Revue d'Economie et de Statistique Appliquée
Numéro 22 Décembre 2014
ISSN : 1112-234X

THE EFFECT OF INSTITUTIONS AND GOVERNANCE ON ECONOMIC GROWTH WITH A REFERENCE TO THE CASE OF ALGERIA OVER THE PERIOD 1970-00

RAAD Ali[1]

Abstract
The objective of this article is to investigate the effect of institutions and governance on per capita GDP growth. A Solow type model augmented by a measure of institutional quality and governance is estimated over the period 1970-00. Our results show that institutions are significantly and positively linked to per capita GDP growth. Their contribution to Algeria's fitted per capita GDP growth over the period of study is negative.

The rest of this work is organized as follows. A brief review of the literature is given in the introduction. Section 2 presents the benchmarking of Algeria in terms of growth and institutions. Section 3 deals with the econometric part of this work. Conclusions and suggestions make the last section of this work.

1. Introduction

North (1990) defines institutions broadly as the formal and informal constrains on political, economic and social interactions. The role of good institutions in establishing an incentive structure that reduces uncertainty and promotes efficiency, thereby contributing to stronger economic performance, is further emphasized in North (1991).

More recently, MacFarlan et al (2003) give a more specific shape to this broad definition of institutions. They describe them as those particular entities, procedural devices, and regulatory frameworks which affect performance mainly by promoting better policy choices. As examples they mention commitment devices relative to central bank independence and balanced amendments; the existence and design of international trade agreements; and regulations governing the functioning of labour, product, and financial markets.

Governance is on the other hand defined by Kaufmann, Kraay, and Mastruzzi (2008) in the following way: governance consists of the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored and replaced; the capacity of the governments to effectively formulate and implement sound policies; and the respect of the citizens and the state for the institutions that govern economic and social interactions among them. More recently, Prabir De (2010) defines governance as the process by which decisions are made and implemented, or simply as the action of institutions.

[1] Professer à l'université Alger 3

ISSN : 1112-234X

Institutions and governance have been found to be directly as well as indirectly linked to income levels and growth. Aron (2000) and Rodrik, Subramanian and Trebbi (2002) establish a direct connection between institutions, governance and growth through transactions costs which can be much higher in an environment in which property rights are not properly protected, and the rule of law is not well enforced. As a consequence, economic agents tend to use inexpensive but less efficient technologies which make them less competitive. They may even resort to the black market economy and rely on bribery and corruption to facilitate their operations, Busse et al. (2007), thereby leading to the rise of a rent seeking, informal economy.

Furthermore, Rodrik, Subramanian, and Trebbi (2002) think of three channels through which institutional quality can affect income levels: (i) by reducing information asymmetries, since information about market conditions, goods, and participants is channelled through institutions; (ii) by reducing risk, as property rights are defined and enforced by institutions; and finally (iii) by restricting the actions of politicians and interest groups, given that institutions make them accountable to citizens. On the other hand, income levels may also affect institutions and governance, as more developed countries tend to enjoy high quality institutions and good governance.

An indirect link between governance and income levels and growth can be established through other determining factors such as trade, investment, infrastructure, and geography. For trade, for instance, which influences growth and vice versa, a better integration in the world economy can make a country take advantage of technology spillovers and knowledge information. However, as Kohsaka (2007) argues, benefits from lowering trade barriers in terms of growth and income levels can be suboptimal or unattainable in the absence of adequate institutions that practice good governance. Furthermore, weak institutions may act as significant barriers to trade, Anderson and Marcouiller (2002), increasing trade costs, and thereby hampering growth.

Geography is another relevant factor that has been found to have an impact on income, trade, institutions, and governance. Literature on the effects of geography on development is full of examples in which location, climatic conditions, and resource endowments may have a significant impact on economic performance. Bulte and Dmania (2005), for instance, argue that an abundance of resources can have a negative effect on institutional quality in developing countries, because this may lead to enriching and corrupting the ruling class. In addition, Francois and Manchin (2007) draw attention to the relevance of (international) institutional coordination and improved infrastructure in minimizing international trade costs.

