6. Fiscal Policy

6.1 Tax policy

6.1.1 Wealth taxation problem

Government offers favorable conditions for investment. If investors come and invest, government might feel tempted to tax capital later. Investors know it, so they do not invest.

Government opportunity to "cheat" is clear, what about motives? Assumption: "benevolent" government, maximizing citizens' utility.

Basic model

i) Individuals live two periods

Period 1: * Receive (exogenous) income: 1

* Consume part of income: c_1^i

* Save (= invest) the rest: k^i

$\Rightarrow$ First period families budget constraint: $c_1^i + k^i = 1$

Period 2: * Time endowment (1) devoted to labor (l^i) and leisure (x^i):

$1 = l^i + x^i$

* Receive wage earnings: $(1-\tau_L)1l^i$

* Receive capital earnings: $(1-\tau_k)Rk^i$

Unitary gross returns: R=1

⇒ Second period families budget constraint:

$$c_2^i = (1-\tau_k)\, k^i + (1-\tau_L) l^i$$

Individuals decisions?
Period 1: how much to save (how much to consume).
Period 2: how much to work and to consume.

These decisions depend on:

- preferences: $U(c_1^i, c_2^i, x^i) = u(c_1^i) + c_2^i + v(x^i)$
- possibilities: budget and time constraints

ii) Government collects taxes on labor and capital income to finance a given spending (G). No lump sum taxes available.

Government budget constraint: $G \leq \tau_L l + \tau_k k$

iii) Two policy regimes

Commitment:

Period	Actions	Active player
1 (beginning)	τ_k, τ_L	Government
1 (during)	k^i	Individuals
2	l^i	Individuals

Discretion:

Period	Actions	Active player
1 (during)	k^i	Individuals
1 (end)	τ_k, τ_L	Government
2	l^i	Individuals

Key difference: taxes on capital set before (commitment) or after (discretion) investment.

Solution (Backward induction)

A) Commitment

1) Families decide in periods 1 and 2 how much to save and to work, knowing the tax rates.

$$\text{Saving} = K(\tau_K),\ K'(.) < 0$$

$$\text{Labor supply} = L(\tau_L)\ ,\ \ L'(.) < 0$$

2) At the beginning of period 1, government chooses τ_K and τ_L, to maximize families' utility:

