DOES CORRUPTION MATTERS FOR MENA COUNTRIES GROWTH PERFORMANCE?

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Abstract

This article aims at testing the effects of institutional characteristics on growth in the MENA (Middle East and North Africa) countries. We explain the conditional convergence in terms of initial conditions, macroeconomic performance, trade openness, government size, natural resource abundance and institutional and political structures for a sample of 90 countries over the period 1960-2000. We use regional indicators and MENA-specific variables in order to test for the effects of each variable on the growth performance of the MENA economies. We highlight the direct and indirect impacts of both corruption and bureaucratic quality on the MENA growth compared to the other regions of the world.

Introduction

The recent empirical growth literature has suggested a wide range of variables as determinants of growth[1]. The list includes, among others, initial conditions, macroeconomic performance, trade openness, government size, income distribution, financial market development, natural resource abundance, political stability and institutional quality[2]. The effects of corruption as institutional variable on economic growth performance have been a topic of debate over the last 40 years. On the one side, there is a view, exemplified by Myrdal (1989) and Shleifer and Vishny (1993), that corruption is detrimental for investment and economic growth. On the other hand, Lui (1985), and others have found it plausible for corruption to be beneficial for economic growth at some levels. However, the empirical evidence has supported the existence of a linear and negative correlation between the level of corruption and the average growth rate of per-capita income (see Mauro, 1995; Hall and Jones, 1999). In particular, empirical studies by Tanzi and Davoodi (1998), Mauro (1998) and Gupta et al. (2001) have shown that corruption alters the composition of government expenditure[3] towards less productive activities and, therefore, the greater the government expenses are, the greater the negative effects of corruption are.

The objective of this paper is not to see whether the world economy is characterized by a global conditional convergence. The main purpose of the paper is to test if the institutional characteristics have any effects on MENA countries growth. It attempts to find out if the corruption and bureaucratic quality variables have any effects on MENA countries long run growth performance. While performing the analysis, the paper tries also to find out if corruption

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[1] The economic determinants of growth included in cross-national regressions include: fiscal policy (Easterly and Rebelo 1993), government consumption (Barro 1991), Inflation (Fischer 1993), black market premium on foreign exchange (Sachs and Warner 1995), overvaluation of the exchange rate (Dollar 1992), financial liberalization (Eichengreen 2002), trade policy (Lee 1993).

[2] Several cross-country studies of growth have found that the conventional factors of growth (labor, physical and human capital accumulation, and so on) do not fully explain the growth experience especially for developing countries and introduced an institutional explanation (see Easterly and Levine 1997).

[3] On corruption and public expenditure, see also Abed and Gupta (2002) and the review by Hillman (2004).

effects growth directly or indirectly. To capture the specific effects on MENA countries MENA-specific variables are introduced to the regressions in addition to the region-specific variables. To compare between corruption and bureaucratic quality effects on MENA countries and the others world regions countries, specific non-MENA regions' variables are also introduced in the regressions.

The paper is organized as follows. Section 2 discusses the determinants of growth in the MENA region. Using an empirical model based on a large cross-country data set, Section 3 analyzes the specific effects of institutional variables on growth in the MENA countries and compares the effects of different variables on growth in the MENA region and other areas, through the region-specific variables introduced. Section 4 explains how corruption affects growth indirectly. Again MENA-specific regressors and region-specific regressors are introduced to better assess the indirect impacts of corruption on MENA countries. Section 5 concludes the article.

Determinants of Growth in the MENA region

We begin our study of the determinants of growth by considering the issue of global conditional convergence. An equation of global convergence is estimated with various determinants of growth to study their impacts on growth. The determinants of the MENA region growth are then identified by introducing specific variables to the MENA countries in the global convergence regression. This approach makes it possible to compare each variable's contribution to growth in different regions of the world, including the effects of corruption.

The relation of global convergence: Tests of the conditional convergence hypothesis

Equation (1), shows the β-conditional convergence as suggested by Barro and Sala-i-Martin (1991) as well as Mankiw, Romer and Weil, (1992):

$$\frac{\ln(q_{iT}) - \ln(q_{i0})}{T} = \hat{\beta}\ln(A(0)) + \hat{\beta}\ln(q_{i,0}) + \vartheta_i X_{i,t} + u_{i,t},\ i = 1,\ldots,N \qquad (1)$$

where $\beta = -(1 - e^{\hat{\beta}T})/T$ is an estimator of the speed of $\hat{\beta}$ adjustment toward the steady state and q_i represents the real *per capita* income in country *i*.

$X_{i,t} = \left[\ln(n + g + \delta)\ln(s_K)\ln(s_H)\right]$ proxies the steady state equilibrium of the economy for the period [0,T], whereas A(0) measures the initial level of efficiency of the factors of production and $u_{i,t}$, is the standard error term, independently and identically distributed (i.i.d) both across *i* and *t* with mean equal to zero and finite variance, σ^2. Following Mankiw, Romer and Weil (1992), conditional β-convergence is hypothesized to take place if $\beta > 0$.

The cross section approach of convergence tests supposes that the initial technological level is identical[4] across all countries, and A(0) is unobservable (Mankiw, Romer and Weil, 1992). This assumption has even less chance to be checked for a sample incorporating developed and developing countries. It limits the range of this approach by producing biased OLS estimates. Indeed, if this assumption is not checked, there is an omission of a relevant variable correlated with the other explanatory variables, which biases the coefficients of the convergence regression.

[4] The assumption of an identical technological level was tested and rejected for 19 industrialized countries by Helliwell (1994).

