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Constraints to Economic Development and Growth in the Middle East and North Africa

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Constraints to Economic Development and Growth in the Middle East and North Africa

Abstract

When comparing the speed and extent of economic development in different geographic regions of the world over the past 20 years, the under-average performance of Arab countries in general and Arab Mediterranean countries in particular is striking. This is despite an overall favorable geo-strategic situation at the crossroads of three continents, with excellent connections to sea and waterways and in direct proximity to the European Union, one of the world's economic hubs. It is also despite the minor importance of negative factors such as a high-burden diseases or high levels of ethnic fractionalization.

In this paper, I focus on identifying the most important constraints on Arab Mediterranean economic development. I use state-of-the-art econometric tools to quantify constraints that have been identified through economic theory and studies of the political economy characteristics of the region. The empirical results offer support for the central hypothesis that limited technological capacities and political economy structures are the primary constraints on economic development. With a view to international structural adjustment efforts, my findings imply that the limited success of the Euro-Mediterranean policy to stimulate the economic development of the Arab Mediterranean countries might be because structural adjustment efforts do not tackle—or at least do not sufficiently tackle—these constraints.

Keywords: economic development, quantitative analysis, political economy, Arab countries

JEL Codes: F50, O10, O53, C30

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Zusammenfassung

Hemmnisse wirtschaftlicher Entwicklung im Nahen Osten und in Nordafrika

Vergleicht man Geschwindigkeit und Umfang der wirtschaftlichen Entwicklung der verschiedenen Weltregionen in den vergangenen zwanzig Jahren, so fällt insbesondere das unterdurchschnittliche Abschneiden der arabischen Länder im Allgemeinen und der arabischen Mittlemeerländer im Besonderen ins Auge, und dies trotz einer insgesamt vorteilhaften geographischen Lage im Schnittpunkt dreier Kontinente mit exzellenten Anschlussmöglichkeiten an See- und Wasserwege, trotz der direkten Nachbarschaft zum Weltwirtschaftsdrehkreuz Europäische Union und trotz der relativ geringen Bedeutung wichtiger entwicklungshemmender Faktoren, beispielsweise ethnische Zersplitterung oder massive Ausbreitung von Krankheiten wie AIDS oder Malaria.

In diesem Aufsatz wird versucht, von den unterschiedlichen Hemmfaktoren wirtschaftlicher Entwicklung, die in der wirtschaftstheoretischen Literatur und/oder in MENA-Regionalstudien diskutiert werden, diejenigen herauszuarbeiten, die wirtschaftliche Entwicklung am stärksten behindern oder möglicherweise stärker als andere. Dabei benutze ich modernste ökonometrische Verfahren, um den Einfluss der verschiedenen erklärenden Variablen zu quantifizieren. Die Ergebnisse stützen die Eingangshypothese, dass insbesondere mangelnde technologische Kapazitäten und Fähigkeiten sowie regionalspezifische politökonomische Strukturen die wirtschaftliche Entwicklung in den arabischen Mittelmeerländern behindern.

Constraints to Economic Development and Growth in the Middle East and North Africa

Juliane Brach

Article Outline

1 Introduction

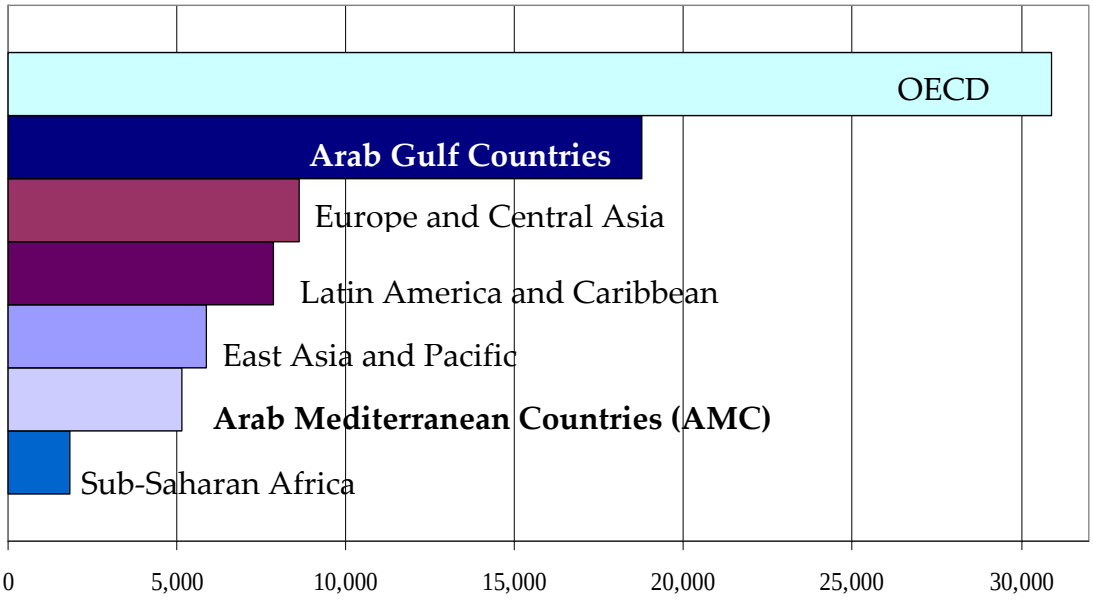
During the past 20 years, the Arab countries of the Middle East and North Africa have displayed weak overall economic performance and have been less economically attractive in comparison to other developing regions.

Despite the plethora of scholarly articles and publications by international organizations on economic development and growth, the contributions on the economic performance of the Middle East and North Africa (MENA) in general and the Arab MENA (AMENA) countries in particular remain limited. Much of the literature uses the aggregate "MENA region," which comprises both Arab and non-Arab economies, such as the EU member and candidate countries Malta and Turkey and the highly developed countries Israel and Iran (Sala-I-Martin/Artadi 2003; Aubert 2004). This article concentrates on the Arab countries of the Middle East and North Africa (AMENA) and further differentiates between Arab Mediterranean countries (AMCs) and Arab Gulf countries. The final sample comprises 77 countries, including the five AMCs: Algeria, Egypt, Jordan, Morocco, and Tunisia.[1]

[1] I collected data for a total of 173 countries. A detailed list of countries is provided in annex A.1.

Figure 1 shows the per capita income of AMENA countries in an international comparison and indicates a huge income gap between AMCs and Arab Gulf states that is hidden in the MENA aggregate. The countries of the Gulf Council (GCC) have the second-highest per capita income in the world, topped only by the high-income OECD countries. In contrast, Arab Mediterranean countries have the second-lowest per capita income; only sub-Saharan Africa performs worse.

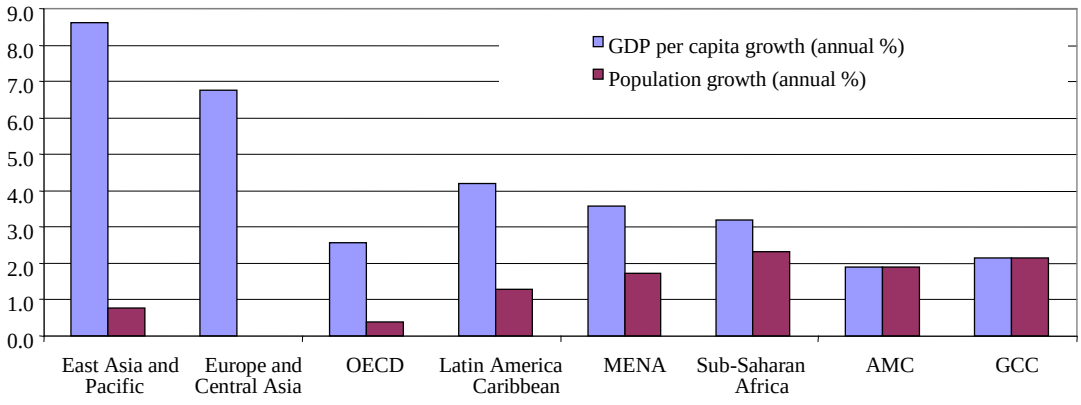
Figure 1: GDP per Capita (PPP, USD)



Source: Brach 2007, calculations are based on WDI 2007

In a regional comparison, AMENA countries show relatively low rates of economic growth, coupled with high rates of population growth, as depicted in Figure 2. Tight labor markets in the region face major challenges because average population growth between 2000 and 2010 is estimated to be more than double that in all other regions (Dasgupta 2003).

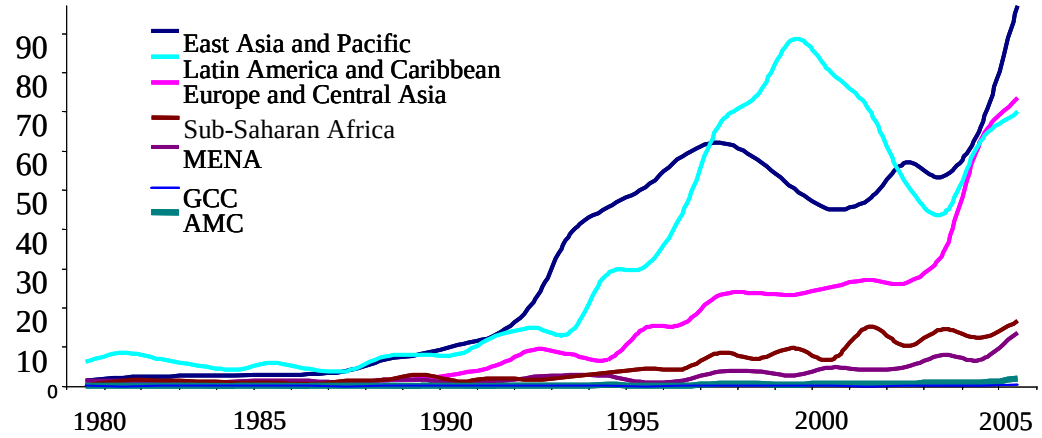
Figure 2: GDP Growth by Regions



Source: Brach 2007, calculations are based on WDI 2007.

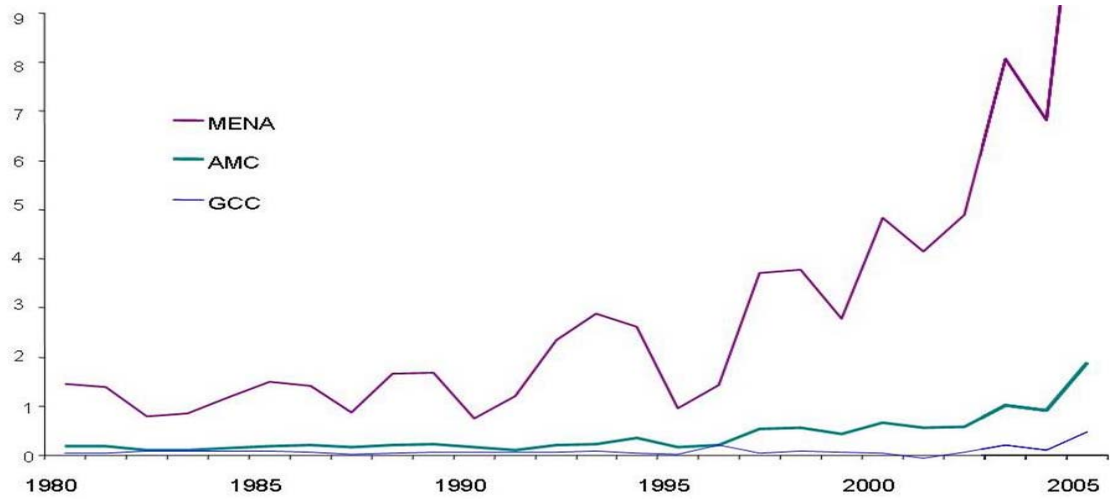
Figures 3 and 4 depict the low attractiveness of AMENA countries in a regional comparison: These countries profit the least from net inflows of foreign direct investment (FDI). Less than 5 percent of worldwide FDI is directed toward this region. Despite a gradual increase in net FDI inflows, the level is significantly below other developing regions. Even sub-Saharan Africa performs better. As for the GCC countries, it must be noted that they are massively exporting FDI. This is, however, not true for AMCs.

Figure 3: FDI Net Inflows by Regions (billion USD)



Source: Brach 2007, calculations are based on WDI 2007.

Figure 4: MENA Net FDI Inflows (billion USD)



Source: Brach 2007, calculations are based on WDI 2007.

The oil-dependent Gulf monarchies are an important example of countries in which the high income level is not an adequate gauge of technological progress and sustainable intensive growth. Despite the large discrepancy in per capita income in Arab Mediterranean and Arab Gulf countries, all Arab countries face similar problems, though at different levels of urgency.

There is ample economic literature which recognizes the existing growth deficit and weak economic performance of MENA countries. However, little research investigates the constraints on economic development in the AMENA countries that might explain why they perform below their potential. Understanding the most binding constraints to economic development and growth is a prerequisite for identifying effective structural adjustment measures, both nationally and internationally. National governments, as well as international organizations, have only limited financial and administrative resources dedicated to structural adjustment and development support. And rarely, if ever, is it possible to tackle all possible constraints. Policy makers have to make choices and set priorities to ensure that efforts and available resources are directed toward alleviating the most binding constraints.

This paper aims to partially fill this void. Two-stage cross-country regression models are used to identify the importance of different theoretical economic and political economy explanatory variables. The discussion then also draws on regional political economy literature and insights from MENA regional studies in order to contextualize and interpret the empirical results.

