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Research Purpose

Estimating the indirect effect of democracy on economic growth in MENA countries over the period (1990 - 2015)

Research hypotheses:

**H₁:** democracy affects economic growth significantly through various channel variables.

**H₂:** the indirect effect of democracy on growth differs in different democratic groups of countries within the MENA region.

**H₃:** the indirect effect of democracy on growth is affected by the standards of living in the MENA countries.

**H₄:** the indirect effect of democracy on growth is stimulated by the Arab spring revolution.
The Indirect effects of Democracy on Economic Growth

Democracy

- Allocating resources efficiently
- Income equality
- Political stability
- Education
- Health
- Physical capital accumulation
- Government size
- Trade openness
- Population growth
- Corruption

Economic Growth
Panel data: N= 1, 2,3, ...,17 MENA Countries  
T = 1,2,......,26 Years (1990 - 2015).

Equations: 6 Equations, for 6 Endogenous Variables
### Dependent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measurement</th>
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</thead>
<tbody>
<tr>
<td>Economic growth (GDPP)</td>
<td>GDP per capita</td>
</tr>
<tr>
<td>Health (HEAL)</td>
<td>Mortality rate, infant (per 1,000 live births)</td>
</tr>
<tr>
<td>Physical capital (GCF)/ per labor</td>
<td>Gross capital formation includes land improvements; plant, machinery, and equipment purchases; and the construction of roads, railways, schools, offices, hospitals, commercial and industrial buildings, relative to number of labor.</td>
</tr>
<tr>
<td>Government size (GZ)</td>
<td>Government final consumption expenditure includes all government current expenditures for purchases of goods and services, expenditures on national defense and security relative to GDP.</td>
</tr>
<tr>
<td>Trade openness (TR)</td>
<td>Imports and exports relative to GDP</td>
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</table>
## Independent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measurement</th>
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<tbody>
<tr>
<td>Democracy (DEM)</td>
<td>Varieties of democracy (V-DEM) index, Electoral democracy index (freedom of expression index, Freedom of association index, Clean elections index).</td>
</tr>
<tr>
<td>Primary Education (EDUP)</td>
<td>Education, School enrollment, primary (% gross).</td>
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<tr>
<td>Female primary education (EDUPF)</td>
<td>School enrollment, primary, female (% gross)</td>
</tr>
<tr>
<td>Exchange rate (EX)</td>
<td>Official exchange rate (LCU per US$, period average)</td>
</tr>
<tr>
<td>Population growth (POPG)</td>
<td>Population growth (annual %)</td>
</tr>
<tr>
<td>Urban population (UPOP)</td>
<td>Urban population (% of total)</td>
</tr>
<tr>
<td>Share of population (POP1)</td>
<td>Population ages 0-14 (% of total)</td>
</tr>
<tr>
<td>Share of population (POP2)</td>
<td>Population ages 65 and above (% of total)</td>
</tr>
<tr>
<td>Corruption Index (CO)</td>
<td>Corruption Index (V-DEM index)</td>
</tr>
<tr>
<td>Unemployment (UM)</td>
<td>Unemployment, total (% of total labor force)</td>
</tr>
<tr>
<td>Inflation (INF)</td>
<td>INF: Inflation, consumer prices (annual %)</td>
</tr>
<tr>
<td>Land area (LA)</td>
<td>Land area (sq. km)</td>
</tr>
<tr>
<td>Oil producing countries (Dummy)</td>
<td>If the oil production is more than one million barrels per day=1, 0 otherwise</td>
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</table>
Model Equations

\[ \ln GDPP_{it} = \gamma_0 + \gamma_1\ln HEA_{it} + \gamma_2\ln EDU_{it} + \gamma_3\ln GCF_{it} + \gamma_4\ln GZ_{it} + \gamma_5\ln TR_{it} + u_{it} \] ..................... (1)

\[ \ln HEA_{it} = \beta_0 + \beta_1\ln GDPP_{it} + \beta_2 EDEM_{it} + \beta_3\ln PRI_{it} + u_{it} \] .................................................. (2)

