The Political Economy of Nonlinear Capital Taxation

Emmanuel Farhi         Iván Werning

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most countries $\tau^k > 0$
most countries $\tau^k > 0$ and progressive $\tau^{k'} > 0$
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$\tau^K > 0$: corporate tax, capital gains, income tax
most countries $\tau^k > 0$ and progressive $\tau^{k'} > 0$

- $\tau^K > 0$: corporate tax, capital gains, income tax
- $\tau^{K'} > 0$: income tax
most countries $\tau^k > 0$ and progressive $\tau^{k'} > 0$

- $\tau^K > 0$: corporate tax, capital gains, income tax
- $\tau^{K'} > 0$: income tax

normative theories mixed

- Atkinson-Stiglitz: $\tau^k = 0$
- Chamley-Judd: $\tau^k = 0$
- others: $\tau^k \neq 0$ (Non-Separability / Inverse Euler)
Introduction

❖ This Paper
❖ Main Result
❖ Related Literature
❖ Outline

Two Period Model

Infinite Horizon

Conclusions

most countries $\tau^K > 0$ and progressive $\tau^{K'} > 0$

$\tau^K > 0$: corporate tax, capital gains, income tax

$\tau^{K'} > 0$: income tax

normative theories $\rightarrow$ mixed

Atkinson-Stiglitz: $\tau^k = 0$

Chamley-Judd: $\tau^k = 0$

others: $\tau^k \neq 0$ (Non-Separability / Inverse Euler)

Q: Equilibrium Capital Taxation?
most countries $\tau^k > 0$ and progressive $\tau^{k'} > 0$

$\tau^K > 0$: corporate tax, capital gains, income tax

$\tau^{K'} > 0$: income tax

normative theories $\rightarrow$ mixed

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Q: Equilibrium Capital Taxation?
positive theories? $\tau^K > 0$, silent on $\tau^{K'}$
Existing Positive Theories

- **positive theories?** \( \tau^K > 0 \), silent on \( \tau^{K'} \)

- **time-inconsistency** (Kydland-Prescott)
  - representative agent
  - linear taxes
  - ex-post: capital = lump-sum
  - no-commitment
Existing Positive Theories

- positive theories? $\tau^K > 0$, silent on $\tau^{K'}$
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  - linear taxes
  - ex-post: capital = lump-sum
  - no-commitment → capital taxation
- redistribution
  - commitment but heterogeneous agents
  - linear tax on capital + lump-sum rebate
  - mediant voter + skewed distribution
Existing Positive Theories

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    capital taxation
This Paper

❖ Introduction
❖ This Paper
❖ Main Result
❖ Related Literature
❖ Outline

Two Period Model
Infinite Horizon
Conclusions

Political Economy...

redistribution + time-inconsistency
Political Economy...

redistribution + time-inconsistency

focus...

$\tau^K$ and $\tau^{K'}$
This Paper

Introduction
❖ This Paper
❖ Main Result
❖ Related Literature
❖ Outline
Two Period Model
Infinite Horizon
Conclusions

Political Economy...

redistribution + time-inconsistency

focus...

$\tau^K$ and $\tau^{K'}$

ingredients...

heterogenous agents
Political Economy...

redistribution + time-inconsistency

focus...

$\tau^K$ and $\tau^{K'}$

ingredients...

- heterogenous agents
- elections + no commitment
This Paper

- Political Economy...
  redistribution + time-inconsistency

- focus...
  $\tau^K$ and $\tau^{K'}$

- ingredients...
  - heterogenous agents
  - elections + no commitment
  - unrestricted tax instruments: redistribution vs. incentives
Political Economy...

redistribution + time-inconsistency

focus...

$\tau^K$ and $\tau^{K'}$

ingredients...

- heterogenous agents
- elections + no commitment
- unrestricted tax instruments:
  redistribution vs. incentives
- ex-post temptation:
  extreme redistribution (capital levy)
Political Economy...

redistribution + time-inconsistency

focus...