Two main hypotheses guide the analysis: i) MENA economic development is significantly constrained by a lack of technological capacity and a highly inefficient allocation of resources. ii) The inefficient allocation of resources in MENA countries is based on the domestic political economy in each country and results in part from the prevalent socioeconomic and political systems of the region.

The relatively limited body of available literature stresses the poor economic performance and development of the Arab world, especially in comparison to other developing regions. Despite high oil prices and worldwide increases in energy demand, Arab Gulf countries have not been able to channel capital accumulation into intensive sources of growth. Productivity remains low and total factor productivity (TFP) hampers rather than advances economic growth and development in these countries (Bisat et al. 1997; Abu-Qarn/Abu-Bader 2007).

There is, however, little agreement as to why Arab countries have mastered globalization so poorly. Why are there some highly competitive sectors such as the oil industry, with hardly any positive effects on local businesses and social structures, as in the Arab Gulf States, and why does the "formal" private sector remain limited despite an active and successful "informal" sector in the MENA region?

To date, international structural adjustment programs and recommendations to support Arab Mediterranean economic development have been primarily inspired by the Washington Consensus. In principle, the IMF, the World Bank, the United States (Broader Middle East and North Africa Initiative), and the European Union (Euro-Mediterranean Partnership or European Neighborhood Policy) have championed programs to increase competition from within and outside national borders through privatization and trade openness, respectively. What we know today is that neither national nor international structural adjustment measures and programs in the Middle East and North Africa have rendered satisfactory results: AMENA countries have witnessed a de facto decline in GDP over the past 20 years. In order to develop suitable and appropriate strategies for economic development and growth from an international as well as a national perspective, it is necessary to specifically target those constraints that are most hampering economic development. Unfortunately, it seems

that the constraints to economic development in the MENA region have yet to be better identified, and support and reform efforts may therefore be targeted in the wrong direction.
To provide a comprehensive and fresh look at MENA economic development, this paper draws on different disciplines and integrates insights from economics, political science, and regional studies into a broader analytical framework. The aim of this paper is to test whether and to what extent the technological capacities and characteristics of MENA political economies have explanatory power with respect to economic development and income levels.
The next section introduces the relevant literature from both economic and regional studies perspectives and summarizes the explanatory variables championed in the different strands of literature. Section 3 discusses the indicators used for measuring the dependent and independent variables, the model specifications, and the data. Ordinary least squares (OLS) regressions yield a sense of the magnitude of the estimated coefficients. In addition, two-stage least squares (2SLS) based on instrumental variables (IV) are used to address reverse causality, omitted variable bias, possible endogeneity, and measurement problems that restrain the accurate interpretation of relationships identified by the OLS regressions. The two stages of the estimation procedure will be elaborated in different subsections. Section 4 presents the empirical results as well as their interpretation and discussion. Special emphasis is given to the Arab countries of the Middle East and North Africa. Section 5 provides a conclusion and outlines implications for further research.

2 Related Literature

2.1 Economic Theory

Innovation and Growth

Neoclassical growth theory focuses on physical and human capital accumulation as the ultimate sources of growth. In contrast, endogenous growth theorists champion technological progress and factor productivity. As a result, growth research has a stronghold on technological innovations and high-technology research and development. However, domestic high-technology industries and sectors are virtually nonexistent in the context of developing countries. Eighty-five percent of innovations have been developed in OECD countries. Even in the USA, high-technology manufacturing accounts for merely 5 percent of the GDP. The question of how to optimize the innovation process in high-technology sectors is subordinate to the more fundamental questions of how to trigger and how to accelerate growth in a sustained manner. Due to the lack of domestic high-technology sectors in developing countries, the priority of research has shifted from generating technology to accessing foreign technology, in particular technology from the highly industrialized OECD countries. This is demonstrated by trade economists' concentration on the importance of economic integration and free trade (Frankel/Romer 1999). Some authors, such as Sachs and Warner (1999) or Dollar and Kraay (2004), argue that trade integration is the major determinant of growth in poor countries because there are no domestic sources of technology. This view has been challenged by a relatively new strand of literature originally triggered by the seminal paper of Basu and Weil (1998).

Technology Adoption and Growth

Basu and Weil (1998) point to the technological bias towards the needs and framework conditions in highly developed countries where these technologies have been developed. They argue that the capacity of developing countries to adapt and adopt foreign technologies is as important as access to technologies, since existing technologies are not appropriate for use in developing countries. Recent studies empirically validate this model and further emphasize the importance of this concept (Acemoglu/Zilibotti 2001; Los/Timmer 2006).
Hausmann and Rodrik (2003) compare the process of technology adoption in developing countries to the innovation process in industrialized countries. They show that there is no "off-the-shelf technology" available to developing countries and that learning about technology and problem solving using the knowledge acquired in mastering technology is not without cost.

Efficient Allocation of Resources and Growth

Traditionally, inefficient allocation of resources has been identified as a lack of competition caused by monopolistic market structures, high protection against foreign competitors, and state domination of sectors or industries. The structural adjustment championed by the Bretton Woods organizations was and still is, despite certain limitations of this approach (cf. e.g. Kappel 2003), principally based on the exposure of formally closed economies to international competition through trade openness and widespread privatization in to increase competition and, concomitantly, the competitiveness of developing economies (World Bank 2006).
However, a rapidly growing strand of literature supports the view that differences in growth and prosperity originate from differences in institutions. Institutions are generally described in this paper as the rules and norms of human behavior, following the definition provided by North (1989 and 1990).
Acemoglu et al. (2004) focus on the importance of economic institutions for economic growth. They argue that economic institutions that facilitate and encourage factor accumulation, innovation, and the efficient allocation of resources are necessary for societies to be able to prosper. Easterly et al. (1997) and more recently Alesina et al. (2003) point to cultural and ethic fractionalization as further external sources of differences in economic growth, in addition to geography and climate. In a widely cited paper Rodrik et al. (2004) integrate these diverse arguments into an integrated model and conclude that "institutions rule" over geography and trade integration for economic development.

Political Economy and Growth

Krueger (1974) was the first to theoretically and empirically outline the economic phenomenon of rent seeking and its negative consequences. Her findings point to: 1) high deadweight loss, 2) a negative perception of the economic system and market mechanism as rewarding the rich and well-connected, 3) economic activity that is increasingly devoted to capturing gains from rents rather than adopting new technologies and taking entrepreneurial risks.
Olson (1982) identifies vested interests among individuals specialized in the old technologies as a major cause of the slowdown in technological progress. He argues that these indi-

viduals are tempted to collude and exert political pressure in order to delay or prevent innovations that might erode their rents.

Inefficient bureaucratic organizations are also regarded as an important factor retarding economic development. In a recent paper, Acemoglu et al. (2006) present an economic theory to explain why certain societies end up with such structures. Their findings suggest that an inefficient state structure 1) allows the rich to use patronage, 2) creates more rents for bureaucrats than an efficient state would, and 3) creates its own constituency and tends to persist over time.

Economic theory identifies certain political economy structures that are more likely to hamper economic development than others. It is important to note that rent seeking in this context describes the behavior of individual economic and political actors, not the behavior of the state. In functioning market structures, individuals direct their efforts to creating and expanding individual profit margins. This can be done in both economic and political spheres. Merits and economic profit increase individual prosperity, political influence, and responsibility. In contrast, rent-seeking activities have the same intention, increasing individual profit and/or political influence, but draw on a completely different mechanism. Instead of profitability and innovativeness, rent seeking requires long-standing personal relationships. Rent seeking is thus not a productive activity—no "value added" is created—but rather a form of redistribution. The efforts of individuals are thus channeled to activities such as establishing and maintaining complex sociopolitical networks (Buchanan et al. 1980).

Economies with a high degree of rent seeking are sometimes described as rentier economies. As such, the latter concept is directly linked to the neopatrimonial-state literature of political science (Lewis 1994; Schlumberger 2005; Erdmann/Engel 2007) but is not identical to this rentier-state approach, as will be discussed in the next section.

2.2 MENA Regional Studies

In this paper, rent seeking is defined as the individual effort to personally appropriate funds, for example, state subsidies, transfer payments, or economic rents generated through state intervention and/or monopolistic market structures. I have also presented the negative consequences of such a "rent-seeking culture" (Erdmann/Engel 2007). Recent country studies, based on field research by their authors, have once again stressed that the rent-seeking structures outlined in the theoretical framework above exist in all AMCs.[2]

MENA Polity, Politics, and Political Economy Structures

Political economy structures in AMENA countries are characteristically different from European or "Northern" economies and political systems, which are generally based on competition, equality of chances, market mechanisms, and representation. MENA economies are better described as rentier economies, where individual economic success depends on personal networks and successful rent seeking. A large body of MENA regional studies on po-

[2] Algeria (Nili and Rastad 2007, Lowi 2004), Egypt (Schlumberger 2004, Dobronogov and Iqbal 2005), Jordan (Schlumberger 2004, Loewe et al. 2006), Morocco (Cherouki and Ben Ali 2007, Cammett 2007) Syria (Bolbol 2002, Zorob 2006), and Tunisia (Bechri and Naccache 2007, Bellin 1994, Cammett 2007)

litical and economic structures has investigated 1) where these funds/rents stem from and 2) why they are widely available. This strand of literature has established that the AMENA countries also display a rent dependency at the state level.

Beblawi and Luciani (1987) developed the concept of the rentier state, in which the nature of the state and the legitimation of the government is essentially determined by the nature and sources of the state's revenues. The originally narrow definition of oil rents[3] has since been broadened. Different rents or nonproductive revenues play an important role in the region. The AMCs, which are scarcely endowed with oil and gas resources, in contrast to the Arab Gulf countries, depend on official development aid (ODA) and transfer payments at the level of the state and on workers' remittances. Some might argue that FDI is also a form of external revenues. However, FDI is an investment, whereas ODA and transfer payments are grants. While FDI is allocated to potentially profitable markets and segments, ODA is granted for humanitarian or, in the case of the AMCs, geopolitical and conflict situations. While the AMCs are underachievers with respect to FDI, more ODA is allocated to the MENA region than to any other region in the world (World Bank 2007).

The remittances that workers who live and work abroad send home to their (extended) families directly increase the purchasing power of these individuals, independent of their actual labor income. These personal transfers constitute rents, but these have little or no effect on government revenues because this money is difficult to tax. This is different for rent revenues (such as the monopolistic and oil rents of state-owned companies) or external revenues and transfer payments (such as ODA). Since these funds make up an important part of their revenues, MENA governments are endowed with significantly more revenues that are neither extracted from their societies by taxation nor through economic productivity than governments in other developing regions. Governments do not need to justify the consumption or use of their revenues vis-à-vis the taxpayer, nor do they need to reinvest in production and economic processes to guarantee high revenues in future. This characteristic is very different from the obligations of and constraints on democratic European governments in relation to their tax-paying constituencies with respect to their use of tax-based revenues.

The polity and politics of the AMENA countries are described as being neopatrimonial political rule by authoritarian regimes based on a patron-client relationship and an informal exercise of power (Pawelka 1993). Recent research confirms the actuality of this political characterization as well as the importance of the special link between economic and political decision making in MENA countries, stating that the perpetuation of regime stability is possibly the superordinate objective of political and economic policies in these countries (Beck 2003). The specific ways in which politics and institutions have interacted with rents are shaping the patterns of economic performance in the region (Esfahani 2007; Beck 2007).

[3] Understood as the revenues above the opportunity costs in the oil sector.

Empirical Studies on MENA Growth

Despite the plethora of scholarly articles and international organizations' publications on economic growth in various countries and regions of the world, the contributions on economic growth performance in MENA countries remain limited. Important components of the existing literature on MENA growth use the aggregate "MENA region" (Sala-I-Martin/Artadi 2003; Aubert 2004; Dasgupta 2003). The definition of the region varies significantly from study to study but generally covers around twenty countries, including Iran, Turkey and Israel. Consequently, these studies yield only very general and generic observations.

A few papers investigate MENA economic growth at a more disaggregated level. Bisat et al. (1997) provide a detailed analysis of the economic growth rates of ten AMENA countries based on a growth accounting exercise (for the years 1971–96). They find that the investment process which took place over these years was not accompanied by sufficient improvement in total factor productivity (TFP). In fact, the average annual TFP growth was negative over the whole period.

Recently, Abu-Qarn and Abu-Bader (2007) have revisited the sources of MENA growth and have attempted to determine the key factors that lead to economic growth in MENA countries over the period 1960–1998. They found that MENA growth performance was essentially determined by physical capital accumulation and, to a lesser extent, by the accumulation of human capital. The contribution of TFP to economic growth was negligible; all six AMENA countries exhibit negative TFP growth.

Nabli and Véganzonès-Varoudakis (2007) address the empirical link between economic reform, human capital, and physical infrastructure and MENA economic growth. They find a strong positive impact from advances in physical infrastructure and human capital and a negative impact from structural reform on growth in six MENA countries over the period from 1970 to 1999.

2.3 The Value Added of Quantitative Analysis

The two disciplines of economics and regional studies on the Middle East have coexisted thus far with very little interaction. This paper attempts to bridge these disciplines and combine insights for a more comprehensive understanding of possible constraints and other factors hampering economic development in Arab countries.

Although economists have recognized the difficult economic situation in these countries, it seems that they have not been able to sufficiently explain it.

Economists point to the inefficient allocation of resources as a major clue. Despite considerable wealth and capital accumulation in the region, this potential has not been sufficiently directed to creating intensive sources of growth and has proved insufficient for supporting sustainable development. The answer was formerly (and partially still is) increased competition among domestic economic actors through privatization and increased openness and exposure to international competition through trade and integration into the world market.