In this work, we use a neoclassical framework to investigate the relationship between institutions/governance and per capita GDP growth. Our results show that governance and institutions are significantly and positively linked with per capita GDP growth over the period of study. The implications for Algeria are that bad

ISSN : 1112-234X

governance, as indicated by a composite index of governance, contributed negatively to Algeria's fitted growth.

The rest of this work is arranged in the following way. In the next section we benchmark the performance of Algeria in terms of growth and institutions against that of some comparators. Section 3 details the empirical model, estimation and tests, data issues, analysis of the results, and the implications for Algeria. Section 4 concludes and suggests the directions for further research.

2. Benchmarking Algeria in Terms of Growth and Governance

There are many data sets that can be used to analyse the effects of institutions and governance on growth and economic development in general. Most of these data sets are however not produced on a regular and continuous basis for a long period. One of the most widely used sources is the International Country Risk Guide data set available for a set of countries on five measures of institutional quality: rule of law, corruption in government, quality of the bureaucracy, expropriation risk, and repudiation of contracts by government. Other sources include Business Environmental Risk Intelligence and Business International on corruption, red tape, and the efficiency of the judicial system, Mauro (1995).

For the purpose of this study and given the period in which we are interested, a more recent source is available to us. It is the data set gathered on institutional quality by Kaufmann, Kraay and Mastruzzi (2003). These data are produced for 198 countries on six indicators and concern the years 1996, 1998, 2000, and 2002. The six governance indicators are measured in units ranging from about -2.5 to 2.5, with higher values corresponding to better governance outcomes. We therefore expect these indicators, individually and as composite index as well, to enter growth regression equations with a positive sign. A brief description of these six measures is given below.

"Voice and Accountability" and "Political Stability and Absence of Violence" are intended to capture the process by which those in authority are selected and replaced. "Government Effectiveness" and "Regulatory Quality" are supposed to reflect the ability of the government to design and implement sound policies. Finally, the "Rule of Law" and "Control of Corruption" are assumed to summarize the respect of citizens and the state for the institutions which govern their interaction. In our case, all these indicators are used as averages over the four years 1996, 1998, 2000, and 2002[2]. We turn now to the analysis of the performance of

[2] For reasons of lack of data availability and because institutions tend to change slowly over time, we use these indicators averages over the period 1996-02 as proxies for a country's level of institutional development over the period 1970-00. We can interpret our results as assessing the long-term relationship between institutions, which evolve slowly overtime, and economic growth, which is volatile in the short-run but more precisely measured in the

ISSN : 1112-234X

Algeria, in terms of growth and governance, as compared to other countries and groups in the hope that a sort of relationship can be revealed.

Table 1 gives per capita GDP growth calculated as an average over the period 1970-00 for Algeria and comparators. Algeria is outperformed, in average terms, by the MENA region and the sample of countries we are using here. We note, in particular, that Algeria lags behind both Egypt and Tunisia for which per capita GDP growth over the period of study stands at 2.5%. Nevertheless, Algeria performs better in the group of oil-exporters, and developing countries.

Table 2 presents the performance of Algeria in terms of governance along with comparators. The column, termed Govern, is the simple average of the six indicators introduced earlier. The record for Algeria (-0.86) reveals the poor quality of institutions that Algeria enjoyed during the period 1996-02. Nonetheless, this bad performance may, at least partly, be explained by the fact that the governance index is calculated over a period of turmoil in Algeria.

In the MENA region, Tunisia has the best performance (+0.22) as compared to Egypt (-0.17) and Algeria (-0.86). In the oil exporting countries group, all the countries are in the negative zone with the ranking as Venezuela (-0.51) first, Algeria (-0.86) second, and Nigeria (-1.00) last.

The brief descriptive analysis we have so far conducted in this section may indicate the presence of a negative relationship between growth and governance. In the next section, we examine this possibility by means of econometric tools.

