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ECONOMIC DEVELOPMENT AND SUB-REGIONAL IDENTITIES

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ABSTRACT

This study argues that the regions classified by the World Bank are not coherent in terms of economic structures. The special identities within each region dictate that the economic performance in different sub-regions should be determined independently. Embracing Barro's (1991) regional uniqueness analysis, each region is divided according to distinctive characteristics. A fixed effects unbalanced panel model for 185 countries over the period 1970-2012 is used. The results indicate that explanatory variables responded differently in each group, which indicates the significant effect of the identities used to determine the division of the regions. Based on our findings, this study recommends that governments should act as follows: (1) adjust their policies so that the population grows according to the growth requirements, (2) rationalize the management of natural resource-revenues and establish a multi-sectored economy, and (3) enhance political rights and civil liberties in addition to fighting corruption.

JEL Classifications: I2, O1

Keywords: Economic Development, Population Growth, Human Capital, Government Expenditures, Foreign Direct Investment, Political Risks.

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INTRODUCTION

Economic growth has been studied and analyzed for decades. The neoclassical theories developed by Solow (1956) and Swan (1956) were good starting points that facilitated the development of comprehensive models by other economists, such as Romer (1986) and Lucas (1988). However, Romer and Lucas lacked the specificity of human capital, allowed for a technology spillover effect, and used impractical constant returns to scale assumption. The studies by Romer (1990) and Aghion and Hewitt (1992) combined research and development theories and imperfect competition into the framework of economic growth theories. However, a number of studies focused on the role of institutions on growth (Rodrik *et al.* (2004), Acemoglu and Johnson (2005), De Haan *et al.* (2006), and Mehlum *et al.* (2006)). The latest studies by Acemoglu and Robinson (2013), Prescott (2014), Taylor (2014), and Summers (2014) argue that policies are the main generators of growth and that incorrect decisions lead to poor economic performance. Economic growth, according to these studies, is defined as an increase in a country's GDP or GNP, and it occurs when there is an increase in the multiplied product of population and per capita income.

None of these studies considered the unique identities of regions¹ until Barro (1991) identified the differences among regions. Barro identified a dummy variable for each region to distinguish regional uniqueness. The Sub-Saharan Africa and Latin America regions displayed low per capita income relative to East Asia. To eliminate outliers in the dataset, a dummy variable was created for each region. However, there were two problems with Barro's findings: (1) the significance of the regional dummy variables depended on the elimination or addition of other explanatory variables, and (2) the combination of the three regional variables in one dataset ignored the different identities of each region.

Barro neglected the special features that differentiate countries in each region. For example, the category of oil producers represents only a portion of the MENA countries. In addition, many Sub-Saharan countries are categorized as part of debt relief programs, whereas others are not. In addition, corruption and other political risks vary among countries within each region. These factors divide each region further into subcategories with different growth rates. Following this logic and focusing on the two aforementioned problems faced by Barro (1991), the goal of this paper is to prove that regions are not coherent in terms of economic structures. In addition, this research addresses the differences within each region that have proven to have major effects on economic growth. The explanatory variables included in this study are those that are frequently used and show relevance in the literature. This paper is unique because it considers the characteristics of each regional group; it divides the total dataset into five regions and studies the sub-groups within regions separately.

The study finds that regions lack homogeneity in terms of economic structures and their correlation with growth. Therefore, dividing each region according to its identity provides results that are more powerful and proves that the economic growth of each sub-group (sub-region) is determined autonomously. Moreover, explanatory variables respond differently in each sub-region, which indicates the importance of the features used to divide the regions. This paper is organized as follows. The related literature is discussed in section two. Section three describes the methodology and the data. Section four explains the empirical work, the results, and findings. Section five concludes the paper.

RELATED LITERATURE

Extensive literature has been developed to examine the determinants of economic growth. These studies attempt to define the main determinants of countries' economic growth. In general, it has been demonstrated that economic growth is determined by the rate of population growth, mortality rate, fertility rate, human capital, government expenditures, foreign direct investment, culture, and political risk. Several economists believe that the population growth rate is positively related to per capita income. Furuoka (2009) referred to the long-term positive association between population growth and economic growth. Numerous studies on developing economies (Barro and Sala-i-Martin 2003 and Sachs 2008) found that a high population growth rate has a negative effect on growth. In an empirical study on Kenya, Kiguru *et al.* (2013) found that population growth promotes economic development. Klasen and Lawson (2007) found that a high population growth rate offset poverty reduction programs in Uganda and led to lower growth. Furthermore,

Alexiou (2009) found an insignificant relation between population growth and economic growth in Eastern Europe.

According to Gertler and Molyneaux (1994), the fertility rate per woman is a deterrent variable in growth theory. Sindig (2009) found that fertility is critical for economic growth. Furthermore, Li *et al.* (2008) found that a higher fertility rate per woman reduces the ability to raise high-quality children, which has a negative effect on the expected per capita output. In addition, Rosenzweig and Zhang (2009), in a study on China, found that fertility decreases the level of education and thus the economic performance. The mortality rate is another determinant that is used extensively in the literature. This variable represents the mortality rate per 1000 infants. Cutler *et al.* (2006) stated that there is a tight correlation between per capita income growth and mortality rate. Cervellati and Sunde (2005) focused on the association between life expectancy and human capital accumulation and their importance in the growth of emerging economies. Soares (2005) suggested that as mortality decreases, investment in human capital increases, which increases the return to the individuals with prolonged life. Galor (2005) found that the association of technological progress and mortality rate is the main driver of growth.