In brief, this mechanism describes the logic behind the structural adjustment measures, programs, and recommendations introduced by international actors such as the Bretton Woods

organizations, that is, the International Monetary Fund and the World Bank, as well as those championed by the European Union in the course of the Euro-Mediterranean Partnership or European Neighborhood Policy. However, the past 20 years have shown that the situation in the AMCs has not changed significantly.
The value added of this paper is the combination of MENA regional studies and economics in order to better explain these countries' development difficulties. The cross-country regression analyses are an important complementary tool for quantifying and weighing the importance of several explanatory variables from regional science and economics.

3 Methodology

The two hypotheses are tested with two-stage cross-country regressions, based on a sample of 173 countries. Unless reported otherwise, all data are from the year 2005. The base year for constant US dollar prices in purchasing power parity is 2000. The quantitative data analysis is based on cross-country regressions and benchmark comparisons.

Cross-country Regressions

The cross-country regressions use the correlation between dependent and independent variables. In my analysis, log GDP per capita is confronted with different variables identified as important for economic development from an economic theory perspective. The aim is to analyze their general relationship and find out whether these factors have a positive or negative influence on long-term economic development. In addition, the regressions help to quantify the degree to which the respective variables matter and to understand the explanatory power of the variables (R^2).

Benchmark Comparison

A benchmark comparison allows for inter- and intraregional country-by-country comparison, based on country rankings and regional comparisons. This is an important step in identifying the level to which MENA growth is affected by constraints.

3.1 Instrumental Variables Estimation and Two-stage Least Squares

The reason I do not apply panel data analysis is twofold. The most important constraint is the availability of data concerning the key variables, such as quality of economic institutions and technological readiness. On the one hand, neither time series nor panel data analysis is possible, because important indicators such as the technology or institutional parameters are only available for the years after 1995 and 2003, respectively. On the other hand, MENA countries have not shown significant changes in the institutional variables over the past ten years (Heritage Foundation 2007; CIDCM 2006), which renders both techniques less attractive. I thus rely on multiple regression analysis.
Standard Ordinary Least Squares (OLS) regression, as described above, gives us an idea of the fit and the degree of explanatory power of the variables concerned. However, due to endoge-

neity, multicollinearity,[4] and heteroscedasticity[5] concerns, possible measurement and omitted variables bias the coefficients and are therefore not entirely accurate. I use instrumental variable methods such as Two-stage Least Squares (2SLS) regressions to provide better estimates.
In this section I outline the concept of Instrumental Variables (IV) and 2SLS regressions, which will be employed in the next section. 2SLS is a state-of-the-art instrumental variable method for solving the problem of endogeneity of one or more explanatory variables, that is, for multiple regression models with single or multiple endogenous explanatory variables. In applied econometrics, the method of 2SLS is currently the second most popular after OLS estimations.
When dealing with omitted variable bias, that is, a bias due to unobserved variables that are not included, the least satisfactory option is to ignore the problem and accept biased and inconsistent estimators. In some cases the problem can be solved by using suitable proxy variables for the unobserved variables. However, in many cases it is not possible to find a suitable and good proxy. IV offers a different approach to solving this problem: the unobserved variable is left in the error term, but at the same time the presence of the omitted variable is recognized. For illustration, consider a linear model with four explanatory variables:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \gamma \quad (1)$$

This equation describes a simple regression model which regresses the dependent variable y on the independent variables x_i, $i = 1,2,3$, with β_0 being the intercept and γ the random error term. In this straightforward case, the coefficients β_1, β_2, and β_3 can be estimated with an OLS regression.
Often when dealing with empirical problems such as the identification of determinants of long-term economic development, we find that one or more identified explanatory variables are in fact endogenous rather than exogenous. Rather than using x to describe explanatory variables in general, I rewrite equation (1) where z and y represent exogenous and endogenous variables, respectively.

$$y_1 = \beta_0 + \beta_1 y_2 + \beta_2 z_1 + \beta_3 z_2 + u_1 \quad (2)$$

Testing for Endogeneity

For those cases where all explanatory variables are exogenous, OLS regressions provide the most efficient estimates. If, however, this assumption is violated, we need to apply 2SLS, since the OLS coefficient will not be accurate in this case. The test for endogeneity shows whether 2SLS is necessary and appropriate. Thus, we need to test whether or not the endogenous explanatory variable y_2 correlates with the error term u_1. In the case that y_2 is uncorrelated ($Cov(y_2,u_1) = 0$), OLS estimation is appropriate. If y_2 and u_1 are correlated ($Cov(y_2,u_1) \neq 0$), we need to estimate by 2SLS.
The Hausman Test directly compares OLS and 2SLS estimates and determines whether these differences are statistically significant. If all explanatory variables are exogenous, OLS and 2SLS estimates are consistent. The test determines whether the hypothesis that they are correlated is

[4] Multicollinearity generally refers to the correlation among the regressors. In the 2SLS context, a special form of multicollinearity might arise. Correlations between $\hat{y}_2$ and the exogenous variables are often higher than the correlation between y_2 and these variables.

[5] In contrast, for homoscedasticity variance of u_1 cannot depend on any of the exogenous variables, i.e., ($Cov(z_1, \ldots, z_n, u_1) = 0$.

rejected at a low significance level. In this case we conclude that y_2 is endogenous. If an endogenous explanatory variable is identified, the next step is to find an instrumental variable.

Instrumental Variable

Since y_2 and u are correlated, we need additional information in order to obtain consistent β estimators. This information is provided through additional exogenous, observable variables z. z is called an instrumental variable for y_2 if two assumptions are satisfied: First, z is uncorrelated with u ($Cov(z,u) = 0$). Rather than through rigorous testing, this assumption must in the majority of cases be maintained by appealing to economic behavior.[6] Second, the assumption that z is correlated with y_2 ($Cov(z, y_2) \neq 0$) needs to be satisfied. This correlation can be tested easily with a simple regression. Because the correlation is complicated by the presence of the exogenous explanatory variables, partial correlation is tested ($\pi_2 \neq 0$ or $\pi_3 \neq 0$). Both assumptions serve to better identify the regression coefficients β. To obtain the parameters π, the reduced form (3) is estimated by OLS and yields the fitted values.

$$y_2 = \pi_0 + \pi_1 z_1 + \pi_2 z_2 + \pi_3 z_3 + \pi_4 z_4 + v_2 \quad (3)$$

IV estimators with multiple instruments are called two-stage least squares. At the first stage, the regression is run to obtain the fitted values $\hat{y}_2$ of y_2.

$$\hat{y}_2 = \hat{\pi}_0 + \hat{\pi}_1 y_2 + \hat{\pi}_2 z_1 + \hat{\pi}_3 z_2 + u_1 \quad (4)$$

The following second stage is an OLS regression which uses the fitted values $\hat{y}_2$ in place of y_2.

$$y_1 = \beta_0 + \beta_1 \hat{y}_2 + \beta_2 z_1 + \beta_3 z_2 + u_1 \quad (5)$$

The simple model presented here can easily be extended to a multiple case by adding either more exogenous explanatory or endogenous explanatory variables. Consider equations (6) and (7), respectively.

$$y_1 = \beta_0 + \beta_1 y_2 + \beta_2 z_1 + \ldots + \beta_k z_{k-1} + u_1 \quad (6)$$

$$y_1 = \beta_0 + \beta_1 y_2 + \beta_2 y_3 + \beta_3 z_1 + \beta_4 z_2 + u_1 \quad (7)$$

In order to estimate a case with the two endogenous explanatory variables y_2 and y_3, we would need at least two additional exogenous variables, possibly z_3 and z_4.

[6] In cases with more than one instrumental variable, overidentification tests provided by some statistical programs such as STATA can effectively test the correlation with the structural error. Unfortunately, SPSS does not offer this feature and other programs such as STATA were not available. Tests will be performed as soon as possible.

3.2 Model Specifications

The challenge in every empirical or quantitative paper is multifaceted. Empirical econometric analysis is a very dynamic discipline and, from a regional studies perspective, the state-of-the-art analytical tool for supporting and complementing qualitative and theoretical research. The aim of this cross- or interdisciplinary paper is to combine state-of-the-art methodology, presented in the previous section, with insights and evidence from MENA regional studies, and especially from political science.

So far, I have (in section 2) described the implications of economic theory literature on development and economic growth. I have discussed the limits of these conceptualizations against the background and situation in developing versus highly industrialized countries (cf. subsection 2.2). I have then identified political economic characteristics that hamper economic development and growth in general and I have outlined their importance and prevalence in MENA countries in particular.

The remainder of this paper is dedicated to systematically combining these insights and shedding light on the constraints to economic development in the AMENA countries. Prior to presenting the empirical results in the next section, I will use this section to comment briefly on the individual methodological steps of the empirical analysis: model specification, choice of variables, and robustness check.

The specification of the regression model is an important step, critical to the quality and consistency of the empirical results. The challenge of model specification is twofold: first, confronting theory with data; second, learning from data, within the boundaries of the chosen model. The theoretical background outlined in section 2 sets the general analytical framework. The variables were chosen on the grounds of a solid and well established theoretical framework. Economic development in developing country i depends on the quality of its economic institutions, its technological capacities, the degree of integration with the world economy, the size of the domestic market, and its endowment with natural resources such as oil and gas. In addition, economic development in country i is affected by war, internal as well as cross-border armed conflicts, and finally by its geographic location.

Generally speaking, the present paper attempts to estimate the following equation, which formally presents and summarizes the arguments of the theoretical discussion:

$$\begin{aligned} ECDEV_i = \quad & \beta_1 + \beta_2\, EconInst_i + \beta_3\, Technology_i + \beta_4\, Openness_i + \\ & + \beta_5\, Marketsize_i + \beta_6\, Oildependence + \beta_7\, Conflict_i + \\ & + \beta_8\, Geography_i + \beta_9\, Region_1 + \gamma_i \end{aligned} \tag{8}$$

The economic development (ECDEV) of country i is the dependent variable and thus is written on the left side of the equation. The idea is to find out *if* (statistical significance), *how* (positive or negative sign), and to *what extent* (magnitude of coefficient) variations of independent variables are able to explain cross-country differences in economic development. β_1 is the intercept and γ_i the random error term.

The important independent variables with a potential positive effect, as identified through theoretical and empirical contributions are: the quality of economic institutions (ECONINST), technological progress (technology), trade integration (Openness), and market

size (Market). In contrast, war and conflict (conflict) as well as geography are, particularly in developing countries located close to the equator, to have a negative impact. In order to control for regional differences, a set of regional dummy variables is also included.

The key variables of interest are economic institutions and technology. Therefore, summarizing a set of control variables in Z_i yields the core or benchmark specification, equation (9), which stresses that the analysis focuses on our independent variables of particular interest: economic institutions, technology, and regional characteristics.

$$logGDP_i = \beta_1 + \beta_2 Z_i + \beta_3 EconInst_i + \beta_4 Technology_i + \\ + \beta_5 Region_i + \gamma_i \quad (9)$$

To estimate the coefficients, we first need to find out how to actually measure the variables. In some cases this is straightforward. Variables such as regional identification are directly observable. In other cases well-established proxy variables exist. Economic development is, by and large, proxied by the per capita GDP. While the GDP per capita is not just an indicator for the level of economic development, under the assumption that per capita income levels were more or less similar in the very distant past, differences in current income levels reflect the diverging growth performance in the long run (Bormann et al. 2006).

Throughout the literature, there are widely accepted proxy variables for all chosen control variables, which are summarized in Table 1. The first variable relates to the mere size of a national economy, measured as the total population. Since a larger domestic market is generally associated with increased business opportunities and a broader basis of human capital, I expect a positive sign. The next two variables introduce an international dimension of economic development. The integration into the global economy as an important determinant of development, both because it enlarges markets and because it is an important channel for technology transfer, has been discussed in section 2. Here I use the real openness of a country as calculated by Summers et al. (2006) as the proxy.[7] The internal and external conflicts of a country increase the uncertainty for investors and restrict living conditions, and this variable is therefore expected to have a negative sign (Collier/Hoffler 2004).

Table 1: Control Variables and Their Measures

Variable	Measure	Variable Name
Size of economy	total population in million, 2006	POPUL
Trade integration	the ratio of nominal imports plus exports to GDP (PPP) in US dollars	TRADE
Armed conflict	number and intensity of internal and external conflicts	CONFL
Latitude	distance of capital city from equator, measured as the absolute value of latitude	DISTEQ
Oil dependency	dummy variable taking the value 1 for a country that is a major oil exporter, 0 otherwise	OILDEP

The last two variables control for the impact of geographic location on development. Distance from the equator is a proxy for climate. Economic development in a country with a tropical climate is, on the one hand, likely to be constrained due to the high burden of tropi-

[7] (EX + IM)/GDP per capita (PPP).

cal diseases and high morbidity rates (Diamond 1999; Sachs 2001). On the other hand, extreme hot or cold temperatures, temperature changes (such as the night/day change in deserts), and high humidity are challenging conditions for specialized machinery, sensitive technologies, and research, and thus seem to hamper technological progress. Finally, oil dependency relates to the discussion on rent –seeking; rentier states; Dutch disease; and, last but not least, the resource curse literature.