To solve this lack of robustness problem of growth regressions, Islam (1995), Caselli and Al. (1996) and Berthelemy, Dessus and Varoudakis (1996) estimated the relation on panel data by introducing individual heterogeneity in the form of fixed effects. This process has its drawbacks as highlighted by Temple (1999)[5]. Temple (1998) suggested a second method which consists of introducing regional indicators into the regressions, in order to approximate these unobservable technological levels. Temple referred to the results of Koop, Osiewalski and Steel (1995) which show that the technological differences are more notable between groups of country, than within them. Temple's suggestion is adopted in the estimations to avoid the regressions' coefficients bias. Regional dummies are thus introduced in the regressions to correct the estimations bias.

Basic specification

In this section cross-country regression models will be used to position the MENA region's economic growth within an international perspective. A small set of regressors that would account for most of the variation in cross-country *per capita* GDP growth is identified. The absence of guidance from growth theory, as to which variables to include, makes the choice among the great number of possible correlates of growth a difficult one. However, our selection is guided by variables that proved to be more "robust" than others in the recent growth literature. In addition, variables that are believed to have shaped the MENA region's recent growth performance are included; Appendix A provides the variable definitions and data sources.

A pooled sample of 90 countries is used in the regressions covering the period from 1960 to 2000; Appendix B provides the complete list of the countries of the sample. Four control variables are included: the logarithm of the average value of the rate of investment on the period 1960-2000 (INVEST), the growth rate of population (N), one of the various indicators of the level of openness of country (SOPEN) and - finally - the difference of the average number of years of study of the population of age higher than 15 years between 1960 and 2000 (KH6020)[6]. For the calculation of this difference, a proxy for human capital similar to that of Barro and Lee (2002) is adopted. Specifically, we use the average number of years of schooling (in primary, secondary and higher education) for individuals older than 15. This proxy for human capital is introduced into the regressions in level and not in logarithms, taking into account the criticism of Benhabib and Spiegel (1994).

The results of the various OLS regressions are reported in Tables 1 and 2. The standard deviations of the estimators are corrected for heteroskedasticity using White's (1980) procedure. The signs of the coefficients are as expected. In accordance with the theoretical model, we note that the growth is influenced negatively by the initial GDP per capita and the population growth rate. On the other hand, the level of initial human capital and the average rate of investment have positive impacts on growth. The absence of conditional convergence hypothesis is rejected in all the cases at the 1% level of statistical significance. The significance of certain variables (in particular the logarithm of the rate of investment) depends on the control variables included in the regression, which is akin to the criticism formulated by Levine and Renelt (1992).

Regional effects

In order to implement Temple's recommendation to introduce regional dummy variables, in the regressions to correct the estimations bias due to the restrictive assumption of identical initial technologies for all sample countries, the complete sample of 90 countries is sub-divided into five disjoint areas. Asia (Asia: 16 countries) 17.77% of the sample, the Central and South America

[5] Taking into account the temporal dimension introduces non-desired effects because of the cyclic variations series. Moreover, the method employed to eliminate the influence of the fixed effects reduced the precision of the estimations and can, in certain cases, to exacerbate biases due to errors of measurement. For more information and studies of the advantages and disadvantages of the cross section approach of convergence compared to that of panel data, refer to Temple (1999).

[6] The use of this variable was enthused from the work of Sachs and Warner (1997).

(Latin: 22 countries) 24.45% of the sample, Sub-Saharan Africa (SSA: 21 countries) 23.33% of the sample, Middle East and North Africa (MENA: 9 countries) 10% of the sample and the rest of the world, mainly the OECD countries (22 countries) accounts for 24.45% of the total sample. Table 1 presents the regressions using regional dummy variables thus made up. (See appendix B for their descriptions).

The majority of the control variables coefficients did not change when taking into account the regional difference in technological levels. Thus, variables KH6020, LGDP60 and N are significant and have the expected signs in all considered cases. INVEST is less significant in the regressions containing political stability variable and even nonsignificant in regressions containing the institutional variables. However in both cases, they possess the expected sign.

The coefficient of regional dummies for Asia (ASIA), Latin America (Latin) and Middle East and North Africa (MENA) are positive and significant, suggesting differences in growth among these regions. The regional variable MENA is significant at 1% level in all models but in Model 1-5 (Table 1-Model 5), where it is significant at the 5% level. The coefficient of the MENA dummy is the highest compared to other regional dummies suggesting that these growth specifications are more significant for MENA region, relative to the other regions in comparison to the OECD. Thus, the difference in the regional dummy coefficients specifically for MENA and Asia is the weakest in Model 1-1 and the highest in Model 1-4 in which the bureaucratic quality variable (BQ) is introduced. A more powerful effect on the growth of the MENA countries in comparison to OECD of the institutional variables (BQ and CORR), the political stability variable (REVCOUP) of the government spending variable (CONSGOVT) and of natural resource variables (OIL and SNR) is detected. The regional dummy of ASIA is also always significant but with a lower coefficient than that of MENA[7]. The coefficient of the regional dummy of Latin America has a smaller magnitude and is less significant in all the models compared to other regional dummies. On the other hand, the regional variable of Sub-Saharan Africa is insignificant.

Oil and natural resources appear to have negative impact on economic growth in the MENA region. All of the arguments, discussed in the recent literature, explaining the negative link between natural resource abundance and growth performance, apply in the context of the MENA region. Sachs and Warner (1997), for instance, have found compelling evidence that countries with high initial ratio of natural resource exports tend to grow slowly in subsequent periods[8]. Earlier findings of development literature about the disappointing performance of resource-abundant countries have motivated their study on the link between natural resources and economic growth. Natural resource abundance negatively affects growth through several channels. Natural-resource abundant countries tend to exhibit the Dutch-disease syndrome in terms of overvalued exchange rates, and hence the difficulty to develop a profitable export-oriented or import-competing manufacturing sector. Resource-rich countries are also associated with wasteful consumption and public investment behavior, and provide incentives for rent-seeking and other unproductive activities. In addition, it is widely observed that natural resource availability forestalls reform. Finally, the secular decline of world prices of natural resources and their high volatility translate into high uncertainty, which, in turn, generates negative growth.

