

# BLOCKING DEVELOPMENT

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## Taking Stock

- Lecture 1:
  - Institutions matter.
  - Social conflict view, a useful perspective on understanding the choice of institutions
  - Inefficient institutions may be preferable for the politically powerful.
- This lecture:
  - Compare the incentives of the elite to block development.
  - Historical example: Iceland, 16<sup>th</sup>-19<sup>th</sup> century.
  - Conclusion: Motive of factor price manipulation more deleterious to development than rent extraction.
- Leading up to the next lecture: Compare inefficiencies in Oligarchy and Democracy.

## Why Iceland Starved? The Problem

- Stagnant economy in 16<sup>th</sup>-19<sup>th</sup>.
- Typical pattern of **underdevelopment**.
  - Backward techniques of agriculture;
  - Famines of increasing frequency;
  - Declining average height of the population.

## Why Iceland Starved? The Puzzle

- Eggertsson (2005, p. 102): “The central paradox in Iceland’s economic history is Icelanders’ failure to develop a specialized fishing industry and exploit on a large scale the country’s famous fisheries.”
- Key questions:
  - why did fisheries not develop?
  - why were resources inefficiently tied in to agriculture?

## Why Iceland Starved? An Answer

- According to Eggertsson, the answer lies in social conflict, and the fact that **the elite would be hurt by the development of the fisheries**.
  - Landlords had political power and “realized that the development of a specialized fishing industry would draw farm workers away, substantially increasing labor costs.” (p. 111).
- Lessons:
  - modelling inefficient institutions;
  - investigate the particular channels through which the elite is hurt by development.

### Modelling Approach

- Building on the seminal work by Arrow, Black, Hotelling.
- Agents have preferences over allocations and understand the mapping from economic institutions to allocations.
- Thus they have **induced preferences over economic institutions** (policies).
- They also understand the mapping from political institutions to economic institutions.
- Therefore, they also have **induced preferences over political institutions**.
- Consistent with the tradition of work in social choice, those preferences are not always aligned.
- Key concept in mediating preferences: **political power**.

## Modelling Approach (continued)

- Build a simple model to understand preferences over policies.
- Some groups are going to prefer “inefficient” policies (here policies that retard economic growth and cause stagnation).
  - “Inefficient” therefore does not necessarily mean Pareto inefficient.
- These inefficient policies in turn leading to **blocking of development** and a process of **underdevelopment**.
- Ultimately building up to understanding of equilibrium political institutions.

## Economic Model: Overview

- Three groups: workers, elite producers and “middle-class producers”.
- Economic and hence political conflict between all three groups.
- The elite are in power and will choose policies/economic institutions in order to transfer resources from the two other groups to themselves.
- Two central economic mechanisms:
  - Revenue extraction
  - Factor price manipulation
- **Political mechanism**: the elite will also try to manipulate economic allocations in order to protect their political power.

## Economic Model: Preferences

- All agents have preferences at time  $t = 0$ :

$$U_0^j = \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t c_t^j. \quad (1)$$

- Mass of workers equal to 1, set of elite agents  $S^e$  with mass  $\theta^e$ , and set of middle-class agents  $S^m$  with mass  $\theta^m$ .
- Elite and middle-class producers have access to technology:

$$y_t^j = \frac{1}{1-\alpha} (A_t^j)^\alpha (k_t^j)^{1-\alpha} (l_t^j)^\alpha, \quad (2)$$

where  $k$  denotes capital and  $l$  labor. Capital depreciates fully after use.

- Key difference between the two groups is their productivity.
  - $A^m$  for the middle class and  $A^e$  for the elite.

