1 *Article*

2 # The Indirect Effect of Democracy on Economic

3 # Growth in the MENA Region (1990-2015)

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13

14 **Abstract:** This paper examines the indirect effect of democracy on economic growth using a dataset
15 of 17 MENA countries from 1990 to 2015. Democracy is assumed to affect growth through a series
16 of channels: education, health, physical capital accumulation per labor, government consumption,
17 and trade openness. A system of six simultaneous equations, 3SLS, is used to estimate the effect of
18 democracy on growth through these channels. For further analysis, the countries are classified into
19 groups according to the democratic status on the one side, and the level of income on the other. The
20 results indicate that democracy enhances growth through its positive effect on health in all
21 classifications of countries within the MENA region. However, the effect of democracy on growth
22 through education and physical capital/labor is non-monotonic. Democracy always hinders growth
23 through government size and trade openness. Once all of these indirect effects are accounted for,
24 the overall effect of democracy on growth is negative in less democratic countries and poor
25 countries, but positive in more democratic countries and rich countries.

26 **Keywords:** Economic Growth; Democracy; MENA; Simultaneous Equations
27

28 **1. Introduction**

29   The direct relationship between democracy and economic growth has been widely investigated in
30 the literature in the last 50 years and several theories have been developed regarding the relationship
31 between the two variables. Democracy is not just an additional variable to include in the growth
32 equation; in fact, it creates the appropriate environment for various other economic variables to work
33 effectively towards enabling economic growth. Therefore, even though the direct effect of democracy
34 on growth may not be sufficiently conclusive or significant, the indirect effect of democracy on growth
35 via different linking channels is highly significant. Estimating this indirect effect of democracy on
36 economic growth, using rigorous econometric techniques, is a new trend in the growth/democracy
37 literature.

38

39   The main purpose of this study is to estimate the indirect effect of democracy on economic growth
40 through different channels in the Middle East and North Africa (MENA) region for the period 1990-
41 2015. We estimated a full system of equations determining economic growth and the channel variables
42 using panel simultaneous equations model, specifically three stage least squares (3SLS). This main
43 objective is fulfilled through attempting to achieve the following sub-purposes; first, identifying the
44 most important channels through which democracy can affect economic growth and estimating the

45 effect of democracy on these identified channels. Second, estimating the effect of these channels on
46 economic growth in the MENA region. Then, calculating the indirect effect of democracy on growth.
47 We estimated this indirect effect for different democratic-groupings within the region separately, to
48 investigate whether this relationship is related to the stage of political/democratic transition of countries
49 or not. Moreover, the indirect effect of democracy on growth is also estimated in rich and poor countries
50 within the region separately to examine whether a minimum level of per capita income is a prerequisite
51 for democracy to be in the right social and institutional setting to work towards improving growth or
52 not.

53 **2. Economic and Political Background of MENA countries**

54 *2.1. The Political background of MENA countries*

55   The MENA region is well-known for the domination of authoritarian regime types whether they
56 are monarchies or national republics where authority is centralized in the hands of a single ruler who
57 is usually persistent for several years or decades, and the absence of representative governance.
58 Sometimes ad-hock elections or small-scale electoral representations are present but mostly, real
59 democracy does not exist within the MENA region. It seems that the region is well behind the world
60 regarding the process of political transition.
61
62   Researchers have long attempted to study the phenomenon of authoritarianism in the region.
63 Several theories have been proposed regarding the hindrance of political and democratic transition.
64 Many researchers have tried to determine the institutional, cultural, demographic or religious factors
65 that are hindering democratic transition in the region. Generally, there is no consensus on the topic.
66 The modernization theory states that only educated and affluent societies can transition towards
67 democracy (Lipset, 1959). The social structure theories indicate that religion as well as religious and
68 ethnic fragmentation is found to influence democratic success or failure (Weber, 1930; Huntington,
69 1993). In addition, the natural resources theory shows that oil-rich autocratic nations can buy foreign
70 aid and support, and thus are more likely to block attempts towards democratic transition (Acemoglu,
71 et al., 2001; Verdier, 2004). Finally, whereas the liberal hypothesis states that only when there is
72 economic freedom, there could be political freedom (Friedman, 1962); the early institutional theory
73 views institutions as the base for political transition (Acemoglu, et al., 2001, 2002).
74
75   According to the Varieties of Democracy (V-DEM) institute, countries are divided into four
76 categories; liberal democracy, electoral democracy, electoral autocracy, and closed autocracy. The
77 required prerequisites for the first two categories are free and fair multiparty elections and minimal
78 institutions. Then, if liberal principles are satisfied, the country is classified as a liberal democracy, if
79 not; the country is an electoral democracy. In 2016, only Tunisia was classified as a liberal democracy
80 in the MENA region, and Lebanon an electoral democracy. For the third and fourth classifications,
81 the "prerequisites for democracy" not fulfilled are no free and fair elections, de-facto multiparty
82 elections or minimal institutions. Then, if elections for the chief executive with a minimal level of
83 competition exist, the country is an electoral autocracy, if not; the country is a closed autocracy
84 (Lührmann, et al., 2017). Therefore, according to these previous criteria, Algeria, Djibouti, Egypt, Iran,
85 Iraq, Sudan, and Turkey are electoral autocracies, whereas Jordan, Kuwait, Libya, Morocco, Oman,
86 Qatar, Saudi Arabia, and Yemen are considered as closed autocracies.

87 *2.2. The Economic Background of MENA countries*

88   In 1990, the real GDP of the region amounted to $1,626 billion, equivalent to about 4.3% of the
89 world GDP, it increased to $4,304 billion, accounting for 5.7% of world GDP in 2015. Turkey followed
90 by Saudi Arabia and Iran are the largest economies, representing 25.3%, 15.8%, and 11.1% of the
91 region's total GDP respectively in the same year, which constitutes more than half of the GDP of the
92 region. The five smallest economies (Djibouti, Mauritania, Somalia, Sudan, and West bank & Gaza)
93 together account for less than 1% of the region's GDP (WB, WDI, 2016).

94
95   As a populated region with 437 Million capita, amounted to 5.9% of the world population in
96   2015; the GDPP is a more accurate measure for human welfare than GDP measure. The average per
97   capita GDP in the region was $7,498 in 2015, more than one and a half that of middle-income countries
98   worldwide. However, GDPP in individual MENA countries differs greatly. The region has some of
99   the richest countries in the world. Qatar had the fifth highest GDP per capita in the world in 2015.
100   Other high-income countries include United Arab Emirates, Kuwait, Bahrain, Saudi Arabia, and
101   Oman. The average GDPP of these five countries, together with Qatar, was $32,728 in 2015.
102
103   Turkey, Lebanon, Libya, Iran, Iraq and Algeria are considered as upper middle-income
104   countries. The average per capita GDP of this group is about $7,096, three times more than the GDPP
105   in lower-middle income countries within the same region. Turkey alone has twice the income per
106   capita of Lebanon - the second highest income in the same group- and three times of GDPP in Algeria,
107   which is the poorest country in that group.
108
109   On the other hand, the MENA's lower middle-income countries are Syria, Yemen, Djibouti,
110   Sudan, west bank & Gaza, Egypt, Morocco, Jordan and Tunisia. Average GDPP for this group is only
111   $2,332 in 2015. Syria, Yemen, Djibouti, and Sudan are considered the poorest countries in the region.
112   Because of internal conflicts and wars, Yemen and Syria have seen a dramatic decline of their GDPP
113   to less than $800 for each.