To see whether the regional groups of countries differ among themselves in terms of growth impacts of the considered explicative variables in the different models, two Fisher tests are constructed. A first one, (F-test-1) including OECD in the considered geographical regions and a

[7] If MENA is considered as the reference region by taking off MENA region dummy from the regression then Latin America, Sub-Saharan Africa and OECD region's dummies are significant in all the models. Except in model 1-5, for the Latin America dummy. In this model the variable REVCOUP for political stability is introduced, it seems to have a similar effect on growth for MENA and Latin America regions. Asia region's dummy became significant in model 1-4 in which the bureaucratic quality variable is added. This result reveals a different effect of BQ on MENA and Asia growth.

[8] Natural resources are defined as primary agriculture, fuels and minerals.

second, (F-test-2) excluding OECD. The difference in the growth determinants impacts on the growth performance among regions is very clear if OECD is one of the considered regions. In fact, F-test-1 is significant for all models. However, if OECD region is excluded (F-test-2), then the difference is found to be significant only for model 1-2 and 1-4 were corruption and bureaucratic quality variables are introduced. The institutional variables seem to explain the difference on growth performance between non-OECD regions' countries.

Interaction between openness and growth

We considered as indicators of the degree of openness of a country: the average number of years between 1970 and 1990 (variable SOPEN) when the country was regarded as open according to the criteria of Sachs and Warner (1995).

SOPEN shows a positive impact of openness on growth (Model 1-1). It is significant at 1% level in all regressions (Table 1). For Rodriguez and Rodrick (2001), the more a country is closed the more it suffers from the consequences of certain macroeconomic imbalances, which in turn explains the positive impact of openness on growth.

Public expenditures

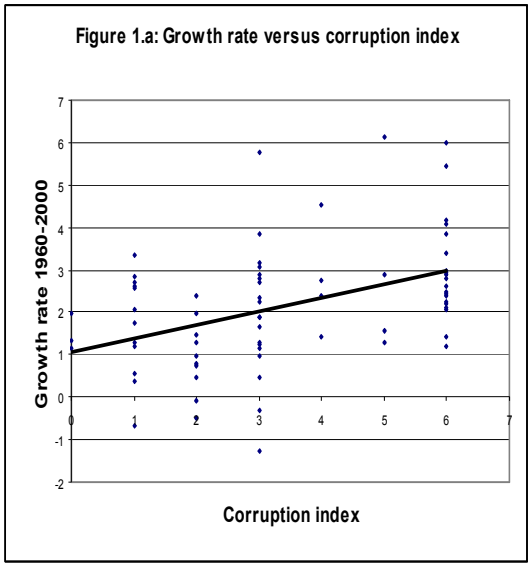
In (Model 1-3) the public expenditures (CGOVT): the mean of the government consumption in the GDP over the period 1960-2000 is included. In the neoclassical analysis, the amount and the structure of public expenditure act on the level of GDP *per capita* and not on GDP growth rate. In contrast, public expenditures possess a permanent effect on the long-term growth rate in endogenous growth models.

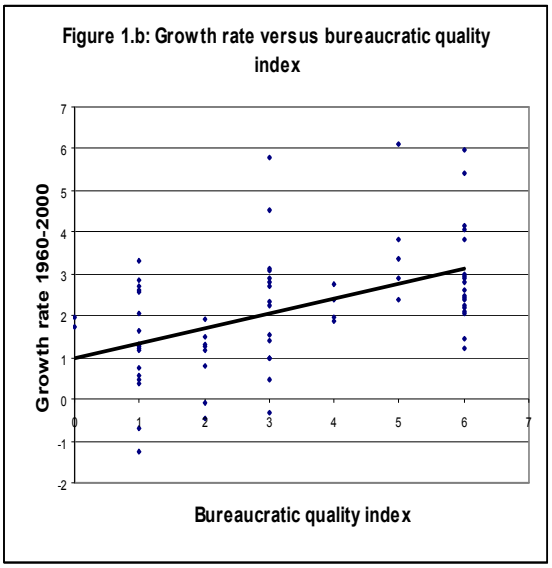
In line with the theoretical conclusions, the coefficient of public expenditures variable is negative and significant at the 5% level. This negative effect of the public consumption (other than expenditures on education and defence) on growth is explained by the fact that public consumption does not improve productivity in addition to its indirect effect on saving and private consumption through taxation.

Institutions and growth

Two institutional variables are introduced: a corruption index (CORR) measuring the diffusion of “illegal means of payments” and a bureaucratic quality index (BQ). Both indexes range from 0 to 6, where lower scores indicate more corruption and less bureaucratic quality.

Corruption and bureaucratic quality seem to matter significantly for a country’s growth. We performed a simple exercise, relating the corruption and bureaucratic quality indexes (measuring country’s ratings for the 1960-2000 period), with the Growth rate for 1960-2000 period. The partial relations between growth and corruption and bureaucratic quality indexes are respectively in Figure 1.a and Figure 1.b. (Note that only seven values for the indexes are observed). Obviously, greater control of corruption and better bureaucratic quality are favorable to growth. Specifically, an improvement by one rank in the underlying indexes (corresponding to a rise by 1 rank in the corruption and bureaucratic quality indexes) is estimated to raise the growth rate on impact by respectively 0.32 and 0.36 percentage points.





