogram of the CGI is reported in Figure 2. It's a bit skewed to the right. The median index is about -9.7. Our CGI indicates that Finland (FIN) has the best governance index that equals 100 and Afghanistan (AFG) has the lowest index that equals -88.85 among these 188 countries in our data. Based on the quartiles of the CGI, we also report the ranking of governance of these 21 MENA countries in Table 2. Among these MENA countries, Cyprus has the best governance ranking and Iraq has the lowest one.

Using equation (1), we run a regression of the log of per capita GDP on the CGI and report the outcome in Table 3.1; the corresponding graphical outcome is presented in Figure 3.1. In Table 3.1, due to small p-values, both the t-test and f-test support the significance of slope estimate and validity of the model. The slope estimate indicates that per capita GDP is going to grow by about 2% (0.0199) if the CGI increases by one unit. The multiple or adjusted R^2 says that 53% of variation in log of per capita GDP can be explained by CGI.

We also conduct another regression that is only based on these 21 MENA countries and report the outcome in Table 3.2 and Figure 3.2. It can be seen that the estimated slope is 0.01804 that is a bit lower than the estimated slope of 0.0199 from the whole sample of 188 countries. While the estimated slopes are similar, we do notice that the adjusted R^2 drops significantly to 35.9%.

To this end, we make a comparison of the CGI and log of per capita GDP in both year 2009 and 2013 and summarize our findings in Table 4. The CGI in 2013 is obtained using the same loading we derived in 2009. While we feel disappointed that the improvement in CGI doesn't fully coincide with the economic growth in the MENA countries, however, the low adjusted R^2 we found earlier may indicate that there are more factors that are involved in these countries' economic growth in addition to the soundness of governance. For example, Fig. 3.1 shows that the MENA countries that are way above the regression line are mostly oil rich countries.

The results of Table 4 reveal interesting points. Over the period 2009 to 2013, only five of the countries in the MENA countries, namely United Arab Emirates, Algeria, Iraq, Israel, and West Bank and Gaza, have experienced an improvement in CGI that was

accompanied by an enhancement in economic growth. Additionally, over the same period only one country in the sample, namely Iran, has experience an improvement in its CGI with no change in economic growth. Furthermore, only four countries namely Cyprus, Kuwait, Libya, Oman, and Yemen have experienced deterioration in their CGI that was also accompanied with lower economic growth over the same period. Finally, or more importantly, over the same period about fifty percent of the MENA countries, namely Bahrain, Djibouti, Egypt, Jordan, Lebanon, Morocco, Qatar, Saudi Arabia, Tunisia, and Turkey have experienced deterioration in the CGI that was accompanied by an increase in economic growth.

V. Conclusion

There are two main contributions in this paper. The first contribution is that we were able to create a "composite governance index" (CGI) that summarizes the existing six governance measurements; the Worldwide Governance Indicators (WGI), using the Principal Components Analysis (PCA). The first principal component derived from the WGIs accounts for as much as 81% of the variations in the original six WGI measurements, which indicates that it can be used as a strong indicator for evaluating governments' managerial ability and effectiveness. The second contribution is that we were able to quantify the marginal contribution of improvement in governance on economic performance using PPP adjusted constant per capita GDP data. We find that the per capita GDP would rise by about 2% if the CGI increases by one unit. Using the Rule of 70, the marginal estimate further indicates a mere five-unit improvement in CGI would double a country's per capita GDP in seven years.

Our results suggest that nine countries of the MENA region have shown a positive correlation between governance and economic growth which includes those countries that have experience deterioration accompanied by deterioration and those countries that have experienced an enhancement accompanied by an enhancement in governance index and in economic growth, respectively. The relatively low R^2 of 35.9% confirms these results. More specifically, the CGI explains only 35.9% of the variations in economic growth in the MENA region. Our results go in line with the findings of Emara and Jhonsa (2014) that the majority of the MENA countries have achieved fragile levels of economic growth that does not depend on sound governance. Our next step in this research is to include more control variables in the MENA regression model and we hope that, by doing this, we can have a better qualitative prediction outcome on the link between governance and growth in this region.

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Appendix

Table A Governance Indicators and Definitions

1- Voice and accountability	Measured by the extent to which a country's citizens are able to participate in selecting their government as well as freedom of expression, association, and the press.
2- Political stability and absence of violence	Measured by the likelihood that a government will be destabilized by unconstitutional or violent means, including terrorism.
3- Government effectiveness	Measured by the quality of public services, the capacity of civil services and their independence from political pressure, and the quality of policy formulation.
4- Regulatory quality	Measured by the ability of a government to provide sound policies and regulations that enable and promote private sector development.
5- Rule of law	Measured by the extent to which agents have confidence in and abide by the rules of society, including the quality of property rights, the police and the courts, and the risk of crime.
6- Control of corruption	Measured by the extent to which public power is exercised for private gain, including both petty and grand forms of corruption as well as elite "capture" of the state.