## Economic Model: Policies

- Activity-specific tax rates on production,  $\tau^e \geq 0$  and  $\tau^m \geq 0$ .
- Important: no other fiscal instruments
  - In particular, **no lump-sum non-distortionary taxes**.
- Lump-sum transfers targeted towards each group,  $T^w \geq 0$ ,  $T^m \geq 0$  and  $T^e \geq 0$ .
- Return from natural resources  $R$ .
- Parameter  $\phi \in [0, 1]$ , related to “**state capacity**,” measures how much of the tax revenue can be redistributed.
- Government budget constraint is therefore:

$$T_t^w + \theta^m T_t^m + \theta^e T_t^e \leq \text{Revenue}_t \equiv \phi \int_{j \in S^e \cup S^m} \tau_t^j y_t^j dj + R. \quad (3)$$

## The Labor Market

- Only workers work, so market clearing implies

$$\int_{j \in S^e \cup S^m} l_t^j dj \leq 1, \quad (4)$$

- Key condition for **excess supply**:

$$\theta^e + \theta^m \leq \frac{1}{\lambda}, \quad (\text{ES})$$

- If this condition is not satisfied, then there will be or **full employment**.
- Also assume for simplification that

$$\theta^e \leq \frac{1}{\lambda} \text{ and } \theta^m \leq \frac{1}{\lambda}, \quad (\text{A1})$$

## Economic Equilibrium

- An **economic equilibrium** is defined as a sequence of wages  $\{w_t\}_{t=0,1,\dots,\infty}$ , and investment levels and employment levels for all producers,  $\{[k_t^j, l_t^j]_{j \in S^e \cup S^m}\}_{t=0,1,\dots,\infty}$  such that given  $\{\tau_t^e, \tau_t^m\}_{t=0,1,\dots,\infty}$  and  $\{w_t\}_{t=0,1,\dots,\infty}$ , all producers choose their investment and employment optimally and the labor market clears.

## Equilibrium: Preliminaries

- Firm-maximization:

$$\max_{k_t^j, l_t^j} \frac{1 - \tau_t^j}{1 - \alpha} (A^j)^\alpha (k_t^j)^{1-\alpha} (l_t^j)^\alpha - w_t l_t^j - k_t^j,$$

which yields

$$k_t^j = (1 - \tau_t^j)^{1/\alpha} A^j l_t^j, \quad (5)$$

and

$$l_t^j \begin{cases} = 0 & \text{if } w_t > \frac{\alpha}{1-\alpha} (1 - \tau_t^j)^{1/\alpha} A^j \\ \in [0, \lambda] & \text{if } w_t = \frac{\alpha}{1-\alpha} (1 - \tau_t^j)^{1/\alpha} A^j \\ = \lambda & \text{if } w_t < \frac{\alpha}{1-\alpha} (1 - \tau_t^j)^{1/\alpha} A^j \end{cases} . \quad (6)$$

## Equilibrium Wages

- Combining (6) with (4), **equilibrium wages** are obtained as follows:
  1. If Condition (ES) holds, there is excess supply of labor and  $w_t = 0$ .
  2. If Condition (ES) does not hold, then there is “excess demand” for labor and the equilibrium wage is

$$w_t = \min \left\langle \frac{\alpha}{1 - \alpha} (1 - \tau_t^e)^{1/\alpha} A^e, \frac{\alpha}{1 - \alpha} (1 - \tau_t^m)^{1/\alpha} A^m \right\rangle. \quad (7)$$

- Whichever group has lower marginal product (given policies) determines the equilibrium price of labor.
- This opens the way for **factor price manipulation**.

## Inefficient Policies

- Suppose there is an upper bound on taxation, so that

$$\tau_t^m \leq \bar{\tau} \text{ and } \tau_t^e \leq \bar{\tau},$$

- The timing of events within each period is as follows:
  - *first*, taxes are set;
  - *then*, investments are made.
- This implies no **holdup**.
- Also to start with, focus on Markov Perfect Equilibria (MPE).

## Revenue Extraction

- Let us start with pure revenue extraction.
- This means shutting off the factor price interactions, i.e., **assume that (ES) is satisfied.**
- The elite would like to tax the middle class up to the peak of the Laffer curve.