\( \tau^K \) and \( \tau^{K'} \)

ingredients...

- heterogenous agents
- elections + no commitment
- unrestricted tax instruments: redistribution vs. incentives
- ex-post temptation: extreme redistribution (capital levy)
- reputation
Main Result

progressive capital tax: $\tau^{K'} > 0$
progressive capital tax: $\tau^K > 0$

$\tau^K > 0$ at top

$\tau^K < 0$ at bottom
progressive capital tax: $\tau^{K'} > 0$

$\tau^K > 0$ at top

$\tau^K < 0$ at bottom

mechanism

$\tau^{K'} > 0 \quad \downarrow \text{future inequality}$
progressive capital tax: \( \tau^{K'} > 0 \)

\( \tau^K > 0 \) at top

\( \tau^K < 0 \) at bottom

mechanism

\( \tau^{K'} > 0 \) \( \downarrow \) future inequality \( \uparrow \) credibility
progressive capital tax: $\tau^{K'} > 0$

$\tau^K > 0$ at top

$\tau^K < 0$ at bottom

mechanism

$\tau^{K'} > 0 \quad \downarrow \text{future inequality} \quad \uparrow \text{credibility}$

results $\quad \rightarrow \text{ex-ante considerations, not ex-post}$
Ramsey...

- **time-inconsistency:** Kydland-Prescott (1977); Fischer (1980); Klein-Rios-Rull (2003)
- **Reputation:** Kotlikoff-Persson-Svensson (1988); Chari-Kehoe (1990); Benhabib-Rustichini (1996)
Related Literature

Ramsey...

- Reputation: Kotlikoff-Persson-Svensson (1988); Chari-Kehoe (1990); Benhabib-Rustichini (1996)

Redistribution...

Related Literature

- Ramsey...
  - Reputation: Kotlikoff-Persson-Svensson (1988); Chari-Kehoe (1990); Benhabib-Rustichini (1996)

- Redistribution...

- Mirrleesian economies...
1. Two Period Model

2. Infinite Horizon Model
<table>
<thead>
<tr>
<th>Outline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
</tr>
<tr>
<td>❖ This Paper</td>
</tr>
<tr>
<td>❖ Main Result</td>
</tr>
<tr>
<td>❖ Related Literature</td>
</tr>
<tr>
<td>❖ Outline</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Two Period Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infinite Horizon</td>
</tr>
</tbody>
</table>

1. Two Period Model
2. Infinite Horizon Model
Two Period Model
continuum of agents $\theta$
continuum of agents $\theta$

preferences

\[ v_0 = u(c_0) - \theta h(n_0) + \beta u(c_1) \]
continuum of agents $\theta$

preferences

$$v_0 = u(c_0) - \theta h(n_0) + \beta u(c_1)$$

resource constraint

$$\int c_0(\theta) \, dF(\theta) + k_1 \leq \int n_0(\theta) \, dF(\theta)$$

$$\int c_1(\theta) \, dF(\theta) \leq Rk_1$$

[RC]
continuum of agents $\theta$

preferences

$$v_0 = u(c_0) - \theta h(n_0) + \beta u(c_1)$$

resource constraint

$$\int c_0(\theta) \, dF(\theta) + \frac{1}{R} \int c_1(\theta) \, dF(\theta) \leq \int n_0(\theta) \, dF(\theta) [RC]$$
Incentives

\[ \theta \rightarrow \text{private info} \]
Incentives

θ → private info

incentive compatibility: \((c_0(\theta), n_0(\theta), c_1(\theta))\):

\[
\begin{align*}
    u(c_0(\theta)) - \theta h(n_0(\theta)) + \beta u(c_1(\theta)) & \geq \\
    u(c_0(\theta')) - \theta h(n_0(\theta')) + \beta u(c_1(\theta'))
\end{align*}
\]
Incentives

