

Challenges in Measuring Government Capacity

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Outline

1. Challenges
2. State Capacity as a Latent Variable
3. Presenting Some Results

Challenges in Measuring Government Capacity

- It is “latent” (we do not observe it directly)
- Multidimensionality of the concept
- Need to identify good indicators
- Whether/How to aggregate these indicators

Example: Good Governance in India

- Five dimensions of good governance: political, administrative, economic, social, and legal/judicial
- 164 different indicators: ranging from 24-52 per dimension
- Process to validate indicators as SMART through field testing (specific, measurable, attainable, realistic, and time-bound).
- But, how shall we aggregate them?

Source: Challenges in Monitoring and Evaluation: An Opportunity to Institutionalize M&E Systems (2010)

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A Project to Estimate Level of State Capacity

Goal: estimate level of state capacity for all countries annually from 1960-present (Hanson and Sigman 2013)

- **State capacity**: the ability of the state to implement its policies.
- Focus on core dimensions: extractive, coercive, and administrative capacities
- Assume these dimensions are latent (unobserved) and interrelated
- Use a broad range of indicators to construct a measure of state capacity from these three dimensions.

Extractive Capacity Indicators

Census Frequency (calculated from UN 2011)

Efficiency of Revenue Mobilization (World Bank CPIA)

Relative Political Capacity (Arbetman-Rabinowitz and Johnson, 2007)

Tax Evasion not Damaging (IMD)

Taxes on Income as % of Revenue (IMF, WDI)

Taxes on International Trade as % Revenue (IMF, WDI)

Total Tax Revenue as % GDP (IMF, WDI)

Coercive Capacity Indicators

Anocracy (calculated from Polity IV)

Fractal Borders (Alesina et al., 2011)

Military Personnel per 1,000 in pop. (COW)

(log) Military Spending per capita (COW)

Paramilitary Personnel per 1,000 in pop. (Sudduth, 2016)

Police Officers per 1,000 in pop. (UN)

Monopoly on Use of Force (BTI)

Political Terror Scale (US Dept. of State; Amnesty International)

Administrative Capacity Indicators

Administration and Civil Service (Global Integrity)

Administrative Efficiency (Adelman and Morris, 1967)

Bureaucratic Quality (Political Risk Services)

Census Frequency (calculated from UN 2011)

Contract-Intensive Money (WDI)

Effective Implementation of Government Decisions (IMD)

Efficiency of Revenue Mobilization (World Bank CPIA)

Quality of Budgetary and Financial Management (World Bank CPIA)

Quality of Public Administration (World Bank CPIA)

Statistical Capacity (World Bank)

Taxes on Income as % of Revenue (IMF, WDI)

Taxes on International Trade as % Revenue (IMF, WDI)

Weberianness (Rauch and Evans, 2000)

Methodology

- Bayesian latent variables analysis via Markov-Chain Monte Carlo.
- We use the indicators to make an estimate of the unobserved level of state capacity.
- This involves specifying a mathematical relationship between Capacity and each indicator.
- Use computing power to estimate Capacity and unknown mathematical parameters with tens of thousands of simulations
- This approach is robust to missing values for some indicators.

How does the method work?

The observed indicators are modeled as a function of a latent state capacity parameter(s):

$$\begin{aligned}\text{Indicator}_1 &= c_1 + \lambda_1 \text{Capacity} + \epsilon_1 \\ \text{Indicator}_2 &= c_2 + \lambda_2 \text{Capacity} + \epsilon_2 \\ \text{Indicator}_3 &= c_3 + \lambda_3 \text{Capacity} + \epsilon_3 \\ &\vdots \quad \quad \quad \vdots \\ \text{Indicator}_{25} &= c_{25} + \lambda_{25} \text{Capacity} + \epsilon_{25}\end{aligned}$$

The parameters λ_i estimate the linear relationships between Capacity and the observed indicators.