114   **3. Literature Review**

115   A new trend in economic growth/democracy literature suggests that the direct effect of
116   democracy on economic growth can be insignificant; however, the indirect effect is significant and
117   prominent. To estimate this indirect effect, the total effect of democracy on growth is decomposed
118   into its different components; mainly human capital, physical capital accumulation, income
119   distribution, political stability and population growth, among others (Baum & Lake, 2003; Sturm &
120   de Haan, 2001; Tavares & Wacziarg, 2001).
121
122   Baum & Lake (2003) used a sample of 128 countries worldwide over the period from 1967 to
123   1997, and concluded that democracy has no statistically significant direct effect on growth. However,
124   there are significant indirect effects of democracy on growth through increased life expectancy in
125   poor countries and improved secondary education in non-poor countries. Moreover, Tavares &
126   Wacziarg (2001) applied their model on a panel of 65 industrial and developing countries from 1970
127   to 1989. They concluded that democracy fosters growth by improving the accumulation of human
128   capital and lowering income inequality. On the other hand, democracy hinders growth by reducing
129   the rate of physical capital accumulation and, less robustly, by raising the ratio of government
130   consumption to GDP. When summing up the indirect effects of democracy on growth, the negative
131   effect through physical investment dominates, and the overall effect of democracy on economic
132   growth is moderately negative.
133
134   Fabro & Aixal (2012) assured the necessity to consider the difference between the direct and
135   indirect effects of institutional quality on growth. This difference has often been ignored and, when
136   taken into account, has led to a remarkable lack of consensus. They used a simultaneous equations
137   model- weighted two stage least squares (2SLS) - over the period from 1976 to 2005 to estimate the
138   direct and indirect effects of economic and political freedom on the economic growth of 79 countries
139   worldwide. They examined the effect of investment in physical capital and investment in secondary
140   school education on economic growth. The results indicated that democracy, represented in civil
141   liberties, political freedom and economic freedom, is important for economic growth either through
142   a better allocation of resources or, indirectly, through the stimulation of investment in physical and
143   human capital.
144

145   Helliwell (1994) used instrumental variables to examine empirically the linkages between
146 democracy and economic growth in 90 countries worldwide over the period from 1960 to1985. He
147 concluded that democracy has a negative and statistically insignificant direct effect on growth, but a
148 larger positive indirect effect through education and investment. Moreover, by applying a
149 simultaneous equations model, 3SLS, on a sample of 96 developed and developing countries
150 worldwide, Feng (1997) aimed to investigate the relationship between democracy, political stability
151 and economic growth over the period from 1960 to 1980. The results indicated that democracy has a
152 positive indirect effect upon growth through its impacts on the probabilities of both regime-change
153 and constitutional government change from one ruling party to another. Finally, Przeworski &
154 Limongi (1993) investigated the effect of political regimes on economic growth. They indicated that
155 political regime has no direct effect on growth but it increases GDP per capita through its negative
156 effect on population growth rate.
157
158   As illustrated above, the papers that analyzed the indirect effect of democracy on growth have
159 reached no consensus in results regarding the same channels. Many authors have indicated that
160 democracy could promote growth while fostering human capital accumulation (Mariscal & Sokoloff,
161 2000; Fabro & Aixal, 2012; Tavares & Wacziarg, 2001). For physical capital, the evidence is less
162 conclusive. Harms & Ursprung (2002) and Busse (2004) find that democratic countries attract direct
163 foreign investment, while Adam & Filippaios (2007) and Tavares & Wacziarg (2001) argue that
164 democracy reduces private investment and therefore, hinders economic growth. The inconclusive
165 results may be a result of including a large number of different countries in the estimated model,
166 which may produce conflicting results regarding the effect of democracy on the same channel.
167
168   Few works argue that the effect of democracy on growth could be non-linear, differs according
169 to the stage of democracy, or the initial standards of living in the countries under consideration
170 (Kuznets, 1959; Barro, 1996). Barro (1996) used a sample of 100 countries worldwide to analyze the
171 effect of democracy on economic growth. He assessed the direct relationship between democracy &
172 economic growth, while the initial GDP per capita, education, health, population growth rate,
173 government size, black-market-premium and rule-of-law variables were held constant to isolate the
174 direct effect of democracy on growth. The overall effect of democracy on growth turned out to be
175 weakly negative. Upon omitting the rule of law, education, health and fertility rate variables from
176 the model, the effect of democracy on growth becomes positive and significant. Barro attributed the
177 favorable effect that democracy had on growth to a positive correlation between democracy and these
178 omitted variables that are themselves growth promoting. Upon replacing the democracy index with
179 two dummy variables representing democracy index score, Barro found evidence of a non-linear
180 relationship between democracy and growth. The results reported that the middle level of democracy
181 is the most favorable to growth, while the lowest and highest levels had lower growth rates.
182 Therefore, the growth rate reaches a peak at a middle level of democracy after which growth rate will
183 start to diminish if democracy continues to rise.
184
185   A limited number of papers illustrated the direct effect of democracy on economic growth in
186 African countries and the MENA region. None of them investigated the indirect effect of democracy
187 on growth via different channels. Zghidi (2017) used a panel of 31 African countries over the period
188 from 1986 to 2014 to investigate whether political stability and democracy increase the economic
189 growth rate, using generalized method of moment (GMM) dynamic panel data analysis. He
190 concluded that both democracy and political stability have a positive and significant effect on
191 economic growth. Rachdi & Saidi (2015) used a sample of 17 MENA countries to investigate
192 empirically the effect of democracy on growth during the period from 1983 to 2012, using two
193 different models: a fixed effect (FE) and random effect (RE) regression model, and GMM model. They
194 repeated the test five times for each model using several measures of democracy that capture different
195 aspects of democracy, taken from the Integrated Network for Societal Conflict Research. They found

196   the effect of democracy to be negative and statistically significant on economic growth for both
197   models for four out of the five measures of democracy.
198

199   While the previous studies have contributed considerably to the knowledge in the area of
200   economic growth/democracy relationship, there is limited coverage of the literature with regards to
201   many aspects. The MENA region is not adequately considered as a focus area in the study of the
202   relationship between growth and democracy, and none of the previous papers has examined the
203   indirect effect of democracy on growth in the MENA region specifically. Furthermore, the study
204   attempts to classify the estimated models into homogenous groups according to the stage of
205   democratic transition of the groups of countries on the one hand and according to the standards of
206   living within each of these groups of countries on the other to determine the factors, which stimulate
207   or hinder the effect of democracy on economic growth. A new and comprehensive indicator of
208   democracy is also being utilized to carry out this study which is the electoral democracy index
209   constructed by the V-DEM institute, University of Gothenburg.

210   **4. Model Specification**

211   In order to estimate the indirect effects of democracy on growth, we specified a panel data model
212   to estimate economic growth in 17 MENA countries over the period from 1990 to 2015. We identified
213   the important channels through which democracy affects economic growth indirectly; namely health,
214   education, physical capital per labor, government size, and trade openness. Therefore, the model
215   includes six equations, the economic growth equation, as well as five channel equations.
216

217   The estimated democracy coefficients of each equation are sensitive to the chosen specification,
218   and especially to the exclusion of particular endogenous or exogenous variables. For the growth
219   equation, the specification is derived from an augmented Solow model, with the set of channel
220   variables as independent variables. The equation is expressed as follows:
221

222     $\ln GDPP_{it} = \gamma_0 + \gamma_1 \ln MR_{it} + \gamma_2 \ln EDUS_{it} + \gamma_3 \ln GCFL_{it} + \gamma_4 \ln GZ_{it} + \gamma_5 \ln TR_{it} + u_{it}$ ………………... (1)

223

224   where t =1, 2,…..,26 years (1990 - 2015), i =1, 2 ,….,17 MENA countries. $\ln GDPP_{it}$ is the natural
225   log of per capita income in period t, at each country i, $\ln MR_{it}$ is the natural log of mortality rate,
226   $\ln EDUS_{it}$ is the natural log of secondary school enrollment rate, $\ln GCFL_{it}$ is the natural log of gross
227   capital formation per labor, $\ln GZ_{it}$ is the natural log of government size, $\ln TR_{it}$ is the natural log of
228   trade openness, and u_{it} residuals. γ_0, γ_1, γ_2, γ_3, γ_4, γ_5 are the parameters to be estimated, and
229   according to the theory, it is expected that: $\gamma_1 > 0$, $\gamma_2 > 0$, $\gamma_3 > 0$, $\gamma_4 > 0$, $\gamma_5 > 0$.
230