Human capital is considered a main generator to economic growth. According to Barro (1991), Cohen and Soto (2007), and Lutz *et al.* (2007), there is a positive correlation between years of schooling and economic growth. Glaeser *et al.* (2004) and Golar (2005) argued that the accumulation of human capital is the main source of long-term growth. Sunde and Vischer (2011) found that both the initial levels and the current changes in human capital are positively correlated with growth. However, Bills and Klenow (2000) found that changes in human capital could explain only the short-term growth rates of the economy. Kakar *et al.* (2011) found that school enrollment has a positive effect on economic growth over both the long- and short-term. Government spending is a tool to enhance economic growth. De Haan and Romp (2007) found a direct effect of government spending on per capita income. In a study of England, Ireland, and Greece, Loizides and Vamvoukas (2005) concluded that government size “Granger causes” economic growth in both Ireland and the UK, but not Greece. However, Angelopoulos *et al.* (2008) found no consistent evidence of the effect of government spending on per capita output. Likewise, Dinca and Dinca (2013) found that the government spending in the post-communist countries did not significantly affect the economy. Alexiou (2009) found that capital spending in many Eastern European countries is positively correlated with economic growth.

Foreign direct investment (FDI) is an efficient tool for economic growth (Li and Liu, 2004). Prakash and Potoski (2007) found that FDI creates incentives for domestic firms in developing countries to improve their standards. However, Sanderson and Kentor (2009) argued that FDI has a positive impact on only the primary sector of the economy. Hermes and Lensink (2003) concluded that FDI has a positive effect on growth, only if the host country has a sufficiently developed financial system. However, according to Sumner (2005), the benefits of FDI are linked only to the FDI policy regime. Culture is strongly associated with economic growth (Tabellini, 2010). A number of studies found a correlation between the norms and values of individuals and the performance of the economy. In studying the effect of culture on growth, Barro and McCleary (2003) and Williamson (2009) found that culture plays an important role in

economic growth. Williamson and Mathers (2011) argued that culture is important for initial growth, in the absence of economic freedom. However, when economic freedom exists, the effect of culture on growth disappears. Adopting the Tabellini (2010) and Williamson and Mathers (2011) culture measure, four cultural categories are identified: trust, respect, individual self-determination, and obedience. Consistent with Francois and Zabojnik (2005), Tabellini (2010), and Williamson and Mather (2011), trust, respect, and self-determination were shown to be positively associated with economic growth.

Regional Variables:

In this study, different regions are included. These regions are based on the World Bank classifications. In each region, a dummy variable was created to identify the countries with special characteristics. In the MENA region, the dummy variable indicates the effect of oil production on economic growth. In the Sub-Sahara region, a number of countries are classified as highly indebted poor countries (HIPC). This classification is based on a debt relief program adopted by the International Monetary Fund (IMF) and the World Bank for countries with a high debt ratio. This program has an exogenous effect on economic growth. However, higher growth by these countries does not indicate an improvement on economic indicators but is an external factor that leads to positive change. For this reason, a dummy variable was created to represent the HIPC countries.

The European income per capita varies between western and eastern countries. This division occurred after World War II when Eastern Europe followed the Soviet bloc, whereas Western Europe was part of an alliance led by the United States. This situation was maintained until the collapse of the Soviet Union in 1990. To differentiate between these regimes, a dummy variable was created to represent the countries in Western Europe. The Asian and Pacific countries differ in relative corruption risks. Some countries in this region have a high corruption risk, such as Afghanistan, Bangladesh, and North Korea², whereas others, such as Australia, Japan, Malaysia, and Singapore, have a low corruption risk. A dummy variable was created to indicate countries with high corruption. This variable is expected to have a negative sign. A significant number of Latin American countries are rich in natural resources (table 9). These countries are expected to have higher economic growth than other Latin countries. To capture the effect of this difference, a dummy variable was created to represent resource-rich countries.

METHODOLOGY AND DATA

This study focuses on the various categories that differentiate countries in each region in terms of the economic structures and how these categories correlate with growth.