Key Variables

For both key variables, economic institutions and technology, there are no established proxies. Nevertheless, there are some suitable possibilities. The most common approach is to measure the quality of economic institutions by the extent of existing property rights, as these are generally viewed as an important indicator of a reliable and stable economic situation, where investors are protected against arbitrariness and expropriation. However, this indicator yields a very narrow definition of economic institutions. In a widely cited contribution, North (1990) provides a much broader interpretation of economic institutions, describing them as "humanly devised constraints that shape human interaction" and which "as a consequence structure incentives in human exchange whether political, social, or economic."
Following this approach, I use a set of indicators to measure economic institutions. Rather than developing my own index, I draw partially on the Index of Economic Freedom (IEF) provided by the Heritage Foundation, which will be briefly introduced in section 3.3. The quality of economic institutions is presented as a set of eight indicators which are summarized as a simple average.[8]

$$\begin{aligned} ECONINST_i = 1/8 \; \Sigma \; (&Property\ rights + Business\ Regulation + \\ + \; &Tariff\ Openness + Fiscal\ burden + \\ + \; &Monetary\ Regime + Capital\ Markets\ Restrictions + \\ + \; &Goods\ Markets\ Restrictions + \\ + \; &Labor\ Market\ Rigidity) \end{aligned} \tag{10}$$

Technology is often used as a synonym for innovativeness, and therefore, standard measures are the number of patents filed by residents, the number of scholarly articles, the number of scientists per 10,000 inhabitants, and expenditures for research and development (R&D). While these measures may be appropriate in the context of highly industrialized countries, I have already discussed why they are not appropriate when dealing with developing economies (cf. section 2). Therefore, there is little sense in applying these indicators.
Instead, I use technological readiness rather than innovative capacity as a proxy. This choice reflects the fact that technological progress in developing countries does not stem a priori from technological advances, but rather from the efficient use and adaptation of already existing technologies. The Global Opinion Survey (GOS) published by the World Economic Forum is one of the few sources that allow for a cross-country comparison of international competitiveness. Even if technological readiness is not directly observable, the GOS question

[8] Originally, the IEF encompasses ten freedoms. However, in this paper I will use similar indicators, corruption and the allocative nature of government, as instrumental variables.

5.7 "Your country's level of technological readiness (1 = generally lags behind most other countries, 7 = is among the world leaders)" is a valuable proxy.
Table 2 briefly summarizes how the key variables are measured in the first step of the empirical analysis of this paper.

Table 2: Key Variables

Variable	Measure	Variable Name
Economic institutions	quality of economic institutions is measured as an index of the degree of freedom of eight indicators	ECONINST
Technological readiness	country average of executive opinion survey	TECHREAD

OLS regressions with the above variables will yield important insights on the relationship between these and the dependent variable, economic development.
We know from economic and political economy literature that economic institutions matter. In contrast to geography or market size, which are clearly exogenous variables, economic institutions themselves depend on different factors, and are therefore endogenous rather than exogenous variables. Particularly since they are man-made and, to a large extent, chosen by the ruling elites. In order to specify economic institutions, I again draw on several important determinants that potentially shape national economic institutions, as identified in political economy and MENA regional studies literature.
The economic institutions (ECONINST) of country i depend on the nature of its political institutions and political rule (Polity), the extent of rent-seeking behavior (RENTSEEK), the allocative nature of the state (ALLOSTA), the workers' remittances received (REMITTAN), the endowment with natural resources (OILDEP), and possibly the regional context. Equation (11) yields the benchmark specification for the analysis of economic institutions. The proxy variables that I use for the chosen independent variables are summarized in Table 3.

$$\begin{aligned} ECONINST_i = {} & \pi_1 + \pi_2\, Polity_i + \pi_3\, Rentseek_i + \\ & + \pi_4\, Allosta_i + \pi_5\, Remittan_i + \\ & + \pi_5\, Oildep_i + \pi_5\, Region_i + \gamma_i \end{aligned} \tag{11}$$

Table 3: Economic Institutions: Instrumental Variables

Variable	Measure	Variable Name
Political institutions	nature of political rule, measured on a scale ranging from authoritarian (-10) to democratic (10)	POLITY
Allocative state	subsidies as percent of government expenditures	ALLOSTA
Oil dependency	fuel exports as percent of GDP	OILDEP
Rent seeking	corruption as a major constraint to investment	RENTSEEK
Remittances	workers' remittances received	REMITTAN

Some might argue that none of these explanatory variables, except the endowment with natural resources, are exogenous, especially from a political science perspective. This is true; however, all of these variables tend to only change very slowly and with respect to the AMENA

countries have not changed significantly over recent decades. According to the short- to medium-term perspective, the assumption that these factors are exogenous holds true.

The first two variables relate to the rentier-state debate and literature. Both authoritarian rule and the large-scale allocation of resources to subsidies are expected to hamper the effectiveness and quality of economic institutions. The next two variables introduce the rentier-economy aspect. Whether individuals' economic effort is directed toward productive or nonproductive activities is highly effected by the amount of remittance inflows and the extent to which personal networks matter in economic and business life. The dependence-on oil variable controls for the source of rents, which has received the most attention. But this variable is expected to have a small or minimum impact since the AMCs at the center of the analysis in this paper are for the most part scarcely endowed with oil and gas resources.

In line with the methodology discussed above, for the empirical analysis, economic institutions need to be viewed as part of the residual. The specification equation (9) needs to be rewritten as:

$$\begin{aligned} logGDP_i = \quad & \beta_1 + \beta_2 Z_i + \beta_3 Technology_i + \\ & + \beta_4 Region_i + u_i \end{aligned} \tag{12}$$

Where, *ceteris paribus*, Z_i is the set of control variables and u_i is the residual error term. Rather than being able to estimate the endogenous variable ECONINST directly, we need to use the above-presented instrumental variables to obtain further information.

Introducing the relevant interaction terms yields the following extended core specification which will be the two-baseline model in subsequent OLS regression analysis, combined in the 2SLS analysis: where β_1 is the intercept and γ_i the random error term.

Throughout the paper I will be interested in the sign, magnitude, and significance of the coefficients β_j, $j = 2, ..., 7$.

$$\begin{aligned} \text{logGDP}_i = \quad & \beta_1 + \beta_2 Z_i + \beta_3 \text{EconInst}_i + \beta_4 \text{Technology}_i + \\ & + \beta_5 Openness_i + \beta_6 MED_i + \\ & + \beta_7 EconInst_i{*}Technology_i + \gamma_i \end{aligned} \tag{13}$$

$$\begin{aligned} ECONINST_i = \ & \pi_1 + \pi_2 Polity_i + \pi_3 Rentseek_i + \\ & + \pi_4 Allosta_i + \pi_5 Remitan_i + \\ & + \pi_6 Oildep_i + \pi_7 Region_i + \\ & + \pi_8 MED{*}Allosta + \\ & + \pi_9 MED{*}Rentseek + \\ & + \pi_{10} MED{*}Polity + \\ & + \pi_{11} MED{*}Remittances + \gamma_i \end{aligned} \tag{14}$$

A positive (negative) sign identifies a positive (negative) impact of the respective variable on economic development. A negative sign is thus an important indicator of a constraining factor, a constraint to economic development or the quality of economic institutions, respectively. The magnitude of the coefficient hints at the economic or practical importance of the variable and is interpreted as the percentage to which it is able to explain differences in economic development across countries. Finally, the significance level is important to achieve the correct idea of the explanatory power of the variable. The standard significance levels at

the 1, 5 and 10 percent mark are reported. The lower the significance level, the higher the chance that the coefficient is not robust against sample changes.[9] The aim is to identify whether a variable has a positive or negative impact and to weigh the impact and effect of the determinants relative to each other (see Table 4).

Table 4: Variable Description

Variable	Description	Kind	Source
Economic development	log GDP per capita	hard data	WDI
Technological readiness	country's level of technological readiness, values ranging from 1 to 7	survey	WEF 7.01
Economic institutions	index of economic freedom including ten parameters, values ranging from 0 to 100	survey and hard data	Heritage Foundation
Rent seeking	corruption as a major constraint to investment	survey	WDI
Authoritarian rule	10 = democratic, -10 = authoritarian	index	CIDCM
Robustness check			
Technological capacity	index of science and technology capacity including 7 parameters, values ranging from 5.03 to-0.51	survey and hard data	RAND
Technological adoption	Companies' ability to absorb new technologies, values ranging from 1 to 7	survey	WEF 7.02

3.3 Data

Despite substantial improvements, the quality and quantity of data from the Arab countries pose important obstacles to advances in research, and this partially explains why this region remains marginalized in academic literature. For this reason, I have chosen to use only disclosed sources and reports that have been internationally recognized for their reliability.

The World Bank's (2007) *World Development Indicators* (WDIs) provide the most reliable and comprehensive set of hard data on the MENA countries. They document the problem of insufficient and unsustained MENA economic growth performance over the past twenty years. All of the indices presented below draw on WDIs hard data to complement their survey data.

The *Global Competitiveness Index*, published by the World Economic Forum (2007) is based on an executive opinion survey (Global Opinion Survey, GOS) of over 10,000 enterprises worldwide. In 2003, the GCI, for the first time, covered five AMENA countries. The most recent edition includes 12 AMENA countries. Rather than using the whole index, I draw on individual indicators which are undisclosed but which were provided to me by the WEF. These comprise the categories technological readiness, process sophistication, innovative capacity, quality of education, and quality of universities. These are used mainly as alternative measures for technological readiness. The subindex technological readiness is also used as a measure of robustness. The GOS is one of the most comprehensive and detailed sources providing insight into national competitiveness as it is viewed from inside the country. The

[9] For my analyses, I operate at the standard 1 to 10 percent level of significance; however, in cases where the coefficient shows a large economic importance, I also check the significance at a 15 percent level, as suggested by Wooldrige (2003).

attractiveness of these data sets is uncontested. However, interpretations of the results need to take some important methodological shortcomings into account: The country averages are calculated on the basis of the answers from executive officers of firms with more than 100 employees only (World Economic Forum 2007b). This limits the representativeness of the results, especially in the case of the Arab countries, where the vast majority of firms are small and medium enterprises (SMEs) with less than ten employees. Keeping this in mind, the WEF data are nevertheless valuable because, in contrast to other sources, the definition of technological readiness directly reflects the theoretical discussion on the importance of technology adoption rather than innovation. WEF data is an important complement to WDI data, which focuses on indicators such as R&D expenditure, patents filed, and scientists employed to reflect the technological dimension of development. These indicators are often not applicable in the case of developing countries and are either insignificant or not available, as described in the section on technological adoption above.[10]

In the *Index of Economic Freedom* (Heritage Foundation 2007) looks at property rights, which are widely used as an indicator of economic institutions. However, this definition is not appropriate for two reasons: international experience from Latin American and East Asian countries, respectively, shows that, on the one hand, advances in property rights are no guarantee of economic success and that, on the other hand, economic success is not conditional on property rights. For the analysis of the quality of economic institutions in MENA countries, I therefore draw on the Index of Economic Freedom (IEF), which is based on ten areas of economic freedom (government, fiscal, finance, monetary, trade, property rights, investment, labor, business, and corruption) compiled from 90 indicators. The index is a nonweighted average which draws on the Transparency International Corruption Perception Index to measure the freedom from corruption. The IEF claims to be the first comprehensive study of economic freedom. Its first volume was published in 1995. Despite some criticism, mainly due to its simple average nature, the IEF provides a unique tool for comparing economic institutions across countries. Some of its shortcomings can be countered by not relying on the aggregate index itself but using the individual subindices instead, which I do in the analysis presented here.

The *Polity IV Database* by the Center for International Development and Conflict Management contains semiannually coded information on regime and authority characteristics for all independent states (with total population greater than 500,000) in the global state system and covers the years 1800–2004. Polity IV codes regime characteristics as the authority patterns of effective polity in the arena of conventional politics. Along the 20-point polity scale, which ranges from authoritarian (-10) to democratic (10), polity scores are reliable and accurate to within one or two points. The Polity IV database provides a classification of regimes and facilitates the study of regime persistence. Polity IV classification is based on the three general categories of authority patterns: executive recruitment, executive constraints, and political competition. All variables are explained in detail in the *Polity Users' Manual* (CIDCM 2006).

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[10] For an elaborate discussion of the explanation power of GCI for competitiveness, especially in the AMCss, see Brach (2007).

The *Kaufmann et al.* (2005) data set is included mainly in order to use their control variables, such as distance from equator and landlocked, I have used the Kaufmann et al. data as a base, which I have partially updated and, where possible, extended. While the *Center for the Study of Civil War* data set (CSCW 2005) provides information about the number of conflicts between 1970 and 2004 for every country, the *Penn World Table 6.2* by Summers et al. (2006) calculates OPENNESS as the total trade as percentage of GDP. Purchasing power parity (PPP) is the number of currency units required to buy goods equivalent to what can be bought with one unit in the base country.

$$OPENNESS = (EX + IM) : real\ GDP\ per\ capita \quad (15)$$

Finally, the *RAND Index of Science and Technology (IST)* (Wagner 2001) complements the information on technological and scientific capacities from a MENA perspective (as provided by the WEF), I include the data from the RAND IST, which is based on a survey of American scientists and their perception of the scientific standards and capacities of international cooperation partners.

This section's fairly general description of data sources is complemented by a more detailed presentation of the variables in Table 4 and annex A.2. For the robustness check, I partially complement the indicators by using additional sources of data. A full specification of the alternative measures is provided in section 4.4. In total, I have collected data for a total of 173 countries. Due to data restrictions in some countries and variables and list wise exclusion of variables, I have N = 103 for OLS and N = 77 for 2SLS regressions, respectively. The final sample of 77 countries comprises seven Arab countries: the five AMCs, Algeria, Tunisia, Morocco, Egypt, and Jordan, and the two Arab Gulf states, Oman and Yemen. The full list of countries is provided in annex A.1.

3.4 Verifying the Assumptions and Descriptives

The quality of any regression results depends on whether the model's assumptions are (sufficiently) met.