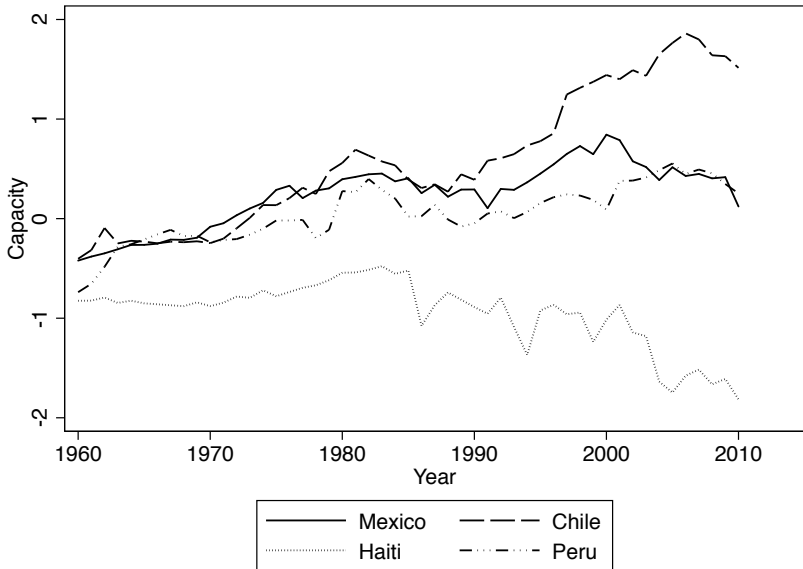
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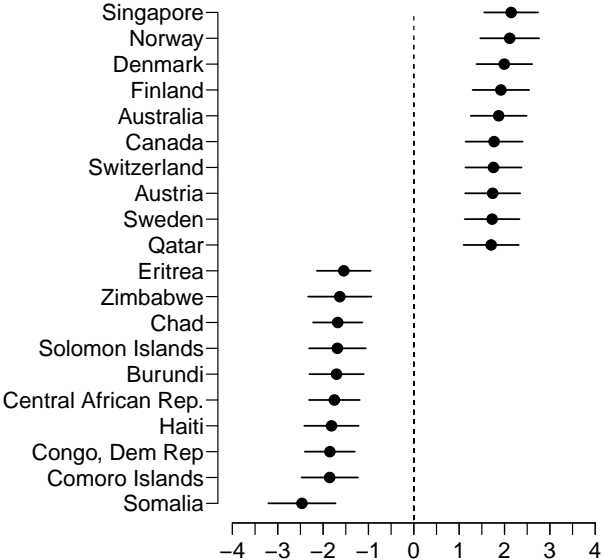
Capacity: Most-Correlated Indicators

(log) Military Spending per capita (COW)	.87
Tax Evasion not Damaging (IMD)	.81
Bureaucratic Quality (Political Risk Services)	.78
Quality of Budgetary and Financial Management (CPIA)	.77
Effective Implementation of Government Decisions (IMD)	.76
Statistical Capacity (World Bank)	.71
Quality of Public Administration (CPIA)	.70
Monopoly on Force (BTI)	.67
Efficiency of Revenue Mobilization	.67
Anocracy (Polity IV)	.63