To identify the special characteristics of each region, this study uses a procedure originally adopted by Barro (1991), who differentiated regions based on unique dummy variables. The following research focuses on the differences among the regions. In addition, it addresses the differences in each region that are believed to have significant effects on economic growth. Because the regions lack homogeneity, they must be divided based on their unique features. The main dataset is thus divided into five subsets, and each subset (sub-region) represents a different region. In each sub-region, a dummy

variable is included to represent the factor used to divide each region. The model is estimated for each region, for each country i at time t , as follows:

$$\begin{aligned}
 PCGDP_{it} = & \beta_0 + \beta_1 POPULATION_{it} + \beta_2 MORTALITY_{it} + \beta_3 FERTILITY_{it} \\
 & + \beta_4 SCHOOL ENROLLMENT_{it} + \beta_5 GOVEXP_{it} + \beta_6 FDI_{it} \\
 & + \beta_7 CULTURE_{it} + \beta_8 REGIONAL DUMMY_{it} + \varepsilon_{it}
 \end{aligned} \tag{1}$$

In equation 1, the dependent variable is *PCGDP*. This variable is the GDP per capita based on purchasing power parity (PPP). According to the World Bank's definition, PPP GDP is the gross domestic product converted to international dollars, using purchasing power parity rates. The dependent variable is used in this form to make the per capita output comparable among the different regions. The independent variables chosen in this paper are consistent with those frequently found in literature. *POPULATION* is the annual population growth rate. *MORTALITY* is the infant mortality rate per 1000 live births³. *FERTILITY* is the total fertility rate per woman⁴. *SCHOOL ENROLLMENT* is the gross secondary school enrollment percentage. *GOVEXP* is the general government final consumption expenditure as a percentage of GDP⁵. *FDI* is the net flow of foreign direct investment as a percentage of GDP⁶. *CULTURE* is the sum of the three positive norms (trust, respect, and control) minus the negative belief (obedience). The calculation of the *CULTURE* index is illustrated in Appendix B. *REGIONAL DUMMY* is a special variable that defines the characteristics of the regions and the sub-regions. All of the dummy variables are defined and explained in section 2.

The sample used in this study includes the unbalanced annual panel data from 185 countries over the period 1970-2012. The economic data are derived from the *World Development Indicators* (WDI) and *Global Development Finance* (GDF) databases. The corruption index is derived from the *International Country Risk Guide* (ICRG) database. The culture index is developed using questions from *World Values Surveys* (WVSs). The civil liberties and political rights indices are derived from *Freedom House*.

EMPIRICAL FINDINGS

Table 1 presents the results of the regressions of the different region samples: MENA, Sub-Saharan, Europe, Central Asia, Latin America, the Caribbean, South Asia, East Asia, and the Pacific.

MENA Region:

The Middle East and North Africa (MENA) region is considered an important part of the world. Despite more than seven decades of oil generating revenues, this region remains classified as developing by the World Bank. Karl (2004) found this is because it is a single-sectored⁷ economy. Others, such as Rodrik (1997), argued that it is because of the lack of democracy and transparent institutions.

TABLE 1. ALL REGIONS WITH DEPENDENT VARIABLE PCGDP

	MENA	Sub-Sahara Africa	Europe & Central Asia	Latin & Caribbean	S. & E. Asia	& & Pacific
POPULATION	-436.64* (1.75)	-294.09*** (4.25)	1914.96*** (3.31)	-2824.29*** (4.15)	-1758.33 (1.1)	-727.19 (1.38)
MORTALITY	130.73*** (5.1)	38.35*** (5.87)	-252.96*** (3.47)	6.51 (0.17)	227.05*** (3.3)	122.94* (3.82)
FERTILITY	-122.81 (0.47)	-644.86*** (4.2)	810.1 (0.46)	-2442.97*** (3.48)	-4442.77*** (2.58)	-2004*** (2.8)
SCHOOL ENROLLMENT	30.19** (2.15)	21.78*** (3.54)	66.95** (2.16)	-15.4 (0.8)	184.05*** (4.55)	157.90*** (8.57)
GOVEXP	-214.27*** (5.88)	-33.41*** (2.6)	-92.86 (0.97)	-50.72 (0.84)	827.09*** (3.52)	216.18*** (3.26)
FDIGDP	-25.51 (1.29)	-40.12 (1.03)	259.85*** (2.94)	159.62*** (2.35)	-447.80** (2.08)	55.28 (1.02)
CULTURE	903.01*** (5.51)	353.83*** (2.35)	3325.13*** (5.43)	-1148.74*** (2.7)	2137.78*** (3.35)	
Dummy (Oil)		2198.74*** (10.46)				
Dummy (HIPC)			-3210.47*** (8.53)			
Dummy (E-W)				8314.74*** (4.65)		
Dummy (Natural Resources)					2107.87 (1.5)	
Dummy (Corruption)					-3162.28 (1.02)	-8739*** (2.77)
Constant	12143.76 (6.84)	3617.68 (3.8)	-7293.64 (1.45)	21760.48 (6.37)	-14693.19 (2.16)	3173.06 (0.92)
R ²	0.80	0.90	0.80	0.62	0.75	0.56

Values in parenthesis are *t*-statistics. Significance at 10%, 5%, and 1% is denoted by *, **, and ***, respectively

As shown in table 1, population growth has a negative effect on economic growth. An increase in population is considered a proxy for an increase in labor force and is expected to have a positive effect on the economy. In the MENA region, the population growth rate has a negative effect on economic growth. The dependence on a single industry, particularly in oil-producing countries, controlled by a small portion of the labor force, leaves the balance of the population unable to contribute to the productivity process and this becomes an overall burden to the economy. The fertility rate also decreases the economic growth. The positive sign of school enrollment indicates the importance of human capital on growth.