Figure 1 Principal Component Selection Criteria

Three Criteria to Select PCA
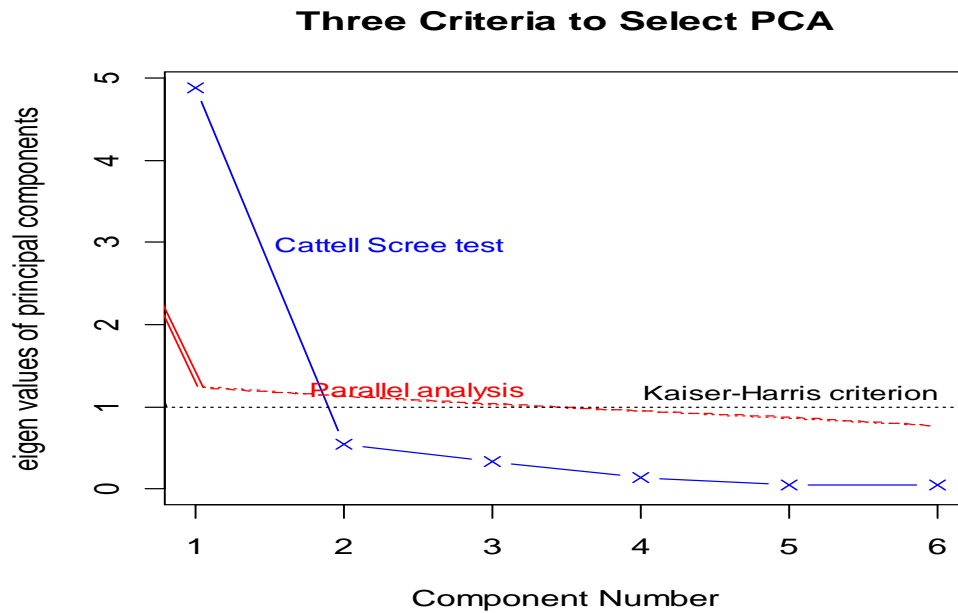
Figure 2 The Distribution of Composite Governance Index

Composite Governance Index

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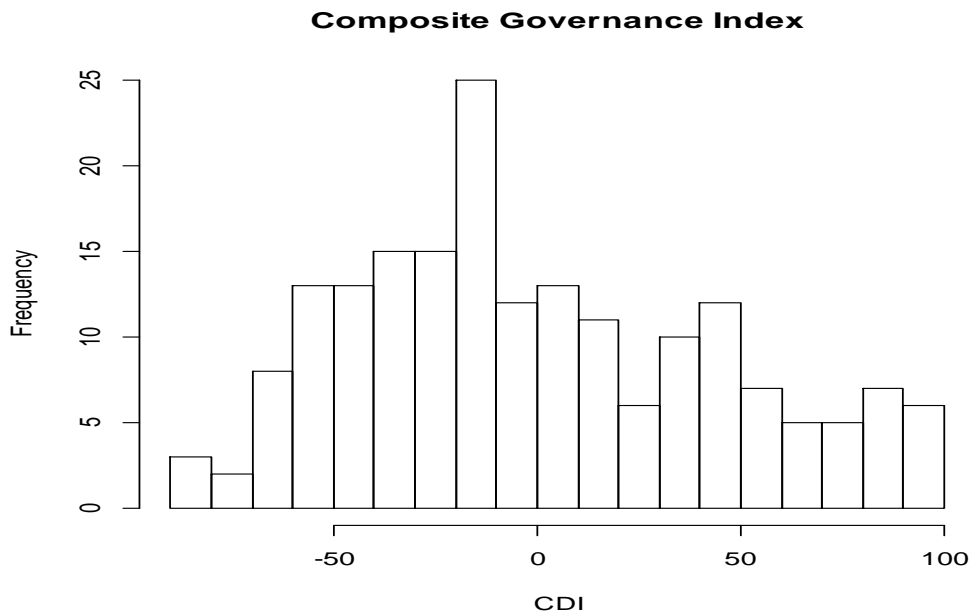
Figure 3.1 Linear Regression for All 188 Countries