θ ➔ private info

incentive compatibility: \((c_0(\theta), n_0(\theta), c_1(\theta))\):

\[
 u(c_0(\theta)) - \theta h(n_0(\theta)) + \beta u(c_1(\theta)) \geq \\
 u(c_0(\theta')) - \theta h(n_0(\theta')) + \beta u(c_1(\theta'))
\]

[IC]

budget constraints:

\[
 c_0 + a_0 \leq n_0 - T^n(n_0) \\
 c_1 \leq Ra_0 - T^a(a_0)
\]

[BC]
Incentives

θ \rightarrow \text{private info}

\text{incentive compatibility: } (c_0(\theta), n_0(\theta), c_1(\theta)):

\[ u(c_0(\theta)) - \theta h(n_0(\theta)) + \beta u(c_1(\theta)) \geq u(c_0(\theta')) - \theta h(n_0(\theta')) + \beta u(c_1(\theta')) \]

\text{[IC]}

\text{budget constraints:}

\[ c_0 + a_0 \leq n_0 - T^n(n_0) \]
\[ c_1 \leq R a_0 - T^a(a_0) \]

\text{[BC]}

\text{Proposition. [Implementation]}

[IC] \leftrightarrow [BC]
Probabilistic voting
Probabilistic voting

- two candidates: A vs. B
- propose policies $v_0^i(\theta)$ for $i = A, B$
Probabilistic voting

- two candidates: A vs. B
- propose policies \( v_0^i(\theta) \) for \( i = A, B \)
- agents vote, comparing

\[
v_0^A(\theta) + \varepsilon^A \quad \text{vs.} \quad v_0^B(\theta) + \varepsilon^B
\]
Politics

Introduction

Two Period Model
❖ Environment
❖ Incentives
❖ Politics
❖ Commitment
❖ Policy Game
❖ No Commitment
❖ Main Result
❖ Intuition

Infinite Horizon

Conclusions

% Proabilistic voting

❖ two candidates: A vs. B
❖ propose policies $v_i^0(\theta)$ for $i = A, B$
❖ agents vote, comparing $v_A^0(\theta) + \varepsilon^A$ vs. $v_B^0(\theta) + \varepsilon^B$
❖ $\varepsilon^A - \varepsilon^B$: uniform and i.i.d.
❖ result maximize

\[ \int v_0(\theta) \, dF(\theta) \]
Probabilistic voting

- two candidates: A vs. B
- propose policies \( v^i_0(\theta) \) for \( i = A, B \)
- agents vote, comparing

\[
v^A_0(\theta) + \varepsilon^A \quad \text{vs.} \quad v^B_0(\theta) + \varepsilon^B
\]

\[
\varepsilon^A - \varepsilon^B: \text{uniform and i.i.d.}
\]

result maximize

\[
\int v_0(\theta) \, dF(\theta)
\]

- crucial: values equality in consumption
Commitment Benchmark

Commitment benchmark

\[
\max \int v_0(\theta) \, dF(\theta) \quad \text{s.t.} \quad \text{IC and RC}
\]
Commitment Benchmark

Commitment benchmark

$$\max \int v_0(\theta) \, dF(\theta) \quad \text{s.t.} \quad \text{IC and RC}$$

Define marginal tax

$$u'(c_0(\theta)) = \beta R(1 - \tau(\theta))u'(c_1(\theta))$$
Commitment Benchmark

Commitment benchmark

\[
\max \int v_0(\theta) \ dF(\theta) \quad \text{s.t.} \quad \text{IC and RC}
\]

define marginal tax

\[
u'(c_0(\theta)) = \beta R (1 - \tau(\theta)) u'(c_1(\theta))
\]

Atkinson-Stiglitz

\[\tau^k(\theta) = 0\]
Commitment Benchmark

Commitment benchmark

\[
\max \int v_0(\theta) \, dF(\theta) \quad \text{s.t. IC and RC}
\]

define marginal tax

\[
u'(c_0(\theta)) = \beta R (1 - \tau(\theta)) u'(c_1(\theta))
\]