TABLE 2. THE MEAN OF THE VARIABLES

	MENA	Sub Saharan	Europe & C. Asia	Latin & Caribbean	E., S. Asia & Pacific
PCGDP	13185.9	2321.63	15452.43	8252.32	8014.66
POPULATION	3.49	2.56	0.67	1.42	1.77
MORTALITY	46.86	94.30	20.50	35.90	49.63
FERTILITY	4.87	5.86	2.12	3.40	3.97
SCHOOL ENROLLMENT	58.54	25.77	92.54	65.41	56.99
GOVEXP	19.31	15.88	18.12	15.1	13.98
FDIGDP	1.81	3.18	3.71	3.36	3.23

Fiscal policy and FDI do not appear to be effective in the MENA region. High corruption and limited political rights and civil liberties are the reasons behind this result (Table 3). Consistent with literature, the culture variable is highly significant, with a positive sign. A culture variable mean value equal to 3.00, on the 0-10 scale, indicates that the MENA region belongs to the low culture group (Table 5).

TABLE 3. THE MEAN OF THE POLITICAL INDICES

	MENA	Sub-Saharan	Europe & C. Asia	E. Europe & C. Asia	West Europe	Latin & Caribbean	E. Asia & Pacific
Civil Liberties	5.32	4.3	2.26	2.94	1.05	2.41	3.3
Political Rights	5.63	4.48	2.4	3.09	1.16	2.17	3.49
Corruption	3.85	2.96	5.44	3.60	7.72	4.12	4.38

The dummy variable is statistically significant, with a positive sign. This indicates the positive effect of oil revenues on economic growth and the dependence on oil. As shown in table 4, the coefficients of the independent variables of oil-producing countries are higher. This result supports our findings that MENA oil-producing countries have higher economic growth than other MENA countries. The results for the population growth rate, mortality rate, and fertility rate are as expected. The negative effect of the population rate and the fertility rate in the poor-natural resource developing countries supports the conclusions by Barro and Sala-i-Martin (2003) and Sachs (2008).

TABLE 4. MENA REGION WITH DEPENDENT VARIABLE PCGDP

	Oil Producers	Non-oil producers
POPULATION	753.78*** (3.44)	-229.95*** (3.28)
MORTALITY	334.7*** (3.32)	-14.83* (1.91)
FERTILITY	3616.15*** (3.95)	-142.63 (1.24)
SCHOOL ENROLLMENT	189.51*** (2.89)	62.57*** (8.73)
GOVEXP	-192.5 (1.54)	-13.5 (0.5)
FDIGDP	-0.80 (0.01)	26.13 (1.41)
Constant	10380.9 (1.3)	1950.7 (3.06)
R ²	0.086	0.56

*Values in parenthesis are t-statistics. Significance at 10%, 5%, and 1% is denoted by *, **, and ***, respectively*

The low standard deviations of CULTURE in the MENA region, illustrated in Table 5, indicate that the countries in this region share similar norms and values. Additionally, dividing the sample into oil and non-oil producing countries did not produce different standard deviations. The low variation in CULTURE was the primary reason for excluding this variable from the sub-regions of the MENA region as shown in table 4. As expected, testing this variable shows an insignificant effect (table 6).

TABLE 5. DESCRIPTIVE STATISTICS OF THE CULTURE

Regions	Mean	Std. Dev.	Min	Max
MENA	3.00	0.50	2.40	3.85
Non-oil producers	3.04	0.58	2.60	3.85
Oil producers	2.97	0.42	2.40	3.54
Sub-Sahara	2.69	0.46	1.83	3.73
HIPC	2.51	0.33	1.83	2.88
Non-HIPC	3.17	0.42	2.74	3.73
Latin	3.66	0.54	2.87	4.77
High resource	3.50	0.47	2.87	4.29
Low resource	4.16	0.44	3.79	4.77
Europe	4.38	0.91	3.09	6.87
E. Europe & C. Asia	3.96	0.46	3.09	4.89
W. Europe	5.42	0.41	5.10	6.87
Asia	4.22	1.01	2.27	6.21
High corrupt	3.76	0.92	2.27	5.44
Low corrupt	4.74	0.85	3.66	6.21

Sub-Saharan Africa:

Sub-Saharan Africa, with a \$1433⁸ average per capita income in 2012, is considered the lowest per-capita income region; it is also subject to high corruption and limited political rights and civil liberties (Table 3). The coefficients of the independent variables have identical signs as the coefficients in the MENA region, as illustrated in Table 1. Both regions share identical factors affecting their economies: high population rate, poverty, inequality in income distribution, religious and ethnic tensions, and other political risks. As expected, the culture variable shows a highly statistically significant effect, with a positive sign. As shown in Table 5, the mean of CULTURE is 2.69, which is considered the lowest among all regions. The dummy variable is statistically significant, with a negative sign. This proves that the recipients of these aids have lower per capita income compared with the other countries in the region.

