Democracy-growth dynamics for richer and poorer countries

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Outline

• Framing the question
• Methodology
• Results – Overall
• Results – Rich countries
• Overall dynamics
• Looking at the starting point (again)
Is there a connection between growth and democracy?

...probably a bit tricky...so
Starting point – Single countries (1)

...maybe we see a connection here?!
Starting point – Single countries (2)
Where do we start?

Starting point – Single countries (3)
“Our” starting point

• **Seminar** in spring 2015 about **democracy and economic growth**

• **Two seminal papers:**
  
  

What is the discussion about?

Two hypotheses (Schumpeter [1942])

Democracy is a luxury enjoyed by rich countries. It is expensive, i.e. generally reduces growth.

*Lipset [1959], Barro [1996]*

vs.

Democracy fosters an environment (and ‘civil virtues’) that enhance(s) growth.

*Friedman [1962], Gerring [2005]*
How to measure democracy?

Polity project and measures:


• **Polity2 variable**: Measures level of democracy on a scale between -10 (autocracy) and 10 (democracy)

• Based on **information** such as:
  • Openness and competitiveness of executive recruitment
  • Constraints of chief executive
  • Regulation and competitiveness of participation
Polity2 - shortcomings

Data is:
• based on / mainly used for **conflicts**
• sparse for newly independent countries:
  • Use **“backfilling”** (idea by Gerring [2005]): Fill back data of main country of **“contiguous empire”** into all countries of this empire
  • **Extend this to overseas empires** (colonialism)
Measure the democracy level?

Two limiting cases:

- **Level** of democracy *or*
- **Democratic or political capital** as a key notion

  Fungible resource accumulated over time, promising increased return in the future.

  or **stock of democracy**

...and a whole spectrum in between using a *mediating formula*...

\[
PCI_{\alpha,T_0}(c, t) = n_\alpha \sum_{\tau=T_0}^{t} P_2(c, \tau) \alpha^{t-\tau}
\]
Examples of political capital indices
What political capital index to take

• Papers measured **one pair** (discount factor, start year)
  
e.g. Gerring: ($\alpha=0.99$, $T_0=1900$)

• But why not take the **whole spectrum**:
  
  • from level (low discount factor) to stock (high discount factor)
  
  • from far away start year (1800) to recent start year (1960)
What countries to analyse?

- Seminal papers measured “the world”.
- Why not analyse sub-groups by GDP\(^1\)?
- Are the results still the same?

Table 1: Countries grouped by GDP p.c.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>23,893</td>
<td>86,127</td>
<td>28,194</td>
<td>28</td>
</tr>
<tr>
<td>2</td>
<td>6,195</td>
<td>18,634</td>
<td>7,549</td>
<td>29</td>
</tr>
<tr>
<td>3</td>
<td>2,738</td>
<td>6,125</td>
<td>2,818</td>
<td>33</td>
</tr>
<tr>
<td>4</td>
<td>974</td>
<td>2,531</td>
<td>1,101</td>
<td>31</td>
</tr>
<tr>
<td>5</td>
<td>155</td>
<td>899</td>
<td>421</td>
<td>41</td>
</tr>
</tbody>
</table>

\(^1\) GDP p.c. and growth of GDP p.c. are easy to measure, e.g. by the World Development Indicators of the World Bank.
The grid

- Based on idea of “political capital spectrum” and countries grouped by GDP, this is “the grid”
- 226’800 regressions per GDP group

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Grid specification</th>
<th>Length of grid dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_0$</td>
<td>1800 to 1960 in 2-year steps</td>
<td>81</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>0.01 to 1.00 in steps of 0.01</td>
<td>100</td>
</tr>
<tr>
<td>Time periods $\tau$ - 40 years</td>
<td>(1962,2002) to (1973,2013)</td>
<td>28 periods $\tau$</td>
</tr>
<tr>
<td>Time periods $\tau$ - 50 years</td>
<td>(1962,2012) to (1963,2013)</td>
<td></td>
</tr>
</tbody>
</table>
The model

\[ g(c, t) = \gamma PCI_{\alpha, T_0}(c, t) + \sum_{i=1}^{q} \delta_i g(c, t - i) + \alpha(c) + \epsilon(c, t) \]

