

MARKETS VERSUS GOVERNMENTS:  
POLITICAL ECONOMY OF  
MECHANISMS

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## Introduction

- Traditional public finance and macro analysis of fiscal policy:
  - e.g., Ramsey; macroeconomics of taxation and gov't spending.
  - exogenous instruments and exogenous benevolent objectives.
  - extension: endogenous instruments, mechanism design approach.
  - full ability to commit to policies.
- But government and politicians are self-interested and unable to commit to pre-specified policies
- **Buchanan:** “Theoretical welfare economics enables us to define the necessary marginal conditions that must be satisfied for an allocation of economic resources to be efficient. Straightforward extension of this analysis to ‘theoretical institutional economics’ should enable us to define a similar set of conditions that would have to be met if an institutional arrangement or rule is to be classified as ‘efficient.’ It now seems quite possible that future developments will in fact allow for general statements of such conditions.”

## Alternative?

- Take political economy, self-interest and inability to commit, seriously.
  - What does it imply for the structure of policies?
  - What does it imply for the control of politicians?
- As a first step, focus on the simplest model of political economy: control of self-interested politicians via elections as in the Barro-Ferejohn approach.
- This framework enables us to provide potential answers to the questions above.
- Also potentially useful to investigate questions related to why and when “anonymous markets” are preferred to mechanisms.

## Overview of Results

- Characterization of equilibrium taxation schemes, “mechanisms,” subject to political economy constraints.
  1. Start with a simple case to illustrate main ideas.
  2. Main model: dynamic Mirrlees economy with self-interested and no commitments to policies.
- In both cases, key object **sustainability constraints** of politicians to ensure that they do not deviate from a prescribed norm of behavior.

## Main Results

- Initially sustainability constraints create **distortions**.
  - Greater labor supply and output translate into greater temptation for the government to deviate.
  - Distort production using tax structure.
- **Question**: how do these distortions evolve?
- When government is **no less patient** than the agents, then increasing sequence of utilities to the government.
  - Future payments relax both future and current (government) sustainability constraints.
- In the limit, back to standard results:
  - No further labor distortions relative to dynamic Mirrlees.
  - **Zero aggregate tax on capital**.
- But these results **do not apply** when government less patient than citizens, and distortions, e.g., capital taxes, remain asymptotically.

## Political Economy Environment

- Let us start with the simplest political economy environment.
- Measure 1 of homogeneous citizens with instantaneous utility

$$U(C, L),$$

satisfying standard assumptions. Discount factor  $\beta < 1$ .

- Policies determined by a self-interested ruler.
- A large number of potential rulers all with identical preferences over government consumption,  $x$ , with discount factor  $\delta$ :

$$\mathbb{E} \left[ \sum_{t=0}^{\infty} \delta^t v(x_t) \right]$$

- Normalize:  $v(0) = 0$ .

## Political Economy Environment (continued)

- No restriction on the structure of tax instruments.
- Institutional constraint

$$x \leq \eta F(K, L).$$

- $\eta$  measure of institutional constraints on politicians.

## Political Economy Environment: Timing of Events

At every date:

- Individuals make labor supply decisions, aggregate labor supply is determined and output  $F(K, L)$  is produced.
- The ruler decides the amount of consumption to allocate to citizens (possibly as a function of their labor supply, i.e., it chooses a mapping  $\mathbf{c} : \mathbb{R}_+ \rightarrow \mathbb{R}_+$ ), government consumption  $x$ , and next period's capital stock,  $K'$ .
- Elections are held and citizens jointly decide whether to replace the politician.

Look for the best equilibrium from the viewpoint of citizens—i.e., a **constrained efficient allocation**.

## Technology and Feasibility

- CRS production  $Y_t = F(K_t, L_t)$ , full depreciation of capital.
- Feasibility

$$C_t + x_t + K_{t+1} \leq F(K_t, L_t)$$

$$x_t \leq \eta F(K_t, L_t)$$

$$(C_t, L_t) \in \Lambda$$

- $\Lambda$  is a set of feasible allocations and policies (for now just an arbitrary set, e.g.  $U(C_t, L_t) \geq 0$ ).