TABLE 6. INCLUDING CULTURE WITH DEPENDENT VARIABLE PCGDP⁹

	MENA		Sub-Saharan Africa		Latin America	
	Non-oil producers	Oil-producers	HIPC	Non-HIPC	Poor-resources	Rich-resources
CULTURE	-17.08 (0.13)	382.18 (1.13)	123.83 (1.24)	518.5 (0.98)	-1210.39 (1.42)	467.83 (1.17)

The results of the other variables are hidden

TABLE 7. SUB-SAHARAN AFRICA REGION WITH DEPENDENT VARIABLE PCGDP

	HIPC	Non-HIPC
POPULATION	0.65 (0.07)	-861.9*** (3.88)
MORTALITY	-2.8 (4.27)	-49.46*** (3.48)
FERTILITY	-179.34*** (10.11)	504.8** (2.00)
SCHOOL ENROLLMENT	8.9*** (6.74)	88.99*** (7.07)
GOVEXP	-0.45 (0.29)	-105.8*** (5.78)
FDIGDP	0.5 (0.33)	7.92 (0.49)
Constant	2064.34 (18.16)	4905.8 (3.02)
R ²	0.39	0.24

*Values in parenthesis are t-statistics. Significance at 10%, 5%, and 1% is denoted by *, **, and ***, respectively*

To support the dummy variable results, the Sub-Saharan sample was divided into HIPC and non-HIPC countries. As shown in Table 7, the coefficients of the HIPC countries are much lower than the non-HIPC countries, which prove that the independent variables have less of an effect on economic growth in the HIPC countries.

The significant negative sign of the mortality rate is explained by the highest mortality rate that this region is characterized by, as shown in table 2. Similar to the MENA region, the low variation in CULTURE between both sub-regions, when including this variable, has no predictive power (Table 6). Accordingly, we prefer to exclude this variable from the tests presented in Table 7.

Latin America and Caribbean:

This region consists of nations with different economic and political regimes and different resource endowments. Because of the inability to service their debt, many Latin American countries defaulted on their external debt in the 1980s. The 2008 global financial crisis hindered the original reform plans resulting from the 1980s crisis and forced these countries to change their policies and find other solutions. The population growth rate in Latin America is statistically significant, with a negative sign (Table 1). As expected, the fertility rate has a significant negative sign. The FDI has high predictive power, with a positive effect. The main reason for this result is that Latin countries have strong political rights and civil liberties, in addition to low corruption (Table 3). The culture variable does not appear to influence the economic performance with a 3.66 mean. However, dividing the region into two sub-regions shows that the high resource sub-region has a lower culture (3.5) than the low resource sub-region (4.16). This is the reason that CULTURE has a negative sign (Table 1).

TABLE 8. LATIN AMERICA AND CARIBBEAN REGION WITH DEPENDENT VARIABLE PCGDP

	Low-Resource Countries	Rich-Resource Countries
POPULATION	-184.73 (0.41)	-990.08*** (2.73)
MORTALITY	-16.47 (0.42)	58.71*** (2.96)
FERTILITY	-3244.49*** (5.38)	-1907.14*** (4.47)
SCHOOL ENROLLMENT	14.66 (0.71)	79.27*** (6.96)
GOVEXP	253.21*** (5.47)	-135.52*** (3.84)
FDIGDP	368.59*** (6.63)	74.36*** (3.42)
Constant	11134.39 (4.14)	8781.49 (6.14)
R ²	0.19	0.57

*Values in parenthesis are t-statistics. Significance at 10%, 5%, and 1% is denoted by *, **, and ***, respectively*

The resource dummy variable represents the countries with high natural resources. This variable displays no predictive power. Unlike the oil-producing MENA countries, Latin economies are more diversified, which results in less dependence on natural resources. Dividing the dataset into low-and high-natural resource countries produces different results. As shown in table 8, in low-resource countries, the fertility rate, the government expenditures, and the FDI are significant, with signs as expected.

For high-resource countries, all of the independent variables are significant. The government expenditures have a negative sign. The inefficiency of the fiscal policy is primarily because of corruption, as indicated in table 3. Similar to the previous regions, including CULTURE in the high resource and low resource sub-regions does not show predictive power (Table 6).

Europe and Central Asia:

The results indicate that Europe has determinants different from the other regions. Historically, Europe has a higher economic growth. As shown in table 1, the population growth rate has a positive significant effect on the economic growth. In comparison, Europe has the lowest annual population growth rate and the highest output. This is related to the opportunities that are available in Europe. School enrollment is significant, with a positive effect; the period average and the coefficient of this variable are higher than those in the other regions, which indicate the prominence of human capital to economic growth in developed countries. FDI is significant, with a positive effect on economic growth. Europe is considered more attractive to foreign investors in terms of risk, corruption, and stable growth.

