Pillars of Prosperity

State Capacity in Economic Development

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Aims of this Lecture

Will develop the formal model introduced yesterday and use it to look at empirical determinants of fiscal capacity

We will begin with just fiscal capacity which allow us to fix the main ides

We will then add legal capacity

– for simplicity, we focus on the linear case where $V(g) = g$.

We explore both theory and evidence.

Road map for part B

1. Some further motivation

2. A simple two-period model

3. Equilibrium policy and investment in fiscal capacity

4. Some extensions

5. Implications and data

3. Equilibrium policy and investment in fiscal capacity

(the story so far)

Optimal policies within each period:

– Fiscal capacity fully utilized

– Transfers reflect residual public revenue and depend on θ

– Whether spending is on transfers or public goods depends on comparing α_s and $2(1-\theta)$

The Indirect Utility Function

Plugging in optimal policy, this is given by

$$\begin{aligned} W(\alpha_s, \tau_s, m_s, \beta^J) &= \alpha_s g_s^* + (1-\tau_s)\omega + \\ &\quad \beta^J[R_s + \tau_s\omega - g_s^* - m_s] \end{aligned}$$

where g_s^* is the optimal provision of public goods which we derived yesterday and m_s is cost of funding state capacity investment

and $\beta^I = 2(1-\theta)$ and $\beta^O = 2\theta$.

The Investment objective

Let

$$U^I(\tau_2) = \left[\phi W\left(\alpha_H, \tau_2, 0, \beta^I\right) + (1-\phi) W\left(\alpha_L, \tau_2, 0, \beta^I\right)\right]$$

and

$$U^O(\tau_2) = \left[\phi W\left(\alpha_H, \tau_2, 0, \beta^O\right) + (1-\phi) W\left(\alpha_L, \tau_2, 0, \beta^O\right)\right]$$

be the "value functions" for entering period two as an incumbent or the opposition as a function of the state variable τ_2.

Incumbent I_1 maximizes expected utility sets τ_2 under uncertainty about α_2,and I_2, to maximize

$$W(\alpha_1, \tau_1, F(\tau_2 - (1-\delta)\tau_1), 2(1-\theta)) + (1-\gamma)U^I(\tau_2) + \gamma U^O(\tau_2)$$

The Fiscal Capacity Euler Equation

$$W_m(\alpha_1, \tau_1, m_1, 2(1-\theta))F_\tau\left(\tau_2 - (1-\delta)\,\tau_1\right)$$
$$= (1-\gamma)\,U_\tau^I\left(\tau_2\right) + \gamma U_\tau^O\left(\tau_2\right)$$
$$\text{c.s. } \tau_2 - \tau_1 \geqslant 0$$

Marginal cost is in period one foregone consumption or public goods and reduced period two consumption

The benefit from investing is in terms of future public revenues (less reduced cost of private incomes).

Period one cost depends on period one public revenues

$$\begin{aligned} \lambda_1 &\equiv W_m(\alpha_1, \tau_1, m_1, 2(1-\theta)) \\ &= \max\left\{\alpha_1, 2\left(1-\theta\right)\right\}. \end{aligned}$$

The Fiscal Capacity Euler Equation

The above equation simplifies to:

$$\begin{aligned} \omega[(E(\lambda_2) - 1] &\lessgtr \lambda_1 F_\tau \left(\tau_2 - (1-\delta)\,\tau_1\right) \\ \text{c.s.} \quad \tau_2 - \tau_1 &\geqslant 0 \end{aligned}$$

where

$$E(\lambda_2) = \phi\alpha_H + (1-\phi)E(\lambda_2 \mid \alpha_2 = \alpha_L)$$

is the *expected* value of public funds in future

with $E(\lambda_2 \mid \alpha_2 = \alpha_L) = \begin{cases} \alpha_L & \text{if } \alpha_L \geq 2(1-\theta) \\ 2[(1-\theta)(1-\gamma) + \gamma\theta] & \text{otherwise} \end{cases}$

Is investment positive?