- **Panel regression**, fixed effects, within-estimator
- Would like to estimate **coefficient** \( \gamma \)
- Might include lagged dependent variable to deal with serial correlation
- **In our case**: 4 lags would suffice to control for this
- BUT: Results are very similar for both cases (q=0, q=4) – Stick to q=0.
Results – Panel Regression

- Significance and sign of coefficients

Table 3: Significance of coefficients for country groups, all discount factors $\alpha$

<table>
<thead>
<tr>
<th>GDP groups</th>
<th>% Positive coefficients</th>
<th>% Negative coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>all 10% significance</td>
<td>all 10% significance</td>
</tr>
<tr>
<td>1</td>
<td>0% 0%</td>
<td>100% 90%</td>
</tr>
<tr>
<td>2</td>
<td>100% 10%</td>
<td>0% 0%</td>
</tr>
<tr>
<td>3</td>
<td>64% 10%</td>
<td>36% 0%</td>
</tr>
<tr>
<td>4</td>
<td>70% 28%</td>
<td>30% 4%</td>
</tr>
<tr>
<td>5</td>
<td>100% 79%</td>
<td>0% 0%</td>
</tr>
</tbody>
</table>
Results – Panel regression

- Long- and short-term growth – low and high discount factors $\alpha$

Figure 1: Size of selected coefficients relating growth to long- and short-term political capital (90% error bars)
Results – Most significant discount factors

- High $\alpha$ are most significant – “confirms” Gerring et al.’s choice of $\alpha = 0.99$
Results - Summary

Based on the previous findings, we can say that for groups between the second lowest and the second highest average GDP, there is a strong long-term incentive (high discount factors $\alpha$) to democratize, whereas the short-term incentive (low discount factors $\alpha$) is considerably less so. For the countries with the lowest average GDP, there is a strong incentive to democratize for all time horizons.
What about the “rich guys”?

• Should they turn quickly towards autocracy to enhance growth?
• We can have a look at what happens then.
• ... sparse data for this case ...
Rich countries “de-democratize” (1)

- As for level of democracy, most rich countries look like this...

- Some like this....
Rich countries “de-democratize” (2)

- Some look like this ... more interesting

- Two look like this: Singapore and Belgium
Rich countries “de-democratize” (3)

• ...if we analyse them by a panel regression

<table>
<thead>
<tr>
<th>Discount factors</th>
<th>% Positive coefficients</th>
<th>% Negative coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>all</td>
<td>10% significance</td>
</tr>
<tr>
<td>all α</td>
<td>42%</td>
<td>16%</td>
</tr>
<tr>
<td>low α</td>
<td>25%</td>
<td>0%</td>
</tr>
<tr>
<td>high α</td>
<td>90%</td>
<td>36%</td>
</tr>
</tbody>
</table>

• We see that in the long-run, a negative effect in growth goes along with de-democratisation.
Analysis of overall dynamics

Motivation:
Can the dynamics between democratization and growth be described by a single function?

\[ g = \gamma(PCI) \times PCI \]

- What properties should this function have?
- At the PCI level of the different GDP groups \( i = 1, \ldots, 5 \): \( \gamma(PCI) = \gamma_i \) – what resulted from our panel regressions.
Cost-return analysis

- Idea: $\gamma(PCI) = \gamma_A \ln(PCI) + \gamma_B PCI + \gamma_C$
Cost-return model – Results (1)

• **Results**: Fit this function to the results of the panel regression (averaged over time slices) – one result for each pair \((\alpha, T_0)\)