Atkinson-Stiglitz

\[ \tau^k(\theta) = 0 \]

idea: separability
voting in each period
voting in each period

\[ t = 0: \text{choose tax system to max } \int v_0(\theta) \, dF(\theta) \]
voting in each period

\[ t = 0: \text{choose tax system to max } \int v_0(\theta) \, dF(\theta) \]

\[ t = 1: \text{choose reform or not to max } \int v_1(\theta) \, dF(\theta) \]
voting in each period

\[ t = 0: \text{choose tax system to max } \int v_0(\theta) \ dF(\theta) \]

\[ t = 1: \text{choose reform or not to max } \int v_1(\theta) \ dF(\theta) \]

reform...

\[ \text{cost: } \rho \text{ lost output} \]
Policy Game

Introduction

Two Period Model
❖ Environment
❖ Incentives
❖ Politics
❖ Commitment
❖ Policy Game
❖ No Commitment
❖ Main Result
❖ Intuition

Infinite Horizon

Conclusions

voting in each period

\[ t = 0: \text{choose tax system to max } \int v_0(\theta) \, dF(\theta) \]

\[ t = 1: \text{choose reform or not to max } \int v_1(\theta) \, dF(\theta) \]

reform...

\[ \text{cost: } \rho \text{ lost output} \]

\[ \text{benefit: equalize consumption } c_1(\theta) = Rk_1 - \rho \]

compare...

\[ \int u(c_1(\theta)) \, dF(\theta) \text{ vs. } u(Rk_1 - \rho) \]
$t = 0$ candidates...

$(T^n_A, T^a_A) \text{ vs. } (T^n_B, T^a_B)$
$t = 0$ candidates...

$(T_A^n, T_A^a) \text{ vs. } (T_B^n, T_B^a)$

agents vote A vs B...

winner $i^*$...

$(T_{i^*}^n, T_{i^*}^a)$
Policy Game

Introduction

Two Period Model
❖ Environment
❖ Incentives
❖ Politics
❖ Commitment
❖ Policy Game
❖ No Commitment
❖ Main Result
❖ Intuition

Infinite Horizon

Conclusions

$t = 0$ candidates...

\[(T^n_A, T^a_A) \text{ vs. } (T^n_B, T^a_B)\]

agents vote A vs B...

winner \(i^*\)...

\[(T^n_{i^*}, T^a_{i^*})\]

$t = 1$ candidates

▷ no reform \(\rightarrow T^a_{i^*}\) implemented

▷ reform \(\rightarrow\) full redistribution
Policy Game

Introduction

Two Period Model
❖ Environment
❖ Incentives
❖ Politics
❖ Commitment
❖ Policy Game
❖ No Commitment
❖ Main Result
❖ Intuition

Infinite Horizon

Conclusions

$t = 0$ candidates...

\[(T^n_A, T^a_A) \text{ vs. } (T^n_B, T^a_B)\]

agents vote A vs B...

winner \(i^*\)...

\[(T^n_{i^*}, T^a_{i^*})\]

$t = 1$ candidates

△ no reform \(\longrightarrow T^a_{i^*}\) implemented

△ reform \(\longrightarrow\) full redistribution

(expropriation tax: \(\hat{T}^a(Ra) = Ra - RK_1 - \rho\))
solving backwards...
No Commitment

solving backwards...

\[ t = 1: \text{no reform if and only if} \]

\[ \int u(c_1(\theta)) \, dF(\theta) \geq u(Rk_1 - \rho) \]

strategy maps: \( T^a_0 \) and \( a(\theta) \) reform or not

\[ t = 0: \text{candidates always avoid reform...} \]

... otherwise output \( \rho \) lost!
solving backwards...

\[ t = 1: \text{ no reform if and only if } \]
\[ \int u(c_1(\theta)) \, dF(\theta) \geq u(Rk_1 - \rho) \]

strategy maps: \( T^a_0 \) and \( a(\theta) \rightarrow \text{reform or not} \)

\[ t = 0: \text{ candidates always avoid reform...} \]
\[ \text{... otherwise output } \rho \text{ lost!} \]

\[ \rightarrow \text{constrained optimum problem} \]
No Commitment

max \int v_0(\theta) \, dF(\theta)

subject to IC, RC and

\int u(c_1(\theta)) \, dF(\theta) \geq u(Rk_1 - \rho)