Economic Growth vs CGI

log (per capita GDP) = 9.0722 + 0.0199*CGI
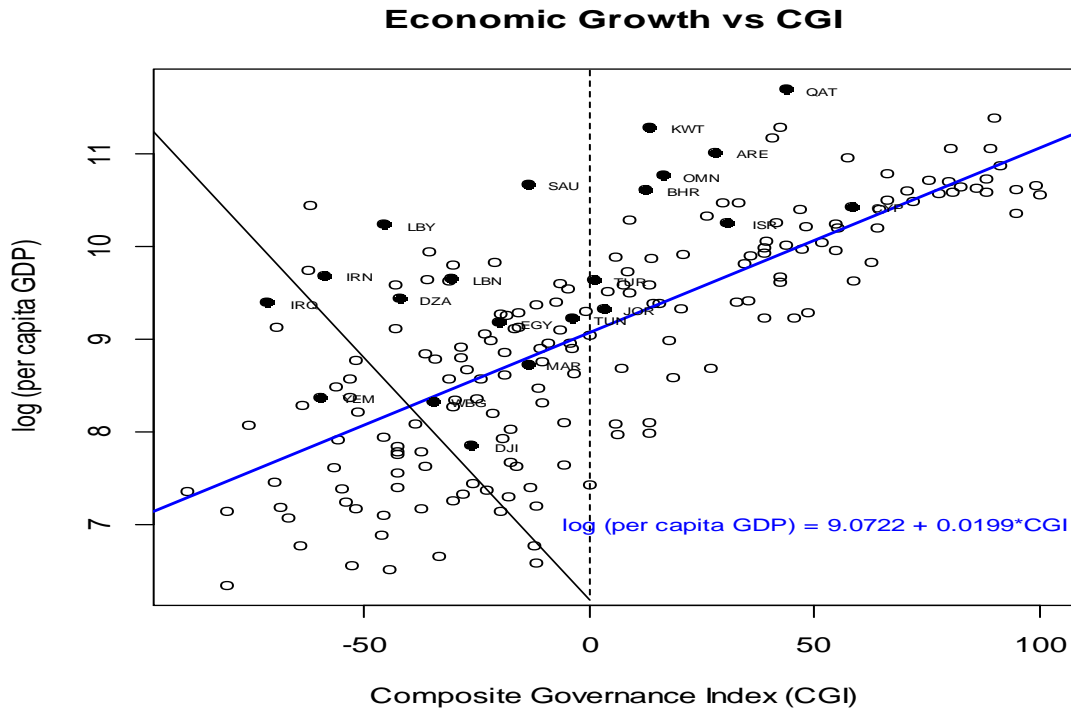
Figure 3.2 Linear Regression for 21 MENA Countries

**Economic Growth vs CG
(MENA Country)**

log (per capita GDP) = 9.9860 + 0.0180*CGI

Regression Line
(188 Countries)

141
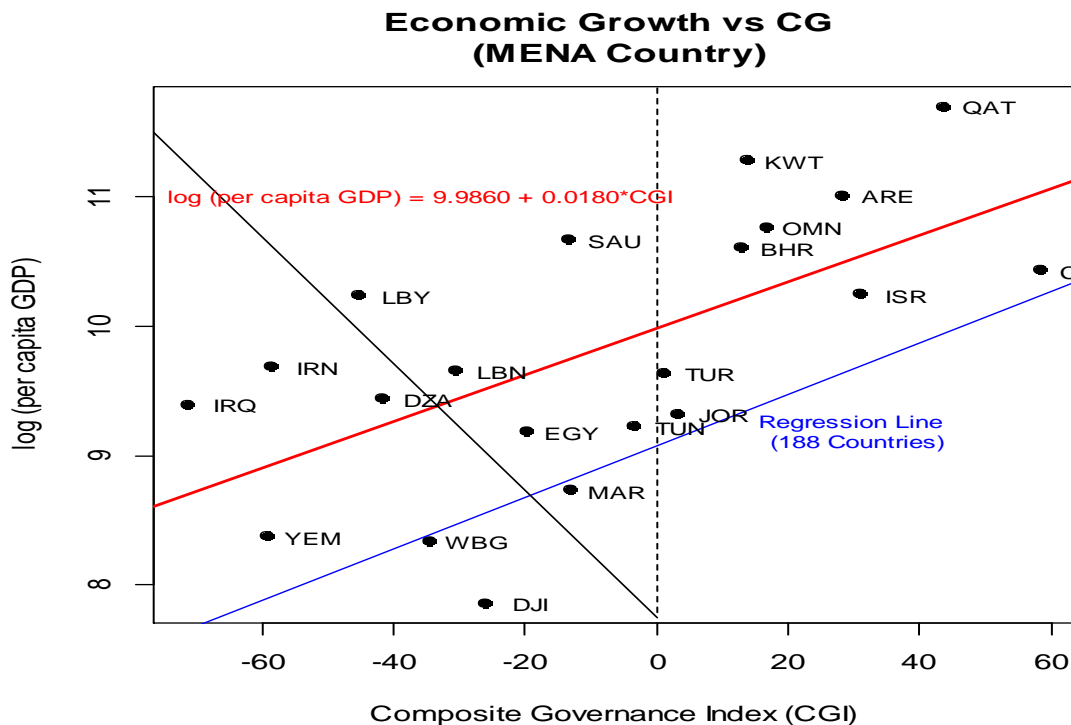
Table 1 Loadings of Principal Components

