Okun’s Law: (Un)fit for Low-Income Countries?

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Joint Work with
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<table>
<thead>
<tr>
<th>Country</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria*</td>
<td>Mongolia</td>
</tr>
<tr>
<td>Botswana</td>
<td>Myanmar (1998)</td>
</tr>
<tr>
<td>Cabo Verde</td>
<td>Nicaragua*</td>
</tr>
<tr>
<td>Cameroon</td>
<td>São Tomé and Príncipe</td>
</tr>
<tr>
<td>Côte d’Ivoire</td>
<td>South Africa*</td>
</tr>
<tr>
<td>Egypt* (1990)</td>
<td>Sudan</td>
</tr>
<tr>
<td>Honduras*</td>
<td>Tanzania (1995)</td>
</tr>
<tr>
<td>Kenya</td>
<td>Tunisia (1990)</td>
</tr>
<tr>
<td>Mauritius</td>
<td>Vietnam* (1990)</td>
</tr>
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<td>Moldova* (1993)</td>
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</tbody>
</table>
Okun’s Law: What we estimate

Gaps version

\[ u_t - u_t^* = \beta (y_t - y_t^*) + \varepsilon_t \]

Changes version

\[ \Delta u_t = \alpha + \gamma \Delta y_t + \omega_t \]

\[ e_t - e_t^* = \beta^e (y_t - y_t^*) + \varepsilon_{et} \]

\[ \Delta e_t = \alpha^e + \gamma^e \Delta y_t + \omega_{et} \]

\[ l_t - l_t^* = \beta^l (y_t - y_t^*) + \varepsilon_{lt} \]

\[ \Delta l_t = \alpha^l + \gamma^l \Delta y_t + \omega_{lt} \]
Main results

• Distribution of Okun coefficients in Low-Income Countries
• Probing the cross-country heterogeneity in Okun coefficients
Distribution of Okun Coefficients and R-squared: Unemployment

Gap Version
- Unemployment Coefficient
  - Mean = -0.18
  - Sd = 0.17
  - N = 19

- Unemployment R-squared
  - Mean = 0.19
  - Sd = 0.20
  - N = 19

Change Version
- Unemployment Coefficient
  - Mean = -0.17
  - Sd = 0.14
  - N = 19

- Unemployment R-squared
  - Mean = 0.17
  - Sd = 0.18
  - N = 19
Distribution of Okun Coefficients and R-squared: Employment

**Gap Version**
- Employment Coefficient
  - Mean = 0.25
  - Sd = 0.42
  - N = 25
- Employment R-squared
  - Mean = 0.15
  - Sd = 0.17
  - N = 25

**Change Version**
- Employment Coefficient
  - Mean = 0.19
  - Sd = 0.25
  - N = 25
- Employment R-squared
  - Mean = 0.11
  - Sd = 0.16
  - N = 25
Distribution of Okun Coefficients and R-squared: Labor Force