Hence, Model 1-2 reveals a positive linkage between less corruption and growth. The coefficient is positive and significant at the 1% level. However, the share of the investment in GDP (in logarithmic form) becomes insignificant. Private investment becomes insignificant. The regional dummies ASIA and MENA are positive and significant at the 1% level of significance, while LATIN is significant only at the 5%. Less corruption seems to have the same effect on the growth as a better bureaucratic quality. Thus, a favorable institutional climate with less corruption seems to support growth.

BQ is introduced in Model 1-4 as an institutional variable. The addition of this variable in the regression produces a notable change since the private investment represented by the logarithm of the share of the investment in the GDP becomes insignificant. The regression shows that a better bureaucratic quality supports growth. This variable is significant at the 1%, indeed.

The regional dummies: ASIA and MENA are positive and significant at the 1% level, while LATIN is significant at the 5%. These regions thus have tendency to grow more than these structural variables enable us to foresee, in particular the bureaucratic quality.

The results of Model 1-2 and 1-4 illustrate the positive effect of growth on institutional indicators, as well as the positive effect of these indicators on the growth. It is difficult with these estimations to specify the direction of causality between the economic growth and institutional variable. Bad institutional indicators show less growth and a weak growth perforce the probability of worse institutional indicators.

Political stability

A proxy for political stability (REVCOUP) is introduced: the average number of revolutions and the number of government inversion per annum over the period of 1970-1985.

The coefficient of the variable REVCOUP is negative and significant at the 5% level (Model 1-5). This variable translates the probability of a threat weighing on the rights of ownership because of instability and political agitation. Such a situation discourages the foreign and domestic investment and would consequently reduce growth. The regional variables ASIA and MENA are positive and significant at the 5%, while LATIN is significant at the 10%.

Natural resources

To determine the effect of natural resources on growth, two variables are introduced successively: the share of the mineral production in the GNP in 1971 (NR) and a dummy variable (OIL), indicating by 1 the countries with fuel exports accounting for 50% and more of the total exports over the period 1984-1986 and by 0 others.

The coefficient of NR is negative and significant at the 1% level (Model 1-6). In this case, all the regional variables are positive and significant. The dummy variables ASIA, LATIN and MENA are significant at the 1% level whereas SSA variable is significant at the 5%.

The countries with fuel exports accounting for 50% and more of the total of exports between 1984 and 1986 are marked as oil countries. The dummy variable (OIL) indicating these countries is insignificant (Model 1-7).

Table 1: Regressions of global convergence with regional dummies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	5.100***	8.201***	5.892***	8.199***	5.852***	3.876**	4.969***
	(2.81)	(4.76)	(3.11)	(4.78)	(3.22)	(2.24)	(2.73)
LGDP60	-0.793***	-1.033***	-0.820***	-1.112***	-0.836***	-0.679***	-0.785***
	(-4.04)	(-5.21)	(-4.10)	(-5.52)	(-4.20)	(-3.65)	(-4.01)
INVEST	0.798***	0.123	0.738**	0.125	0.677**	0.945***	0.812***
	(2.62)	(0.45)	(2.44)	(0.45)	(2.23)	(3.55)	(2.63)
KH6020	0.319***	0.278***	0.310***	0.223***	0.326***	0.329***	0.329***
	(3.60)	(3.75)	(3.32)	(2.76)	(3.72)	(4.09)	(3.62)
n	-0.697***	-0.821***	-0.648***	-0.594***	-0.632***	-0.771***	-0.650***
	(-3.71)	(-4.85)	(-4.05)	(-3.95)	(-3.22)	(-3.86)	(-3.58)
SOPEN	1.847***	1.091***	1.842***	1.195***	1.831***	1.667***	1.829***
	(4.95)	(3.20)	(5.65)	(3.76)	(4.74)	(4.73)	(4.92)
CORR		0.379***					
		(5.53)					
CGOVT			-0.027**				
			(-2.18)				
BQ				0.472***			
				(6.69)			
REVCOUP					-0.771**		
					(-2.41)		
SNR						-4.613***	
						(4.11)	
OIL							-0.204
							(-0.654)
ASIA	1.256**	1.527***	1.265***	1.440***	1.134**	1.633***	1.264***
	(2.52)	(2.96)	(2.67)	(3.02)	(2.14)	(3.45)	(2.55)
LATIN	0.828**	0.914**	0.845**	1.091**	0.785*	1.247***	0.859**
	(1.97)	(2.11)	(2.11)	(2.53)	(1.72)	(2.72)	(2.04)
SSA	0.591	0.019	0.622	0.029	0.342	1.240**	0.619
	(0.98)	(0.03)	(1.11)	(0.05)	(0.5)	(2.15)	(1.02)
MENA	1.486***	1.838***	1.601***	2.041***	1.358**	2.000***	1.507***
	(2.81)	(3.56)	(3.01)	(3.73)	(2.40)	(4.02)	(2.86)

F-test-1	2.93**	8.81***	2.95**	9.46***	3.29**	3.61**	2.89**
F-test-2	1.15	6.23***	1.32	5.61***	1.39	0.81	1.02
$\overline{R}^2$	0.68	0.73	0.69	0.75	0.68	0.71	0.67
N	86	72	86	72	85	85	86

The Student-t statistics are given in brackets, where the standard errors have been computed through White (1980) correction procedure. (*), (**), and (***) denote significance at the 10%, 5% and 1% levels, respectively. F-test-1 is the F test, testing region effects (including OECD). F-test-2 is the F test, testing region effects (Excluding OECD).