<table>
<thead>
<tr>
<th>Quality of fit</th>
<th>% of total</th>
<th>thereof % of functions with</th>
<th>most frequent (\alpha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>log cost</td>
<td>log return</td>
</tr>
<tr>
<td>Poor</td>
<td>59.0%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Good</td>
<td>41.0%</td>
<td>0.3%</td>
<td>99.7%</td>
</tr>
<tr>
<td>Total</td>
<td>8100</td>
<td>0.1%</td>
<td>99.9%</td>
</tr>
</tbody>
</table>

• **High \(\alpha\) fit best**: with \(R^2_{\text{adj}} > 0.9\): \(\alpha\) in [0.86, 0.97] most frequent
• **Log return** function **prevails** by far.
Cost-return model – Results (2)

- **Growth shrinks** for all GDP groups, **max** at PCI = 40%
- Growth turns negative for one GDP group
- Depends on initial value of PCI, average move of PCI per GDP group

![Diagram showing growth rates for different PCI values across GDP groups.](image-url)
Cost-return model – LT effects

- **Effect of average move of PCI in GDP groups after 25 years**

<table>
<thead>
<tr>
<th>25-year growth</th>
<th>GDP Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Unadjusted</td>
<td>94.2%</td>
</tr>
<tr>
<td>Adjusted</td>
<td>67.3%</td>
</tr>
<tr>
<td>Delta</td>
<td>-26.9%</td>
</tr>
<tr>
<td>Start PCI value</td>
<td>74.3%</td>
</tr>
<tr>
<td>Average PCI move</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

- Compare to Acemoglu et al.’s result of 20% after 25 years
Cost-return model – Auto- to Democracy

- Analysis: Autocracy to democracy
- PCI moves from -25% to 25% in 25 years
- GDP of “autocracy-turned-democracy” grows by 16% more

Table 12: Transition autocracy to democracy for stagnant and slow initial growth

<table>
<thead>
<tr>
<th>Point in time</th>
<th>Variable</th>
<th>Stagnant</th>
<th>Slow growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>t = 0</td>
<td>GDP</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>growth</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>PCI</td>
<td>-25%</td>
<td>-25%</td>
</tr>
<tr>
<td>t = 25, adjusted</td>
<td>GDP</td>
<td>116.5</td>
<td>149</td>
</tr>
<tr>
<td></td>
<td>growth</td>
<td>1.31%</td>
<td>2.31%</td>
</tr>
<tr>
<td></td>
<td>PCI</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Delta PCI</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>t = 25, unadjusted</td>
<td>GDP</td>
<td>100</td>
<td>128</td>
</tr>
<tr>
<td></td>
<td>growth</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>PCI</td>
<td>-25%</td>
<td>-25%</td>
</tr>
<tr>
<td></td>
<td>Delta PCI</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>GDP ratio adjusted</td>
<td>1.16</td>
<td>1.49</td>
</tr>
<tr>
<td></td>
<td>GDP ratio unadjusted</td>
<td>1.0</td>
<td>1.28</td>
</tr>
<tr>
<td></td>
<td>Ratio adjusted / unadjusted</td>
<td>1.16</td>
<td>1.16</td>
</tr>
</tbody>
</table>

Figure 4: GDP growth for transition autocracy to democracy, case of slow initial growth

5. Conclusion

Our main findings are in line with the recent paper 'Democracy Does Cause Growth' by Acemoglu et al. (2015), plus we reconcile Barro (1996) and Gerring et al. (2005). Acemoglu et al. (2015) went deeper compared to the analyses of Barro (1996) and Gerring et al. (2005) by use of a dynamic panel model, thus...
Coming back to our initial countries

- **Green**: positive correlation, **red**: negative correlation
- **Darker line**: significant (10% level), **lighter line**: not ...

- One country per GDP group
- Except GDP group 1:
  - 1 de-democratizing country
  - 1 democratizing country
- For these countries, many of the group features are confirmed.
Mozambique
Mongolia
Albania
Oman
Singapore
Spain
Conclusion
Further research questions

• Analyze the richest group of countries more thoroughly – e.g. by network analysis, involving trade networks...
• Analyze the overall dynamics more thoroughly, e.g. for the case of low PCI (strong autocracies)
Thank you !!

• Any more questions?