The regional variable used in this region is significant, with a positive sign. This displays that Western Europe has a higher economic growth. Controlling for the region type in models 1 and 2, Table 9 illustrates that the explanatory variables in Western Europe are relatively more responsive. The population growth rate and the fertility rate have high predictive power, with positive signs. This result is consistent with Furuoka (2009) and Sindig (2009). Contrariwise, the explanatory variables in Eastern Europe and Central Asia are less responsive to the per capita income. The mortality rate and the FDI are the only variables that are significant. The possible reason behind this result is the inclusion of the pre-1990 period in the study. The collapse of the Berlin Wall in 1990 was a turning point for these countries. Prior to this date, this area was part of the USSR and was characterized by low growth¹⁰.

TABLE 9. EUROPE AND C. ASIA REGION WITH DEPENDENT VARIABLE PCGDP

	Model 1	Model 2	Model 3	Model 4
	Western Europe	E. Europe & C. Asia	High CULTURE	Low CULTURE
POPULATION	2173.20*** (2.64)	265.22 (0.68)	342.79 (0.37)	3511.61*** (10.11)
MORTALITY	-4158.10*** (17.56)	-171.36*** (3.25)	-1210.54*** (5.68)	-50.28 (0.69)
FERTILITY	12383.53*** (3.51)	1292.41 (1.01)	11109.45*** (3.09)	745.35 (0.54)
SCHOOL ENROLLMENT	83.06** (2.52)	41.51 (1.29)	181.35*** (4.53)	153.48** (2.22)
GOVEXP	-948.92*** (3.78)	-53.06 (1.05)	123.19 (0.84)	-92.08 (0.78)
FDIGDP	9.28 (0.12)	230.15*** (3.51)	84.76 (0.74)	556.11*** (4.48)
CULTURE	4385.00*** (7.86)	260.50 (0.30)	5430.09*** (6.3)	3400.82** (2.3)
Constant	17604.81 (1.64)	3959.53 (0.74)	-35027.21 (3.63)	-18297.14 (1.87)
R ²	0.56	0.48	0.71	0.85

Values in parenthesis are *t*-statistics. Significance at 10%, 5%, and 1% is denoted *, **, and ***, respectively

TABLE 10. EAST EUROPE AND CENTRAL ASIA BEFORE AND AFTER 1990

	Before 1990	After 1990
POPULATION	640.99 (1.14)	286.37 (0.96)
MORTALITY	-168.95*** (4.09)	-353.73*** (11.08)
FERTILITY	1791.37 (0.92)	3690.86*** (4.99)
SCHOOL ENROLLMENT	-19.10 (0.31)	189.66*** (6.74)
GOVEXP	-143.46 (1.02)	-161.03*** (3.03)
FDIGDP	-782.85** (2.31)	107.23*** (3.62)
CULTURE	-1505.261 (0.39)	286.7992 (0.32)
Constant	10870.35 (1.50)	-5279.63 (1.78)
R ²	0.51	0.55
<i>PCGDP mean</i>	\$4,954	\$8,938

Values in parenthesis are *t*-statistics. Significance at 10%, 5%, and 1% is denoted *, **, and ***, respectively

To test the effect of each system on growth, we further divide the sub-regions into the periods before and after 1990 (Table 10). Table 10 shows that after 1990, Eastern Europe has had similar results to Western Europe (Table 9). However, Eastern Europe shows major differences in school enrollment, government expenditures, and FDI between both periods. This result, along with the large increase in income, reflects the adoption of a new democratic regime (Stark and Bruszt, 1998).

The variation in the culture variable indicates that different cultures coexist in Europe. To capture the effect of cultural differences, we divide the main set into high culture (culture mean above 4.0) and low culture (culture mean below 4.0) sub-regions. As shown in models 3 and 4 of table 9, this division shows that culture is significant in both groups. However, countries with higher culture also show higher coefficients and predictive power. This result is supported by the high mean for Western Europe. Unlike the other regions, the high standard deviation in CULTURE reflects the powerful results of both sub-groups, which clearly indicates the importance of culture to economic performance.

South Asia, East Asia, and Pacific:

During the past four decades, the South Asia, East Asia, and Pacific regions have been experiencing tremendous economic expansion. This growth has resulted in an increase in interdependence among the countries in the region. The strength and support of the economic growth in this region is primarily because of the region's population growth. However, human activities associated with economic growth have also produced distressing effects and severe environmental degradation¹¹.

As shown in Table 2, the fertility rate is among the lowest. This is a result of the laws adopted by many Asian countries to reduce the fertility rate. This region has the lowest government expenditure output ratio. Similar to other developing countries, FDI does not display any predictive power for economic growth. With the second highest culture, the culture variable shows high predictive power with a positive sign. The regional variable represents the countries with high corruption. The negative sign of this variable indicates that countries with high corruption have low economic growth. Dividing the regional variable into high- and low-corruption countries (Table 11) reveals that low-corruption countries have higher parameters than high-corruption countries.