WGI\Loadings of PCs	L_1	L_2	L_3	L_4	L_5	L_6
Control of Corruption (corr)	*0.4303*	-0.062	0.2557	-0.6295	0.5808	-0.1095
Government Effectiveness (ef)	*0.431*	-0.2729	0.2576	0.0263	-0.2887	0.7677
Political Stability (ps)	*0.3377*	0.8773	0.1642	0.2728	0.0836	0.0892
Regulatory Quality (rq)	*0.415*	-0.3868	0.0367	0.6964	0.337	-0.2799
Rule of Law (rl)	*0.4424*	-0.02	0.1273	-0.1736	-0.6771	-0.5469
Voice & Accountability (va)	*0.3835*	0.0454	-0.9076	-0.1167	0.0155	0.1152
Eigenvalues (λ)	4.8735	0.5509	0.3394	0.1414	0.0493	0.0455

Table 2 Ranking According to the Quartiles

Country	CGI	Rank	Country	CGI	Rank
ARE	28.10	2	KWT	13.56	2
BHR	12.67	2	LBN	-30.70	3
CYP	58.25	1	LBY	-45.35	4
DJI	-26.30	3	MAR	-13.30	3
DZA	-41.87	4	OMN	16.69	2
EGY	-19.85	3	QAT	43.52	1
IRN	-58.69	4	SAU	-13.49	3
IRQ	-71.26	4	TUN	-3.55	2
ISR	30.73	2	TUR	0.94	2
JOR	3.08	2	WBG	-34.46	4
			YEM	-59.40	4

Notes: Rank = 1 if CGI > 35.4, Rank = 2 if -9.7 < CGI ≤ 35.4, Rank = 3 if -34.1 < CGI ≤ -9.7, Rank = 4 if CGI ≤ -34.1

Table 3.1 Impact of GCI on Economic Growth- All Countries

Dependent variable: Log Per Capita GDP Estimation Method: Linear Regression Model	
CGI	0.020***
	(0.001)
Intercept	9.072***
	(0.062)
Countries/Observations	188
F (1, 186) statistic = 210	p-value: < 2e-16
R-Squared	0.53

*Notes: ***, ** and * denotes statistical significance at the 1%, 5% and 10% levels respectively. Numbers in round parentheses (.) are the robust standard errors.*

Table 3.2 Impact of GCI on Economic Growth- MENA Countries

Dependent variable: Log Per Capita GDP Estimation Method: Linear Regression Model	
CGI	0.018***
	(0.001)
Intercept	9.986***
	(0.186)
Countries/Observations	21
F (1, 19) statistic = 12.2	p-value: 0.0024
R-Squared	0.36

*Notes: ***, ** and * denotes statistical significance at the 1%, 5% and 10% levels respectively. Numbers in round parentheses (.) are the robust standard errors.*

Table 4: The Change in CGI and Growth Between the Years 2009 and 2013

Country	CGI/09	CGI/13	Improve	logY/09	logY/13	Growth
ARE	28.10	32.26	4.16	11.02	11.02	YES
BHR	12.67	-2.24	-14.91	10.61	10.64	YES
CYP	58.25	51.03	-7.22	10.44	10.31	NO
DJI	-26.30	-36.58	-10.27	7.86	7.98	YES
DZA	-41.87	-40.31	1.56	9.44	9.49	YES
EGY	-19.85	-43.65	-23.80	9.19	9.22	YES
IRN	-58.69	-55.06	3.63	9.69	9.66	NO
IRQ	-71.26	-67.17	4.09	9.40	9.63	YES
ISR	30.73	33.98	3.26	10.26	10.34	YES
JOR	3.09	-6.42	-9.50	9.33	9.34	YES
KWT	13.56	-3.35	-16.91	11.29	11.22	NO
LBN	-30.70	-34.57	-3.87	9.66	9.71	YES
LBY	-45.35	-75.04	-29.69	10.24	9.88	NO
MAR	-13.30	-16.00	-2.69	8.74	8.84	YES
OMN	16.69	6.84	-9.84	10.77	10.57	NO
QAT	43.52	37.57	-5.95	11.70	11.82	YES
SAU	-13.49	-13.64	-0.14	10.68	10.80	YES
TUN	-3.55	-14.09	-10.54	9.23	9.28	YES
TUR	0.94	-1.84	-2.78	9.65	9.83	YES
WBG	-34.46	-33.21	1.25	8.34	8.41	YES
YEM	-59.40	-64.84	-5.45	8.38	8.21	NO

Notes: CGI: composite governance index, Improve = CGI/13 – CGI/09
logY = natural log of per capita GDP, Growth: whether logY/13 > logY/09