Because $F_\tau(0) = 0$, it is sufficient that

$$E(\lambda_2) - 1 \geq 0$$

So expected future value of public funds needs to be large enough.

This depends on our key parameters: $\{\phi, \alpha_H, \alpha_L, \theta, \gamma\}$

Agenda

Analyze optimal investment

understand how it depends on the model parameters

confront with the data

Pigovian planner

We begin with the following useful benchmark:

Proposition 1 *Suppose that* $\theta = 1/2$ *and* $\gamma = 0$*. Then*

1. *there is positive investment in fiscal capacity.*

2. *higher* ϕ *or* ω *(or higher* α_H *and* α_L*) increase investment in fiscal capacity.*

Implications I

Income and War Risk

If $\theta = 1/2$ and $\gamma = 0$, then $E(\lambda_2) = \phi\alpha_H + (1-\phi)\alpha_L \geq 1$ and all period 2 spending is on public goods

Investment is higher if:

– Tax base, ω, is larger

– Higher risk of war: ϕ

Implications II

Natural resources

Define GDP/capita as $y = R + \omega$

- if y given, larger income share of resource, i.e., lower ω rents cuts planner's investment in state capacity
- if R given, planner raises fiscal capacity with higher GDP/capita

Political equilibria

We now explore what happens when politics determines decisions

This depends on two critical conditions:

Cohesiveness: $\alpha_L \geq 2\,(1-\theta)$

more likely to hold when θ close to $\frac{1}{2}$ and /or α_L is large, i.e. the stronger are common-interest motives.

Condition implies $E(\lambda_2 \mid \alpha_2 = \alpha_L) \geq 1$

Stability: $\phi\alpha_H + (1-\phi)\,2\,[(1-\gamma)\,(1-\theta) + \gamma\theta] \geq 1.$

relevant when Cohesiveness fails

more likely to hold when γ is low (given that θ is low) e.g., holds as $\gamma \to 0$ even if $\phi \to 0$

condition implies $E(\lambda_2) \geq 1$

Common-interest state

If the cohesiveness holds the economy follows the Pigovian outcome in Proposition 1.

Thus all future tax revenue is used for public goods and the earlier comparative statics hold

(if α were continuous rather than binary there would be undersupply of public goods for some realizations of α (when $2(1-\theta) > \alpha_s \geq 1$) and hence some inefficiency)

Predictions are exactly was with the planning outcome.

Redistributive State

Proposition 2 *If the cohesiveness condition fails and the stability condition holds then:*

1. *there is positive investment in fiscal capacity.*

2. *higher ϕ, ω, and lower γ raise future fiscal capacity.*

Implications III

Turnover

Expansion of fiscal capacity is now also driven by desire to use the state for redistribution, when $\alpha_2 = \alpha_L$

Given that θ is low, the higher is political stability (lower γ), the more an incumbent becomes a residual claimant on state resources

With enough stability, an incumbent may invest more than a Pigovian social planner (with the same α_L)

Weak state

Proposition 3 *If both Cohesiveness and Stability fail, then*

1. *there is no incentive to invest in fiscal capacity*

2. *the investment in fiscal capacity does not therefore vary with parameters*

The expected future value of public funds is so low that incumbent does not find it worthwhile to invest in fiscal capacity

She fears redistribution away from her own group next period when $\alpha_2 = \alpha_L$

– weak state materializes when ϕ and θ are low and γ is high

If $\delta > 0$, then in a weak state, fiscal capacity may actually decline due to lack of investment to replace lost fiscal capacity.