TABLE 11. SOUTH, EAST ASIA, AND PACIFIC REGION WITH DEPENDENT VARIABLE PCGDP

	Corruption		Culture	
	High	Low	Low	High
POPULATION	-2341.31*** (6.87)	-1825.82 (0.97)	-3276.42*** (9.99)	-705.38 (0.37)
MORTALITY	-30.65* (1.96)	-1996.37*** (3.5)	-201.02*** (5.89)	576.80*** (3.57)
FERTILITY	1225.88*** (2.95)	3581.16 (0.92)	5095.10*** (6.5)	-9059.36*** (3.68)
SCHOOL ENROLLMENT	22.91*** (2.71)	163.94** (2.11)	-13.48 (1.16)	218.19*** (3.15)
GOVEXP	-15.96 (0.46)	1695.06*** (5.39)	18.47 (0.57)	1527.55*** (4.65)
FDIGDP	46.58* (1.68)	-465.87 (1.63)	64.73*** (3.24)	-740.79*** (2.62)
CULTURE	33.71 (0.41)	-93.02 (0.06)	-110.97 (1.20)	3002.91*** (3.73)
Constant	2307.66 (2.10)	-15718.19 (1.15)	2343.51 (2.74)	-31967.83 (2.89)
R ²	0.76	0.85	0.51	0.32

*Values in parenthesis are t-statistics. Significance at 10%, 5%, and 1% is denoted by *, **, and ***, respectively*

Significant government expenditures are the main difference between both subsets and have a positive effect in the low-corruption countries and a negative effect in the high-corruption countries. This verifies that corruption renders governmental programs ineffective. Culture does not show predictive power in both sub-regions; with the highest standard deviation, this indicates that Asia has a diversified culture. Even in both sub-regions, the standard deviations are high, with significant differences in the extreme values. To capture the effect of culture in Asia, we control for the mean and divide the subset into high culture (culture mean above 4.0) and low culture (culture mean below 4.0). The results show that CULTURE has high predictive power with a positive sign in the high-culture countries and no effect in the low-culture countries.

CONCLUDING REMARKS AND POLICY IMPLICATIONS

This study contributes to existing growth literature by presenting how economic growth is determined in different sub-regions. This consideration required the provision of different identities to the subgroups in each region. All but one of the regional dummy variables had significant effects on economic growth. The predictive power of the dummy variables proves that each region differs in terms of the structure of the economies and the determinants of growth. Dividing each region according to its identity provides results that are more powerful. This proves that the economic growth of each sub-region is determined independently. Explanatory variables responded differently in

each sub-region; such variables display the significant effect of the features used to divide the regions and reflects the importance of this division in this model.

The culture variable proves to be extremely important in the economic growth model. It demonstrates a highly predictive power in the high-culture countries and no effect on the low-culture countries. The recommended policies should be implemented differently according to the unique identities within each region. Based on our findings, we draw the following conclusions:

1. Population growth exerts downward pressure on the Middle Eastern, African, and Latin economies, but it has a positive effect on the European economies.
2. Rationalizing the management of natural resource-revenues is crucial to less-developed countries, particularly in the MENA region. Shifting the oil dependence of these countries to include other sectors leads to higher output growth and creates more employment opportunities, resulting in higher standards of living.
3. Political risks are a major issue and they are significantly correlated with economic growth. As presented in table 3, regions with high levels of corruption have low per capita income. Fighting corruption and enhancing political rights and civil liberties are good foundations for the economy, improving the effectiveness of governmental policies and attracting foreign investment.
4. Although culture is an important determinant of growth, enhancing culture is not an easy task. Culture is correlated with individuals' roots and backgrounds, in addition to their religions and ethnicities. Consequently, the cultural progress effects are realized over the long-term.

APPENDIX A: COUNTRIES USED IN THE STUDY

Europe and Central Asia		Latin America and Caribbean	South, East Asia, & Pacific	Sub-Sahara Africa	
E. Europe & C. Asia		Low-Resources	low Corruption	HIPC	Non-HIPC
Albania	Austria	Bahamas, The	Australia	Benin	Angola
Andorra	Belgium	Chile	Bhutan	Burkina Faso	Botswana
Armenia	Denmark	Costa Rica	Brunei Darussalam	Burundi	Cape Verde
Azerbaijan	Finland	Cuba	Fiji	Cameroon	Equatorial Guinea
Belarus	France	Dominican Republic	Hong Kong	Central African Rep.	Gabon
Bosnia & Herzegovina	Germany	Grenada	Japan	Chad	Kenya
Bulgaria	Greece	Guyana	Korea, Rep.	Comoros	Lesotho
Croatia	Iceland	Jamaica	Malaysia	Congo, Dem. Rep.	Mauritius
Cyprus	Ireland	Nicaragua	New Zealand	Congo, Rep.	Namibia
Czech Republic	Italy	St. Kitts and Nevis	Singapore	Cote d'Ivoire	Nigeria
Estonia	Luxembourg	St. Lucia	High Corruption	Eritrea	Seychelles
Georgia	Monaco	Uruguay	Afghanistan	Ethiopia	South Africa
Hungary	Netherlands	Rich-Resources	Bangladesh	Gambia, The	Swaziland
Kazakhstan	Norway	Antigua and Barbuda	Cambodia	Ghana	Zimbabwe
Kosovo	Portugal	Argentina	China	Guinea	MENA
Kyrgyz Republic	Spain	Barbados	India	Guinea-Bissau	Oil producers
Latvia	Sweden	Belize	Indonesia	Liberia	Algeria
Liechtenstein	Switzerland	Bolivia	Kiribati	Madagascar	Bahrain
Lithuania	UK	Brazil	Korea, Dem. Rep.	Malawi	Iran, Islamic Rep.
Macedonia, FYR		Colombia	Lao PDR	Mali	Iraq
Moldova		Dominica	Maldives	Mauritania	Kuwait
Montenegro		Ecuador	Mongolia	Mozambique	Libya
Poland		El Salvador	Nepal	Niger	Oman
Romania		Guatemala	Pakistan	Rwanda	Qatar
Russian Federation		Haiti	Papua New Guinea	Sao Tome & Principe	Saudi Arabia
San Marino		Honduras	Philippines	Senegal	Uni. Arab Emirates
Serbia		Mexico	Solomon Islands	Sierra Leone	Non-oil producers
Slovak Republic		Panama	Sri Lanka	Somalia	Djibouti
Slovenia		Paraguay	Thailand	South Sudan	Egypt, Arab Rep.
Tajikistan		Peru	Timor-Leste	Sudan	Jordan
Turkey		St. Vincent & the Grenadines	Tonga	Tanzania	Lebanon
Turkmenistan		Suriname	Vanuatu	Togo	Morocco
Ukraine		Trinidad and Tobago	Vietnam	Uganda	Syrian Arab Rep.
Uzbekistan		Venezuela, RB		Zambia	Tunisia
					West Bank & Gaza
					Yemen, Rep.