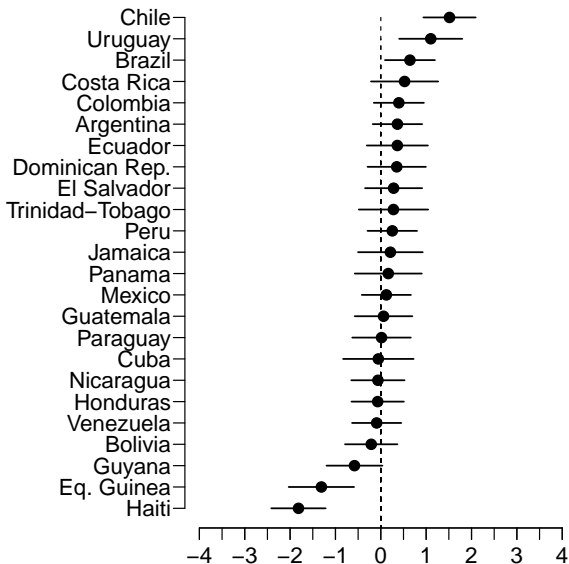
Capacity Over Time in Four Countries



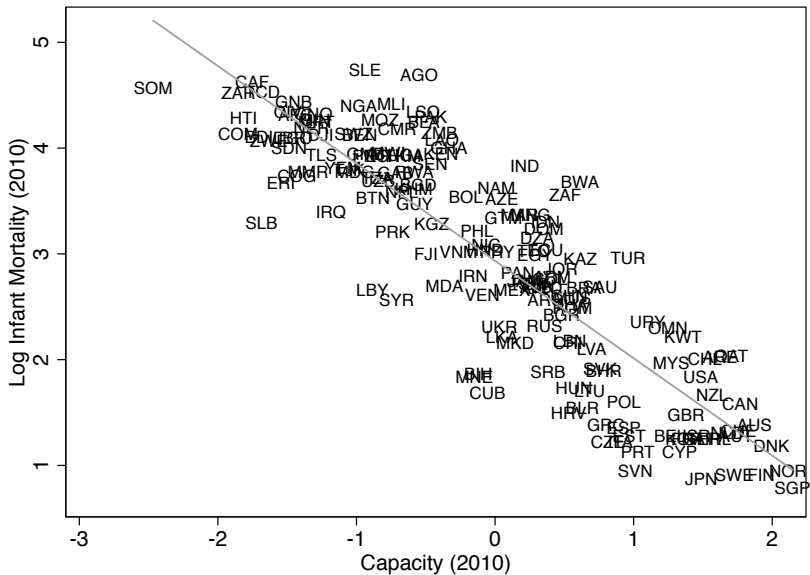
Capacity Rankings in 2010: 10 Highest and Lowest



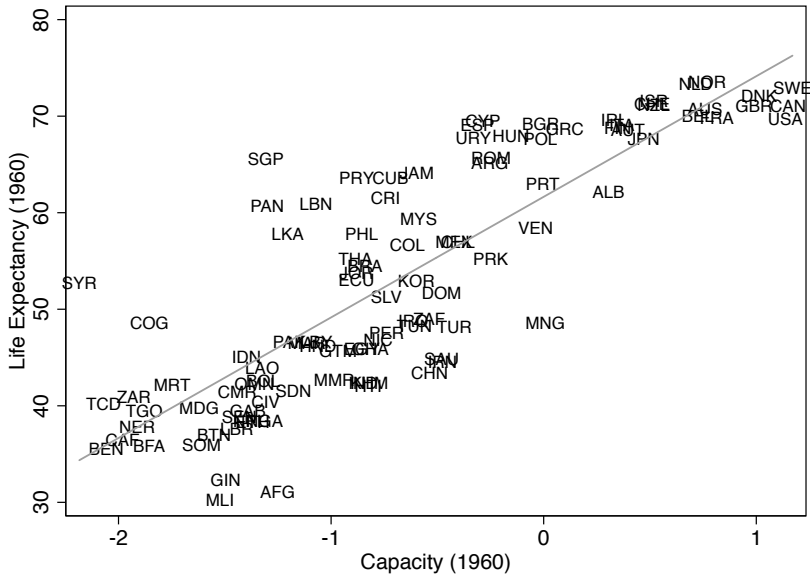
Capacity in 2010: Latin America and Caribbean



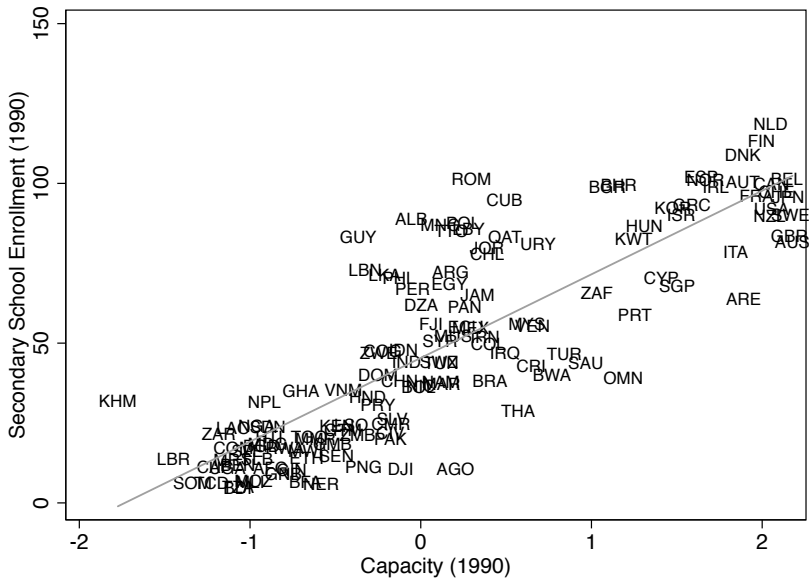
Capacity and Infant Mortality (2010)



Capacity and Life Expectancy (1960)