231   Turning to the channel equations, we relied, when possible, on existing empirical literature.
232   Democracy index as well as income per capita are included into all equations of different channels.
233   The measure of democracy considered in this work is obtained from the V-DEM institute; we utilized
234   their electoral democracy index (EDEM). Health equation ($\ln MR_{it}$) is represented by the infant
235   mortality rate; female education ($\ln EDUPF_{it}$) is considered an important determinant of health in
236   MENA region. Primary school education ($\ln EDUP_{it}$), health ($\ln MR_{it}$), among others are the
237   determinants of education equation as follows.
238

239     $\ln MR_{it} = \beta_0 + \beta_1 EDEM_{it} + \beta_2 \ln GDPP_{it} + \beta_3 \ln EDUPF_{it} + u_{it}$…………….……….………..…………. (2)

240     $\ln EDUS_{it} = \beta_0 + \beta_1 EDEM_{it} + \beta_2 \ln GDPP_{it} + \beta_3 \ln EDUPF_{it} + \beta_4 \ln MR_{it} + u_{it}$…..……..…………..……. (3)

241     $\ln GCFL_{it} = \beta_0 + \beta_1 EDEM_{it} + \beta_2 \ln GDP_{it} + \beta_3 \ln EDUS_{it} + \beta_4 \ln EX_{it} + \beta_5 \ln UPOP_{it} + \beta_6 \ln UM_{it} + u_{it}$…… (4)

242     $\ln GZ_{it} = \beta_0 + \beta_1 EDEM_{it} + \beta_2 \ln GDP_{it} + \beta_3 \ln CO_{it} + \beta_4 \ln POPG_{it} + \beta_5 \ln TR_{it} + u_{it}$…..……..…………… (5)

243     $\ln TR_{it} = \beta_0 + \beta_1 EDEM_{it} + \beta_2 \ln GDP_{it} + \beta_3 \ln LA_i + \beta_4 \ln UPOP_{it} + \beta_5 INF_{it} + u_{it}$……………………....... (6)

244
245   Physical investment per labor ($lnGCFL_{it}$) is the third channel, expressed by the gross capital
246   formation per labor. Education, exchange rate, urban population and unemployment rate represent
247   the main explanatory variables in equation 4. Equation 5 represents the government size channel, the
248   government final consumption expenditure (% GDP) is an appropriate measure for this variable in
249   the literature ($lnGZ_{it}$). Corruption index ($lnCO_{it}$), population growth ($lnPOPG_{it}$), trade openness
250   ($lnTR_{it}$) are specified as important regressors in this equation. Finally, the openness equation includes
251   the country area ($lnLA_i$), inflation (INF_{it}), and urban population ratio ($lnUPOP_{it}$) as important
252   determinants.
253
254   Data for all the variables, except democracy index is transformed into natural logarithm, which
255   is helpful to obtain the normal distribution of the data. The estimated parameters in this form are the
256   elasticities and the difference in logs approximate the growth rates, so the results are interesting and
257   easy to interpret. The data, and its sources and measures, are represented in Appendix A, Table A.1.
258
259   The previous specification is applied on various models, to test the sensitivity of our results on
260   the one hand and to answer the following two questions on the other. Does this indirect effect of
261   democracy on growth differ according to the state of political transition of each group of countries
262   within the MENA region? Does this indirect effect of democracy on growth depend on the level of
263   income per capita of these countries?
264
265   To achieve the main aim of this study, and answer the previous questions, we classify countries
266   within the MENA region into two groups, relatively democratic and relatively autocratic countries
267   within the region. We use, first, the classification of Freedom House of 'free and partly free' countries
268   as one model and 'not free' countries as the other model. Second, we use the V-DEM institute
269   classification of countries to electoral and liberal democracy and electoral autocracy group as one
270   model and closed autocracy countries as the other model. Moreover, we classify the MENA countries
271   into democratic-countries and autocratic-countries based on the average electoral democracy index
272   score, over the period of the study, for each country within the region.
273
274   In addition, another classification is obtained by dividing the countries into rich countries, which
275   have income of more than $4000 per capita annually, and poor countries, which have less than $4000
276   per capita annually. This number is calculated as an average of the per-capita GDP of all the 17
277   countries in the sample over the period of the study. This is equivalent to the World Bank
278   classification, since we consider low income and lower-middle income countries as poor, but upper-
279   middle income and high-income economies as rich. To capture the different effects of democracy on
280   growth in poor and rich countries, if any, we include a dummy variable in our different channel
281   equations. This dummy is coded 1 if the country is poor, and is coded 0 otherwise. We then separately
282   interact this variable with democracy. The resulting interaction terms, democracy in poor countries
283   and democracy in rich countries are included in all of our channel equations to capture the
284   quantitatively distinct effects of democracy on growth via different channels in poor and rich groups
285   of countries. Details of different groups of countries in each model are illustrated in Appendix B,
286   Table B.1.
287

5. Methodology

289   A full set of six simultaneous equations with six dependent variables is estimated, using 3SLS.
290   This technique is appropriate to our model because of two reasons. First, it is expected that our
291   channel variables are endogenous variables in the system; Hausman test is applied to verify this
292   endogeneity problem. Second, the economic growth and channel variables, which are on the left-
293   hand side of all equations, exist on the right hand side of other equations in the system.
294

295   The estimated coefficients of the economic growth equation $(\hat{\gamma}_s)$ –Equation 1- yield the effect
296   of the channels on the growth in MENA region, whereas the estimated coefficients of the channel
297   equations $(\hat{\beta}_s)$ - Equations (2) to (6) - represent the effect of democracy on the channels. The product
298   of the coefficient of democracy in the channel equation by the coefficient of the channel variable in
299   growth equation illustrates how democracy affects growth indirectly through this particular channel.
300   The summation of these calculated coefficients yields the total indirect effect of democracy on growth
301   in MENA region.
302
303   As mentioned above, the indirect effects of democracy on growth via each channel variable are
304   calculated by multiplying coefficients across equations. Therefore, the statistical significance of these
305   coefficients $(\hat{\delta}_s)$ is not straightforward. The delta method (Oehlert, 1992) is utilized to calculate the
306   standard errors of these calculated coefficients as in Equation (7).
307

308   $$SE(\hat{\delta}_i) = \sqrt{\hat{\gamma}_i^2 SE(\hat{\beta}_{1i}^2) + \hat{\beta}_{1i}^2 SE(\hat{\gamma}_i^2)} \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \ (7)$$

309   where $\hat{\delta}_i$ is the calculated indirect effect of democracy on economic growth via each channel
310   variable, i denotes each channel variable, education, health, physical capital/labor, government size,
311   and trade openness respectively. $\hat{\gamma}_i$ is the estimated coefficient of each channel variable in Equation
312   1, $\hat{\beta}_{1i}$ is the estimated coefficients of democracy in each channel equation (Equation 2 to 6). SE is the
313   standard errors of the estimated coefficients.

314   **6. Empirical Results**

315   The six equations of our system have been estimated simultaneously in different models. The
316   estimated coefficients are reported and discussed in successive sections. First, the effect of different
317   channels on economic growth is displayed in Section 6.1. Then, the effect of democracy on each
318   channel is determined and represented in Section 6.2. Therefore, the indirect effect of democracy on
319   growth via each channel is calculated in different models based on the stage of democracy in each
320   group of countries within the region, as illustrated in Section 6.3. Section 6.4 displays the estimated
321   indirect effect coefficients of democracy on growth according to the country's standard of living.
322   Finally, Section 6.5 examines the sensitivity of our results to some modifications of the model.
323
324   Before displaying the estimated coefficients of our models, diagnostic tests have been performed
325   to check the consistency and efficiency of our estimates. First, Hausman test is applied, as illustrated
326   in Appendix C, Table C.1, and the results confirm the endogeneity of our models, which requires the
327   use of an endogenous technique such as 2SLS and 3SLS. Therefore, 3SLS estimator is consistent and
328   more efficient than the OLS estimates. Moreover, the variance inflation factor (VIF) is applied to our
329   estimated models - after performing the 2SLS - and confirms the absence of the multicollinearity
330   problem in all of our estimated equations as illustrated in Appendix C, Table C.2.