[\nu]
### No Commitment

**Introduction**

- Two Period Model
  - Environment
  - Incentives
  - Politics
  - Commitment
  - Policy Game
  - No Commitment
  - Main Result
  - Intuition

**Infinite Horizon**

**Conclusions**

---

\[
\max \int v_0(\theta) \, dF(\theta)
\]

subject to IC, RC and

\[
\int u(c_1(\theta)) \, dF(\theta) \geq u(Rk_1 - \rho)
\]  \[\nu\]

- first-order conditions \( \tau^k(\theta) \neq 0 \)
Two formulas for capital taxes

- **progressivity**

\[
\tau^k(\theta) = \frac{\beta Ru'(Rk_1 - \rho) - u'(c_0(\theta))}{\mu_0 \nu^{-1} \beta + \beta Ru'(Rk_1 - \rho)}
\]

- **level**

\[
\tau^k(\theta) = \frac{u'(Rk_1 - \rho) - u'(c_1(\theta))}{\mu_0 \nu^{-1} R^{-1} + u'(Rk_1 - \rho) - u'(c_1(\theta))}
\]
Two formulas for capital taxes

\[ \tau^k(\theta) = \frac{\beta Ru'(Rk_1 - \rho) - u'(c_0(\theta))}{\mu_0 \nu^{-1} \beta + \beta Ru'(Rk_1 - \rho)} \]

\[ \tau^k(\theta) = \frac{u'(Rk_1 - \rho) - u'(c_1(\theta))}{\mu_0 \nu^{-1} R^{-1} + u'(Rk_1 - \rho) - u'(c_1(\theta))} \]

Proposition.
(i) \( \tau^k \) progressive
(ii) positive at top
(iii) negative at bottom
Intuition

no-commitment constraint

\[ \int u(c_1(\theta)) \, dF(\theta) \geq u(Rk_1 - \rho) \]

distortions
no-commitment constraint

\[ \int u(c_1(\theta)) \, dF(\theta) \geq u(Rk_1 - \rho) \]

distortions
two effects

LHS \rightarrow progressive subsidy
no-commitment constraint

\[
\int u(c_1(\theta)) \ dF(\theta) \geq u(Rk_1 - \rho)
\]

distortions

two effects

LHS \rightarrow \text{progressive subsidy}

RHS \rightarrow \text{constant tax}
Intuition

- no-commitment constraint

\[ \int u(c_1(\theta)) \, dF(\theta) \geq u(Rk_1 - \rho) \]

- distortions
  - two effects
    - LHS \(\rightarrow\) progressive subsidy
    - RHS \(\rightarrow\) constant tax

- ex-ante: progressivity reduces inequality
  \(\rightarrow\) helps avoid ex-post reform
Intuition

no-commitment constraint

\[ \int u(c_1(\theta)) \, dF(\theta) \geq u(Rk_1 - \rho) \]

distortions

two effects

LHS ➔ progressive subsidy
RHS ➔ constant tax

ex-ante: progressivity reduces inequality ➔ helps avoid ex-post reform

implementation: \( T^a(a) \) convex, increasing at the top, decreasing at the bottom
mechanism...

asset distribution endogeneous
mechanism...

- asset distribution endogenous
- policy → not ex-ante redistribution
Intuition

Mechanism...