3. The Econometric Model

The relationship between growth and governance depends to a great extent on the conditioning variables used in the regression equation. There are many variables that can be used to control such a relationship. For the purpose of this study, we use the following generic representation, due to Durlauf et al (2004), as our growth regression

$$\gamma_i = \lambda \log y_i(0) + \psi X_i + \Pi Z_i + \varepsilon_i ,$$

where γ_i is per capita GDP growth, $y_i(0)$ is initial per capita income, X_i contains a constant, an indicator of physical capital, another for human capital, and effective capital depreciation. The variables contained in $\log y_i(0)$ and X_i represent those growth determinants that are suggested by the Solow growth model, whereas Z_i represents those growth determinants that lie outside Solow's original theory.

In general, the specification given above is the baseline for much of what is known as growth econometrics. This type of regression is sometime named after

long-run, over the span of several decades. See Taveras 2004 p-54 who does the same thing.

ISSN : 1112-234X

Barro because of the extensive use that he has made of these regressions to study alternative growth determinants. Many other growth writers have also used it for the same purpose.

3.1. Estimation and Tests

Assuming away possible endogeneity of regressors, the specification introduced in the preceding subsection is estimated by ordinary least squares (OLS) over the period 1970-00. The set of countries comprises 107 countries in total[3], among which 81 are classified as developing countries, 9 belong to the MENA region, and 8 are oil exporting as per the World Bank classification of 2004. In addition, 31 countries are classified as non open according to criteria set in Sachs and Warner (1995), among which Algeria is part.

When heteroscedasticity is present, we simply use the White Hetroscedasticity Covariance Matrix Estimator (White), without any further investigation of its form. The decision whether to use this estimator or not is based on the White statistic (= nr^2) included in the results of Table 3. The other statistic (W) which appears in Table 3, is used to perform an asymptotic Wald test for parameter stability. The purpose of this test is to see whether the estimated model can be employed to draw conclusions about Algeria. The other statistics included in Table 3 are the usual t, F, and $\overline{R}^2$.

3.2. Regression Results for Growth Rates

The regression results are presented in Table 3. Eq. 1 is the simple Mankiw Romer Weil (1992) model, referred to here as MRW, Eq. 2 is the MRW model augmented by the governance indicator, GOVERN, whereas Eq. 3 does not control for population growth, GPOP. It is however important to notice that GPOP is theoretically important and should not be dropped on significance grounds solely. In our case, the omission of GPOP does not lead to major changes in the results we have obtained. We turn now to the analysis of the results obtained.

Although the Solow variables could be important in many respects, we will not analyze their individual effects on per capita GDP growth here. This is because these variables are used here as conditioning variables. We do note however that, except for population growth (GPOP) which happens to be statistically insignificant in regression 2 and is dropped from regression 3 without affecting the main conclusions, all other conditioning variables are significant at the 5% significance level and appear with the theoretically predicted sign.

The variable GOVERN is a composite index calculated as a simple arithmetic average of the six governance indicators introduced earlier. Higher values of this

[3] **T**he sample used in each model is less than 107 depending on data availability. The set of countries used in this study is presented in the appendix.

ISSN : 1112-234X

index are associated with better institutions and governance while low values indicate poor institutions and governance. We therefore expect GOVERN to have a positive effect on per capita GDP growth.

The results given in Table 3, show that the governance composite index has effectively a positive and highly significant impact on growth as evidenced by the t statistics in Eqs 2 and 3. The estimated coefficient on GOVERN in both equations (= 0.13) implies that a one-standard-deviation increase in the governance composite index, that is a rise by 0.84 in Govern in our sample, is estimated to raise per capita GDP growth by 1.1 percentage points on average.

This main result concerning the composite index, Govern, remains valid as far as the simple governance indicators are concerned. In addition, we notice that the effect of governance and institutions becomes less important when we control for other variables such as, openness, dependence on natural resource exports, and macroeconomic instability[4].

3.3. The Implications for Algeria

In order to analyse the implications for Algeria, we first generate its fitted value of per capita GDP growth using each estimated model. A decomposition of this value is conducted in a second stage in order to determine the contribution of each factor to Algeria's fitted per capita GDP growth over the period 1970-00. In order for this to work, we first have to deal with the problem of parameter heterogeneity that characterises all cross-section regressions.