331   *6.1. The Effect of Different Channels on Economic Growth (1990 – 2015)*

332   Table 1 illustrates the results of estimating Equation 1, which represent the effect of each channel
333   variable on the economic growth in MENA region. The estimated parameters are highly significant
334   and consistent with the economic theory. Moreover, the goodness of fit is significant and very strong
335   in all of the models. The effect of education and health on growth is very strong and positive in all
336   the models. This is theoretically expected since human capital improvement enhances productivity,
337   and consequently, increases economic growth. In the more democratic countries, the effect of
338   education is stronger than its effect in less democratic countries. A 1% increase in secondary school
339   enrolment leads to 0.55% increase in economic growth on average in democratic groups, but only
340   0.28% increase in growth in the less democratic countries. As proved by many authors (Barro, 1996;
341   Freund & Jaud, 2014) democratic countries reduce the education inequality, which maximizes the
342   effect of education on growth. On the contrary, the effect of health on economic growth is stronger in
343   less democratic countries than in more democratic ones. A 1% decrease in mortality rate leads to an

344 increase in growth by 0.53% and 0.96% on average in more-democratic and less-democratic groups,
345 respectively.

346   Table 1: The Effect of the Channel on Economic Growth in Different Models

Effect of channel on growth	Education	Health	Ph. Capital	Gov. Size	Trade	R2
Free and partly free	0.575	-0.301	1.111	0.893	-0.282	0.89
	[4.53]	[-3.32]	[20.52]	[5.82]	[-2.94]	
Not free	0.269	-0.935	0.833	0.505	-0.224	0.86
	[4.19]	[-16.44]	[27.19]	[6.76]	[-6.47]	
Electoral and liberal democracy & electoral autocracy	0.550	-0.689	0.514	0.531	-0.215	0.79
	[9.39]	[-14.14]	[15.21]	[6.25]	[-6.75]	
Closed autocracy	0.285	-1.179	1.086	0.209	-0.427	0.90
	[2.71]	[-15.63]	[29.00]	[2.03]	[-3.70]	
Democratic-countries	0.525	-0.599	0.723	0.595	-0.253	0.85
	[6.99]	[-9.54]	[18.93]	[5.90]	[-7.39]	
Autocratic-countries	0.272	-0.762	0.955	0.546	-0.246	0.88
	[2.57]	[-9.62]	[27.11]	[6.55]	[-3.01]	

347 T-statistics are included in Parentheses.

348   The increase in physical capital formation per labor fosters the economy strongly in all models;
349 a 1% increase in investment per labor induces the growth by 0.87% on average of all models. Physical
350 capital formation increases production and creates more employment opportunities. Furthermore, it
351 leads to technical progress, which helps realize the economies of large-scale production, increases
352 specialization and provides machines and equipment for the growing labor force. Therefore, it leads
353 to the expansion of the market (Shuaib & Ndidi, 2015). Consequently, the increase in physical capital
354 formation is expected to foster the economy strongly. On the other hand, trade openness in MENA
355 region hinders economic growth in all models, with an elasticity of 0.30 on average. This may occur
356 because imports of these countries mostly exceed exports, and the terms of trade tend to be in disfavor
357 of these countries. There is no significant difference between the effect of these two variables on
358 growth in democratic and autocratic groups of countries.
359
360   Government size enhances economic growth, since more government spending on
361 infrastructure, education and health affects economic growth positively. In addition, the effect of
362 government size on growth is stronger in democratic countries than in autocratic countries, with an
363 elasticity ranging from 0.42 on average for the relatively autocratic groups to 0.67 on average for the
364 relatively democratic groups of countries.

365 *6.2. The Effect of Democracy on the Link Variables (1990 – 2015)*

366   As illustrated in Table 2, the effect of democracy on education is significant and positive in the
367 democratic countries, indicating that a one-percentage point increase in democracy index tends to
368 increase education by 0.22% on average. However, the same effect turns to be negative in the
369 autocratic groups, with a marginal effect that equals -0.65 on average. The effect of democracy on
370 mortality rate is negative and strong in all models. One percentage point increase in democracy tends
371 to decrease mortality rate by 1% on average in all models. Democracies are more responsive to the
372 basic needs of the population than dictatorships. They will choose policies that promote human
373 capital accumulation, even if on the account of physical capital.
374
375
376

377   Table 2: The Effect of Democracy on the Channels in Different Models

Effect of democracy on the channel	Education	Health	Ph. Capital	Gov. Size	Trade
Free and partly free	0.239	-1.029	0.499	-0.573	1.003
	[3.33]	[-3.14]	[3.75]	[-2.89]	[5.16]
Not free	-0.669	-0.317	-0.971	0.969	2.199
	[-5.82]	[-2.02]	[-3.17]	[3.97]	[3.89]
Electoral and liberal democracy & electoral autocracy	0.166	-0.830	1.258	-0.779	3.019
	[1.49]	[-5.10]	[4.65]	[-3.02]	[4.84]
Closed autocracy	-0.752	-1.041	-0.865	-0.383	0.557
	[-5.51]	[-6.69]	[-2.67]	[-2.07]	[2.61]
Democratic-countries	0.250	-0.868	0.636	-0.585	2.543
	[2.91]	[-3.73]	[2.71]	[-4.43]	[4.86]
Autocratic-countries	-0.533	-2.448	-1.787	-1.454	1.126
	[-5.42]	[-9.98]	[-4.64]	[-4.62]	[2.60]

378   T-statistics are included in Parentheses.

379   The effect of democracy on physical investment per labor is also positive in democratic countries
380   (0.80 on average), it turns negative in less democratic countries (-1.2 on average). Democracy could
381   affect physical capital formation positively or negatively. Several researchers argue that physical
382   investment grows in a climate of liberty, free-flowing information and property rights. Democracy
383   reduces the extent of political, social and economic uncertainty, and in turn encourages physical
384   capital formation. On the contrary, other researchers claim that democracy may redistribute national
385   income in favor of labor and disfavor of capital, by giving a greater voice to unions and labor wages
386   and interests. Higher wages increase the cost of production, decrease the profits, and thus lower the
387   incentives for private investment (Tavares & Wacziarg, 2001).

388

389   The effect of democracy on government size is always negative and significant, a one-percentage
390   point increase in democracy decreases government size by 0.47% on average. More likely autocrats
391   intend to increase the size of government to maximize their influence and control over the economy
392   since their power is derived directly from the resources under their control (Tavares & Wacziarg,
393   2001). On the contrary, democracy tends to decrease the government size.
394   The effect of democracy on trade openness is very strong and positive in all models; a one-
395   percentage point increase in democracy index tends to increase trade openness by 1.7% on average
396   for all models. Democracies generally increase the economic freedom and benefit a great number of
397   consumers at the expense of a few producers, who receive more advantages from the protectionist
398   policies. Therefore, democracy stimulates economic freedom and trade openness.

399

400   To conclude, the effect of democracy on mortality rate and government size is always negative,
401   whereas its effect on trade openness is always positive. The effect of democracy on education and
402   physical capital per labor is non-monotonic; it is negative in less democratic groups of countries, but
403   turns positive in the more democratic groups of countries.