Implications III (*continued*)

Turnover

Weak states arise when turnover is high so:

higher γ relevant only when political institutions non-cohesive – when θ is low

– then higher instability rases likelihood of a weak state and low investments in fiscal capacity

Welfare economics of three states

Common-interest state: allocation Pareto optimal

Redistributive state: this is also the case, although welfare tilted towards entrenched incumbent group

Weak state: groups would be better off if agreed to boost fiscal capacity and restrict use of transfers – but not credible

Road map for part B

1. Some further motivation

2. A simple two-period model

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4. Some extensions

5. Implications and data

4. Extensions

The model is very simple and can extended in a wide variety of ways to expand its realism.

We now briefly discuss a few possibilities.

– but we only sketch their implications

(i). Quasi-linear preferences

$$u_s^J = c_s^J + \alpha V(g_s)$$

where V is a concave function, and α is now a constant

Continuous public good demand with

$$\lambda_s = \min \{\alpha V_g(g_s), 2(1-\theta)\}$$

Exogenous tax revenue (like aid or resources) reduces demand for fiscal capacity.

(ii). Tax distortions

$$u_s^J = c_s^J + \alpha_s g_s - \frac{\xi}{\xi+1} l_s^{\frac{\xi+1}{\xi}}$$

where l is labor supply and ξ a constant elasticity

Standard tax distortions provides a bound on the use of the income tax.

Since fiscal capacity is costly, it may be optimal to stop short of optimal income tax.

(iii). Other tax bases

$$u_s^J = \alpha_s g_s + x_s^{AJ} + \frac{\varepsilon}{\varepsilon - 1}\left(x_s^{MJ}\right)^{\frac{\varepsilon-1}{\varepsilon}} - \frac{\xi}{\xi + 1}\ell^{\frac{\xi+1}{\xi}},$$

where x_s^{KJ} is demand for good $K \in \{A, M\}$ in period s.

Mix of taxes changes with investment in τ

Can be used to explain the move from trade to income taxes with economic development

(iv). Infinite-horizon model with quasi-linear preferences and linear investment technology

– can explore steady states and convergence

– similar types of state configuration to the two-period model

So the basic classification of states is not a figment of two period models.

The following picture gives the bifurcation of the parameter space

(v). Heterogeneity

In general, implies that incentives to invest in fiscal capacity depend on which group is in power

- Economic inequality – ω^J
- Political inequality
- Group size
- Entrenchment (limited entry) – γ^J

No *a priori* prediction of effect on investment decisions.

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5. Empirical Implications and Data

I. Wars and fiscal capacity

Interpret ϕ (or α) as measure of external war risk

- ϕ raises fiscal capacity τ in the common-interest and redistributive state, but not in weak state i.e., we expect a stronger effect when θ is high

- war indeed raises fiscal capacity as Tilly hypothesized, provided political institutions are cohesive enough

5. Empirical Implications and Data

II. Income and fiscal capacity

Effects of higher income more involved

– higher ω (as higher α), raises state capacity within common-interest and redistributive states, in simple model

  – in infinite horizon model , higher income also raises the likelihood of a redistributive state and higher fiscal capacity

III. Some basic correlations

1. Fiscal capacity (IMF data)

   total revenue raised as percent of GDP, average 1975-2000

   difference of percentages of revenue raised by income taxes and by trade taxes, average 1975-2000

2. Demand for public goods (COW data)

   prevalence of war up to 1975, since 1816 (or independence)

3. Cohesiveness of political institutions (Polity IV data)

   high constraints on executive up to 1975, since 1800 (or indep.)

4. Political instability (Polity IV data)

   competitive and broad-based executive recruitment up to 1975

5. Income (PWT data) and controls

   level in 1975, also hold constant legal origins

C. Productive State Capacity

We now extend basic set-up with legal capacity

This enables us to discuss complementarities in state capacity and the observed clustering of institutions

It will also serve to endogenize income

– an example of a proximate, rather than ultimate, determinant of state capacity

The broader model has richer predictions for what patterns we should observe in the data.