## Maximization Problem

- Best sustainable mechanism can be supported with no replacement of initial politician and solves

$$\max_{C_t, K_{t+1}, x_t} \sum_{t=0}^{\infty} \beta^t U(C_t, L_t)$$

s.t. feasibility conditions and for all  $t$

$$\sum_{i=0}^{\infty} \delta^i v(x_{t+i}) \geq v(\eta F(K_t, L_t)).$$

## Why the Solution is a SPE

- Politician in power has no incentives to deviate given sustainability constraint.
- If citizens choose  $\rho_t = 1$ 
  - all future politicians form a belief that they will be replaced after first period,
  - set  $x_t = \eta F(K_t, L_t)$ ,  $c(l) = 0$  for all  $l \in [0, \bar{l}]$ ,
  - payoff to citizens is 0.
- Below we'll show that the best SPE can be supported in a [renegotiation proof](#) manner.

## Recursive Characterization

$$V(K, w) = \max_{C, L, K^+, x, w^+} \{U(C, L) + \beta V(K^+, w^+)\}$$

subject to

$$C + x + K^+ \leq F(K, L),$$

$$w = v(x) + \delta w^+,$$

$$v(x) + \delta w^+ \geq v(\eta F(K, L)),$$

$$(C, L) \in \Lambda \text{ and } w^+ \in \mathbb{W}[K^+].$$

## Technical Conditions

- Problem is **not convex** - in the paper allow **randomizations**.
- Assume that maximal utility to the ruler is sustainable.
  - in the paper: sufficient conditions in terms of fundamentals.

# Markets Versus Governments: Political Economy of Mechanisms

## FOCs

- $\gamma$  is multiplier on promise keeping constraint.
- $\psi$  is multiplier on sustainability constraint.

$$\frac{\beta}{\delta} V_w (K^+, w^+) = -\gamma - \psi \leq -\gamma = V_w (w, K).$$

$$U_L (C, L) + U_C (C, L) F_L (K, L) = \psi \eta v' (\eta F (K, L)) F_L (K, L).$$

$$\beta F_K (K^+, L^+) U_C (C^+, L^+) - U_C (C, L) = \psi^+ \eta v' (\eta F (K^+, L^+)).$$

## Observations

- If  $\psi > 0$ , positive distortions on capital and labor:

$$U_L(C, L) + U_C(C, L) F_L(K, L) > 0,$$

$$\beta F_K(K^+, L^+) U_C(C^+, L^+) - U_C(C, L) > 0.$$

- If  $\delta \geq \beta$ ,  $V_w(w, K)$  is a weakly decreasing sequence
  - $V_w(w_t, K_t) - V_w(w_{t+1}, K_{t+1}) \rightarrow 0$ ,
  - $\psi_t \rightarrow 0$ ,
  - distortions disappear in the long run.
- If  $\delta < \beta$ , no such convergence possible.

## Main Result

- There are downward labor and capital distortions in some periods.
- When  $\beta \leq \delta$ , distortions converge to zero.
- when  $\beta > \delta$ , there are positive capital and labor distortions even asymptotically.

# Markets Versus Governments: Political Economy of Mechanisms

## Intuition

For simplicity

- no capital
- $V_w(w_t)$  decreasing  $\rightarrow w_t$  is increasing.

## Interpretation

1. Even though no restriction on the tax structure, distortions at the beginning because of the sustainability constraint.
  - Greater labor supply and output → rents for ruler.
2. In the limit, marginal distortions may disappear.
  - Intuition: **backloading**; it is beneficial to provide delayed compensation to the government, and this eventually makes the sustainability constraint less and less binding.
  - Similar to backloading in principle-agent models, Ray (2002).
  - But, here link to equilibrium distortions (and with different discount factors).
3. This result requires the discount factor of the governments to be **at least as large as** that of the citizens. Perhaps less likely than the converse case, because of **short-sighted** politician behavior.

## Renegotiation-proofness

- Best sustainable equilibrium can be supported with renegotiation-proof strategies.
- If ruler deviates
  - he is replaced,
  - play the best SPE with the ruler given amount of capital  $K(h^t)$ .
- If citizens deviate
  - Play the SPE that gives the ruler utility  $\max \mathbb{W} [K(h^t)]$ .
- No incentives to deviate, at all histories remain on the Pareto frontier.

## Dynamic Mirrlees Taxation: Environment

- Infinite horizon economy in discrete time
- Measure 1 of agents and a ruler/government
- $\Theta = \{\theta_0, \theta_1, \dots, \theta_N\}$  set of potential types,  $\theta_0 < \dots < \theta_N$
- $\mu^\infty$  – arbitrary probability measure over  $\Theta^\infty$  (e.g., Markov)
- $\theta^\infty$  – agent's entire lifetime sequence of skills
- At beginning of time, draw  $\theta^\infty$  for each agent from  $\mu^\infty$
- Agent: privately learns his  $\theta_t$  at the beginning of period  $t$  (not before)
- $\theta^t$  – history of skills up to time  $t$
- Notational simplification: the distribution of skills within the population is stationary and given by  $G(\theta)$ .