In search of the truth about the effects of institutional variables on MENA growth

In this section, the specific effect of the institutional variables on MENA countries growth is better seized by introducing in the regressions region-specific variables. Thus, in an attempt to disentangle the regional from the global growth characteristics specially the institutional variables effects, a differentiated growth impacts of the relevant variables depending on whether the country under study is from the MENA region is allowed by including in the regressions the same variables BQ and CORR, but this time specific to MENA region countries. In other words, each country from the MENA region is allowed to have different slope coefficients from any non-MENA country in the sample. In order to do that, we have included interaction between the variables under study and the dummy variable, MENA.

Thus, the variables to which we add (m) are specific to this area (Model 2-1 and 2-3). We thus have, for a variable X:

$$Xm = X \times (regional\ dummy\ MENA)$$

Also, variables are introduced with specific effects for all the regions (Models 2-2 and 2-4).

As in the regressions of total convergence (Table 1), the variable INVEST is insignificant in the presence of CORR and BQ. BQm and CORRm, like most variables of the regressions, are significant and have the expected signs. Therefore, a bigger difference of the mean number of years of study (in primary, secondary and higher education) of the population over 15 years old between 1960 and 2000 (KH6020), a higher mean number of years between 1970 and 1990 when the country is regarded as open according to the criteria of Sachs and Warner (1997) (SOPEN, Model 2-1), weaker growth rate of the population, less corruption (CORR, Model 2-3 and 2-4) and better bureaucratic quality (BQ, Model 2-1 and 2-2) do favor growth. All these variables are significant at the 1% level of significance.

The newly introduced variables, which are specific to the MENA region, BQm in Model 2-1 and CORRm in Model 2-3, are significant at the 1% level which proves a more important effect of the variables of bureaucratic quality and corruption on MENA countries' growth. Thus, the coefficient of BQ for the MENA countries is revealed to be equal to 0.757 which is more than the double of the coefficient estimated for the whole sample. Quite similarly, the corruption effect on the MENA countries' growth doubles that of the whole sample. This coefficient is estimated as 0.546.

The comparison of the coefficients of the variables specific to each area (introduced into Model 2-2 and 2-4) reveals a more significant effect of bureaucratic quality and corruption on the growth of the MENA countries than on the other world geographical regions; which are Asia, Latin America, and Sub Saharan Africa .

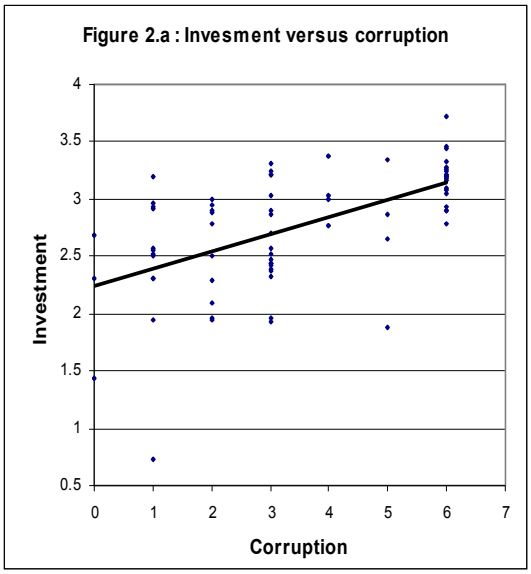
In more details, the variable of bureaucratic quality and corruption specific to Latin America are insignificant which shows that corruption does not have a different effect on growth in this area from that on the OECD countries growth.

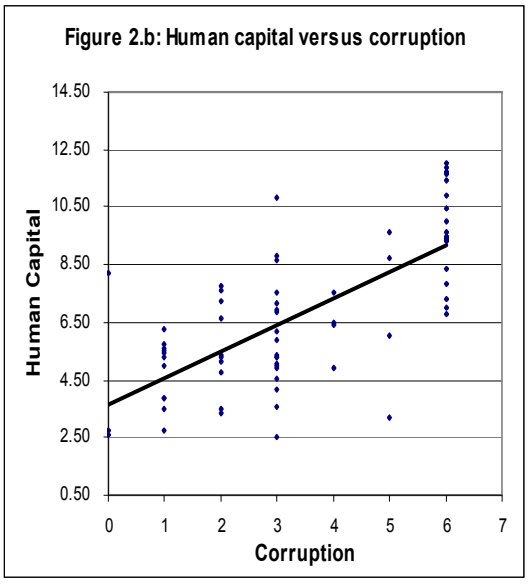
On the other hand, the variables specific to MENA and Asia are significant at 1% which shows a more significant impact of bureaucratic quality on the growth of the countries of these areas than on that of the OECD countries. The specific effect of bureaucratic quality on the growth of Sub-Saharan Africa countries is different from that on the other regions. Indeed, better bureaucratic qualities reduce slightly the growth of the countries of this area (-0.072). This seems like a threshold effect; below a certain minimal level of bureaucratic quality, trying to improve the bureaucratic system reduces growth. In this case, bad bureaucratic quality allows certain flexibility through possibilities of corruption, of illegal payment of bribes and intervention to facilitate certain actions (e.g. investment, export and import licenses), which contribute to growth. This fact is confirmed by the results of Model 2-4, which shows a negative and significant effect of less corruption on growth in Sub-Saharan Africa. In the same way as for bureaucracy, the most significant impact of corruption is on the growth of the MENA countries followed by ASIA. For these two areas the corruption effect on the growth is higher than in the case of the OECD. Specific effect of corruption on Latin America is again insignificant.