Road map for part C

1. Extend the model to include legal capacity

2. Equilibrium policy and investments in fiscal and legal capacity

3. Comparative Statics

4. Data

1. Extend the model to include legal capacity

Suppose that group J's income at s depends on "regulation" p_s^J

$$\omega_s^J = \omega(p_s^J)$$

where ω is an increasing function

We think of p_s^J as "legal protection of property rights" or "legal enforcement of contracts"

This can be given microfoundations: e.g. a credit market model with partial enforcement of collateralized debt contracts

Regulation

Government has discretion over current regulation policy p_s^J which can be group-specific

This is constrained by existing legal capacity, i.e., $p_s^J \leq \pi_s$.

Investment in legal capacity takes the form of:

– courts, judges, credit and property registries.

We assume that the investment is irreversible and also (for sake of symmetry) set $\delta = 0$ for fiscal capacity

We take the initial stock of legal capacity, π_1, as given.

– it can be augmented in period one by a non-negative investment $\pi_2 - \pi_1$

– there is a (convex) cost of investing $L(\pi_2 - \pi_1)$

where $L_\pi(0) = 0$

Other modifications

We need to rewrite the budget constraints and indirect utilities

– replace (exogenous) ω by (endogenous) $\frac{\omega(p_s^I)+\omega(p_s^O)}{2}$ or $\omega(p_s^J)$ as appropriate

The rest of the model is exactly as before.

Road map for part C

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2. Equilibrium policy and investments in fiscal and legal capacity

Production Efficiency?

Will property rights be allocated equally to each group?

Proposition 4 *For $s \in \{1, 2\}$ any incumbent I_s, and any α_s , optimal regulation fully utilizes all legal capacity, $p^{I_s} = p^{O_s} = \pi_s$*

This is an "obvious" result in the current set up:

– relates to Diamond-Mirrlees production efficiency and a Political Coase Theorem

This result can break down if there are rents

Investments in state capacity

We now have two state variables $\{\tau_s, \pi_s\}$.

We can rewrite the new investment objective as

$$W(\alpha_1, \tau_1, F(\tau_2 - \tau_1) + L(\pi_2 - \pi_1), 2(1-\theta)) \\ +(1-\gamma)U^I(\tau_2, \pi_2) + \gamma U^O(\tau_2, \pi_2).$$

where $U^J(\tau_2, \pi_2)$ are the period two value functions for $J \in \{I, O\}$.

State Capacity Euler Equations

There is now a pair of Euler equations for legal and fiscal capacity

$$\begin{aligned} \omega_\pi(\pi_2)[1 + (E(\lambda_2) - 1)\tau_2] &\leqslant \lambda_1 L_\pi (\pi_2 - \pi_1) \\ \text{c.s.} \quad \pi_2 - \pi_1 &\geqslant 0 \end{aligned}$$

$$\begin{aligned} \omega(\pi_2)[(E(\lambda_2) - 1] &\leqslant \lambda_1 F_\tau (\tau_2 - \tau_1) \\ \text{c.s.} \quad \tau_2 - \tau_1 &\geqslant 0 \end{aligned}$$

Are both investments positive?

Since $F_\tau(0) = L_\pi(0) = 0$, it is sufficient (as above) that

$$E(\lambda_2) - 1 \geq 0$$

although the necessary condition for legal capacity is weaker

Three types of state as before

- The cohesiveness implies common-interest state that invests in both types of state capacity
  - Stability implies redistributive state that invests in both types of state capacity
  - Weak state, when neither Cohesiveness nor Stability, no investment in fiscal capacity and less investment (if any) in legal capacity

Complementarity

This is an important additional idea and is a further implication of

$$E(\lambda_2) - 1 \geq 0.$$

It implies that higher π raises incentives to invest in τ and vice versa.