$$\underset{\tau_K,\tau_L}{\text{Maximize}} W(\tau_K, \tau_L)$$

$$\text{s.t.} \qquad G \le \tau_L l + \tau_k k$$

$\Rightarrow$ Ramsey rule: $\varepsilon_K(\tau_K^*) = \varepsilon_L(\tau_L^*)$

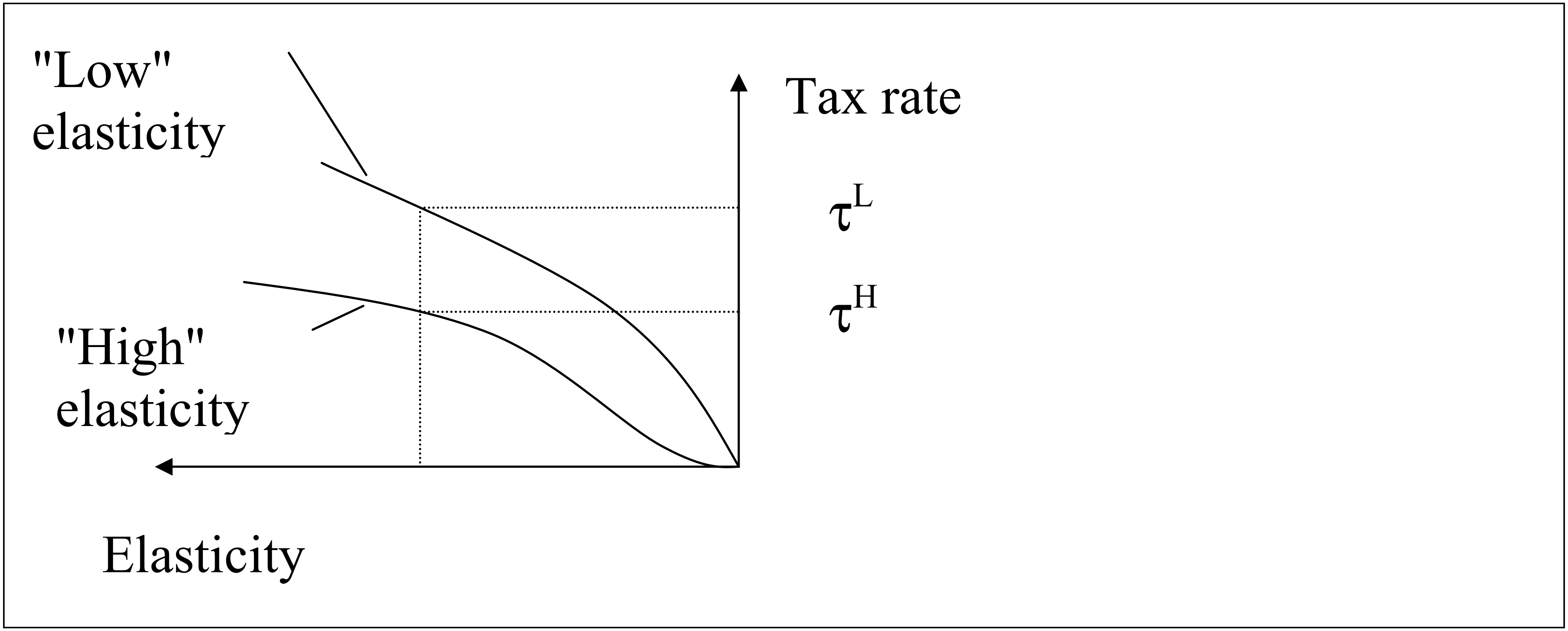
where:

ε_L = labor supply elasticity to labor tax rate

ε_K = saving elasticity to capital tax rate

$\Rightarrow$

- With negative and finite elasticities, both tax rates must be positive.
- Optimal tax rates are higher on the more inelastic tax base.
- Higher government expenditure drives up both tax rates.



Notice: Ramsey rule is a “second best”, taxes are distortionary. Lump sum taxes are assumed away.

B) Discretion

1) Period 2: Families choose labor supply knowing tax rates $L(\tau_L)$

2) Period 1 (end of): Government solves something "similar" to what we solved with commitment:

$$\underset{\tau_K,\tau_L}{\text{Maximize}} W(\tau_K,\tau_L)$$

$$\text{s.t.} \qquad G \leq \tau_L l + \tau_k k$$

$\Rightarrow$ Ramsey rule again: $\varepsilon_K(\tau_K^d) = \varepsilon_L(\tau_L^d)$

τ^d is the equilibrium tax rate under discretion.

But, now capital is a given: $\varepsilon_K = 0$
$\Rightarrow \tau_K$ is not distortionary $\Rightarrow$ choose τ_K as large as necessary and τ_L as small as possible.