APPENDIX B: CALCULATION OF CULTURE INDEX

The culture variable is based on four indices and a different question is used for each index. Trust is measured as the percentage of respondents who agreed, "Most people can be trusted". Respect is measured as the percentage of respondents indicating that "tolerance and respect for other people" is important. Control is measured as the weighted average response to the question quantifying freedom of choice. Obedience is the percentage of respondents that mentioned obedience as being important. The CULTURE variable is the sum of three positive beliefs (control, respect, trust) minus the negative belief (obedience). The culture index is normalized to range between 0 and 10.

CULTURE INDEX (1980-2005)

Country	Culture Index	Country	Culture Index	Country	Culture Index
Sweden	6.87	Argentina	4.29	Ukraine	3.37
Norway	6.63	Georgia	4.13	Belarus	3.36
New Zealand	6.21	Moldova	4.1	Serbia	3.31
Finland	6.11	Spain	4.1	Iraq	3.15
Switzerland	5.98	Kyrgyz Republic	4.04	Brazil	3.11
Germany	5.6	Poland	4.03	Philippines	3.1
Australia	5.55	Colombia	3.93	Turkey	3.09
China	5.44	Venezuela, RB	3.92	Trinidad & Tobago	3.09
Canada	5.27	Dominican Rep.	3.91	Peru	3.07
United States	5.19	Indonesia	3.87	Zimbabwe	3.04
Netherlands	5.18	Hong Kong	3.87	India	2.93
Japan	5.02	Puerto Rico	3.85	Tanzania	2.88
Andorra	4.89	Jordan	3.85	Mali	2.88
Uruguay	4.77	Thailand	3.83	El Salvador	2.87
United Kingdom	4.74	Slovak Republic	3.82	Israel	2.85
Italy	4.68	Estonia	3.8	Ethiopia	2.78
Romania	4.62	Lithuania	3.79	Algeria	2.77
Korea, Rep.	4.55	Chile	3.79	Nigeria	2.74
Czech Republic	4.53	Mexico	3.77	Morocco	2.68
Macedonia, FYR	4.46	South Africa	3.73	Uganda	2.62
Latvia	4.45	Armenia	3.73	Egypt	2.6
Slovenia	4.43	Cyprus	3.71	Zambia	2.45
Croatia	4.43	Hungary	3.71	Saudi Arabia	2.4
Bosnia & Herzegovina	4.36	Azerbaijan	3.7	Burkina Faso	2.35
France	4.36	Singapore	3.66	Ghana	2.28
Russian Federation	4.33	Bulgaria	3.6	Pakistan	2.27
Malaysia	4.32	Iran, Islamic Rep.	3.54	Rwanda	1.83
Bangladesh	4.31	Albania	3.48		
Vietnam	4.31	Guatemala	3.43		

ENDNOTES

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1 This paper adopts regional World Bank classification.

2 World Bank, WDI.

3 Based on WDI, the mortality rate is “the number of infants dying before reaching one year of age, per 1,000 live births in a given year.”

4 According to the WDI, “Gross enrollment ratio is the ratio of total enrollment to the population”.

5 According to the WDI, “General government final consumption includes all government current expenditures on goods and services.”

6 According to the WDI, “FDI is the net inflows of investment to acquire a lasting management interest”.

7 One sector economy: the dependence of oil-producing MENA on oil exports to generate revenues.

8 World Bank, WDI

9 The regressions in table 6 are the same as those in tables, 4, 7, and 8 but with CULTURE added as an independent variable to the tests in table 6.

10 The per capita GDP was \$4,954 before 1990 compared to \$9,838 after 1990.

11 See World Bank Social Indicators.

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