The assumption of normal distribution and cross-correlations is verified for all variables under investigation. In some cases, monotonous data transformations were used to reduce skewness. These transformations only change the shape, and not the order or dimensions, of the data. If these assumptions were not fulfilled, neither the OLS nor the 2SLS estimates would yield reasonable results.

A combination of exploratory data analysis (EDA) and more rigorous tests was performed separately for each variable and bivariate relationship prior to the multivariate analysis, which will be presented in detail in the next section.

Table 5 provides descriptive statistics for the key variables of interest. The first row presents the dependent variable per capita GDP as the measure for economic performance and development. LGGDP is calculated as the natural logarithm of GDP per capita (purchasing power parity) in 2000. In the following rows, five explanatory variables are introduced, four of which are considered exogenous.

OPENNESS is measured using the Penn World Tables ratio (exports plus imports divided by real GDP per capita in constant 2000 prices. Given the demonstrated differing characteristics of highly industrialized and developing countries with respect to innovation vs. technology adoption, I have chosen to measure technological readiness TECHREAD, which is in the WEF's Global Opinion Survey. Controlling for per capita prosperity heavily based on the export of natural resources rather than technological progress, OILDEP is a measure of the oil dependence of a country, measured in fuel exports as a percentage of merchandise exports. Finally, as I focus primarily on economic institutions, with ECONINST I take the composite index of economic freedom as provided by the Heritage Foundation as the measure of institutional quality.

Table 5: Descriptive Statistics

	Mean	Std. Deviation	N
LGGDP	3.9000	0.44946	77
ECONINST	65.6802	9.28532	77
TECHREAD	4.065	1.1905	77
OPENNESS	87.868	43.5229	77
POP05	48.2295	153.39450	77
FUELEX	15.55	24.524	77
LGCONFL	0.5849	0.71410	77
DISTEQ	32.81	17.515	77
POLITY	531.74	435.103	77
CORRUPTI	54.44	24.005	77
ALLO_SUB	42.69	19.018	77
REMITTAN	3.76	5.827	77

4 Empirical Results

Simple bivariate relationships between income and its determinants, on the one hand, and the quality of economic institutions and their possible determinants, on the other hand, showed a clear positive (or negative) relationship, as suggested by the theoretical framework. Any or all of them have the potential to explain the level of economic development and economic institutions. These analyses are not reported, but scatter plots are provided in the annex.

This section presents the empirical results of the more formal tests of these relationships in three steps: First, simple OLS regressions of equation (3.8), reported in Table 6. Second, a simple OLS regression of equation (3.11), provided in Table 7. Third, a 2SLS estimation procedure of equation (3.13), which is documented in Table 8.

Table 6: OLS 77 Countries—Economic Development (lgGDPPC)

	Economic Development (lgGDPPC)								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
ECONINST	0.67*** (7.72)	0.23*** (2.62)	0.21** (2.23)	0.26*** (2.65)	0.19* (1.91)	0.05 (0.58)	0.01 (0.11)	-0.03 (-0.30)	-0.04 (-0.52)
TECHREAD		0.65*** (7.37)	0.65*** (7.24)	0.63*** (7.12)	0.65*** (7.53)	0.62*** (8.50)	0.63*** (8.65)	0.67*** (8.96)	0.53*** (6.57)
OPENNESS			0.08 (1.17)	0.10 (1.43)	0.06 (0.87)	0.03 (0.43)	0.03 (0.46)	0.02 (0.42)	0.02 (0.30)
MARKET			0.03 (0.42)	0.05 (0.65)	0.07 (0.97)	-0.01 (-0.12)	-0.02 (-0.32)	-0.02 (-0.35)	-0.01 (-0.24)
OILDEP				0.12* (1.79)	0.10*' (1.52)	0.06 (0.98)	0.06 (1.05)	0.02 (0.30)	0.00 (-0.03)
LGCONFL					-0.17** (-2.32)	-0.04 (-0.59)	-0.03 (-0.46)	-0.06 (-0.96)	-0.09 (-1.41)
DISTEQ						0.38*** (5.56)	0.40*** (5.75)	0.39*** (5.63)	0.24** (2.26)
MED							-0.08 (-1.34)	0.43*' (1.51)	0.39*' (1.50)
INTM_TE								-0.52* (-1.81)	-0.46* (-1.72)
GULF									0.07 (1.30)
SSA									-0.19** (-2.41)
LAC									0.02 (0.30)
EAP									0.00 (0.04)
OECD									0.22*** (2.87)
Adjusted R^2	0.44	0.67	0.67	0.67	0.70	0.78	0.79	0.80	0.84
N	77	77	77	77	77	77	77	77	77

Note: ***, **, *, and *' denote a significance at the 1, 5, 10 and 15 percent level, respectively.

Table 7: OLS 77 Countries—Economic Institutions (ECONINST)

	Economic Institutions (ECONINST)								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
POLITY	0.650*** (7.402)	0.280*** (3.174)	0.293** (3.150)	0.292*** (3.272)	0.193** (2.072)	0.170* (1.773)	0.187** (1.958)	0.146*' (1.492)	0.280*** (3.174)
RENTSEEK		-0.598*** (-6.780)	-0.607*** (-6.698)	-0.653*** (-7.360)	-0.716*** (-8.107)	-0.709*** (-8.007)	-0.733*** (-7.903)	-0.731*** (-7.961)	-0.598*** (-6.780)
ALLO_SUB			-0.037 (-0.458)	0.013 (0.168)	-0.002 (-0.030)	0.010 (0.124)	-0.016 (-0.199)	-0.003 (-0.40)	0.00*** (23.913)
REMITTAN				0.197*** (2.670)	0.226*** (3.158)	0.208*** (2.829)	0.235*** (3.084)	0.213*** (2.772)	0.293*** (3.150)
MED					-0.195*** (-2.680)	-0.186*** (-2.535)	-0.352 (-0.247)	-0.233 (-0.165)	-0.037 (-0.458)
FUELEX						-0.073 (-1.029)		-0.115*' (-1.511)	-0.607*** (-6.698)
INTM_RE							0.316 (0.517)	0.451 (0.737)	
INTM_PO							0.110 (1.076)	0.154*' (1.462)	
INTM_AL							-0.109 (-0.079)	-0.395 (-0.285)	
INTM_RM							0.028 (0.058)	0.115 (0.245)	
ArabGULF									0.00*** (24.209)
SSA									0.292*** (3.272)
LAC									-0.653*** (-7.360)
EAP									0.013 (0.168)
OECD									0.197*** (2.670)
Adjusted R^2	0.41	0.63	0.63	0.66	0.69	0.69	0.67	0.68	0.68
N	77	77	77	77	77	77	77	77	77

Note: ***, **, *, and *' denote a significance at the 1, 5, 10 and 15 percent level, respectively.

Table 8: Two-Stage Least Squares Regressions—Economic Development (lgGDPPC)

	Economic Development (lgGDPPC)												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
ECONINST		0.50***	0.57***	0.72***	0.46***	0.37**	0.16	0.53	-0.63	0.59*	-0.51	0.20	0.23
		(3.87)	(3.82)	(4.14)	(2.80)	(1.99)	(0.91)	(1.33)	(-1.20)	(1.66)	(1.18)	(1.03)	(1.28)
TECHREAD	0.82***	0.49***	0.44***	0.35***	0.42***	0.45***	0.55***	0.39*	0.99***	0.35*	0.93***	0.43***	0.40***
	(15.32)	(4.66)	(3.88)	(2.70)	(3.85)	(3.95)	(5.16)	(1.17)	(3.43)	(1.75)	(3.90)	(3.47)	(3.52)
OPENNESS			-0.01	0.02	-0.01	0.01	0.02	0.00	0.04	-0.02	0.05	0.01	0.00
			(-0.18)	(0.26)	(-0.10)	(0.14)	(0.32)	(-0.03)	(0.51)	(-0.20)	(0.64)	(0.13)	(0.05)
POP05			0.08	0.12	0.06	0.42	0.01	0.07	-0.12	0.08	-0.10	0.00	0.01
			(1.05)	(1.48)	(0.86)	(0.62)	(0.12)	(0.72)	(-1.07)	(0.89)	(-1.02)	(0.04)	(0.11)
FUELEX				0.20***	0.15**	0.12*	0.09	0.15*	-0.12	0.17**	-0.09	0.08	0.10*
				(2.55)	(2.34)	(1.72)	(0.18)	(0.10)	(-0.85)	(2.10)	(0.76)	(1.32)	(1.73)
LGCONFL						0.00	-0.02		-0.13		0.13		
						(0.02)	(-0.24)		(-1.26)		(1.31)		
DISTEQ					0.26***	0.31***	0.36***	0.24**	0.53***	0.23***	0.50***	0.21**	0.21*
					(3.44)	(3.66)	(4.43)	(2.00)	(3.52)	(1.99)	(3.98)	(1.97)	(1.94)
MED							-0.04	0.61	-0.08	0.05	0.68*	0.23	-0.01
							(-0.67)	(0.75)	(-0.09)	(0.47)	(1.69)	(0.37)	(-0.16)
MED*TECH								-0.05	-1.07*		-0.86*	-0.19	
								(-0.11)	(-1.78)		(-1.91)	(-0.63)	
MED*ECON								-0.53	0.94			-0.06	
								(-0.56)	(0.87)			(-0.09)	
GULF												0.05	0.05
												(0.94)	(0.36)
SSA												-0.17**	-0.17**
												(-2.08)	(-2.10)
LAC												0.03	0.03
												(0.35)	(0.34)
EAP												0.02	0.03
												(0.29)	(0.37)
OECD												0.20***	0.20***
												(2.41)	(2.47)
Adjusted R^2	0.66	0.67	0.65	0.64	0.74	0.76	0.78	0.72	0.70	0.71	0.73	0.80	0.80
N	77	77	77	77	77	77	77	77	77	77	77	77	77

Note: ***, **,and * denote a significance at the 1, 5 and 10 percent level, respectively.

4.1 Determinants of Development: Results from Simple OLS Regressions

All explanatory variables—key and control variables—show the expected signs consistently throughout the different models.

Technological readiness has a highly significant, positive impact and a large economic importance. The coefficients suggest that two-thirds of the variation in economic development can actually be explained by a country's technological readiness. Even after the inclusion of all dummy variables, the importance remains above 50 percent.

When first being introduced in model 7, the dummy for Arab Mediterranean countries (MED) displays a negative sign, but is positive thereafter. The explanation is reasonably straightforward: model 7 points out that the generally positive impact of economic institutions, technological readiness, and the control variables might not hold true when analyzing economic development in AMCs as compared to other regions of the world, without being able to explain why. Models 8 and 9 are able to specify this finding: the negative impact of the MED dummy on economic development stems from the negative impact of lacking technological readiness. While the MED dummy now has a positive sign, the interaction term MED*Technological readiness has a negative sign, and both significant economic and significant statistical relevance (-0.52** and -0.46**, in column 8 and 9, respectively).

In contrast, the impact of economic institutions (ECONINST) changes from positive (columns 1-7) to negative (columns 8 and 9). They also lose significance and magnitude with the

successive inclusion of more variables. This may be puzzling at first, but it supports the hypothesis that economic institutions matter and that they are endogenously dependent on several determinants, the impact of which can be either in support of or an obstacle to economic development. This initial indicative finding needs further investigation and interpretation, which will be provided in section 4.2.

With respect to identifying the most binding constraints to the economic development of the AMCs, the magnitude of the coefficients yields a sense of the potential impact. The benchmark model 9, which includes the regional dummies as well as the interaction term, reveals within a specification with a solid explanatory power of 84 percent (adjusted R^2) that both technological readiness and distance from equator in general have a 53 percent and 24 percent return on economic development. Both findings are in line with the importance of these two variables as noted in the theoretical section. With respect to the AMCs, the positive impact of technological readiness almost diminishes. Adding the interaction term to the TECHREAD coefficient gives the more precise estimate of as little as 0.07, or 7 percent.

However, when looking at the correlation of the residual and ECONINST, it becomes obvious that the measure of the quality of economic institutions, ECONINST, is in itself an endogenous variable.[11] In order to take this interdependence into account and, at the same time, to clarify the importance of its components, I use a two-stage rather than a simple ordinary least squares regression. First, I present the results of simple OLS regression on economic institutions and their determinants, to once again clarify the impact and relative importance of different variables.

4.2 Political Economy and Economic Institutions

ECONINST is identified as an endogenous variable. For several technical reasons, it is not appropriate to rely on ECONINST values for the overall regression, but is better to use a two-stage estimation strategy instead. For technical reasons do 2SLS results not yield information on the impact of different instrumental variables on the endogenous explanatory variable. I thus use this section to shed light on the determinants of economic institutions from an political economy perspective. In a simple OLS analysis, I regress the measure for institutions, ECONINST, on political and political economy variables, such as the nature of a country's polity measures, POLITY. The value ranges between 10 (democratic) and -10 (autocratic) rule. RENTS measures the prevalence and importance of rent-seeking mentalities and structures, drawing on WDI corruption data. Finally, the effect of an inefficient allocation of resources is tested by using ALLOSTA as a measure of the allocative nature of the government (subsidies and other transfers as percent of government expenses). The regression is based on equation (3.8).

Introducing the interaction terms allows an analysis of the effect of an independent explanatory variable on the nature of another independent variable. I look at the interaction terms *RENTSEEK*MED*, *ALLOSTA*MED*, *POLITY*MED*, and *REMITTAN*MED*. One could also

[11] The simple, part, and partial correlations are reported in the annex and show a positive correlation with the residual.

look at differences between economic institutions in OECD and non-OECD countries, using the OECD dummy and, alternatively, a separate non-OECD sample (which is not reported). A summary of the results is presented in Table 7.