404   *6.3. The Indirect Effect of Democracy on Economic Growth (1990 – 2015)*

405   The overall indirect effect of democracy on economic growth is significant in the MENA region
406   through the effect of all the selected channels as illustrated in Table 3. The effect of democracy on
407   economic growth is obtained rigorously through the effect of health, education, and physical capital
408   accumulation per labor. Democracy affects economic growth positively through health in all models
409   with different specifications. It is greater in the less democratic countries than in the more democratic
410   ones. This result is attributed to the effect of health on economic growth as illustrated in Section 6.1.
411   Although the effect of democracy on economic growth via education is unexpectedly negative in

412 autocratic countries, it turns into positive when the country is democratic. The latter result is
413 attributed to the effect of democracy on education as illustrated in Section 6.2.
414
415 Moreover, the effect of democracy on economic growth through physical capital accumulation
416 per labor is significantly positive in the democratic countries, while it is significantly negative in the
417 autocratic groups. An increase in the democracy index by one percentage point fosters growth in the
418 democratic groups by 0.55% on average, and hinders growth in the autocratic groups by 1% on
419 average. In democratic countries, where there is a climate of liberty, free flowing information, and
420 secured property rights, the increase in democracy tends to enhance growth. On the other hand, if
421 there is no good institutional framework, through which democracy could be practiced; higher levels
422 of democracy give a greater voice to unions, labor wages and sectarian interests. Therefore, the cost
423 of production will increase and profits will decrease, thereby reducing private investment.

424 Table 3: The Indirect Effect of Democracy on Economic Growth in MENA Countries

DEM/EG (%)	Total	Education	Health	Ph. Capital	Gov. Size	Trade
Free and partly free	0.207	0.138	0.310	0.554	-0.512	-0.283
	[2.85]	[2.75]	[2.28]	[3.60]	[-2.77]	[-0.93]
Not free	-0.693	-0.177	0.296	-0.790	0.489	-0.493
	[3.06]	[-3.40]	[2.00]	[-3.15]	[3.42]	[-3.33]
Elec.& liberal Dem	0.244	0.089	0.572	0.647	-0.413	-0.650
and elec. autocracy	[3.45]	[1.36]	[4.80]	[4.45]	[-2.72]	[-3.94]
closed autocracy	-0.244	-0.215	1.227	-0.939	-0.080	-0.237
	[5.04]	[-2.43]	[6.15]	[-2.66]	[-1.33]	[-12.63]
Democratic-countries	0.120	0.131	0.521	0.460	-0.348	-0.644
	[4.15]	[2.69]	[1.00]	[2.68]	[-3.54]	[-10.81]
Autocratic-countries	-1.413	-0.145	1.864	-1.707	-0.793	-0.632
	[3.89]	[-2.32]	[6.93]	[-4.57]	[-3.13]	[-2.53]

425 T-statistics of the indirect effect coefficients are calculated using the delta methods. T-statistics of the total effect
426 is the average of t-states of the different channels.

427 The effect of democracy on economic growth through both government size and trade openness
428 is mostly negative in all models with different specifications. An increase in democracy by one-
429 percentage point decreases growth by 0.43% on average via government size, and by 0.49% on
430 average via trade openness.
431
432 From the above discussion, it is clear that the relationship between democracy and growth is
433 non-monotonic via physical capital per labor and education, but it is monotonic via health,
434 government size and trade openness. Therefore, the overall indirect effect of democracy on growth
435 in MENA region is non-monotonic as illustrated in Figure 1. It differs according to the stage of
436 democratic transition of the group of countries. Democracy fosters growth in the more democratic
437 groups; free and partly free countries, electoral and liberal democracies, and democratic countries
438 according to the electoral democracy index, and hinders growth in the less democratic groups; not
439 free countries, closed autocracies, and the autocratic countries according to the electoral democracy
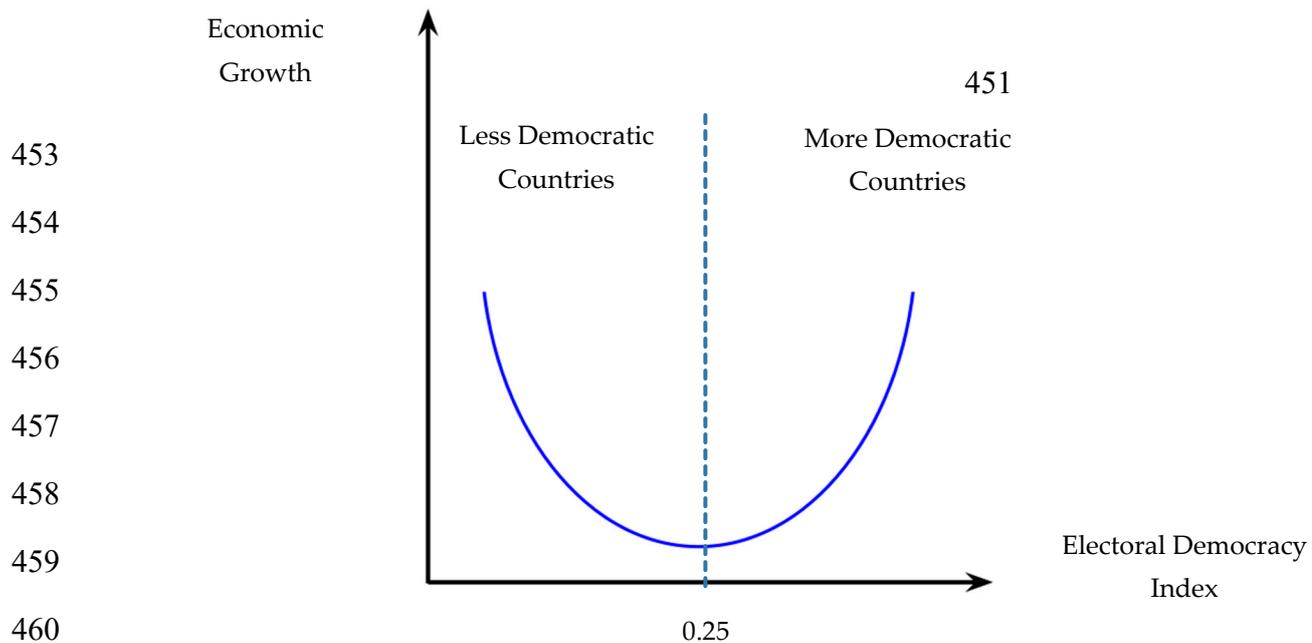440 index, within the region.
441
442
443
444
445
446
447
448

Economic
Growth

451

Less Democratic
Countries

More Democratic
Countries

Electoral Democracy
Index

0.25

Figure 1: The Indirect Effect of Democracy on Economic Growth in MENA Countries

Our results are in line with the political Kuznets curve hypothesis (Kuznets, 1955), which indicates that at the beginning of the political process, democracy decreases economic growth, but when democracy begins to reach a mature stage, it enhances economic growth. In addition, our results are consistent with Barro's findings (1996). The latter's results indicate that democracy has a more favorable effect on growth at a middle level but negative effect in countries with a very low level of democracy. Our results report a negative effect of democracy in countries that are classified as "not free", "closed autocracy", or "autocrats", which usually score very low on the V-DEM electoral democracy index (0.25 or below on average). In addition, democracy has a positive effect on countries classified as "partly-free and free", "electoral democracies", and "democratic groups", which have a democratic index score ranging between 0.3 and 0.55 on average, which falls within the middle range of democracy defined by Barro.

6.4. The Indirect Effect of Democracy on Economic Growth in Poor and Rich Countries within MENA Region (1990 – 2015)

Democracy affects economic growth differently according to the level of per capita income in MENA countries. This hypothesis is investigated first by estimating the effect of democracy on the different channels, as illustrated in Table 4. The effect of democracy on education is not affected by the level of income per capita; it is much affected by the democratic stage of the group of countries. However, the effect of democracy on health is much stronger in rich countries than in poor countries. The latter effect is highly significant in all rich countries whatever the stage of democracy in the group, whereas it is insignificant in three out of six poor groups of countries within the region. The economic conditions are very important and mostly a pre-requisite for democracy to affect health significantly.

The effect of democracy on the physical capital per labor is highly affected by the level of income per capita. Even if the overall effect of democracy on investment is negative in less democratic groups, it turns positive in rich countries. When this effect is positive in the more democratic countries, it is highly significant and strong in rich countries, turns to be insignificant in poor countries.