**Proposition 1** Suppose Assumption (A1) and Condition (ES) hold and  $\phi > 0$ , then the unique political equilibrium features  $\tau_t^m = \tau^{RE} \equiv \min \{\alpha, \bar{\tau}\}$  for all  $t$ .

## Factor Price Manipulation

- Let us next turn to pure factor price manipulation.
- For this reason, assume that  $\phi = 0$ .

**Proposition 2** Suppose Assumption (A1) holds, Condition (ES) does not hold, and  $\phi = 0$ , then the unique political equilibrium features  $\tau_t^m = \tau^{FPM} \equiv \bar{\tau}$  for all  $t$ .

## Revenue Extraction and Factor Price Manipulation Combined

- Now let us allow both effects to operate.
- Clearly, this implies that (ES) should not be satisfied so that the FPM motive is active. Then the elite solve:

$$\max_{\tau_t^m} \left[ \frac{\alpha}{1-\alpha} A^e - w_t \right] l_t^e + \frac{1}{\theta^e} \left[ \frac{\phi}{1-\alpha} \tau_t^m (1-\tau_t^m)^{(1-\alpha)/\alpha} A^m l_t^m \theta^m + R \right], \quad (8)$$

subject to (7) and

$$\theta^e l_t^e + \theta^m l_t^m = 1 \quad (9)$$

and

$$l_t^m = \lambda \text{ if } (1 - \tau_t^m)^{1/\alpha} A^m \geq A^e. \quad (10)$$

## Revenue Extraction and Factor Price (continued)

- Solution depends on whether the elite want to be “producers”.
- Rather than provide a full taxonomy, let us impose:

$$A^e \geq \phi(1 - \alpha)^{(1-\alpha)/\alpha} A^m \frac{\theta^m}{\theta^e}, \quad (\text{A2})$$

- When (A2) holds, we have  $w_t = \alpha(1 - \tau_t^m)^{1/\alpha} A^m \tau_t^m / (1 - \alpha)$ .

## Revenue Extraction and Factor Price (continued)

- Therefore, the elite's problem is simply to choose  $\tau_t^m$  to maximize

$$\frac{1}{\theta^e} \left[ \frac{\phi}{1-\alpha} \tau_t^m (1-\tau_t^m)^{(1-\alpha)/\alpha} A^m l^m \theta^m + R \right] - \frac{\alpha}{1-\alpha} (1-\tau_t^m)^{1/\alpha} A^m \lambda,$$

- Maximization of this expression gives

$$\tau_t^m = \tau^{COM} \equiv \min \left\{ \frac{\kappa(\lambda, \theta^e, \alpha, \phi)}{1 + \kappa(\lambda, \theta^e, \alpha, \phi)}, \bar{\tau} \right\}. \quad (11)$$

**Proposition 3** Suppose Assumptions (A1) and (A2) hold, Condition (ES) does not hold, and  $\phi > 0$ . Then the unique political equilibrium features  $\tau_t^m = \tau^{COM}$  as given by (11) for all  $t$ . Equilibrium taxes are increasing in  $\theta^e$  and  $\alpha$  and decreasing in  $\phi$ .

- Important comparative statics.

## Political Consolidation

- Another motive: is preservation of **political power**.
- The elite enjoy revenues and profits because of their political power, thus likely to take actions to preserve and **consolidate their political power**.
- Suppose, in a reduced-form way, that the elite can lose political power to the middle-class, and when the middle class is richer, this is more likely to happen. Then:

**Proposition 4** Consider the economy with political replacement. Suppose also that Assumption (A1) and Condition (ES) hold and  $\phi > 0$ , then the political equilibrium features  $\tau_t^m = \tau^{PC} > \tau^{RE}$  for all  $t$ . This tax rate is increasing in  $R$  and  $\phi$ .

- Interesting **comparative statics** with respect to  $R$  and  $\phi$ , different from before.