## Environment (continued)

- Political environment identical to above.
- Agent's instantaneous utility at time  $t$ :

$$u(c_t, l_t \mid \theta_t)$$

where  $c_t$  is consumption and  $l_t$  labor supply

- $u$  is concave, differentiable, increasing in  $c$ , decreasing in  $l$ , satisfies single crossing.
- Each individual maximizes

$$\mathbb{E}\left[\sum_{s=0}^{\infty} \beta^s u(c_{t+s}, l_{t+s} \mid \theta_{t+s}) \mid \theta^t\right].$$

# Markets Versus Governments: Political Economy of Mechanisms

## Game

- The same as before.
- **Best mechanisms:** conditional allocations  $(c_t, l_t)$  on current and past reports  $\theta^t$  in incentive-compatible manner.
- **For this presentation:** restrict  $(c_t, l_t)$  to depend on current  $\theta_t$  only.
- In the paper show that most results generalize to full history dependent mechanisms.

## Best Sustainable Mechanism in Mirrlees Economy

$$U^{SM} = \max_{\{c_t(\theta^t), l_t(\theta^t), x_t, K_t\}_{t=0}^{\infty}} \mathbb{E} \left[ \sum_{t=0}^{\infty} \beta^t u(c_t(\theta^t), l_t(\theta^t) \mid \theta_t) \right]$$

s.t.

$$\int c_t(\theta) dG(\theta) + x_t + K_{t+1} = F \left( K_t, \int l_t(\theta) dG(\theta) \right)$$

$$\sum_{s=0}^{\infty} \delta^s v(x_{t+s}) \geq v \left( \eta \left( F \left( K_t, \int l_t(\theta) dG(\theta) \right) \right) \right)$$

$$u(c_t(\theta), l_t(\theta) \mid \theta) \geq u(c_t(\hat{\theta}), l_t(\hat{\theta}) \mid \theta).$$

## Separation of Incentives

Let

$$U(C, L) = \max_{\{c(\theta), l(\theta)\}_{\theta \in \Theta}} \mathbb{E}[u(c_t(\theta), l_t(\theta) | \theta)]$$

$$\int c_t(\theta) dG(\theta) \leq C_t,$$

$$\int l_t(\theta) dG(\theta) \geq L_t,$$

$$u(c_t(\theta), l_t(\theta) | \theta) \geq u(c_t(\hat{\theta}), l_t(\hat{\theta}) | \theta)$$

and

$$\Lambda = \left\{ (C, L) \text{ such that } \exists \left\{ \{c_t(\theta), l_t(\theta)\}_{\theta \in \Theta} \right\}_{t=0}^{\infty} \right. \\ \left. \text{that satisfies constraints above} \right\}.$$

## Results

- Maximization problem for these  $U$  and  $\Lambda$  becomes a special case of the first models.
- All results hold.
- Political economy (aggregate) distortions are **in addition to the standard Mirrlees taxes**.
- When  $\beta \leq \delta$ , the individual distortions are the same as in Mirrlees model.
  - The optimal taxes are the same **with and without political economy**.

# Markets Versus Governments: Political Economy of Mechanisms

## Example

- Consider a very simple example economy with no capital, two types, i.e.,  $\Theta = \{\theta_0, \theta_1\}$ , and  $\eta = 1$ .
- Utility function of the agents is

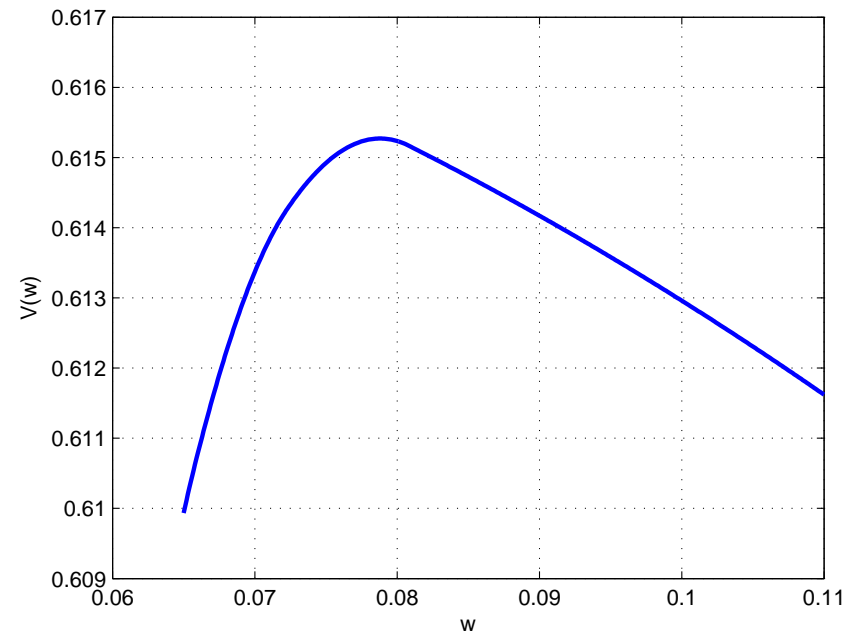
$$u(c, l | \theta) = \sqrt{c} - \frac{l^2}{5\theta}.$$