The benchmark model, which has the largest and most satisfying explanatory power at 69 percent, includes all four political economy variables and, together with the MED dummy, is presented in column 6. Polity structures (0.17), rent-seeking structures (0.21), and the MED dummy (-0.19) all display a similar magnitude of approximately 20 percent. However, rent-seeking structures are economically larger than any other coefficient (-0.71) and thus significantly hamper the efficiency of economic institutions—far more than nonauthoritarian structures positively influence ECONINST.

After introducing the interaction terms in column 7 and 8, neither the MED dummy nor the interaction terms are significant and adjusted R^2 is decreasing. Therefore, the coefficients must be interpreted with care, even though they support the methodological analysis of the previous section.

4.3 Two-Stage Least Squares Regression

In this section, I present the results from 2SLS regression analyses. As described above, 2SLS allows for the synthesis of the individual OLS regressions. The instrumental variables (rent seeking, polity, allocative state functions, etc.) help to identify the economic institutions more precisely. The results from the 2SLS regression are summarized in Table 8.

The explanatory power of the regression analyzes ranges around a satisfying 70 percent. Due to differences in measurement, the 2SLS adjusted R^2 does not directly compare to the adjusted R^2 of the simple OLS regressions.[12] However, the changes of the adjusted R^2 indicate the gain or loss of explanatory power throughout the different models.

All explanatory variables show the expected signs, although not all of them are statistically significant. Columns 1 to 6 represent the general importance of both key variables, economic institutions and technological readiness, for all countries in the sample. Both variables are constantly significant at a 1 or 5 percent significance level and are economically important, as indicated by the magnitudes of 45 and 37 percent of the coefficients of technological readiness and economic institutions, respectively, in column 6. The economy's dependency on oil as measured in fuel exports is also statistically significant and economically important, but it loses importance with the successive introduction of further variables. In contrast, the distance from the equator remains important in all models. The inclusion of armed conflict (LGCONFL) as a control variable slightly raises the explanatory power from model 5 to 6, even though the coefficient is not significantly different from zero.

When the dummy variable for the Arab Mediterranean countries (MED) is added in model 7 and included in every subsequent specification, several changes in data need further explanation: The first thing that becomes obvious is that once I control for Arab Mediterranean Economic development, economic institutions lose both statistical significance and impor-

[12] A Shea partial test is necessary to identify the adjusted R^2 which compares to the values of simple OLS regression. This test is beyond the scope of SPSS analysis and no other statistical program such as STATA was available at the point of writing, but it will be appended as soon as possible.

tance. In those cases where the control variable for armed conflict is included (columns 6, 7, 9, and 11), the effect of economic institutions switches signs and remains negative. For the interpretation, I focus more on the models that omit conflict rather than on those that are particularly affected by open conflict. The West Bank, Gaza, Lebanon and Iraq are not included in the sample due to data restrictions.

Like the results of the simple OLS regressions, the Arab Mediterranean dummy has a negative coefficient if the interaction is not further specified (columns 7 and 13). However, the interaction terms explain the negative impact of technological readiness and economic institutions in economic development is these countries. This implies that the AMCs are lagging technologically behind other countries. Adding the MED*TECH interaction term to the TECH coefficient yields the factual contribution of technological readiness to economic development in these countries. A similar and yet less powerful effect also appears for economic institutions.

4.4 Robustness Check

Several robustness checks have been performed, but are not reported. Table 24 in the annex provides an overview of the alternative measures used.

5 Conclusion

In this paper, I have tested different determinants of economic development with respect to political economy characteristics and technological capabilities. The aim of the paper was to contribute to a better understanding of the determinants of and constraints to economic development in the AMCs in general and in Algeria, Tunisia, Morocco, Jordan, and Egypt in particular.

The results of the quantitative analysis support the notion that, in particular, the lack of technological readiness and the presence of economic institutions dominated by rent-seeking behavior constitute the most acute or most binding constraints to economic development in these countries. The results also indicate that other factors that have dominated the literature on the prospects of Arab Mediterranean economic development in the past, such as conflict and trade openness, are clearly secondary.

The empirical evidence suggests a validation of the second hypothesis, which implies that an economically inefficient allocation of resources in the Middle East and North Africa is deeply rooted in the political economy structures and is therefore beyond the reach of traditional structural adjustment measures that aim to reduce market inefficiencies. Structural adjustment in the region will only be successful when it is able to reduce these main constraints to economic development. The reason international adjustment programs in the region remain unsuccessful may lie in the fact that they are simply targeting the symptoms rather than the causes of low MED economic development.

The findings of this paper also imply that, in contrast to those of successfully developing countries, especially in Asia, MED governments are not dedicated enough to developing their own approaches to structural adjustment which build on the authoritarian polity and the activation of productive potential that has so far been channeled to rent-seeking structures.

In the short to medium term neither the authoritarian nature of these countries nor their prevalent rent-seeking networks will change dramatically. Structural adjustment efforts must therefore take them into account. However, economic development will only gain momentum if it is possible to close the productivity and technology gap between the AMENA countries and the rest of the world, which will continue to widen unless urgent measures are taken. The analysis performed here constitutes an important argument for researchers and national and international policy makers to direct more effort towards understanding and fostering technology diffusion within and into these countries, and towards investigating their technological capacities in depth.

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A Annex

A.1 List of Countries

Table 9: Regression sample: N = 77

Albania, ***Algeria***, Argentina, Armenia, Australia, Bangladesh, Belgium, Benin, Bolivia, Bulgaria, Burkina Faso, Cambodia, Cameroon, Chile, China, Colombia, Costa Rica, Croatia, Czech Republic, Denmark, ***Egypt***, El Salvador, Estonia, Ethiopia, Finland, France, Georgia, Germany, Greece, Guatemala, Hungary, Indonesia, Ireland, Israel, Italy, Jamaica, ***Jordan***, Kazakhstan, Kenya, Kyrgyz Republic, Latvia, Lithuania, Madagascar, Malaysia, Mauritius, Moldova, ***Morocco***, Netherlands, New Zealand, Nicaragua, Norway, **Oman**, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russia, Slovak Republic, Slovenia, Spain, Sri Lanka, Sweden, Switzerland, Thailand, ***Tunisia***, Turkey, Uganda, Ukraine, United Kingdom, United States, Uruguay, Venezuela, **Yemen**

Note: Arab Gulf countries are indicated with bold type; Arab Mediterranean countries in bold italics.

Table 10: Full Sample N = 173

Afghanistan, Albania, ***Algeria***, Angola, Argentina, Armenia, *Australia*, *Austria*, Azerbaijan, Bahamas, **Bahrain**, Bangladesh, Barbados, Belarus, *Belgium*, Belize, Benin, Bhutan, Bolivia, Bosnia, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, *Canada*, Cape Verde, Central African Republic, Chad, Chile, China, People's Republic of, Colombia, Comoros, Congo Brazzaville, Congo, Democratic Republic of the, Costa Rica, Croatia, Cuba, Cyprus, *Czech Republic*, *Denmark*, Djibouti, Dominican Republic, East Timor, Ecuador, ***Egypt***, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, *Finland*, *France*, Gabon, Gambia, Georgia, *Germany*, Ghana, *Greece*, Guatemala, Guinea-Bissau, Guinea, Guyana, Haiti, Honduras, Hong Kong, *Hungary*, *Iceland*, India, Indonesia, Iran, **Iraq**, *Ireland*, Israel, *Italy*, Ivory Coast, Jamaica, *Japan*, ***Jordan***, Kazakhstan, Kenya, Korea, Democratic People´s Republic of (North Korea), *Korea, Republic of (South Korea)*, **Kuwait**, Kyrgyz Republic, Laos, Latvia, ***Lebanon***, Lesotho, Liberia, ***Libya***, Lithuania, *Luxembourg*, Macedonia FYR, Madagascar, Malawi, Malaysia, Mali, Malta, Mauritania, Mauritius, *Mexico*, Moldova, Mongolia, ***Morocco***, Mozambique, Myanmar, Namibia, Nepal, *Netherlands*, *New Zealand*, Nicaragua, Niger, Nigeria, *Norway*, **Oman**, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, *Poland*, *Portugal*, Puerto Rico, **Qatar**, Romania, Russia, Rwanda, Samoa, **Saudi Arabia**, Senegal, Serbia and Montenegro, Sierra Leone, Singapore, *Slovak Republic*, Slovenia, Solomon Islands, Somalia, South Africa, *Spain*, Sri Lanka, Sudan, Suriname, Swaziland, *Sweden*, *Switzerland*, ***Syria***, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Trinidad and Tobago, ***Tunisia***, Turkmenistan, *Turkey*, Uganda, Ukraine, **United Arab Emirates**, *United Kingdom*, *United States*, Uruguay, Uzbekistan, Venezuela, Vietnam, ***West Bank and Gaza***, **Yemen**, Zambia, Zimbabwe

Note: The member countries of the OECD are indicated with italics. Arab Gulf countries are in bold type; Arab Mediterranean countries in bold italics.

A.2 Variables: Definition and Data Sources

Table 11: Variables and Sources

Variable	Description
LGGDP	logarithm of gross domestic product per capita in constant US dollars, purchasing power parity (PPP). Baseline year 2000 (World Bank 2007)
CONFL	number and intensity of internal and external conflicts (CSCW 2005)
DISTEQ	distance of capital city from equator, measured as the absolute value of latitude (Dollar/Kray 2002)
LANDLOCK	dummy variable taking value 1 for countries without access to the sea, 0 otherwise (Dollar/Kray 2002)
OILDEP	dummy variable taking the value 1 for a country being a major oil exporter, 0 otherwise
OPENNESS	natural logarithm of real openness, which is given by the ratio of nominal imports plus exports to GDP (PPP) in US dollars (Summers et al. 2006)
POP	population in million, 2006 (World Bank 2007)
TECHREAD	a country's level of technological readiness, values ranging from 1 to 7 (WEF 2007b)
ECONINST	composite index of economic freedom, including a set of six indicators of economic institutions: business regulations, fiscal burden, property rights, restrictions on investment, capital market restrictions, and labor market rigidity. Values range from 0 to 100, combining survey and hard data (Heritage Foundation 2007).
RENTSEEK	corruption as a major constraint to investment, executive opinion survey (World Bank 2007)
ALLOSTA	allocative nature of the state measured as the compensation of employees, subsidies, and other transfers as percent of government expenses (World Bank 2007)
AUTHOR	authoritarian nature of the state. Composite index of three general patterns of regime authority: executive recruitment, executive constraints, and political competition. The index value ranges on a twenty point scale from 10 = democratic to -10 = authoritarian rule (CIDCM 2006).

Table 12: Regional Dummy Variables

Variable	Description
D_LAC	dummy variable taking the value 1 if a country belongs to Latin America and Caribbean, 0 otherwise
D_EAP	dummy variable taking the value 1 if a country belongs to East Asia and Pacific, 0 otherwise
D_ECA	dummy variable taking the value 1 if a country belongs to Europe and Central Asia, 0 otherwise
D_SSA	dummy variable taking the value 1 if a country belongs to sub-Saharan Africa, 0 otherwise
D_OECD	dummy variable taking the value 1 if a country is member of Organization for Economic Cooperation and Development (OECD), 0 otherwise
D_GCC	dummy variable taking the value 1 if a country is member of the Gulf Cooperation Council (GCC), 0 otherwise
D_MED	dummy variable taking the value 1 if a country is an Arab Mediterranean Country, 0 otherwise

A.3 Regression Output

A.3.1 Simple OLS Regressions: Economic Development

Table 13: Descriptive Statistics

	Mean	Std. Deviation	N
LGGDP	3.9000	.44946	77
IEFOF8	66.6802	9.28532	77
TECHREAD	4.065	1.1905	77
OPENNESS	87.868	43.5229	77
POP05	48.2295	153.39450	77
FUELEX	15.55	24.524	77
LGCONFL	.5849	.71410	77
DISTEQ	32.81	17.515	77
MED	.06	.248	77
INTM_TE	.2469	.96364	77
GULF	.01	.114	77
SSA	.10	.307	77
LAC	.17	.377	77
EAP	.10	.307	77
OECD	.31	.466	77