Gap Version

Labor Force Coefficient

Mean = -0.07
Sd = 0.27
N = 19

Labor Force R-squared

Mean = 0.07
Sd = 0.08
N = 19

Change Version

Labor Force Coefficient

Mean = -0.04
Sd = 0.31
N = 19

Labor Force R-squared

Mean = 0.06
Sd = 0.07
N = 19
Potential Determinants of Okun Coefficient

Okun Coefficient: Unemployment, Gap

- **Corr = -0.60***
- **Corr = -0.26**
- **Corr = 0.04**
- **Corr = 0.39**
- **Corr = 0.68***
- **Corr = 0.09**
- **Corr = -0.09**
- **Corr = -0.16**
## Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
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</thead>
<tbody>
<tr>
<td>Per Capita GDP (k$)</td>
<td>18</td>
<td>2.34</td>
<td>1.62</td>
<td>0.66</td>
<td>6.66</td>
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<tr>
<td>Services (ratio of GDP)</td>
<td>19</td>
<td>0.52</td>
<td>0.09</td>
<td>0.33</td>
<td>0.67</td>
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<tr>
<td>Informal WB (ratio)</td>
<td>6</td>
<td>0.51</td>
<td>0.23</td>
<td>0.15</td>
<td>0.73</td>
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<td>Shadow Economy</td>
<td>22</td>
<td>38.56</td>
<td>13.29</td>
<td>15.10</td>
<td>66.10</td>
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<tr>
<td>Skill Mismatch Index</td>
<td>7</td>
<td>0.15</td>
<td>0.09</td>
<td>0.04</td>
<td>0.26</td>
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<tr>
<td>Business regulations</td>
<td>11</td>
<td>5.66</td>
<td>0.68</td>
<td>4.35</td>
<td>6.74</td>
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<tr>
<td>Labor market regulations</td>
<td>11</td>
<td>5.38</td>
<td>0.86</td>
<td>4.00</td>
<td>6.78</td>
</tr>
<tr>
<td>Mean Unemployment</td>
<td>19</td>
<td>10.67</td>
<td>5.57</td>
<td>2.28</td>
<td>21.68</td>
</tr>
</tbody>
</table>
Learning from country cases

- Mauritius
- South Africa
- Morocco
  - Growth threshold and unemployment
  - Rolling window regression
Unemployment Rate and GDP Growth

Mauritius

South Africa

Morocco

Unemployment Rate and Real GDP Growth over time for Mauritius, South Africa, and Morocco.
Okun’s Law: Mauritius

\[ \beta^e = 0.65^{***} \]
\[ R\text{-sq} = 0.50 \]

\[ \beta^l = -0.03 \]
\[ R\text{-sq} = 0.01 \]

\[ \gamma^e = 0.58^{***} \]
\[ R\text{-sq} = 0.35 \]

\[ \gamma^l = 0.08 \]
\[ R\text{-sq} = 0.03 \]
Okun’s Law: South Africa

Gap Version

- Unemployment Gap: $\beta = -0.33^{***}$, $R$-sq = 0.18
- Employment Gap: $\beta^e = 0.83^{**}$, $R$-sq = 0.14
- Labor Force Gap: $\beta^l = 0.40$, $R$-sq = 0.05

Change Version

- Change in Unemployment: $\gamma = -0.25^{*}$, $R$-sq = 0.09
- Employment Growth: $\gamma^e = 0.76^{*}$, $R$-sq = 0.10
- Labor Force Growth: $\gamma^l = 0.45$, $R$-sq = 0.06
Okun’s Law: Morocco

Gap Version

\[ \beta = -0.02 \quad R-sq = 0.01 \]

\[ \beta^e = -0.42^{**} \quad R-sq = 0.21 \]

\[ \beta^l = -0.46^{**} \quad R-sq = 0.24 \]

Change Version

\[ \gamma = -0.04 \quad R-sq = 0.05 \]

\[ \gamma^e = -0.19 \quad R-sq = 0.04 \]

\[ \gamma^l = -0.25 \quad R-sq = 0.08 \]
Okun’s Law in Morocco: Growth Threshold and Unemployment

\[ \gamma = -0.04 \quad \text{R-sq} = 0.05 \]

\[ \gamma = 0.08 \quad \text{R-sq} = 0.05 \]

\[ \gamma = -0.25* \quad \text{R-sq} = 0.32 \]
Okun’s Law in Morocco: Rolling Window Estimation

10-Year Window

Okun coefficient

R-squared
Conclusions

- Average Okun coefficients
  - Unemployment rate: -0.18
  - Employment: 0.19

- Heterogeneity in Okun coefficients
  - Okun’s Law holds well for some LICs
  - Heterogeneity in Okun coefficients can be explained by per capita GDP

- Richer models might be needed to explain the relationship between labor markets and GDP growth in the Low-Income Countries