- With  $\theta_0 = 0$  and  $\theta_1 = 1$ , and the two types equally likely.
- Also assume  $v(x) = \sqrt{x}$ .
- Baseline case:  $\beta = \delta = 0.9$ .
- Variations  $\delta = 0.8, 0.7, 0.6$ .

# Markets Versus Governments: Political Economy of Mechanisms

## Example (continued)

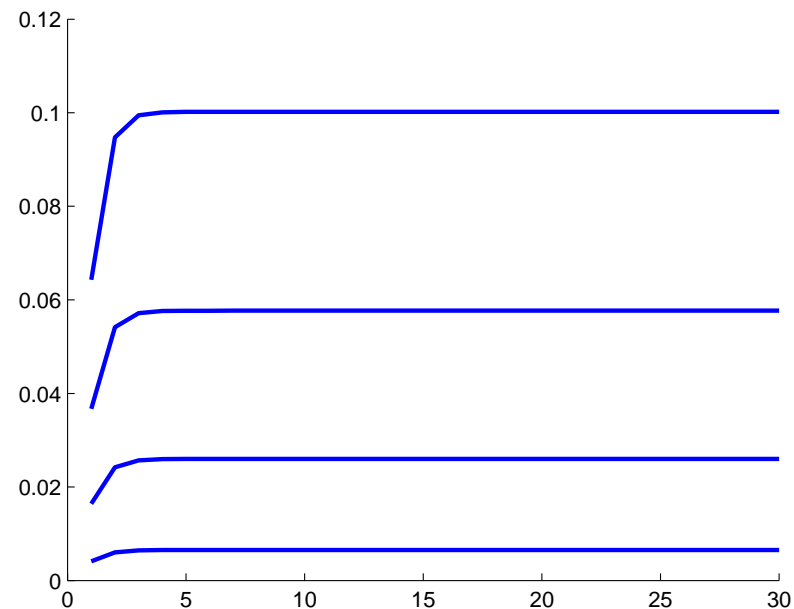
- Value function of citizens when  $\beta = \delta = 0.9$ :



# Markets Versus Governments: Political Economy of Mechanisms

## Example (continued)

- Time path of normalized promised values to government (i.e.,  $(1 - \delta)w_t$ ):

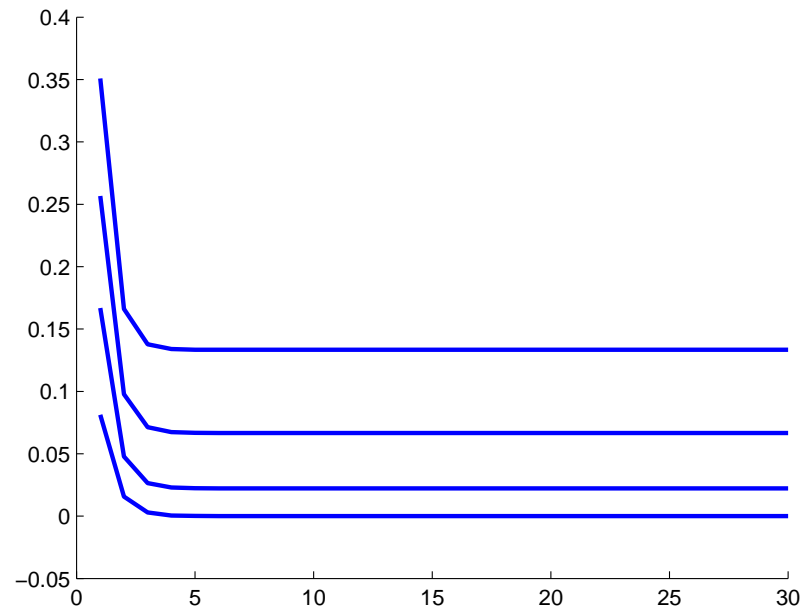


- Higher curves correspond to higher values of  $\delta$ .
- Interesting feature: very fast convergence.