## Subgame Perfect Equilibria versus MPE

- Does the restriction to MPE matter?
- Given the timing of events, [the answer is no.](#)

**Proposition 5** The MPEs characterized in Propositions 1-4 are the unique SPEs.

- Why? Because there is no [commitment problem.](#)

## Holdup

- Inefficiencies become more serious when there is an issue of **holdup**.
- More explicitly, we say that there is holdup if in the timing of events the elite set taxes after the middle class choose investments.
- Let us now focus on MPE.

**Proposition 6** With holdup, there is a unique political equilibrium with  $\tau_t^m = \tau^{HP} \equiv \bar{\tau}$  for all  $t$ .

- Therefore, with holdup there is **excessive taxation** even from the viewpoint of the elite.

## Subgame Perfect Equilibria versus MPE Again

- With holdup, there is over-taxation, so MPE and SPE are no longer identical.

**Proposition 7** Consider the holdup game, and suppose that Assumption (A1) and Condition (ES) hold and  $\bar{\tau} = 1$ . Then for  $\beta \geq 1 - \alpha$ , there exists a subgame perfect equilibrium where  $\tau_t^m = \alpha$  for all  $t$ .

- Implicit commitment to low taxes using trigger strategies if parties are sufficiently patients.
- Potential alternative to “good institutions”, but **imperfect**.

## Technology Adoption

- Let us now consider technology adoption, whereby producers (in particular the middle class) choose their technology,  $A^m$ ) at Time  $t = 0$  at some cost  $\Gamma(A^m)$ .
- Similar to hold up, but worse because there is only one time investment.
- When the objective of the elite is factor price manipulation, this doesn't matter.

**Proposition 8** Consider the game with technology adoption and suppose that Assumption (A1) holds, Condition (ES) does not hold, and  $\phi = 0$ , then the unique political equilibrium features  $\tau_t^m = \tau^{FPM} \equiv \bar{\tau}$  for all  $t$ . Moreover, if the elite could commit to a tax sequence at time  $t = 0$ , then they would still choose  $\tau_t^m = \tau^{FPM} \equiv \bar{\tau}$ .

## Technology Adoption (continued)

- However, when there is at least some element of revenue extraction, lack of commitment introduced by technology adoption at the beginning is harmful to all groups.

**Proposition 9** Consider the game with technology adoption, and suppose that Assumption (A1) and Condition (ES) hold and  $\phi > 0$ , then the unique political equilibrium (either SPE or MPE) features  $\tau_t^m = \tau^{RE} \equiv \min \{\alpha, \bar{\tau}\}$  for all  $t$ . If the elite could commit to a tax policy at time  $t = 0$ , they would prefer to commit to  $\tau^{TA} < \tau^{RE}$ .

- Note that SPE does not help.
- Because punishment strategies not possible (only one-time investment).
- What can be done? Economic institutions...

## Inefficient Economic Institutions

- We now start thinking about economic institutions.
- Since we know preferences over policies, we can derive induced preferences over economic institutions.
- In particular, let us consider two stylized institutions.
  - security of property rights, modeled as limits on taxes.
  - regulation of technology, modeled as barriers to technology adoption by the middle class.

## Security of Property Rights

- **General principle:** in the absence of holdup issues, the elite have no interest to grant further property rights to other groups (even if they can).
- This conclusion is modified in the presence of technology adoption or holdup.
- Simple model: imagine that the elite can commit (somehow credibly) to some maximum tax rate  $\bar{\tau}$  instead of some higher-level  $\bar{\tau}^H$ .

**Proposition 10** Without holdup and technology adoption, the elite prefer  $\bar{\tau} = \bar{\tau}^H$ .

## Security of Property Rights (continued)

- The picture changes with holdup or technology adoption.

**Proposition 11** Consider the game with holdup and suppose Assumptions (A1) and (A2) hold, Condition (ES) does not hold, and  $\phi > 0$ , then as long as  $\tau^{COM}$  given by (11) is less than  $\bar{\tau}^H$ , the elite prefer  $\bar{\tau} = \tau^{COM}$ .