Growth economists have many ways to deal with this issue. The easiest one is to test for parameter stability in the sample and if the test is not significant, that is if we accept the null hypothesis of parameter stability, then we can use the estimated model to draw conclusions about different groups. The second way is simply to use panel data.

For the purpose of this study, we divide the sample of countries into two subgroups: rich economies and poor economies based on the sample median of initial per capita GDP (PCGDP70). We then test for parameter stability in each estimated model using an asymptotic Wald test statistic (W). This statistic appears to be not significant in our equations. We can therefore draw statistically valid conclusions about Algeria.

We start our analysis of the implications for Algeria by reconsidering the results presented in Table 3.These show that the inclusion of the governance index, Govern, adds significantly to the explanation of per capita GDP growth

[4] These variables happen to be highly significant and important in the case of Algeria. They contribute much to Algeria's poor economic growth record. For a lack of space we have not included these variables here. See Raad Ali for other regressions including simple governance indicators, openness, reliance on primary goods exports, and macroeconomic instability.

ISSN : 1112-234X

differences, as we have already mentioned earlier in the preceding subsection. The empirical implications of this significant addition can be seen in terms of the speed of convergence, $\hat{\beta}$, and the implied number of years necessary for an average economy to close up half of the gap that separates it from its steady state, H.T. The former is estimated to be around 2%, whereas the latter is just above 35 years. Both figures are consistent with empirical evidence.

Concerning the performance of Algeria, we note that the most important implication is the significant drop in fitted per capita GDP growth, $\hat{PCGR}$, which falls sharply from 2.32 to around 0.92. It is fairly clear that the addition of the governance indicator is what lies behind this significant fall in Algeria's predicted per capita GDP growth.

Table 4 presents the contribution of each factor considered here to Algeria's fitted growth. Each contribution is made of two parts: (i) the magnitude of the estimated coefficient on the particular factor, which depends on the other factors being controlled for in the regression equation, and (ii) the deviation of the value taken by that factor for Algeria relative to the sample mean.

The main conclusions from this post estimation growth accounting is that outside investment and initial per capita GDP, which, as we expected, both contributed positively to Algeria's fitted growth over the period 1970-00, all the remaining factors considered here made negative contributions to Algeria's fitted growth over the same period .

In particular, the last two estimated equations show that poor quality institutions and governance, as compared to the sample mean, contributed negatively to Algeria's per capita GDP growth over the period 1970-00. This negative contribution was far much larger, in absolute terms, than the one recorded for human capital, the other negative contributor to Algeria's fitted economic growth (-1.89 against -0.89 percentage points in Eq.2). It is solely due to Algeria's poor record in terms of institutions and governance relative to the sample mean, and cannot be explained by the overall governance index which happens to be positively related to per capita GDP growth in Eqs. 2 and 3.

4- Conclusions

Using a Solow type model and data over the period 1970-00, we demonstrated the fact that good quality institutions and governance are positively and significantly linked to per capita GDP growth. These results are not different from other results obtained so far.

When the model is used to draw conclusions about Algeria we found that the poor growth record that Algeria enjoyed over the period of study is, to a great extent, explained by its poor quality institutions and governance. It is, however, necessary to recall that data available on governance and used here coincide with a

period of turmoil and political unrest in Algeria. The conclusions regarding Algeria could, therefore, suffer a bias because of this.

This work can be improved in many ways. First, the list of conditioning variables can be reviewed and thereby the effect of other variables on the link between growth and institutions can be tested. Second, the use of panel data and GMM to deal with parameter heterogeneity is now more than recommended. This latter approach proves to be very helpful when it comes to drawing conclusions about individual countries as the use of the time series approach remains very limited since the necessary data for such an exercise are lacking for countries such as Algeria.

References

Anderson, J. E., and D. Marcouiller, 2002, "Insecurity and the Pattern of Trade: An Empirical Investigation", Review of Economics and Statistics 84(2), 342–352.

Aron, J. 2000, "Growth and Institutions: A Review of the Evidence", World Bank Research Observer 15(1), 99–135.