# Markets Versus Governments: Political Economy of Mechanisms

## Example (continued)

- Aggregate distortions, here equivalent to the marginal tax rate on the high type;
- Behavior depends on whether government is less or more patient.

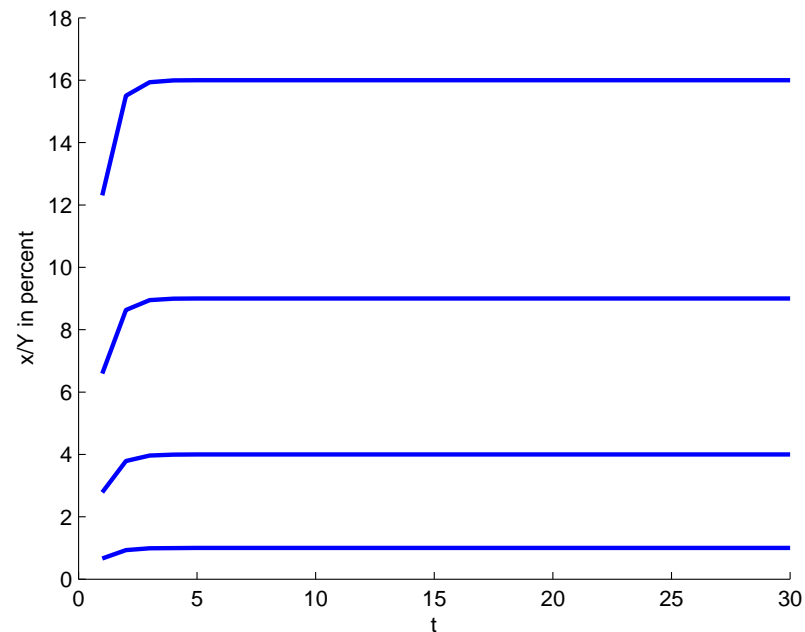


- Distortions can be very large asymptotically (e.g.,  $\delta = 0.6$  leads to asymptotic distortions of 15 percent).

# Markets Versus Governments: Political Economy of Mechanisms

## Example (continued)

- Interestingly, in all cases only a small fraction of GDP goes to the government:



## Anonymous Markets Versus Mechanism

- **Anonymous markets:** any allocation without “mechanisms” centralizing information.
- E.g., Bewley-Aiyagari economy with incomplete markets, or smaller coalitions sharing risks without government involvement etc..
- Let  $U^{SM}(\delta)$  be the ex ante expected value of the best sustainable mechanism when the government discount factor is  $\delta$ .
- Let  $U^{AM}$  be the utility of anonymous markets.

**Proposition 1** *Suppose  $U^{SM}(\delta) \geq U^{AM}$ , then  $U^{SM}(\delta') \geq U^{AM}$  for all  $\delta' \geq \delta$ . Moreover, as  $\delta \rightarrow 0$ ,  $U^{AM} > U^{SM}(\delta)$ .*

- Next define  $U^{SM}(\eta)$  analogously:

**Proposition 2** *Suppose  $U^{SM}(\eta) \geq U^{AM}$ , then  $U^{SM}(\eta') \geq U^{AM}$  for all  $\eta' \leq \eta$ . Moreover, as  $\eta \rightarrow 0$ ,  $U^{SM}(\eta) > U^{AM}$ .*

## Conclusions

- Towards a simple framework for political economic analysis of public policies.
  - Self-interested politicians without commitment power.
- Policy recommendations that ignore political economy constraints potentially misleading.
- This paper: a framework focusing on taxation and risk sharing.
  - which normative conclusions survive when we incorporate political economy constraints?
  - when are mechanisms, with their political economy distortions, desirable relative to anonymous markets?
- Main results:
  - when government as patient as the citizens, **marginal distortions disappear in the limit**
  - But in the more realistic case with more shortsighted government, distortions **remain asymptotically**.

## Directions for Future Research

- Here one type of incentive problem, that of income insurance. Similar issues arise or other information-related government interventions, e.g., a contract enforcement for regulation.
- Modeling of political constraints has been very simple (and abstract). Often, politicians have more complex objectives, such as reelection or ideological targets.
  - Introduce **political competition** and multiple competing groups.
- Are severe political punishments possible? **Renegotiation-proofness**.
- Finally: how should institutions be designed so that political economy constraints on the design of resource allocation mechanisms are relaxed?