490   The effect of democracy on government size is mostly negative in rich as well as poor counties.
491 This effect is stronger - more negative - in rich countries than in poor countries. Moreover, the effect
492 of democracy on trade openness is always positive no matter in poor or rich countries.
493

494   Table 4: The Effect of Democracy on the Channels in Poor and Rich Countries

Effect of Democracy on the Channel	Education	Health	Ph. Capital	Gov. Size	Trade
Free and Partly Free	0.239	-1.029	0.499	-0.573	1.003
	[3.33]	[-3.14]	[3.75]	[-2.89]	[5.16]
Poor Countries	0.297	-0.219	-0.167	-0.219	0.705
	[2.75]	[-0.56]	[-1.02]	[-0.53]	[3.34]
Rich Countries	0.227	-1.167	0.607	-0.497	1.228
	[3.33]	[-3.73]	[5.15]	[-2.03]	[3.10]
Not Free	-0.669	-0.317	-0.971	0.969	2.199
	[-5.82]	[-2.02]	[-3.17]	[3.97]	[3.89]
Poor Countries	-0.644	-0.291	-1.162	1.038	2.234
	[-5.62]	[-1.89]	[-3.14]	[4.35]	[3.97]
Rich Countries	-0.732	-0.800	1.464	-0.312	0.040
	[-3.94]	[-3.14]	[3.06]	[-0.78]	[0.04]
Electoral and Liberal Democracy & Electoral Autocracy	0.166	-0.830	1.258	-0.779	3.019
	[1.49]	[-5.10]	[4.65]	[-3.02]	[4.84]
Poor Countries	0.162	-0.460	0.141	-0.632	2.638
	[1.42]	[-2.24]	[0.45]	[-2.36]	[4.17]
Rich Countries	0.546	-0.931	2.224	-0.777	2.552
	[3.73]	[-5.85]	[8.45]	[-2.93]	[3.10]
Closed Autocracy	-0.752	-1.041	-0.865	-0.383	0.557
	[-5.51]	[-6.69]	[-2.67]	[-2.07]	[2.61]
Poor Countries	-1.501	-0.741	-6.378	1.989	0.614
	[-6.07]	[-2.83]	[-14.78]	[3.86]	[1.82]
Rich Countries	-0.254	-0.840	-0.638	-0.644	0.584
	[-1.58]	[-4.73]	[-1.16]	[-2.61]	[2.59]
Democratic-Countries	0.250	-0.868	0.636	-0.585	2.543
	[2.91]	[-3.73]	[2.71]	[-4.43]	[4.86]
Poor Countries	0.386	0.141	0.286	-0.424	2.583
	[3.46]	[0.57]	[0.94]	[-2.97]	[3.95]
Rich Countries	0.228	-1.066	0.692	-0.662	2.390
	[2.65]	[-5.11]	[2.94]	[-5.00]	[4.11]
Autocratic-Countries	-0.533	-2.448	-1.787	-1.454	1.126
	[-5.42]	[-9.98]	[-4.64]	[-4.62]	[2.60]
Poor Countries	-0.358	-2.844	-2.343	-0.442	2.295
	[-3.51]	[-10.71]	[-6.28]	[-1.19]	[4.90]
Rich Countries	-0.619	-2.040	0.135	-1.740	-0.288
	[-4.83]	[-8.27]	[0.31]	[-5.79]	[-0.72]

495 T-statistics are included in Parentheses.

496   Turning to the overall indirect effect of democracy on economic growth, as illustrated in Table
497 5, important points arise. For all the models, democracy has an overall negative effect on economic
498 growth in poor countries but a positive effect in rich countries. A one-percentage point increase in
499 democracy index fosters growth by 0.69% on average in rich countries, but hinders growth by 1.03%
500 in poor countries within the MENA region. Our finding is in line with the Lipset-hypothesis, which
501 states that development is a prerequisite for democracy, or that democracy cannot survive in poor

502 and uneducated societies. Poor people do not have the luxury of choosing their rulers and having a
503 voice in the political process. They are too preoccupied with earning their livings.

504   Table 5: The Indirect Effect of Democracy on Economic Growth in Rich and Poor Countries

DEM/EG (%)	Total	Education	Health	Ph. Capital	Gov. Size	Trade
Free and Partly Free	0.207	0.138	0.310	0.554	-0.512	-0.283
	[2.85]	[2.75]	[2.28]	[3.60]	[-2.77]	[-0.93]
Poor Countries	-0.297	0.172	0.063	-0.187	-0.190	-0.156
	[1.26]	[2.34]	[0.54]	[-1.02]	[-0.53]	[-1.90]
Rich Countries	0.442	0.132	0.337	0.677	-0.431	-0.272
	[2.76]	[2.66]	[2.38]	[4.99]	[-1.91]	[-1.85]
Not Free	-0.693	-0.177	0.296	-0.790	0.489	-0.493
	[3.06]	[-3.40]	[2.00]	[-3.15]	[3.42]	[-3.33]
Poor Countries	-0.798	-0.178	0.274	-0.954	0.586	-0.526
	[3.27]	[-3.41]	[1.88]	[-3.88]	[3.75]	[-3.41]
Rich Countries	1.568	-0.203	0.754	1.202	-0.176	-0.009
	[1.97]	[-2.90]	[3.08]	[3.04]	[-0.77]	[-0.04]
Elec. & Liberal DEM	0.244	0.089	0.572	0.647	-0.413	-0.650
& Elec. Autocracy	[3.45]	[1.36]	[4.80]	[4.45]	[-2.72]	[-3.94]
Poor Countries	-0.445	0.088	0.331	0.075	-0.352	-0.586
	[1.97]	[1.41]	[2.21]	[0.45]	[-2.22]	[-3.57]
Rich Countries	1.155	0.296	0.669	1.190	-0.433	-0.567
	[4.37]	[3.46]	[5.44]	[7.45]	[-2.67]	[-2.83]
Closed Autocracy	-0.244	-0.215	1.227	-0.939	-0.080	-0.237
	[5.04]	[-2.43]	[6.15]	[-2.66]	[-1.33]	[-12.63]
Poor Countries	-3.045	-0.581	0.864	-3.396	0.608	-0.256
	[3.36]	[-3.92]	[2.32]	[-7.16]	[1.78]	[-1.64]
Rich Countries	0.108	-0.073	0.979	-0.368	-0.171	-0.259
	[1.88]	[-1.12]	[3.79]	[-0.62]	[-1.84]	[-2.03]
Democratic-Countries	0.120	0.131	0.521	0.460	-0.348	-0.644
	[4.15]	[2.69]	[1.00]	[2.69]	[-3.54]	[-10.81]
Poor Countries	-0.636	0.200	-0.093	0.217	-0.269	-0.692
	[2.15]	[3.08]	[-0.55]	[0.94]	[-2.67]	[-3.51]
Rich Countries	0.282	0.118	0.698	0.526	-0.420	-0.640
	[3.47]	[2.47]	[4.49]	[2.91]	[-3.88]	[-3.62]
Autocratic-Countries	-1.413	-0.145	1.864	-1.707	-0.793	-0.632
	[3.99]	[-2.33]	[6.93]	[-4.57]	[-3.13]	[-2.53]
Poor Countries	-0.969	-0.127	2.143	-2.196	-0.240	-0.549
	[3.92]	[-2.49]	[7.24]	[-6.12]	[-1.18]	[-2.57]
Rich Countries	0.567	-0.219	1.537	0.127	-0.947	0.069
	[2.99]	[-2.86]	[6.63]	[0.31]	[-4.44]	[0.70]

505 T-statistics are included in Parentheses.

506 *6.5. Sensitivity Analysis*

507   The sensitivity to sample coverage, obtained from estimating six different models using the same
508 equations' specification and the same methodology but different samples are illustrated in sections
509 6.1, 6.2, and 6.3. Three different democratic groups of countries based on different specifications have
510 been estimated, and the results are consistent and follow the same trend in the three different
511 estimated models; free and partly free countries, liberal democracies and electoral autocracies, and
512 democratic countries according to the V-DEM electoral democracy index. In addition, the results of
513 the autocratic groups of countries also follow the same pattern in the three different estimated

514 models, not free countries, closed autocracies, and autocratic countries according to the V-DEM
515 electoral democracy index. Moreover, in this subsection we examine the sensitivity of our results to
516 the time period and to alternative specifications of the economic growth variable.
517
518 Firstly, we examined the sensitivity of the estimated coefficients to the period of time, therefore,
519 we estimated our six equations over the period from 1995 to 2015. The estimated coefficients are
520 consistent and stable. However, the coefficient of democracy in the trade openness equation takes a
521 lower value in all of the models in the new sample, which has less degrees of freedom, as illustrated
522 in Appendix D, Table D.1 and Table D.2.
523
524 Secondly, we estimated the effect of democracy on the channel variables in alternative
525 specifications of the economic growth variable, specifically GDP, GDPG, and GDPPG. The estimated
526 coefficients have not changed in different specifications, indicating that the estimated coefficients are
527 not biased. However, although the effect of democracy on health in the health equation still follows
528 the same pattern, it represents relatively higher or lower values than before, as illustrated in
529 Appendix D, Table D.3, Table D.4, and Table D.5.