\[ \ln EDU_{it} = \beta_0 + \beta_1\ln GDPP_{it} + \beta_2 EDEM_{it} + \beta_3\ln PRI_{it} + \beta_4\ln HEA_{it} + u_{it} \] ........................................ (3)

\[ \ln GCF_{it} = \beta_0 + \beta_1\ln GDPP_{it} + \beta_2 EDEM_{it} + \beta_3\ln EX_{it} + \beta_4\ln UPOP_{it} + \beta_5\ln UM_{it} + \beta_6\ln EDU_{it} + u_{it} \] (4)

\[ \ln GZ_{it} = \beta_0 + \beta_1\ln GDPP_{it} + \beta_2 EDEM_{it} + \beta_3\ln POPG_{it} + \beta_4\ln TR_{it} + \beta_5\ln CO_{it} + u_{it} \] ................................. (5)

\[ \ln TR_{it} = \beta_0 + \beta_1\ln GDPP_{it} + \beta_2 EDEM_{it} + \beta_3\ln UPOP_{it} + \beta_4\ln INF_{it} + \beta_5\ln LA_{it} + u_{it} \] ................................. (6)
# GDP per capita in MENA region

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GDP per capita by Country

Years 1990-2015
Electoral democracy index in MENA region

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Years 1990-2015

Electoral Democracy Index by Country
## Estimated Models of the MENA Countries

<table>
<thead>
<tr>
<th>Stages of Political Democracy</th>
<th>Standards of living</th>
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<tr>
<td><strong>V-DEM Institute</strong></td>
<td><strong>Freedom house</strong></td>
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<tr>
<td><strong>Electoral Democracy &amp; electoral autocracy</strong></td>
<td><strong>Closed autocracy</strong></td>
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<tr>
<td>Algeria</td>
<td>Jordan</td>
</tr>
<tr>
<td>Djibouti</td>
<td>Egypt</td>
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<tr>
<td><strong>Poor countries</strong></td>
<td><strong>Rich Countries</strong></td>
</tr>
</tbody>
</table>
Simultaneous equations approach in a system of six equations are estimated jointly using 3SLS.

2SLS: It is consistent even if the explanatory variables are endogenous.

+ 

SUR: It is efficient because it takes into consideration correlation of errors across equations. However, it assumes that no endogenous variables on RHS of equations are included.
1. Estimating the effect of the channel variables on the growth.

2. Estimating the effect of democracy on the channels.

3. Computing the indirect effect of democracy on growth through particular channels.

4. Computing the total indirect effect of democracy on growth in MENA region.

5. Utilizing the delta method to calculate the standard errors of the indirect effect coefficients.
Empirical Results

Different democratic groups of countries, V-DEM Classification

- The effect of the channel on growth
- The effect of democracy on the channel
- The indirect effect of democracy on growth

- Graphs showing the impact of various factors such as education, health, ph. capital, government size, and trade under different democratic classifications.
Freedom House Classification

**The Effect of the Channel on Growth**

- **Education**
- **Health**
- **Ph. Capital**
- **Gov. Size**
- **Trade**

**The Indirect Effect of Democracy on Growth**

- **Education**
- **Health**
- **Ph. Capital**
- **Gov. Size**
- **Trade**
- **Total**

**The Effect of Democracy on the Channel**

- **Education**
- **Health**
- **Ph. Capital**
- **Gov. Size**
- **Trade**

Legend:
- **Free and Partly Free**
- **Not Free**
Classification based on EDEM (1990-2015)

- The effect of the channel on growth
- The effect of democracy on the channel
- The indirect effect of democracy on growth
The overall indirect effect of democracy on growth is significant and non-monotonic.