The payoff function is *supermodular.*

– we can exploit results on monotone comparative statics

– simple to derive effects of most parameter shifts

Comparative Statics I: Value of public goods

Higher expected demand for public goods raises investments in state capacity in common-interest and redistributive states.

$$\frac{\partial E(\lambda_2)}{\partial \phi} = \alpha_H - E(\lambda_2 \mid \alpha_2 = \alpha_L) > 0$$

common interests make fiscal capacity more valuable

external conflict promotes fiscal capacity and legal capacity

Comparative Statics II: Political instability and cohesiveness

Investment in fiscal and legal capacity are promoted by lower political instability if institutions are not cohesive

Lower γ raise the likelihood that the Stability condition holds and increases $E(\lambda_2 \mid \alpha_2 = \alpha_L)$ if it holds

– this effect is stronger, the more non-inclusive are political institutions

– more cohesiveness has an uncertain effects on state capacity (although the effect is generally positive in more general models)

Comparative Statics III: Costs of investments

Lower costs of either legal or fiscal capacity raises investments in legal and fiscal capacity in common-interest
and redistributive states.

A downward multiplicative shift of $L(\cdot)$ or $F(\cdot)$ cuts the RHS of investment FOCs for given π_2 and τ_2

– this gives a theoretical rationale for "legal origins" hypothesis but with an auxiliary prediction for fiscal capacity

Comparative Statics IV: Income

Exogenous Growth

Countries with higher incomes real wages choose greater investment in fiscal and legal capacity if in common-interest and redistributive states.

Thus with "exogenous" growth

an increase in income and wages in the form of an upward multiplicative shift of $\omega(\cdot)$, raises $\omega(\pi_2)$ and $\omega_\pi(\pi_2)$ for given π_2, this implies higher GDP $\omega(\pi_2) + R_2$

– gives a link to geography and state development?

Endogenous growth

The model also has "endogenous" growth due to investments in economic institutions

Growth is:

$$\frac{y_2 - y_1}{y_1} = \frac{\omega(\pi_2) - \omega(\pi_1)}{\omega(\pi_1)}$$

this is driven by institutional deepening leading to more efficient private markets

by complementarity, (expected) government size grows together with legal capacity and income

An Extension:

The Genius of Taxation

In a model with rents, government may choose not to extend property rights protection to all groups

So growth rate is:

$$\frac{y_2 - y_1}{y_1} = \sum_{K \in \{A,B\}} \frac{1}{2} \left[\frac{\omega(p_2^K) - \omega(p_1^K)}{\omega(p_1^K)} \right]$$

with $p_s^K \leq \pi_s$.

Taxation is a more efficient form of redistribution and so encourages production efficiency: $p_s^O = \pi_s$.

Creates an even stronger complemetarity between taxation and income per capita.

Road map for part C

1. Extend the model to include legal capacity

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4. Data

4. Data

General prediction about determinants?

– determinants of legal and fiscal capacity should be common

Specific predictions about determinants?

- positive effect of demand for common-interest public goods
- uncertain effect of more cohesive political institutions (depends on turnover)

External conflict

First look at the partial correlation common-interest spending and state capacity?

– use share of years in external war from 1816/independence – now

How to measure fiscal and legal capacity?

– we illustrate results for tax share and property rights index,

Political institutions

We measure inclusive political institutions by the incidence of parliamentary democracy since 1800/independence (high constraints on executive gives similar results)

The partial correlations consistent with a positive effect of cohesive political institutions

Legal origins

Use Shleifer et al measures of legal origin

- We find no systematic positive correlation for British (vs. French) legal origin, but do for German and Scandinavian legal origin

Alternative measures of state capacity – Table 3

Use other proxies for fiscal capacity

share of formal (vs. informal) sector in GDP (World Bank)

share of income taxes in total taxes (IMF)

Use other proxies for legal capacity

private credit as share of GDP

index for contract enforcement (World Bank)

Where next?

This lecture has taken political institutions as fixed

– this has been useful in understanding investments in "economic institutions"

We next explore endogenous political institutions

– investments in staying in power (political violence) (part D)

– the sustainability of consensual political institutions (part E)