- Asset distribution endogenous
- Policy not ex-ante redistribution
- Policy avoid ex-post redistribution!
Intuition

- asset distribution endogenous
- policy \(\rightarrow\) not ex-ante redistribution
- policy \(\rightarrow\) avoid ex-post redistribution!
- ...shift inequality across time
Infinite Horizon

Conclusions

Intuition

- asset distribution endogeneous
- policy not ex-ante redistribution
- policy avoid ex-post redistribution!
- ...shift inequality across time
Infinite Horizon

❖ Setup
❖ Policy Game
❖ Planning Problem
❖ FOCs
❖ Main Result
❖ Worst
❖ Non i.i.d. shocks

Conclusions
<table>
<thead>
<tr>
<th>Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>infinite horizon ➔ dynamic game</td>
</tr>
<tr>
<td>no cost of reform ( (\rho = 0) )</td>
</tr>
<tr>
<td>consumption and work each period</td>
</tr>
</tbody>
</table>
Setup

Introduction

Two Period Model

Infinite Horizon

❖ Setup
❖ Policy Game
❖ Planning Problem
❖ FOCs
❖ Main Result
❖ Worst
❖ Non i.i.d. shocks

Conclusions

infinite horizon ➡ dynamic game
no cost of reform ($\rho = 0$)
consumption and work each period

two differences...

1. reputational equilibria ➡ “endogenize $\rho$”
2. commitment case ➡ immiseration
Setup

preferences

\[ v_t = \mathbb{E}_{t-1}[u(c_t) - \theta_t h(n_t) + \beta v_{t+1}], \]

\[ = \sum_{s=0}^{\infty} \beta^s \mathbb{E}_{t-1}[u(c_{t+s}) - \theta_{t+s} h(n_{t+s})] \]

\{\theta_t\} i.i.d., private information
preferences

\[ v_t = \mathbb{E}_{t-1}[u(c_t) - \theta_t h(n_t) + \beta v_{t+1}], \]

\[ = \sum_{s=0}^{\infty} \beta^s \mathbb{E}_{t-1}[u(c_{t+s}) - \theta_{t+s} h(n_{t+s})] \]

\{\theta_t\} i.i.d., private information

Revelation principle on equilibrium path (Albanesi-Sleet, 2007; Acemoglu-Golosov-Tsyvinski, 2007)
Utility from strategy $\sigma$...

$$U(\{c_t, n_t\}, \sigma) \equiv \sum_{t, \theta^t} \beta^t [u(c_t(\sigma^t(\theta^t))) - \theta_t h(n_t(\sigma^t(\theta^t)))] \Pr(\theta^t)$$

incentive compatibility

$$U(\{c_t, n_t\}, \sigma^*) \geq U(\{c_t, n_t\}, \sigma)$$

[IC]

for all $\sigma$
Technology

\[ v = \text{initial utility entitlement} \]
\[ \psi = \text{distribution of } v \]

resource constraint...

\[ C_t + K_{t+1} \leq F(K_t, N_t) \quad t = 0, 1, \ldots \quad [\text{RC}] \]

\[ N_t \equiv \int \sum_{\theta^t} n_t^v(\theta^t) \Pr(\theta^t) \, d\psi(v) \]

\[ C_t \equiv \int \sum_{\theta^t} c_t^v(\theta^t) \Pr(\theta^t) \, d\psi(v) \]

Feasible allocation. \( (\{c_t^v, n_t^v\}, K_t) : \)

\[ \text{IC, RC and } v = U(\{c_t^v, n_t^v\}, \sigma^*) \]
$H^t = \text{public history entering period } t$

- past reports $\sigma^{t-1,v}(\theta^{t-1})$
- past allocations $(\{c^v_s, n^v_s\}_{s \leq t-1}, \{K_s\}_{s \leq t})$
\( H^t = \) public history entering period \( t \)

- past reports \( \sigma^{t-1,v}(\theta^{t-1}) \)
- past allocations \( (\{c^v_s, n^v_s\}_{s \leq t-1}, \{K_s\}_{s \leq t}) \)

Timing within period...