The absence of conditional convergence hypothesis is rejected for all the countries of the sample at the 1% level of statistical significance in all specifications and an $\overline{R}^2$, suggesting that all the considered control variables explains a little less than two thirds of the differences in the growth rate mean between the countries of the sample.

How corruption affects growth?

Among the various series of growth determinants the corruption index seems a priori to be relevant for investment and human capital. This indicator is measured in seven categories on a 0 to 6 scale, with 6 the most favorable. A partial relation between respectively investment, human capital and corruption index shows, on the basis of cross-country data, that corruption matters significantly for investment and human capital. As we observe in Figure 2.a, an improvement in corruption index by only one rank is associated with a jump in investment rate of GDP by 1.16 percentage point. Moreover, Figure 2.b shows that a one rank improvement in the corruption index produces an increase of 0.92 year in the average number of years of schooling (in primary, secondary and higher education) in 2000 for individuals older than 15 which is the proxy for human capital.





In order to explore these links and to investigate how corruption affects growth two synthetic variables[9] CORRINVEST and CORRKH6020 (measuring respectively the impact of corruption on investment and the human capital profitability's on long term growth rate) are further included in Model 2-5 in addition to the variable CORR. In this exercise, variable CORR has turned out to be insignificant; while CORRINVEST and CORRKH6020 are significant at the 1% level. This reveals an indirect effect of corruption on growth through an impact on investment and human capital.

However, CORRINVEST seems to be another proxy of investment, which becomes insignificant. The variable CORRINVEST coefficient is positive indicating that less corruption is better for investment, which is beneficial for growth. On the other hand, the coefficient of CORRKH6020 is negative reducing the high positive effect of human capital KH6020 as shown in Model 2-5. The overall impact of human capital becomes lower. Therefore, it could be concluded that there is a positive effect of less corruption on the profitability of human capital and thus on growth.

Adding in Model 2-6 MENA-specific CORRINVEST variable allows us to note a stronger effect of less corruption on the investment and thus on growth in MENA countries. Indeed, the CORRINVESTm variable is statistically significant at the 1% level. The variable CORRKH6020, MENA-specific is also significant but only at the level of 10% (Model 2-8), it reduces the negative coefficient of CORRKH6020 and highlights the significant effect of corruption on the human capital in the countries of this area.

A reduction of corruption would have a stronger stimulation of the beneficial impact of the human capital on growth in MENA than it would have on the growth of the other sample countries. To compare specificities of these variables proper to each area, regional specific variables: MENA, Asia, Latin America and Sub Saharan Africa specifics respectively, (CORRINVESTm), (CORRINVESTasia), (CORRINVESTlatin) and (CORRINVESTssa) are introduced into Model 2-7. Symmetrically regional specific effects of CORRKH6020 variable in Model 2-9 are set up by adding to the regressors (CORRKH6020m), (CORRKH6020asia), (CORRKH6020latin) and (CORRKH6020ssa). In both cases the specific MENA and Asia

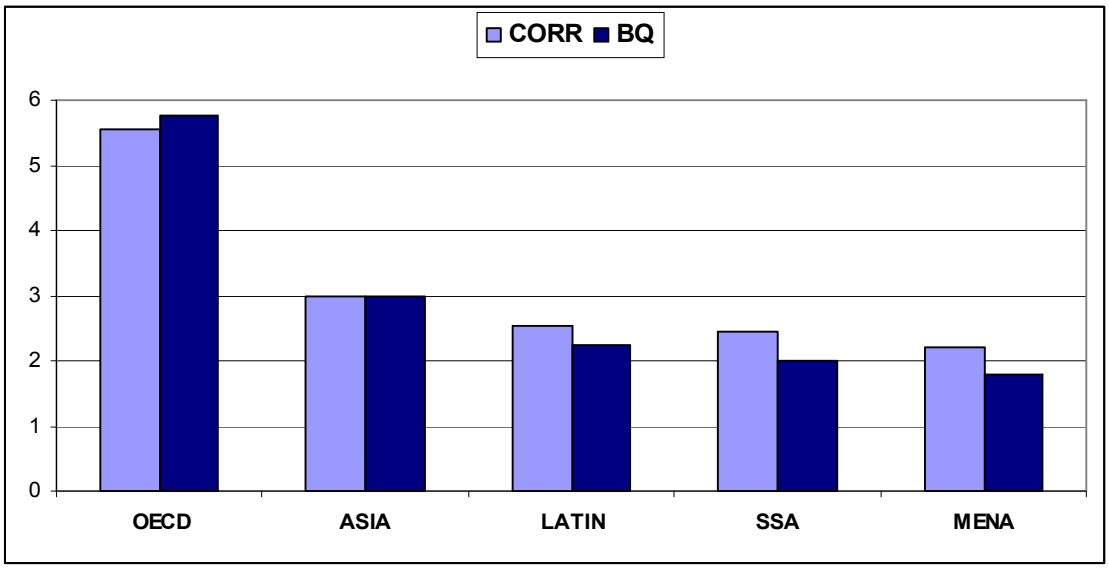
[9] To get more insight into factors affecting growth, synthetic variables relating CORR and REVCOUP, CORR and SNR and CORR and OIL were included but the results were non significant.

variables are the only significant at the 1%. Thus Model 2-7 reveals that the indirect effect of corruption on the investment is more significant for MENA countries than for Asian countries. For both regions the effect is stronger than on OECD countries growth. Model 2-9 shows a more important effect of less corruption on the beneficial role of the human capital on growth for the MENA countries than for the Asian countries. For these two areas, the indirect impact of corruption on the human capital is higher than for the other regions.