Democracy hampers growth in the less Democratic countries, but fosters growth in the more democratic countries within the region.
## “Poor and Rich Countries”

<table>
<thead>
<tr>
<th>DEM/EG (%)</th>
<th>total</th>
<th>capital</th>
<th>ph. capital</th>
<th>H. capital</th>
<th>education</th>
<th>health</th>
<th>gov. size</th>
<th>trade</th>
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<tr>
<td><strong>Electoral Democracy &amp; Electoral Autocracy</strong></td>
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</tr>
<tr>
<td>poor countries</td>
<td>-0.445***</td>
<td>0.494</td>
<td>0.075</td>
<td>0.419*</td>
<td>0.088</td>
<td>0.331**</td>
<td>-0.352**</td>
<td>-0.586***</td>
</tr>
<tr>
<td>rich countries</td>
<td>1.155***</td>
<td>2.155***</td>
<td>1.190***</td>
<td>0.965***</td>
<td>0.296***</td>
<td>0.669***</td>
<td>-0.433**</td>
<td>-0.567***</td>
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<tr>
<td><strong>Closed Autocracy</strong></td>
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<tr>
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<td>-3.396***</td>
<td>-3.679***</td>
<td>0.282***</td>
<td>-0.581**</td>
<td>0.864**</td>
<td>0.608*</td>
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<tr>
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<td>0.108*</td>
<td>0.538*</td>
<td>-0.368</td>
<td>0.906**</td>
<td>-0.073</td>
<td>0.979***</td>
<td>-0.171*</td>
<td>-0.259**</td>
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<tr>
<td><strong>Free and Partly Free</strong></td>
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<tr>
<td>poor countries</td>
<td>-0.297</td>
<td>0.049</td>
<td>-0.187</td>
<td>0.235</td>
<td>0.172**</td>
<td>0.063</td>
<td>-0.190</td>
<td>-0.156*</td>
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<td>1.146***</td>
<td>0.677***</td>
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<td>0.132***</td>
<td>0.337**</td>
<td>-0.431*</td>
<td>-0.272*</td>
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<td>-0.798***</td>
<td>-0.858***</td>
<td>-0.954***</td>
<td>0.096***</td>
<td>-0.178**</td>
<td>0.274</td>
<td>0.586***</td>
<td>-0.526***</td>
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<td>1.753***</td>
<td>1.202***</td>
<td>0.551***</td>
<td>-0.203**</td>
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<td>-0.636**</td>
<td>0.325</td>
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<td>0.200***</td>
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<td>1.537***</td>
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## The Effect of the “Arab Spring Revolution”

<table>
<thead>
<tr>
<th>DEM/EG (%)</th>
<th>total</th>
<th>capital</th>
<th>ph. capital</th>
<th>H. capital</th>
<th>education</th>
<th>health</th>
<th>gov. size</th>
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<tr>
<td>before revolution</td>
<td>0.259***</td>
<td>1.193***</td>
<td>0.554***</td>
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<td>0.099</td>
<td>0.539***</td>
<td>-0.311***</td>
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<td>0.676***</td>
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<td>0.085</td>
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<td>0.136***</td>
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<tr>
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<td>-3.509***</td>
<td>0.274*</td>
<td>-0.136**</td>
<td>0.410</td>
<td>-0.978**</td>
<td>0.331*</td>
</tr>
<tr>
<td>after revolution</td>
<td>-0.891***</td>
<td>0.097**</td>
<td>-1.721***</td>
<td>1.818***</td>
<td>-0.143**</td>
<td>1.961**</td>
<td>-0.734**</td>
<td>-0.254**</td>
</tr>
</tbody>
</table>
Conclusions

- Democracy affects economic growth significantly and indirectly through human capital, physical capital, government size and openness.

- Democracy affects growth non-monotonically. It depends on the stage of democracy in each group of countries within the region.

- Improving democracy in the democratic-countries within the region motivates growth. However autocratic-countries should transfer their regimes towards democracy to gain the benefits of democracy on growth.
Conclusions

- Rich countries are more respondents to democracy than poor countries, therefore minimum level of per capita income is prerequisite for democracy in MENA region.

- After the revolution, democratic institutions are expanding access to human capital, but do so at the expense of physical capital accumulation. The overall indirect effect of democracy on growth is stronger after the revolution than before it.
Future Work

- Other democracy indices, indicators, components

- The relationship between DEM and EG in different time periods, in different groups of countries

- The effect of DEM on EG via different channels; corruption, instability, inflation, income inequality

- Prerequisite for democracy in MENA region
Thank you