1. agents: report \( \sigma^v_t(\theta^t) \) and work \( n^v_t(\sigma^v_t(\theta^t)) \)
2. candidates: platforms \( (\{c^v_t\}, K_{t+1}) \) s.t. RC
3. voting: winning platform implemented
4. move to next period \( H_{t+1} \)
### Credibility

<table>
<thead>
<tr>
<th>Introduction</th>
<th>Two Period Model</th>
<th>Infinite Horizon</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>✗ Setup</td>
<td>✗ Policy Game</td>
</tr>
<tr>
<td></td>
<td>✗ Planning Problem</td>
<td>✗ FOCs</td>
</tr>
<tr>
<td></td>
<td>✗ Main Result</td>
<td>✗ Worst</td>
</tr>
<tr>
<td></td>
<td>✗ Non i.i.d. shocks</td>
<td></td>
</tr>
</tbody>
</table>

#### trigger strategy: deviation ➔ worst
Credibility

<table>
<thead>
<tr>
<th>Introduction</th>
<th>Two Period Model</th>
<th>Infinite Horizon</th>
<th>Setup</th>
<th>Policy Game</th>
<th>Planning Problem</th>
<th>FOCs</th>
<th>Main Result</th>
<th>Worst</th>
<th>Non i.i.d. shocks</th>
<th>Conclusions</th>
</tr>
</thead>
</table>

- **trigger strategy**: deviation → worst
- **credible allocations**: feasible and...

\[
\int U(\{c_{t+s}^v, n_{t+s}^v\}_{s \geq 0}, \sigma^*) d\psi(v) \geq \hat{W}(K_t, \{n_t^v(\theta^t)\})
\]
Credibility

Introduction
Two Period Model
Infinite Horizon
❖ Setup
❖ Policy Game
❖ Planning Problem
❖ FOCs
❖ Main Result
❖ Worst
❖ Non i.i.d. shocks
Conclusions

trigger strategy: deviation $\rightarrow$ worst

credible allocations: feasible and...

$$
\int U(\{c_{t+s}^v, n_{t+s}^v\}_{s\geq 0}, \sigma^*) \, d\psi(v) \geq \hat{W}(K_t, \{n_t^v(\theta^t)\})
$$

$$
\hat{W}(K, \{n_\theta\}) \equiv \\
\max_{K'} \left\{ u(F(K, N) - K') - \sum_\theta \int \theta h(n_\theta) \Pr(\theta) + \beta W(K') \right\}
$$

$W(K) =$ worst equilibrium payoff
best equilibrium \iff \text{Dual planning problem:}

\min K_0 \quad \text{s.t. } (\{c_t^v, n_t^v\}; \{K_t\}) \text{ credible}
FOCs

\[
\frac{\mu_{t+1}}{\mu_t} \beta F_K(K_{t+1}, N_{t+1}) - \frac{\nu_{t+1}}{\mu_t} \beta \hat{W}_K(K_{t+1}, \{n^v_{t+1}\}) = 1
\]

\[
\frac{1}{u'(c^v(\theta^t))} - \frac{\nu_{t+1}}{\mu_{t+1} - \mu_t} = \frac{\mu_{t+1}}{\mu_t} \left( \mathbb{E}_t \left[ \frac{1}{u'(c^v(\theta^{t+1}))} \right] - \frac{\nu_{t+1}}{\mu_{t+1} - \mu_t} \right)
\]
average capital tax:

\[ 1 - \bar{\tau}_t(v_t) \equiv \sum_\theta (1 - \tau(v_t, \theta)) p(\theta) \]

average capital tax is progressive:

\[
\bar{\tau}_{t+1}(v_{t+1}) = \frac{\beta \hat{W}_K(K_{t+1}, \{n_{t+1}^v\}) - u'(c^v(\theta^t))}{\beta R_{t+1}} \frac{\nu_{t+1}}{\mu_{t+1}}
\]

or

\[
\bar{\tau}_{t+1}(v_{t+1}) = \frac{\beta \hat{W}_K(K_{t+1}, \{n_{t+1}^v\}) - \beta R_{t+1}(E_t [u'^{-1}(c^v(\theta^{t+1})))]}{\beta R_{t+1} \frac{\mu_{t+1}}{\nu_{t+1}} - \beta R_{t+1}(E_t [u'^{-1}(c^v(\theta^{t+1})))]}^{-1}
\]
what is the worst?
what is the worst?

\[ W(K) = \min_{n \in [0, \bar{n}]} \max_{K'} \left\{ u(F(K, n) - K') - h(n) + \beta W(K') \right\} \]
what is the worst?

\[ W(K) = \min_{n \in [0, \bar{n}]} \max_{K'} \{ u(F(K, n) - K') - h(n) + \beta W(K') \} \]

two implications...