Whereas, it is important to disaggregate to country level, in fact the regional averages always mask substantial variations across countries in each region. However, since averages for regions show significant variations we see some of these in Figure 3. In fact, corruption and Bureaucracy are highlighted to be major constraints in MENA countries.

The impacts of the institutional variables are the highest on the economies of the MENA region than on those of the other world regions. This is probably due to the fact that in the MENA region, corruption is the highest and bureaucratic quality is the worst: the mean of corruption and bureaucratic indexes in MENA are respectively 2.22 and 1.78, which are apparently below the averages of respective overall sample figures of 3.40 and 3.26 and the other regions averages (corruption and bureaucratic indexes are respectively 5.55 and 5.75 in OECD, 3 and 3 in ASIA, 2.52 and 2.24 in LATIN and 2.44 and 2 in SSA).

Figure 3: regional averages for some variables by region



Source: Authors' calculations.

Overall, MENA countries underperform in terms of control of corruption and bureaucratic quality. This result indicates the need for institutional reform in the MENA region, especially considering the positive and persistent role of corruption on investment and human capital.

The adverse effect of corruption on the economic activity is often described as one of the major constraints that enterprises have to face specially in the developing world. In his cross-country analysis, Mauro (1995) shows that corruption reduces growth. Gupta, Davooli and Alonso-Terme (2002) stress that corruption exacerbates income inequality and poverty. In this paper we are linking corruption to low growth through human and physical capital. In fact, for private investors, corruption increases investment and operation costs, as well as uncertainties

about the timing and effects of the application of government regulations. Corruption raises also the investment and operational costs of public enterprises, which are detrimental to private investment through insufficient and low quality infrastructures (Tanzi and Davooli 1997). Same conclusions have been reached for the effects of bureaucratic quality on the economic activity (Evans and Rauch 2000).

Table 1: Regressions of global convergence with MENA and regional specifics

	(1)	(2)	(3)	(4)	(5)
Constant	8.669***	8.622***	9.203***	9.137***	10.208***
	(6.623)	(6.573)	(6.388)	(6.349)	(7.893)
LGDP60	-1.185***	-0.992***	-1.206***	-1.019***	-1.263***
	(-6.890)	(-5.562)	(-6.947)	(-5.551)	(-8.204)
INVEST	0.421	0.072	0.469	0.162*	-0.161
	(1.468)	(0.288)	(1.599)	(0.667)	(-0.572)
KH6020	0.312***	0.211***	0.364***	0.274***	0.700***
	(3.678)	(2.846)	(4.395)	(3.969)	(6.878)
n	-0.458***	-0.544***	-0.682***	-0.798***	-0.558***
	(-3.141)	(4.351)	(-4.131)	(-5.244)	(-4.414)
SOPEN	1.210***	0.993***	1.095***	0.741**	0.787***
	(4.358)	(3.355)	(3.382)	(2.432)	(2.705)
BQ	0.322***	0.273***			
	(3.803)	(3.205)			
BQm	0.435***	0.550***			
	(3.040)	(3.542)			
BQasie		0.340***			
		(4.447)			
BQlatin		0.105			
		(1.348)			
BQssa		-0.346***			
		(-2.161)			
CORR			0.261***	0.223***	-0.387
			(3.209)	(2.611)	(-1.228)
CORRm			0.285***	0.388***	
			(2.936)	4.121	
CORRasie				0.337***	
				3.759	
CORRlatin				0.080	
				(0.885)	
CORRssa				-0.236*	
				(-1.829)	
CORRINVEST					0.329***
					(3.015)
CORRKH6020					-0.090***
					(-2.695)
$\overline{R}^2$	0.64	0.76	0.62	0.66	0.65
N	72	72	72	72	72

Table 2: Regressions of global convergence with MENA and regional specifics (continued)

	(6)	(7)	(8)	(9)
Constant	10.885***	10.023***	10.843***	10.657***
	(8.243)	(8.037)	(8.314)	(8.090)
LGDP60	-1.311***	-1.095***	-1.304***	-1.146***
	(-8.506)	(-7.073)	(-8.503)	(-7.261)
INVEST	-0.189	-0.333	-0.190	-0.342*
	(-0.684)	(-1.609)	(-0.691)	(-1.689)

KH6020	0.657***	0.661***	0.645***	0.549***
	(6.699)	(8.460)	(6.187)	(6.771)
n	-0.650***	-0.842	-0.639***	-0.765***
	(-4.635)	(-6.830))	(-4.545)	(-5.742)
SOPEN	0.894***	0.746***	0.809***	0.514*
	(2.926)	(2.911)	(2.595)	(1.833)
CORR	-0.338	-0.087	-0.385	-0.408*
	(-1.038)	(-0.373)	(-1.211)	(-1.952)
CORRINVEST	0.303***	0.207***	0.322***	0.325***
	(2.643)	(2.681)	(2.906)	(4.566)
CORRKH6020	-0.083**	-0.107***	-0.082**	-0.101***
	(-2.551)	(-5.857)	(-2.467)	(-5.525)
CORRINVESTm	0.078***	0.127***		
	(3.113)	(5.347)		
CORRINVESTasie		0.120***		
		(6.705)		
CORRINVESTlatin		0.502		
		(1.589)		
CORRINVESTssa		-0.068		
		(-1.191)		
CORRKH6020m			0.054*	0.096***
			(1.897)	(3.218)
CORRKH6020asie				0.093***
				(6.416)
CORRKH6020latin				0.041
				(1.103)
CORRKH6020ssa				-0.088
				(-1.393)
$\overline{R}2$	0.66	0.78	0.65	0.78
N	72	72	72	72

The Student-t statistics are given in brackets, where the standard errors have been computed through White (1980) correction procedure. (*), (**), and (***) denote significance at the 10%, 5% and 1% levels, respectively.