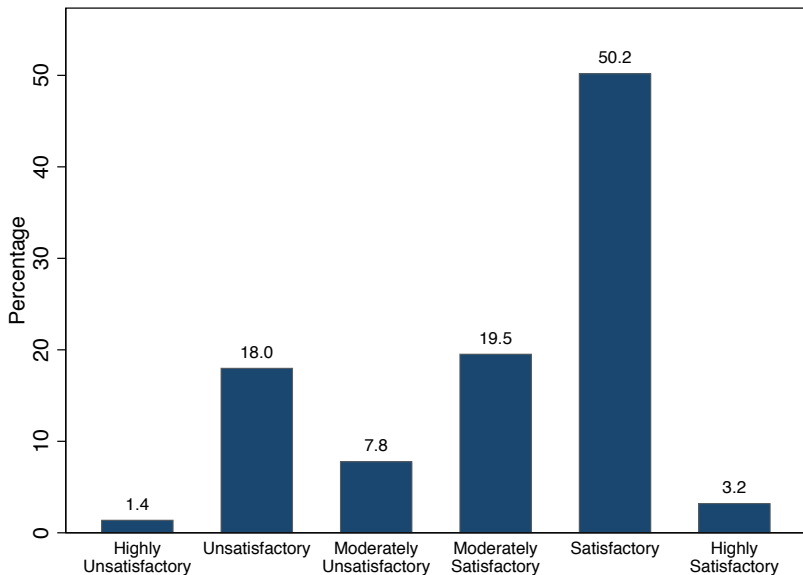
Capacity and School Enrollment (1990)



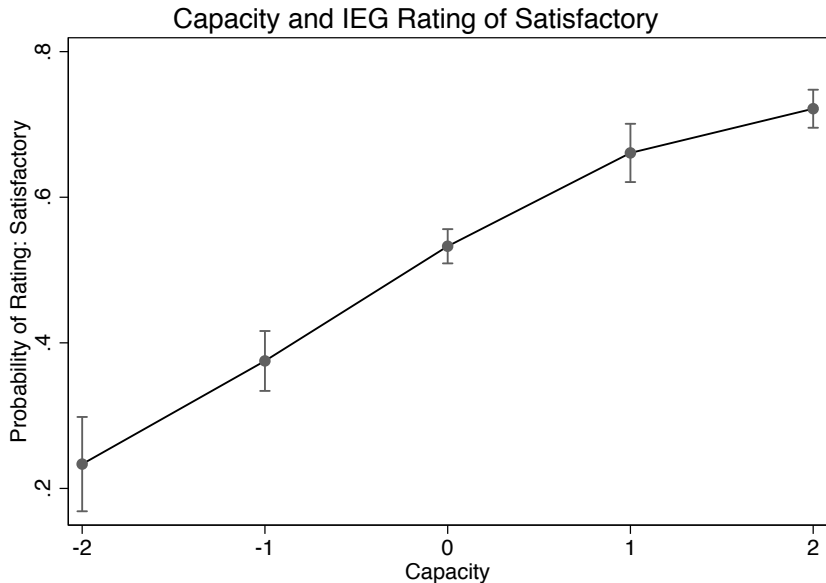
Capacity as Predictor of Project Performance

- We employ these state capacity measurements as a predictor of World Bank project success
- The Bank's Independent Evaluation Group (IEG) has ratings of over 11,000 projects from 1962 and onward
- Question: is the IEG more likely to rate a project's outcome as satisfactory where state capacity is higher?

Distribution of IEG Ratings (n=11,213)



IEG Ratings of World Bank Projects, 1962–2010



Assessment

- Our data allow us to go back to the beginning of the IEG dataset in 1962, which is a step forward in this area of research.
- Each 1-unit increase in Capacity associated with an increase in the probability of a Satisfactory rating by .12-.15.
- Our results are consistent with other work in finding that the state's capabilities are a crucial determinant of project success.

Conclusions

- This methodology eliminates the need for us to construct an index from the indicators, thus avoiding arbitrary weighting schemes.
- Unlike traditional factor analysis, it is robust to missing data points.
- On the downside, it is computationally-intensive and is not easily implemented in standard statistical software.

Thank You!

Jonathan K. Hanson and Rachel Sigman. 2013. "Leviathan's Latent Dimensions: Measuring State Capacity for Comparative Political Research." Available at <http://www.jonathan-hanson.net>.