7. Conclusion, Policy Implications and Future Work

531 Our results conclude that the overall indirect effect of democracy on economic growth is found
532 to be significantly positive in the more democratic countries, but turns negative in the less democratic
533 countries within the MENA region. Therefore, the effect of democracy on economic growth is non-
534 monotonic and changes according to the stage of democratic/political transition of countries. The
535 effect of democracy on education and physical capital is responsible for this non-monotonic
536 relationship. However, the effect of democracy on mortality rate and government size is always
537 negative, and the effect of democracy on trade openness is always positive regardless the stage of
538 democratic transition of different groups of countries.
539
540 Moreover, our results indicate that democracy induces growth in rich countries, but hinders it
541 in poor countries. A minimal level of income - $4000 per capita annually on average – was estimated
542 as the lowest sufficient amount required for people to be educated and affluent enough to have the
543 ability to both seek their political rights and to practice them effectively. Again, the effect of
544 democracy on growth is found to be non-monotonic according to the standards of living in MENA
545 countries. Therefore, improving economic circumstances, namely GDPP in MENA countries, as well
546 as pursuing inclusive sustainable development policies need to be undertaken alongside adopting
547 democratic governance since they are important fundamentals for positive democratic practice in
548 these countries.
549
550 Human capital and physical capital accumulation were found to be the most effective links
551 through which democracy affects growth in the MENA region. The health channel is more affected
552 by the economic circumstances of the group of countries, whereas education is more affected by the
553 democratic stage of the countries. Physical capital is highly affected by both the economic
554 circumstances and political circumstances of the group of countries within the region.
555
556 It is recommended that policy makers encourage democracy in the relatively democratic group
557 of countries to stimulate economic growth. However, the autocratic groups of countries should start
558 taking effective measurements to transfer their regimes and their institutional framework towards
559 one that can support real democratic practice so they can reap the benefits of democracy on growth.
560
561 Some areas in economic growth/democracy models have not been addressed in this study and
562 need to be considered in future work. Electoral democracy is only one aspect of democracy, but
563 institutional development ensures that the elected official is really empowered after election, they
564 also guard against the possibility of elections being rigged. Democracy does not end at the ballot box.

565 Therefore, it would be very beneficial to examine other measures or indices that capture other
566 institutional aspects and components of democracy. In addition, the relationship between democracy
567 and economic growth can be investigated in different groups of countries and for different time
568 periods. Moreover, the indirect effect of democracy on economic growth can be estimated using other
569 seemingly significant channels of influence, especially inflation, corruption and political instability
570 as well as rule of law measures.

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579 **Appendix A. Variables Specification**

580   Table A.1: Variables Definitions and Sources

Variable	Measurement	Data Source
Economic growth (GDPP)	Real per capita gross domestic product	WB, 2016, WDI, Economic and Social Data Service (ESDS), International, (Mimas) University of Manchester.
Health (MR)	Mortality rate, infant (per 1,000 live births)	WB, 2016, WDI, Economic and Social Data Service (ESDS), International, (Mimas) University of Manchester.
Education (EDUS)	Education, School enrolment, secondary (% gross).	WB, 2016, WDI, Economic and Social Data Service (ESDS), International, (Mimas) University of Manchester.
Physical capital accumulation per labor (GCFL)	Gross capital formation includes land improvements; plant, machinery, and equipment purchases; and the construction of roads, railways, schools, offices, hospitals, commercial and industrial buildings divided by employment in each country	WB, 2016, WDI, Economic and Social Data Service (ESDS), International, (Mimas) University of Manchester.
Government size (GZ)	Government final consumption expenditure includes all government current expenditures for purchases of goods and services, expenditures on national defence and security	WB, 2016, WDI, Economic and Social Data Service (ESDS), International, (Mimas) University of Manchester.
Total trade (TR)	Imports and exports of Egypt relative to GDP	WB, 2016, WDI, Economic and Social Data Service (ESDS), International, (Mimas) University of Manchester.
Electoral democracy (EDEM)	Achieved through electoral competition for the electorate's approval under circumstances when suffrage is extensive; political and civil society organizations can operate freely; elections are clean;	Coppedge, et al., 2016, V-DEM institute, University of Gothenburg, Sweden.

	and elections affect the composition of the chief executive of the country. In between elections, there is freedom of expression and an independent media capable of presenting alternative views on matters of political relevance.	
Primary Education (EDUP)	Education, School enrolment, primary (% gross).	WB, 2016, WDI, Economic and Social Data Service (ESDS), International, (Mimas) University of Manchester.
Female primary education (EDUPF)	School enrolment, primary, female (% gross)	WB, 2016, WDI, Economic and Social Data Service (ESDS), International, (Mimas) University of Manchester.
Exchange rate (EX)	Official exchange rate (LCU per US$, period average)	WB, 2016, WDI, Economic and Social Data Service (ESDS), International, (Mimas) University of Manchester.
Population growth (POPG)	Annual change in Population (%)	WB, 2016, WDI, Economic and Social Data Service (ESDS), International, (Mimas) University of Manchester.
Urban population (UPOP)	Urban population (% of total)	WB, 2016, WDI, Economic and Social Data Service (ESDS), International, (Mimas) University of Manchester.
Share of population (POP1)	Population ages 0-14 (% of total)	WB, 2016, WDI, Economic and Social Data Service (ESDS), International, (Mimas) University of Manchester.
Share of population (POP2)	Population ages 65 and above (% of total)	WB, 2016, WDI, Economic and Social Data Service (ESDS), International, (Mimas) University of Manchester.
Corruption Index (CO)	Corruption Index (V-DEM index)	Coppedge, et al., 2016. V-DEM institute, University of Gothenburg, Sweden.
Unemployment (UM)	Unemployment, total (% of total labor force)	WB, 2016, WDI, Economic and Social Data Service (ESDS), International, (Mimas) University of Manchester.
Inflation (INF)	Inflation, consumer prices (annual %)	WB, 2016, WDI, Economic and Social Data Service (ESDS), International, (Mimas) University of Manchester.