Table 14: Correlations: OLS Regressions Development

		LGGDP	IEFOF8	TECHREAD	OPENNESS	POP05	FUELEX	LGCONFL	DISTEQ	MED	INTM_TE	GULF	SSA	LAC	EAP	OECD
Pearson Correlation	**LGGDP**	1.000	.665	.805	.276	-.043	-.052	-.364	.673	-.110	-.106	.062	-.547	-.142	-.068	.728
	IEFOF8	.665	1.000	.666	.336	-.195	-.289	-.391	.510	-.277	-.262	-.021	-.256	-.028	-.228	.612
	TECHREAD	.805	.666	1.000	.196	-.022	-.125	-.184	.389	-.059	-.023	.039	-.370	-.042	.052	.612
	OPENNESS	.276	.336	.196	1.000	-.190	-.213	-.345	.287	-.065	-.046	.021	-.232	-.242	.115	.134
	POP05	-.043	-.195	-.022	-.190	1.000	-.035	.246	.010	-.031	-.034	-.034	-.054	-.101	.383	-.056
	FUELEX	-.052	-.289	-.125	-.213	-.035	1.000	.025	-.026	.169	.098	.245	-.068	-.070	.080	-.156
	LGCONFL	-.364	-.391	-.184	-.345	.246	.025	1.000	-.481	.118	.076	.018	.034	.153	.238	-.355
	DISTEQ	.673	.510	.389	.287	.010	-.026	-.481	1.000	.003	.002	-.065	-.473	-.387	-.307	.567
	MED	-.110	-.277	-.059	-.065	-.031	.169	.118	.003	1.000	.979	-.030	-.090	-.119	-.090	-.177
	INTM_TE	-.106	-.262	-.023	-.046	-.034	.098	.076	.002	.979	1.000	-.030	-.088	-.116	-.088	-.174
	GULF	.062	-.021	.039	.021	-.034	.245	.018	-.065	-.030	-.030	1.000	-.039	-.052	-.039	-.077
	SSA	-.547	-.256	-.370	-.232	-.054	-.068	.034	-.473	-.090	-.088	-.039	1.000	-.153	-.116	-.229
	LAC	-.142	-.028	-.042	-.242	-.101	-.070	.153	-.387	-.119	-.116	-.052	-.153	1.000	-.153	-.303
	EAP	-.068	-.228	.052	.115	.383	.080	.238	-.307	-.090	-.088	-.039	-.116	-.153	1.000	-.137
	OECD	.728	.612	.612	.134	-.056	-.156	-.355	.567	-.177	-.174	-.077	-.229	-.303	-.137	1.000
Sig. (1-tailed)	**LGGDP**	.	.000	.000	.008	.357	.327	.001	.000	.170	.180	.295	.000	.108	.280	.000
	IEFOF8	.000	.	.000	.001	.045	.005	.000	.000	.007	.011	.429	.012	.405	.023	.000
	TECHREAD	.000	.000	.	.043	.425	.139	.055	.000	.306	.421	.367	.000	.360	.327	.000
	OPENNESS	.008	.001	.043	.	.049	.031	.001	.006	.286	.345	.428	.021	.017	.160	.122
	POP05	.357	.045	.425	.049	.	.381	.015	.466	.396	.386	.383	.320	.190	.000	.315
	FUELEX	.327	.005	.139	.031	.381	.	.414	.410	.071	.198	.016	.280	.274	.244	.088
	LGCONFL	.001	.000	.055	.001	.015	.414	.	.000	.153	.255	.437	.384	.092	.019	.001
	DISTEQ	.000	.000	.000	.006	.466	.410	.000	.	.490	.494	.288	.000	.000	.003	.000
	MED	.170	.007	.306	.286	.396	.071	.153	.490	.	.000	.397	.219	.152	.219	.061
	INTM_TE	.180	.011	.421	.345	.386	.198	.255	.494	.000	.	.399	.224	.157	.224	.066
	GULF	.295	.429	.367	.428	.383	.016	.437	.288	.397	.399	.	.368	.328	.368	.252
	SSA	.000	.012	.000	.021	.320	.280	.384	.000	.219	.224	.368	.	.091	.158	.023
	LAC	.108	.405	.360	.017	.190	.274	.092	.000	.152	.157	.328	.091	.	.091	.004
	EAP	.280	.023	.327	.160	.000	.244	.019	.003	.219	.224	.368	.158	.091	.	.117
	OECD	.000	.000	.000	.122	.315	.088	.001	.000	.061	.066	.252	.023	.004	.117	.

Table 15: Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.665[a]	.443	.435	.33773
2	.824[b]	.679	.670	.25821
3	.828[c]	.685	.667	.25919
4	.836[d]	.699	.677	.25532
5	.849[e]	.720	.696	.24777
6	.898[f]	.807	.787	.20736
7	.901[g]	.812	.790	.20615
8	.906[h]	.821	.796	.20277
9	.930[i]	.865	.835	.18268

a Predictors: (Constant), IEFOF8
b Predictors: (Constant), IEFOF8, TECHREAD
c Predictors: (Constant), IEFOF8, TECHREAD, POP05, OPENNESS
d Predictors: (Constant), IEFOF8, TECHREAD, POP05, OPENNESS, FUELEX
e Predictors: (Constant), IEFOF8, TECHREAD, POP05, OPENNESS, FUELEX, LGCONFL
f Predictors: (Constant), IEFOF8, TECHREAD, POP05, OPENNESS, FUELEX, LGCONFL, DISTEQ
g Predictors: (Constant), IEFOF8, TECHREAD, POP05, OPENNESS, FUELEX, LGCONFL, DISTEQ, MED
h Predictors: (Constant), IEFOF8, TECHREAD, POP05, OPENNESS, FUELEX, LGCONFL, DISTEQ, MED, INTM_TE
i Predictors: (Constant), IEFOF8, TECHREAD, POP05, OPENNESS, FUELEX, LGCONFL, DISTEQ, MED, INTM_TE, GULF, LAC, EAP, OECD, SSA

Table 16: Coefficients, lgGDP

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.752	.281		6.239	.000
	IEFOF8	3.221E-02	.004	.665	7.720	.000
2	(Constant)	2.153	.221		9.719	.000
	IEFOF8	1.122E-02	.004	.232	2.624	.011
	TECHREAD	.246	.033	.651	7.370	.000
3	(Constant)	2.144	.231		9.302	.000
	IEFOF8	1.019E-02	.005	.210	2.232	.029
	TECHREAD	.245	.034	.650	7.244	.000
	OPENNESS	8.583E-04	.001	.083	1.173	.245
	POP05	8.363E-05	.000	.029	.415	.679
4	(Constant)	1.973	.247		8.004	.000
	IEFOF8	1.234E-02	.005	.255	2.652	.010
	TECHREAD	.239	.034	.632	7.116	.000
	OPENNESS	1.044E-03	.001	.101	1.433	.156
	POP05	1.308E-04	.000	.045	.653	.516
	FUELEX	2.278E-03	.001	.124	1.787	.078
5	(Constant)	2.263	.270		8.387	.000
	IEFOF8	9.061E-03	.005	.187	1.914	.060
	TECHREAD	.246	.033	.652	7.526	.000
	OPENNESS	6.329E-04	.001	.061	.868	.388
	POP05	1.910E-04	.000	.065	.974	.333
	FUELEX	1.899E-03	.001	.104	1.522	.132
	LGCONFL	-.106	.046	-.169	-2.323	.023
6	(Constant)	2.444	.228		10.713	.000
	IEFOF8	2.415E-03	.004	.050	.584	.561
	TECHREAD	.233	.027	.618	8.496	.000
	OPENNESS	2.650E-04	.001	.026	.432	.667
	POP05	-1.953E-05	.000	-.007	-.116	.908
	FUELEX	1.031E-03	.001	.056	.977	.332
	LGCONFL	-2.406E-02	.041	-.038	-.586	.560
	DISTEQ	9.813E-03	.002	.382	5.563	.000
7	(Constant)	2.537	.237		10.696	.000
	IEFOF8	4.817E-04	.004	.010	.111	.912
	TECHREAD	.240	.028	.635	8.650	.000
	OPENNESS	2.801E-04	.001	.027	.459	.648
	POP05	-5.364E-05	.000	-.018	-.317	.752
	FUELEX	1.099E-03	.001	.060	1.046	.299
	LGCONFL	-1.871E-02	.041	-.030	-.456	.650
	DISTEQ	1.028E-02	.002	.400	5.750	.000
	MED	-.140	.104	-.077	-1.345	.183
8	(Constant)	2.639	.240		10.997	.000
	IEFOF8	-1.339E-03	.004	-.028	-.304	.762
	TECHREAD	.254	.028	.672	8.957	.000
	OPENNESS	2.534E-04	.001	.025	.422	.674
	POP05	-5.876E-05	.000	-.020	-.353	.725
	FUELEX	3.374E-04	.001	.018	.302	.763
	LGCONFL	-4.017E-02	.042	-.064	-.956	.343
	DISTEQ	9.955E-03	.002	.388	5.634	.000
	MED	.785	.520	.433	1.510	.136
	INTM_TE	-.242	.133	-.519	-1.813	.074
9	(Constant)	3.016	.247		12.205	.000
	IEFOF8	-2.151E-03	.004	-.044	-.524	.602
	TECHREAD	.198	.030	.526	6.569	.000
	OPENNESS	1.929E-04	.001	.019	.305	.762
	POP05	-3.965E-05	.000	-.014	-.235	.815
	FUELEX	-3.403E-05	.001	-.002	-.031	.975
	LGCONFL	-5.824E-02	.041	-.093	-1.406	.165
	DISTEQ	6.134E-03	.003	.239	2.264	.027
	MED	.713	.477	.394	1.497	.140
	INTM_TE	-.213	.124	-.457	-1.723	.090
	GULF	.264	.202	.067	1.303	.198
	SSA	-.280	.116	-.191	-2.405	.019
	LAC	2.788E-02	.094	.023	.297	.768
	EAP	4.564E-03	.110	.003	.042	.967
	OECD	.213	.074	.221	2.874	.006

Note: Dependent variable: LGGDP.

A.3.2 Simple OLS Regressions: Economic Institutions

Table 17: Descriptive Statistics

	Mean	Std. Deviation	N
IEFOF8	66.6802	9.28532	77
TR3_POLI	531.74	435.103	77
CORRUPTI	54.44	24.005	77
ALLO_SUB	42.69	19.018	77
REMITTAN	3.76	5.827	77
MED	.06	.248	77
FUELEX	15.55	24.524	77
INTM_RE	3.9740	15.41955	77
INTM_PO	-6.4416	35.23250	77
INTM_AL	2.6577	10.43351	77
INTM_RM	.5315	2.57165	77

Table 18: Correlations: OLS Regressions Institutions

		IEFOF8	TR3_POLI	CORRUPTI	ALLO_SUB	REMITTAN	MED	FUELEX	INTM_RE	INTM_PO	INTM_AL	INTM_RM
Pearson Correlation	**IEFOF8**	1.000	.650	-.771	.368	-.111	-.277	-.289	-.290	.269	-.247	-.163
	TR3_POLI	.650	1.000	-.618	.481	-.266	-.385	-.283	-.383	.310	-.371	-.298
	CORRUPTI	-.771	-.618	1.000	-.436	.345	.075	.147	.093	-.083	.053	.014
	ALLO_SUB	.368	.481	-.436	1.000	-.359	-.237	.027	-.213	.203	-.268	-.299
	REMITTAN	-.111	-.266	.345	-.359	1.000	.201	-.161	.167	-.110	.256	.325
	MED	-.277	-.385	.075	-.237	.201	1.000	.169	.984	-.698	.973	.789
	FUELEX	-.289	-.283	.147	.027	-.161	.169	1.000	.214	-.040	.100	-.023
	INTM_RE	-.290	-.383	.093	-.213	.167	.984	.214	1.000	-.736	.928	.707
	INTM_PO	.269	.310	-.083	.203	-.110	-.698	-.040	-.736	1.000	-.640	-.482
	INTM_AL	-.247	-.371	.053	-.268	.256	.973	.100	.928	-.640	1.000	.905
	INTM_RM	-.163	-.298	.014	-.299	.325	.789	-.023	.707	-.482	.905	1.000

Table 19: Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics		
					R^2 Change	F Change	Sig. F Change
1	.650[a]	.422	.414	7.10543	.422	54.785	.000
2	.802[b]	.644	.634	5.61815	.221	45.965	.000
3	.803[c]	.645	.630	5.64838	.001	.210	.648
4	.823[d]	.677	.659	5.42524	.032	7.128	.009
5	.840[e]	.706	.686	5.20634	.030	7.182	.009
6	.843[f]	.711	.686	5.20415	.004	1.060	.307
7	.850[g]	.722	.680	5.25438	.011	.667	.617

Note: Dependent variable: IEFOF8.

a Predictors: (Constant), TR3_POLI

b Predictors: (Constant), TR3_POLI, CORRUPTI

c Predictors: (Constant), TR3_POLI, CORRUPTI, ALLO_SUB

d Predictors: (Constant), TR3_POLI, CORRUPTI, ALLO_SUB, REMITTAN

e Predictors: (Constant), TR3_POLI, CORRUPTI, ALLO_SUB, REMITTAN, MED

f Predictors: (Constant), TR3_POLI, CORRUPTI, ALLO_SUB, REMITTAN, MED, FUELEX

g Predictors: (Constant), TR3_POLI, CORRUPTI, ALLO_SUB, REMITTAN, MED, FUELEX, INTM_PO, INTM_RM, INTM_RE, INTM_AL

Table 20: Coefficients, ECONINST

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	59.308	1.284		46.201	.000
	TR3_POLI	1.387E-02	.002	.650	7.402	.000
2	(Constant)	76.101	2.677		28.429	.000
	TR3_POLI	5.978E-03	.002	.280	3.174	.002
	CORRUPTI	-.231	.034	-.598	-6.780	.000
3	(Constant)	76.908	3.216		23.913	.000
	TR3_POLI	6.251E-03	.002	.293	3.150	.002
	CORRUPTI	-.235	.035	-.607	-6.698	.000
	ALLO_SUB	-1.819E-02	.040	-.037	-.458	.648
4	(Constant)	75.649	3.125		24.209	.000
	TR3_POLI	6.237E-03	.002	.292	3.272	.002
	CORRUPTI	-.252	.034	-.653	-7.360	.000
	ALLO_SUB	6.582E-03	.039	.013	.168	.867
	REMITTAN	.313	.117	.197	2.670	.009
5	(Constant)	78.736	3.212		24.510	.000
	TR3_POLI	4.127E-03	.002	.193	2.072	.042
	CORRUPTI	-.277	.034	-.716	-8.107	.000
	ALLO_SUB	-1.120E-03	.038	-.002	-.030	.976
	REMITTAN	.360	.114	.226	3.158	.002
	MED	-7.306	2.726	-.195	-2.680	.009
6	(Constant)	79.113	3.232		24.479	.000
	TR3_POLI	3.632E-03	.002	.170	1.773	.081
	CORRUPTI	-.274	.034	-.709	-8.007	.000
	ALLO_SUB	4.744E-03	.038	.010	.124	.901
	REMITTAN	.332	.117	.208	2.829	.006
	MED	-6.960	2.746	-.186	-2.535	.013
	FUELEX	-2.750E-02	.027	-.073	-1.029	.307
7	(Constant)	80.346	3.385		23.738	.000
	TR3_POLI	3.124E-03	.002	.146	1.492	.140
	CORRUPTI	-.283	.036	-.731	-7.961	.000
	ALLO_SUB	-1.567E-03	.039	-.003	-.040	.968
	REMITTAN	.339	.122	.213	2.772	.007
	MED	-8.723	52.899	-.233	-.165	.870
	FUELEX	-4.369E-02	.029	-.115	-1.511	.136
	INTM_RE	.271	.369	.451	.737	.464
	INTM_PO	4.071E-02	.028	.154	1.462	.149
	INTM_AL	-.351	1.233	-.395	-.285	.777
	INTM_RM	.416	1.699	.115	.245	.807

Note: Dependent variable: IEFOF8.