Conclusion

This paper empirically shows, for a panel of 90 countries studied during the 1960-2000 period that corruption constitutes an important part of the development climate especially by affecting investment and human capital. The results confirm that a low level of corruption, a good quality of bureaucracy, contribute significantly to the firms' decision to invest. These results add significantly to the empirical literature on corruption by validating his role on economic performances through investment and human capital over a relatively long period of time.

Comparing the growth pattern of the MENA region within an international perspective, an interesting result of a particular importance of the institutional variables (corruption and bureaucratic quality) for the MENA countries growth is revealed. This was possible by introducing specific institutional variables for MENA and the other regions of the world. In a further step and an order to determine how corruption affects growth, two synthetic variables CORRINVEST and CORRKH6020 that measures the impact of corruption on investment and human capital profitability and thus on the long term growth performance, are introduced simultaneously to the variable CORR. The results highlighted an indirect effect of corruption on growth through the investment and the human capital. To compare these indirect effects on MENA countries to those on the other world regions countries, specific synthetic variables for the different regions were introduced in the specifications.

This econometric analysis revealed that the impact of these institutional variables is highest in the MENA region. Indirect effects of corruption on growth through investment and human capital are the strongest for the MENA countries in comparison with other regions of the world. Thus better-performing institutions may improve growth by increasing the volume and the efficiency of

investment and by improving and promoting human capital. Institutions matter for growth and productivity because they affect incentives of growth performance factors.

However, a corruption control deficiency is not the only reason of the MENA low investment performances and deficit in human capital efficiency, the lack in structural reforms constitutes another major explanatory factor. Trade policy deficiencies (compared to East Asia) reduce investment decisions. Identically, a better financial system (such as in the East Asian economies) would have stimulated firms' decisions to invest. This makes of structural reforms an important question that MENA governments have also to address if the region wants to catch up with more successful developing economies. The MENA region has suffered over several decades from political instability accompanied by a lack of security, which has increased investment risk, reduced business confidence and resulted moreover in a low level of FDI explaining the low economic performance and the convergence underperformance (Guetat and Serranito 2007). Indeed the region is a net exporter of capital.

The MENA countries are expected to meet international benchmarks of efficiency, international norms and standards in areas such as property rights, corruption, bureaucratic quality, good governance, technical norms and safety standards and ... This challenges require policy reform and transition policies to be put in place, in order to minimize adjustment costs.

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Appendix A: Definitions and sources of the variables

The data are compiled from three main sources: Penn-World Tables (PWT) of Summers and Heston (1991, version 6.1) and bases it data of Barro and Lee (1994) brought up to date in 2002 for the human capital variable, and the Sachs and Warner (1997) data.

National aggregates

INVEST Natural logarithm of the average share of investment in the GDP between 1960 and 2000, Source SH v.6.1.

G602000 Growth rate of GDP between 1960 and 2000.

Population

n Population growth rate between 1960 and 2000, Source SH v.6.1.

Government Expenditure

CGOVT Average share of government consumption in the GDP between 1960 and 2000, Source: SH v.6.1.

Opening and marketing policy

SOPEN The fraction of years during the period 1970-1990 in which the country is rated as open according to Sachs and Warner's criteria.

Education

KH6020 Difference of the average number of years of education of the population over 15 years old between 1960 and 2000. From data on education in Barro and Lee, Updated 2002.

Institutional variables

CORR Measure the diffusion of illegal means "of payments" to the government or senior officials, in the form of "bribes" for operations involving the use of export and import licenses, exchange controls, tax assessments, police protection, or loans, etc. This index is measured on a scale going from 0 to 6; with higher values whenever corruption is low. Source: Sachs and Warner (1997).

BQ 0 to 6 index of bureaucratic quality built by "the Center for Institutional Reform and the Informal Sector (IRIS)". Higher index values show better quality and independence of the bureaucracy. Source: Sachs and Warner (1997).

Political stability

REVCOUP Average number of revolutions and coups per year, over the period 1970-1985. Source: Barro and Lee, 1994.

Natural resources

OIL Dummy variable for oil exporters based on the IMF classification of the countries taking 1 for countries whose fuel exports represent 50% or more of the total of exports during the period between 1984 and 1986, and 0 others.

SNR The share of mineral production in GNP in 1971.

Appendix B: List of the countries of the sample and regional dummies

Asia: Bangladesh, China, Hong Kong, Indonesia, India, South Korea, Sri Lanka, Malaysia, Nepal, Pakistan, the Philippines, Papua New Guinea, Singapore, Thailand, Taiwan, Tanzania
Sub-Saharan Africa: Benign, Botswana, Rep. Of Central Africa, Cameroon, Rep. Of Congo, Ghana, Gambia, Kenya, Lesotho, Mali, Mozambique, Mauritius, Malawi, Niger, Rwanda, Senegal, Togo, Uganda, South Africa, Zambia, Zimbabwe
Latin America: Argentina, Bolivia, Brazil, Barbados, Chile, Colombia, Costa Rica, Dominican Rep., Ecuador, Guatemala, Guyana, Honduras, Haiti, Jamaica, Mexico, Nicaragua, Peru, Paraguay, El Salvador, Trinity and Tobago, Uruguay, Venezuela
MENA: Algeria, Egypt, Iran, Israel, Jordan, Morocco, Syria, Tunisia, Turkey
OECD: Australia, Austria, Belgium, Canada, Switzerland, Cyprus, Denmark, Spain, Finland, France, the United Kingdom, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, New Zealand, Portugal, Sweden, the United States.