Land area (LA)	Land area (sq. km)	WB, 2016, WDI, Economic and Social Data Service (ESDS), International, (Mimas) University of Manchester.
Oil producing countries (Dummy)	If the oil production is more than one million barrels per day, the dummy =1, 0 otherwise	-

581

Appendix B. Models Specification

583   Table B.1: Models Specification

Stages of Political Democracy						Standards of living	
Freedom house classification		V-DEM classification		Data classification		Average per capita income ($)	
Free & partly free	Not free	Electoral and liberal democracy & electoral autocracy	Closed autocracy	Democratic countries	Autocratic countries	Poor countries	Rich countries
Kuwait	Algeria	Algeria	Jordan	Algeria	Egypt	Algeria	Iran
Lebanon	Djibouti	Djibouti	Kuwait	Djibouti	Iran	Djibouti	Kuwait
Morocco	Egypt	Egypt	Libya	Iraq	Jordan	Egypt	Lebanon
Tunisia	Iran	Iran	Morocco	Kuwait	Libya	Iraq	Libya
Turkey	Iraq	Iraq	Oman	Lebanon	Oman	Jordan	Oman
	Jordan	Lebanon	Qatar	Tunisia	Qatar	Morocco	Qatar
	Libya	Sudan	Saudi	Turkey	Saudi	Sudan	Saudi
	Oman	Tunisia	Arabia	Morocco	Arabia	Tunisia	Arabia
	Qatar	Turkey	Yemen	Yemen	Sudan	Yemen	Turkey
	Saudi						
	Arabia						
	Sudan						
	Yemen						

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Appendix C. Diagnostic Tests

586   Table C.1: Hausman test of Endogeneity

Effect of channel on growth	χ_1^2	P-value
Free and partly free	86.11	0.000
Not free	24.95	0.0001
Electoral and liberal democracy & electoral autocracy	19.51	0.000
Closed autocracy	31.86	0.000
Democratic-countries	57.45	0.000
Autocratic-countries	45.82	0.000

587   The null hypothesis H0: difference in coefficients between OLS and 3SLS are not systematic.

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592   Table C.2: Multicollinearity tests (mean VIF)

	EQ (1)	EQ (2)	EQ (3)	EQ (4)	EQ (5)	EQ (6)
Free and partly free	6.21	1.78	1.09	3.72	9.82	19.31
Not free	4.10	4.97	1.79	5.52	2.33	2.52
Electoral and liberal democracy & electoral autocracy	8.88	7.06	6.57	1.59	3.79	2.03
Closed autocracy	5.016	11.09	1.48	2.07	1.57	3.88
Democratic-countries	3.35	5.13	1.71	2.04	1.61	2.48
Autocratic-countries	4.82	1.82	2.47	1.36	3.35	5.15

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Appendix D. Robustness Analysis

595   Table D.1: The Effect of the Channels on Economic Growth in Different Models (1995-2015)

Effect of channel on growth	Education	Health	Ph. Capital	Gov. Size	Trade
Free and partly free	0.442	-0.296	1.165	0.878	-0.316
	[3.32]	[-2.98]	[21.14]	[5.47]	[-3.07]
Not free	0.298	-0.989	0.824	0.520	-0.223
	[4.27]	[-16.27]	[25.35]	[6.34]	[-5.98]
Electoral and liberal democracy & electoral autocracy	0.569	-0.687	0.494	0.495	-0.205
	[8.94]	[-13.22]	[13.77]	[5.49]	[-6.08]
Closed autocracy	0.385	-1.255	1.067	0.253	-0.416
	[3.31]	[-15.20]	[27.27]	[2.28]	[-3.24]
Democratic-countries	0.555	-0.615	0.705	0.604	-0.253
	[6.63]	[-8.98]	[17.25]	[5.56]	[-6.89]
Autocratic-countries	0.386	-0.815	0.952	0.546	-0.266
	[3.33]	[-9.44]	[26.01]	[5.98]	[-2.94]

596   T-statistics are included in Parentheses

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598   Table D.2: The Effect of Democracy on the Channels in Different Models (1995-2015)

Effect of democracy on the channel	Education	Health	Ph. Capital	Gov. Size	Trade
Free and partly free	0.265	-1.121	0.480	-0.622	0.879
	[3.79]	[-3.73]	[3.72]	[-3.06]	[5.00]
Not free	-0.634	-0.127	-1.040	0.745	1.444
	[-5.48]	[-0.79]	[-3.27]	[3.07]	[2.75]
Electoral and liberal democracy & electoral autocracy	0.125	-0.789	1.190	-0.770	2.009
	[1.08]	[-4.65]	[4.26]	[-2.81]	[3.68]
Closed autocracy	-0.722	-0.849	-0.937	-0.282	0.393
	[-5.34]	[-5.52]	[-2.77]	[-1.46]	[1.84]
Democratic-countries	0.230	-0.957	0.525	-0.579	1.607
	[2.58]	[-3.96]	[2.10]	[-4.37]	[3.31]
Autocratic-countries	-0.483	-2.246	-1.854	-1.204	0.490
	[-4.93]	[-9.56]	[-4.44]	[-3.75]	[1.10]

599   T-statistics are included in Parentheses.

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602   Table D.3: The Effect of Democracy on the Channels in Different Models - lnGDP

Effect of democracy on the channel	Education	Health	Ph. Capital	Gov. Size	Trade
Free and partly free	0.209	-0.989	0.515	-0.483	0.455
	[3.06]	[-3.03]	[3.80]	[-2.13]	[2.73]
Not free	-0.623	-0.186	-1.183	0.774	1.986
	[-5.50]	[-1.21]	[-3.77]	[3.32]	[3.55]
Electoral and liberal democracy & electoral autocracy	0.039	-0.827	1.216	-0.723	2.512
	[0.36]	[-5.14]	[4.81]	[-2.87]	[4.28]
Closed autocracy	-0.879	-0.916	-1.279	-0.435	0.340
	[-6.46]	[-6.00]	[-3.91]	[-2.34]	[1.61]
Democratic-countries	0.205	-0.771	0.708	-0.536	2.691
	[2.34]	[-3.23]	[2.86]	[-4.22]	[5.18]
Autocratic-countries	-0.422	-1.984	-2.031	-1.192	0.801
	[-4.26]	[-8.42]	[-4.86]	[-3.85]	[1.79]

603   T-statistics are included in Parentheses.

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605   Table D.4: The Effect of Democracy on the Channels in Different Models – lnGDPG

Effect of democracy on the channel	Education	Health	Ph. Capital	Gov. Size	Trade
Free and partly free	0.255	-1.097	0.606	-0.564	0.549
	[3.38]	[-3.24]	[4.34]	[-2.15]	[3.01]
Not free	-0.510	0.080	-1.317	0.796	1.972
	[-4.49]	[0.49]	[-4.30]	[3.24]	[3.00]
Electoral and liberal democracy & electoral autocracy	-0.076	-0.910	1.660	-0.414	3.194
	[-0.67]	[-5.37]	[5.83]	[-1.65]	[4.79]
Closed autocracy	-0.826	-0.818	-1.646	-0.066	0.100
	[-5.95]	[-4.76]	[-6.00]	[-0.33]	[0.45]
Democratic-countries	0.225	-0.815	0.808	-0.623	2.896
	[2.52]	[-3.14]	[3.40]	[-4.44]	[5.08]
Autocratic-countries	-0.263	-1.790	-2.330	-0.940	0.934
	[-2.6]	[-6.69]	[-5.47]	[-3.01]	[1.91]

606   T-statistics are included in Parentheses.

607

608   Table D.5: The Effect of Democracy on the Channels in Different Models - lnGDPPG

Effect of democracy on the channel	Education	Health	Ph. Capital	Gov. Size	Trade
Free and partly free	0.256	-0.669	0.497	-0.806	0.241
	[3.01]	[-1.72]	[3.25]	[-2.37]	[1.38]
Not free	-0.427	0.397	-1.187	0.778	1.612
	[-3.56]	[2.61]	[-3.68]	[2.86]	[2.36]
Electoral and liberal democracy & electoral autocracy	0.117	-0.391	1.561	-0.769	2.677
	[0.95]	[-2.43]	[5.38]	[-2.44]	[4.08]
Closed autocracy	-0.766	-0.559	-1.385	-0.151	-0.045
	[-4.84]	[-3.41]	[-4.38]	[-0.65]	[-0.18]
Democratic-countries	0.316	-0.491	0.786	-0.364	2.310
	[3.59]	[-1.88]	[3.19]	[-2.27]	[3.76]
Autocratic-countries	-0.230	-0.965	-2.206	-0.844	0.884
	[-7.71]	[-3.46]	[-4.35]	[-2.26]	[1.61]

609   T-statistics are included in Parentheses

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