**Proposition 12** Consider the game with holdup and technology adoption, and suppose that Assumption (A1) and Condition (ES) hold and  $\phi > 0$ , then as long as  $\tau^{TA} < \bar{\tau}^H$ , the elite prefer  $\bar{\tau} = \tau^{TA}$ .

- **General principle:** factor price manipulation and political consolidation effects potentially much more damaging to economic efficiency.

## Regulation of Technology

- Would the elite like the middle class to be productive?
- The answer depends on the economic mechanism at work.
  - Yes, if they want to extract revenues.
  - No, if they want to manipulate factor prices or preserve their political power.
- Suppose that government policy  $g \in \{0, 1\}$  influences the productivity of middle class producers, with  $A^m(g = 1) > A^m(g = 0)$ .
- Thus  $g = 0$  like blocking of technological progress.

**Proposition 13** Suppose Assumption (A1) and Condition (ES) hold and  $\phi > 0$ , then  $w = 0$  and the the elite always choose  $g = 1$ .

## Regulation of Technology (continued)

- Different conclusions when **factor price manipulation** or **political replacement** effects are in play.

**Proposition 14** Suppose Assumption (A1) holds, Condition (ES) does not hold,  $\phi = 0$ , and  $\bar{\tau} < 1$ , then the elite choose  $g = 0$ .

**Proposition 15** Consider the economy with political replacement. Suppose also that Assumption (A1) and Condition (ES) hold and  $\phi = 0$ , then the elite prefer  $g = 0$ .

- **Same general principle:** blocking of technology is a major problem when issues of factor price manipulation and/or political consolidation are present.

## Why Iceland Starved? Taking Stock

- Development was blocked in Iceland because factor price manipulation was the dominant motivation for the elite.
  - Eggertsson: “The farm community was conscious of latent upward pressures on labor costs and fought those pressures. When the pull of the fisheries was relatively strong, courts reaffirmed the regulations in the labor market, and authorities tightened enforcement.”
- This took the form of blocking innovations in the fishing industry:
  - Eggertsson: “New incentive schemes for the fishermen were seen as a threat to the system and forbidden. ... The farming community also saw improvements in fishing gear and the resulting increase in labor productivity as upsetting the balance.”

## Inefficient Political Institutions

- The model showed inefficiencies of dictatorship of the elite... is it any better than dictatorship of the middle class, or democracy?
- In general, there is no guarantee that one system is better than another.
- But more important, there are **no natural mechanisms for the more efficient system to emerge** in any case.

## Comparison of Political Systems

- Assume

$$\theta^m = \theta^e < \frac{1}{2}, \quad (\text{A3})$$

and

$$A^m \geq \phi(1 - \alpha)^{(1-\alpha)/\alpha} A^e \frac{\theta^e}{\theta^m}. \quad (\text{A4})$$

**Proposition 16** Suppose Assumptions (A1) and (A3) hold, Condition (ES) does not hold, and  $\phi > 0$ , then the unique political equilibrium with middle class control features  $\tau_t^e = \tilde{\tau}^{COM}$  as given by (11) for all  $t$ .

## Comparison of Political Systems (continued)

- Democracy, on the other hand, will redistribute away from both the middle class and elite producers to the workers.
- Efficiency of democracy depends on **whether there is excess supply or not**.
- **With excess supply**, democracy taxes both the middle class and the elite, so it is **more inefficient** than the dictatorship of either of these two groups.
- **Without excess supply**, democracy is much less redistributive because the median voter understands that high taxes and reduce equilibrium wages.

## Summary and Extension

- Elites may block development, depending on their motivations.
  - Three different motives for inefficient policies; revenue extraction, factor price manipulation and political consolation.
  - Factor price manipulation (and political consultation) more deleterious than revenue extraction.
- Different political regimes produce different results.
- Looking ahead: Consider the dynamic efficiency of political regimes.
  - This will shed light on examples of rise and decline of oligarchies (e.g. Dutch Republics and Venice).