1. \( W(K) \) is nondecreasing and concave
2. \( \hat{W}(K, \{n_\theta\}) \) is increasing, concave, and differentiable.

back to sign...
what is the worst?

\[ W(K) = \min_{n \in [0,\bar{n}]} \max_{K'} \{ u(F(K, n) - K') - h(n) + \beta W(K') \} \]

two implications...

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back to sign...

\[ \bar{\tau}_{t+1}(v_{t+1}) = \frac{\beta \hat{W}_K(K_{t+1}, \{n_{t+1}^v\}) - \beta R_{t+1} \left( \mathbb{E}_t \left[ u'(c^v(\theta_{t+1})) \right] \right)}{\beta R_{t+1} \frac{\mu_{t+1}}{v_{t+1}} - \beta R_{t+1} \left( \mathbb{E}_t \left[ u'(c^v(\theta_{t+1})) \right] \right)^{-1}} \]
what is the worst?

\[ W(K) = \min_{n \in [0, \bar{n}]} \max_{K'} \{ u(F(K, n) - K') - h(n) + \beta W(K') \} \]

two implications...

1. \( W(K) \) is nondecreasing and concave
2. \( \hat{W}(K, \{n_\theta\}) \) is increasing, concave, and differentiable.

back to sign...

\[ \bar{\tau}_{t+1}(\nu_{t+1}) = \beta R_{t+1} \frac{u'(\hat{C}_{t+1}) - \left( \mathbb{E}_t \left[u^{-1}(c^v(\theta^{t+1})) \right] \right)^{-1}}{\beta R_{t+1} \frac{\mu_{t+1}}{\nu_{t+1}} - \beta R_{t+1} \left( \mathbb{E}_t \left[u^{-1}(c^v(\theta^{t+1})) \right] \right)^{-1}} \]
Non i.i.d. shocks

Introduction

Two Period Model

Infinite Horizon

- Setup
- Policy Game
- Planning Problem
- FOCs
- Main Result
- Worst

Non i.i.d. shocks

Conclusions

potential ratchet effects...
... revelation principle doesn’t hold
<table>
<thead>
<tr>
<th>Introduction</th>
<th>Two Period Model</th>
<th>Infinite Horizon</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>❖ Setup</td>
<td>❖ Policy Game</td>
</tr>
<tr>
<td></td>
<td>❖ Planning Problem</td>
<td>❖ FOCs</td>
</tr>
<tr>
<td></td>
<td>❖ Main Result</td>
<td>❖ Worst</td>
</tr>
<tr>
<td>❖ Non i.i.d. shocks</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- potential ratchet effects...
- ... revelation principle doesn’t hold

1. general mechanisms $m^t$
potential ratchet effects...
... revelation principle doesn’t hold

1. general mechanisms

2. assume

- there exists \( w > 0 \) s.t. \( \min_{N \geq 0} F_N(K, N) > w \)
- \( K \in [0, \bar{K}] \) and \( n \in [0, \bar{n}] \) where \( \bar{K}, \bar{N} < \infty \)
- \( u'(F(\bar{K}, \bar{n})) > (\bar{\theta}h(\bar{n}) - h(0))/w \)

revelation principle on equilibrium path
Main Result: Political economy
redistribution + no commitment
Main Result: Political economy

- redistribution + no commitment
- progressive capital tax
Conclusions

Main Result: Political economy
- redistribution + no commitment
- progressive capital tax

key idea: progressivity helps credibility
Main Result: Political economy
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key idea: progressivity helps credibility

extensions: other policies? human capital?