Barro, Robert J. and Xavier Sala-i-Martin, 2004, *Economic Growth*, 2nd ed, MIT Press, Massachussets.

Bulte, E. and R Damania, 2005, "Resource Intensity, Institutions and Development", World Development 33 (7), 1029-1044.

Busse, M., A. Borrmann, S. Fischer, and S. Gröning, 2007, "Institutions, Governance and Trade: An Empirical Investigation of the Linkages in View of the Proposed ACP/EU Economic Partnership Agreements", Hamburg: Hamburg Institute of International Economics.

Durlauf, N. Steven, Johnson, A. Paul, and Johnathan R. W.
Temple, 2004, "Growth Econometrics", Handbook of Economic Growth, Forthcoming.

Francois, J., and M. Manchin, 2007, "Institutions, Infrastructure, and Trade", World Bank Policy Research Working Paper 4152, Washington, DC: World Bank.

Kaufmann, Daniel, Aart Kraay, and Massimo Mastruzzi, 2008, "Governance Matters VII: Governance Indicators for 1996-2007", World Bank Policy Research Department Working Paper, June 2008.

Kaufmann, Daniel, Aart Kraay, and Massimo Mastruzzi, 2003, "Governance Matters III: Governance Indicators for 1996-2002", World Bank Policy Research Department Working Paper.

Kohsaka, A (ed.), 2007, *Infrastructure Development in the Pacific Region*. London and New York: Routledge.

Lane, P. and A. Tornell, 1995, "Power Concentration and Growth", Harvard Institute of Economic Research Discussion Paper, 1720.

Mankiw, N, Gregory, Romer, David and Weil, David, 1992, "A Contribution to the Empirics of Economic Growth," Qurterly Journal of Economics, 152, 407-37.
Mauro, P., 1995, "Corruption and Growth", The Quarterly Journal of Economics, 110 (33), 681-712.
MacFarlan et al , 2003, *Growth and Institutions*, Chapter 3.
North, Douglass C., 1990, *Institutions, Institutional Change and Economic Performance*, New York: Cambridge University Press.
———, 1991, "Institutions," Journal of Economic Perspectives, Vol. 5 (Winter), 97–112.
Prabir De, 2010, "Governance, Institutions, and Infrastructure in Asia", ADB Working Paper Series, 183, January 2010.
Raad Ali, 2006, What Explains the Algerian Economic Growth Record? A Cross-Country Approach over the Period 1970-00, Phd Thesis, Algiers University.
Rodrik, D., A. Subramanian, and F. Trebbi, 2002, "Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development", NBER Working Paper 9305, Cambridge: NBER.

Sachs, Jeffrey, D. and Andrew M. Warner, 1995,"Economic Reform and the Process of Global Integration", Brookings Papers on Economic Activity,1, 1995, 1-95.

Taveras, J., 2004, "Institutions and economic growth in Portugal: a quantitative exploration", Portuguese Economic Journal, 3, 49-79.

Appendix

Variables Definition and Data Sources

PCGR: Real per capita GDP growth rate calculated as the difference between the natural logarithm of per capita real GDP in 2000 and the natural logarithm of per capita GDP in 1970 divided by 30. Source: PWT 6.1. The real per capita series corresponds to the series named rgdpl in the PWT 6.1 data base which stands for the Laspeyres real GDP per capita in 1996 international prices.
LPCGDP70: The logarithm of real per capita GDP in 1970 in 1996 international prices. Source: the PWT 6.1.
LSEC70: Natural logarithm of the gross secondary school enrolment in 1970. Source: WDI (2004)
LINV7000: The logarithm of average investment ratio at current local prices over the period 1970-00. Source: WDI (2004).
GPOP: The average growth rate of total population over the period 1970-00, calculated in the same way as PCGR. Source: WDI (2004).