A.3.3. Two-Stage Least Squares Regressions

Table 21: Correlation Matrix of Parameter Estimates

	IEFOF8	TECHREAD	OPENNESS	POP05	FUELEX	DISTEQ
IEFOF8	1.0000000	-.7773116	-.4560445	.2404496	.2266667	-.3468416
TECHREAD	-.7773116	1.0000000	.3148483	-.1520143	-.1288850	.1828208
OPENNESS	-.4560445	.3148483	1.0000000	.1916568	.1418694	.0213755
POP05	.2404496	-.1520143	.1916568	1.0000000	.2210015	-.3175293
FUELEX	.2266667	-.1288850	.1418694	.2210015	1.0000000	-.1525927
DISTEQ	-.3468416	.1828208	.0213755	-.3175293	-.1525927	1.0000000
MED	.5206459	-.4898376	-.1585642	.1156642	.0249982	-.0263763
GULF	.0266990	-.1348945	-.0632035	-.0574059	-.2353157	.2128796
SSA	-.1539097	.1325037	.1954888	-.0933116	.0440900	.6472329
LAC	-.2888012	.0619905	.2787223	-.1061951	-.0408215	.6489984
EAP	.3096521	-.3899943	-.2994267	-.3296592	-.0674299	.4680810
OECD	-.3023703	-.1042793	.2923385	.0129699	.0189943	-.0658707
	MED	**GULF**	**SSA**	**LAC**	**EAP**	**OECD**
IEFOF8	.5206459	.0266990	-.1539097	-.2888012	.3096521	-.3023703
TECHREAD	-.4898376	-.1348945	.1325037	.0619905	-.3899943	-.1042793
OPENNESS	-.1585642	-.0632035	.1954888	.2787223	-.2994267	.2923385
POP05	.1156642	-.0574059	-.0933116	-.1061951	-.3296592	.0129699
FUELEX	.0249982	-.2353157	.0440900	-.0408215	-.0674299	.0189943
DISTEQ	-.0263763	.2128796	.6472329	.6489984	.4680810	-.0658707
MED	1.0000000	.1590694	.1608677	.1432101	.3817070	.0587921
GULF	.1590694	1.0000000	.1796239	.2307286	.2455201	.1119687
SSA	.1608677	.1796239	1.0000000	.6184377	.4038624	.0820453
LAC	.1432101	.2307286	.6184377	1.0000000	.3953381	.3290207
EAP	.3817070	.2455201	.4038624	.3953381	1.0000000	-.0006352
OECD	.0587921	.1119687	.0820453	.3290207	-.0006352	1.0000000

Table 22: 2SLS: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std.Error	Beta	t	Sig.
1	(Constant)	2.562	.086		29.650	.000
	TECHREAD	.324	.021	.816	15.315	.000
2	(Constant)	1.514	.311		4.877	.000
	IEFOF8	.024	.006	.492	3.873	.000
	TECHREAD	.186	.040	.490	4.658	.000
3	(Constant)	1.348	.341		3.959	.000
	IEFOF8	.028	.007	.570	3.823	.000
	TECHREAD	.169	.044	.445	3.882	.000
	OPENNESS	-.000	.001	-.014	-.181	.857
	POP05	.000	.000	.075	1.050	.297
4	(Constant)	.925	.408		2.266	.026
	IEFOF8	.035	.008	.716	4.143	.000
	TECHREAD	.135	.050	.351	2.704	.009
	OPENNESS	.000	.001	.021	.260	.795
	POP05	.000	.000	.117	1.483	.142
	FUELEX	.004	.001	.200	2.550	.013
5	(Constant)	1.473	.380		3.876	.000
	IEFOF8	.022	.008	.460	2.795	.007
	TECHREAD	.161	.042	.421	3.850	.000
	OPENNESS	-6.601E-05	.001	-.006	-.095	.924
	POP05	.000	.000	.058	.862	.391
	FUELEX	.003	.001	.154	2.338	.022
	DISTEQ	.007	.002	.264	3.436	.001
6	(Constant)	1.699	.451		3.771	.000
	IEFOF8	.018	.009	.370	1.986	.051
	TECHREAD	.171	.043	.454	3.950	.000
	OPENNESS	9.363E-05	.001	.009	.138	.891
	POP05	.000	.000	.042	.624	.535
	FUELEX	.002	.001	.124	1.724	.089
	DISTEQ	.008	.002	.308	3.658	.001
	LGCONFL	.001	.047	.002	.021	.984
7	(Constant)	2.180	.434		5.018	.000
	IEFOF8	.008	.009	.164	.908	.367
	TECHREAD	.211	.041	.558	5.161	.000
	OPENNESS	.000	.001	.019	.319	.751
	POP05	2.189E-05	.000	.007	.116	.908
	FUELEX	.002	.001	.087	1.348	.182
	DISTEQ	.009	-.002	.361	4.433	.000
	LGCONFL	-.010	.043	-.016	-.240	.811
	MED	-.081	.121	-.045	-.669	.506
8	(Constant)	1.309	.898		1.458	.149
	IEFOF8	.026	.019	.529	1.334	.187
	TECHREAD	.149	.087	.389	1.716	.091
	OPENNESS	-2.596E-05	.001	-.002	-.34	.973
	POP05	.000	.000	.071	.723	.472
	FUELEX	.003	.002	.155	1.647	.104
	DISTEQ	.006	.003	.242	2.008	.049
	MED	1.141	1.531	.613	.745	.459
	INTM_TE	-.023	.211	-.048	-.109	.913
	INTM_INT	-.017	.031	-.532	-.563	.575

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std.Error	Beta		
9	(Constant)	4.062	1.251		3.248	.002
	IEFOF8	-.031	.026	-.633	-1.197	.236
	TECHREAD	.374	.109	.991	3.433	.001
	OPENNESS	.000	.001	.040	.515	.609
	POP05	-.000	.000	-.121	-1.073	.287
	FUELEX	-.002	.003	-.121	-.853	.397
	DISTEQ	.014	.004	.532	3.526	.001
	MED	-.142	1.592	-.078	-.089	.929
	LGCONFL	-.083	.066	-.132	-1.262	.211
	INTM_TE	-.501	.279	-1.075	-1.795	.077
	INTM_INT	.030	.034	.939	.870	.387
10	(Constant)	1.173	.811		1.447	.152
	IEFOF8	.029	.017	.593	1.657	.102
	TECHREAD	.135	.077	.352	1.750	.084
	OPENNESS	-.000	.001	-.015	-.203	.840
	POP05	.000	.000	.083	.890	.377
	FUELEX	.003	.001	.168	2.095	.040
	DISTEQ	.006	.003	.230	1.989	.051
	MED	.091	.194	.049	.468	.641
11	(Constant)	3.771	1.021		3.692	.000
	IEFOF8	-.025	.021	-.510	-1.181	.242
	TECHREAD	.350	.090	.926	3.896	.000
	OPENNESS	.000	.001	.046	.638	.526
	POP05	-.000	.000	-.098	-1.024	.310
	FUELEX	-.002	.002	-.090	-.759	450
	DISTEQ	.013	.003	.497	3.976	.000
	MED	1.228	.729	.678	1.685	.097
	LGCONFL	-.080	.061	-.126	-1.313	.194
	INTM_ME	-.403	.212	-.865	-1.905	.061
12	(Constant)	2.340	.437		5.353	.000
	IEFOF8	.010	.009	.196	1.027	.308
	TECHREAD	.163	.047	.426	3.470	.001
	OPENNESS	9.652E-05	.001	.009	.133	.894
	POP05	8,074E-06	.000	.003	.043	.966
	FUELEX	.002	.001	.084	1.323	.191
	DISTEQ	.006	.003	.213	1.971	.053
	MED	.432	1.172	.232	.369	.713
	INTM_TE	-.093	.147	-.194	-.632	.530
	INTM_INT	-.002	.022	-.060	-.088	.930
	GULF	.212	.225	.052	.942	.350
	SSA	-.251	.121	-.167	-2.080	.042
	LAC	.036	.101	.030	.351	.727
	EAP	.037	.126	.024	.290	.773
	OECD	.197	.082	.200	2.410	.019
13	(Constant)	2.274	.413		5.508	.000
	IEFOF8	.011	.009	.230	1.281	.205
	TECHREAD	.153	.043	.398	3.517	.001
	OPENNESS	3.290E-05	.001	.003	.045	.964
	POP05	2.061E-05	.000	.007	.110	.913
	FUELEX	.002	.001	.100	1.727	.089
	DISTEQ	.005	.003	.209	1.944	.056
	MED	-.020	.124	-.010	-.157	.876
	GULF	.206	.224	.051	.920	.361
	SSA	-.254	.121	-.169	-2.103	.039
	LAC	.034	.101	.029	.340	.735
	EAP	.046	.125	.031	.371	.712
	OECD	.201	.082	.205	2.470	.016

Table 23: Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1[a]	.816	.665	.662	.291
2[b]	.821	.675	.667	.267
3[c]	.817	.668	.651	.277
4[d]	.815	.664	.641	.291
5[e]	.873	.762	.743	.237
6[f]	.883	.779	.756	.227
7[g]	.898	.806	.783	.211
8[h]	.865	.748	.716	.251
9[i]	.859	.739	.699	.261
10[j]	.855	.731	.705	.258
11[k]	.874	.764	.733	.242
12[l]	.913	.833	.797	.205
13[m]	.911	.829	.798	.205

a Predictors: (Constant), TECHREAD
b Predictors: (Constant), IEFOF8, TECHREAD
c Predictors: (Constant), IEFOF8, TECHREAD, OPENNESS, POP05
d Predictors: (Constant), IEFOF8, TECHREAD, OPENNESS, POP05, FUELEX
e Predictors: (Constant), IEFOF8, TECHREAD, OPENNESS, POP05, FUELEX, DISTEQ
f Predictors: (Constant), IEFOF8, TECHREAD, OPENNESS, POP05, FUELEX, DISTEQ, LGCONFL
g Predictors: (Constant), IEFOF8, TECHREAD, OPENNESS, POP05, FUELEX, DISTEQ, LGCONFL, MED
h Predictors: (Constant), IEFOF8, TECHREAD, OPENNESS, POP05, FUELEX, DISTEQ, MED, INTM_TE, INTM_INT
i Predictors: (Constant), IEFOF8, TECHREAD, OPENNESS, POP05, FUELEX, DISTEQ, LGCONFL, MED, INTM_TE, INTM_INT
j Predictors: (Constant), IEFOF8, TECHREAD, OPENNESS, POP05, FUELEX, DISTEQ, MED
k Predictors: (Constant), IEFOF8, TECHREAD, OPENNESS, POP05, FUELEX, DISTEQ, MED, LGCONFL, INTM_TE
l Predictors: (Constant), IEFOF8, TECHREAD, OPENNESS, POP05, FUELEX, DISTEQ, MED, INTM_TE, INTM_INT, GULF, SSA, LAC, EAP, OECD
m Predictors: (Constant), IEFOF8, TECHREAD, OPENNESS, POP05, FUELEX, DISTEQ, MED, GULF, SSA, LAC, EAP, OECD

Table 24: Alternative Variables

	Alternative Measures	Description	Source
LGGDP	PCGCP	GDP per capita	WDI
	Growth10	average annual growth, 1995–2005	WDI
	Growth5a	average annual growth, 1995–2000	WDI
	Growth5b	average annual growth, 2000–2005	WDI
OPENNESS	OPENH	freedom of trade	IEF
	OPENKK	fitted trade openness	Kaufmann et al.(2005)
MACROST	MACROSH	monetary freedom	IEF
ECONINST	PROP	property rights	WDI
TECHREAD	Sciedev	ISTC	RAND
	Procsoph	process sophistication	WEF
	Innocap	innovative capacity	WEF
	Patents	number of patents filed by residents	WDI
	Technic	number of technicians and researchers	WDI
	Techabs	technology absorption	WEF
RENTSEEK	RENT_ODA	total amount of ODA	WDI
	Rent_Rem	remittances as percent of GDP	WDI
ALLOSTA	ALLO_Em	compensation of employees as percent of government expenses	WDI
	ALLO_Sub	subsidies and other transfers as percent of government expenses	WDI
DUMMY	D_LAC	Latin America and Caribbean	
	D_EAP	East Asia and Pacific	
	D_ECA	Europe and Central Asia	
	D_SSA	sub-Saharan Africa	
	D_OECD	OECD countries	
	D_GCC	members of the Gulf Cooperation Council	
	D_MED	Arab Mediterranean country	

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