ISSN : 1112-234X

GOVERN: The arithmetic average over the period 1996-02 of the six indicators introduced in the text. It is measured in units ranging from about -2.5 to 2.5. Source: Kaufmann et al (2003)

Table 1 : Per Capita GDP Growth in Algeria and Comparators

County/Group	Number of Countries	PCGR
Algeria	1	1.19
Tunisia	1	2.50
Egypt	1	2.50
Venzuela	1	-1.59
Nigeria	1	-1.48
Korea	1	5.81
MENA	5	2.44
Oil-Exporters	6	0.46
Developing Countries	70	1.11
Sample	95	1.47

Source: Calculations by the author using data described in Appendix 2

PCGR is per capita GDP growth calculated as an average over the period 1970-00

Table 2: The Govern Index in Algeria and Comparators

	Nb	GOVERN
Algeria	1	-0.86
Tunisia	1	0.22
Egypt	1	-0.17
Venzuela	1	-0.51
Nigeria	1	-1.00
Korea	1	0.53
MENA	9	0.05
Oil-Exporters	8	-0.36
Dev. Countries	80	-0.20
Sample	106	0.18

Source: Calculations by the author using data described in Appendix 2.

Table 3 : Estimated Regression Equations

Vble / Eq.	1	2	3
C	-0.04 (-1.63)	0.012 (0.52)	0.009 (0.39)
LPCGDP70	-0.0090	-0.014	-0.014

ISSN : 1112-234X

	(-3.47)	(-5.80)	(-5.78)
LSEC70	0.0080 (3.04)	0.0074 (3.19)	0.0078 (3.58)
LINV7000	0.037 (6.16)	0.031 (5.73)	0.031 (5.79)
GPOP	-0.43 (-1.84)	-0.10 (-0.47)	
GOVERN		0.013 (4.51)	0.013 (4.77)
N	92	91	91
$\overline{R}^2$	0.52	0.61	0.61
F	25.77 (0.000)	28.84 (0.000)	36.33 (0.000)
Nr^2	18.20 (0.20)	36.26 (0.014)	24.13 (0.044)
W	2.60 (0.76)	6.78 (0.34)	6.15 (0.29)
$\hat{PCGR}$	2.32	0.92	0.92
$\hat{\beta}$	0.010	0.020	0.020
H.T	66.22	35.93	36.42

Source: Calculations by the author.

Notes :

Variables are described in Appendix 2.

Annual per capita GDP growth (PCGR) is the dependant variable.
Figures between brackets under the estimated coefficients are t-ratios, whereas those below F, nr^2, and W are p-values.

$\hat{PCGR}$ is fitted growth for Algeria.

$\hat{\beta}$ is the implied speed of convergence.

H.T. is the number of years necessary for an average economy to close the gap between its initial and steady-stat position.

Table 4 : Contributions to Fitted Growth for Algeria

Vble / Eq.	2	3
LPCGDP70	0.57	0.56
LSEC70	-0.84	-0.89
LINV7000	1.36	1.35
GPOP	-0.08	
GOVERN	**-1.34**	**-1.38**

Source: Calculations by the author

ISSN : 1112-234X

List of Countries Used in the Study

Algeria, Argentina, Australia, Austria, Bangladesh, Barbados, Belgium, Belize, Benin, Bolivia, Botswana, Brazil, Burkina Faso, Burundi, Cameroon, Canada, Central African Republic, Chad, Chile, China, Colombia, Congo Dem. Rep. (Zaire), Congo Rep. (Congo), Costa Rica, Cote d'Ivoire, Denmark, Dominican Republic, Ecuador, Dominican Republic, Ecuador, Egypt, El Salvador, Fiji, Finland, France, Gabon, Gambia, Georgia, Ghana, Greece, Guatemala, Guyana, Haiti, Honduras, Hong Kong, Hungry, Iceland, India, Indonesia, Ireland, Israel, Italy, Jamaica, Japan, Kenya, Korea Rep., Latvia, Lesotho, Liberia, Luxembourg, Madagascar, Malawi, Malaysia, Mali, Malta, Mauritania, Mexico, Morocco, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Portugal, Rwanda, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Singapore, Solomon Islands, South Africa, Spain, Sri Lanka, St. Vincent and the Grenadines, Sudan, Sweden, Switzerland, Syria, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, United Kingdom, United States, Uruguay, Venezuela, Zambia, Zimbabwe.