More formally: $$\tau_K(G,k) = \min\left(1, \frac{G}{k}\right)$$

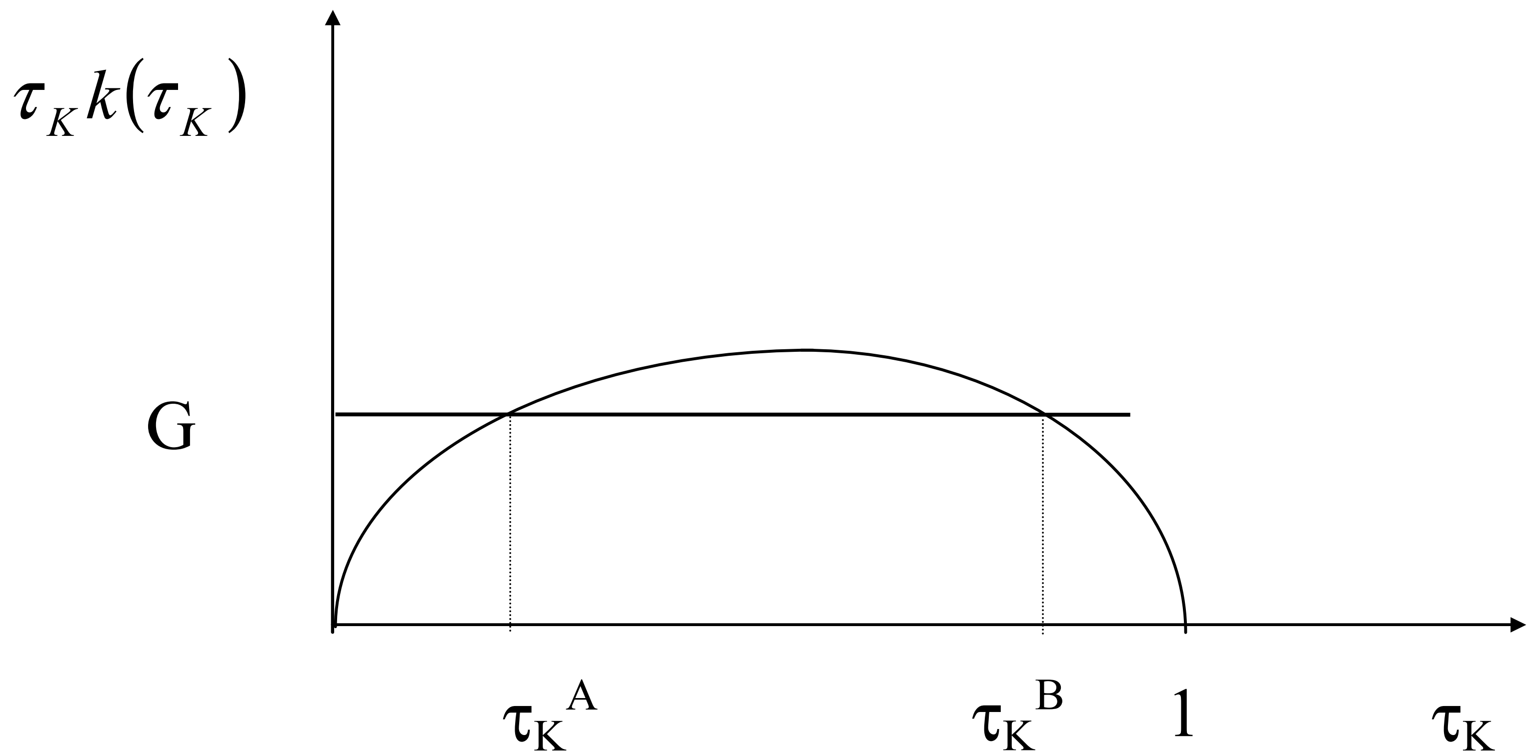
where k is aggregate capital stock.

Two cases:

- If capital stock is large enough, government chooses $\tau_K(G,k) < 1$, collects just taxes on capital $G = k\tau_K(G,k)$, and does not tax labor $\tau_L = 0$.

- If capital stock is not large enough, government chooses $\tau_K(G,k)=1$, and $\tau_L > 0$

3) Period 1: Families analyze government budget



Three equilibria:

a) If $E[\tau_K] = \tau_K^A \Rightarrow$ government charges $\tau_K{}^A$, collecting $G = \tau_K^A k(\tau_K^A) \Rightarrow$ no mistakes

b) Analogous for $\tau_K{}^B$

c) If $E[\tau_K] = 1 \Rightarrow$ no savings at all: $k(1) = 0 \Rightarrow$ government charges $\tau_K = 1$, collecting nothing from capital! Hence, government collects taxes only on labor: $G = \tau_L L(\tau_L) \Rightarrow$ no mistakes

Summary of results with discretion:

Equilibrium	Capital tax rate	Capital stock	Labor tax rate
Full expropriation	1	0	$G = \tau_L L(\tau_L)$
Partial expropriation	$\tau_K{}^B$	$K\left(\tau_K^B\right)$	0
Partial expropriation	$\tau_K{}^A$	$K\left(\tau_K^A\right)$	0

Comments:

- Excessive taxation on capital, compared to Ramsey.
- Excessive taxation on labor, if $\tau_K = 1$, and insufficient taxation on labor, if $\tau_K{}^A$ or $\tau_K{}^B$.
- Multiple Pareto-rankable equilibria, more capital is better.

6.1.2 Money and the inflationary tax

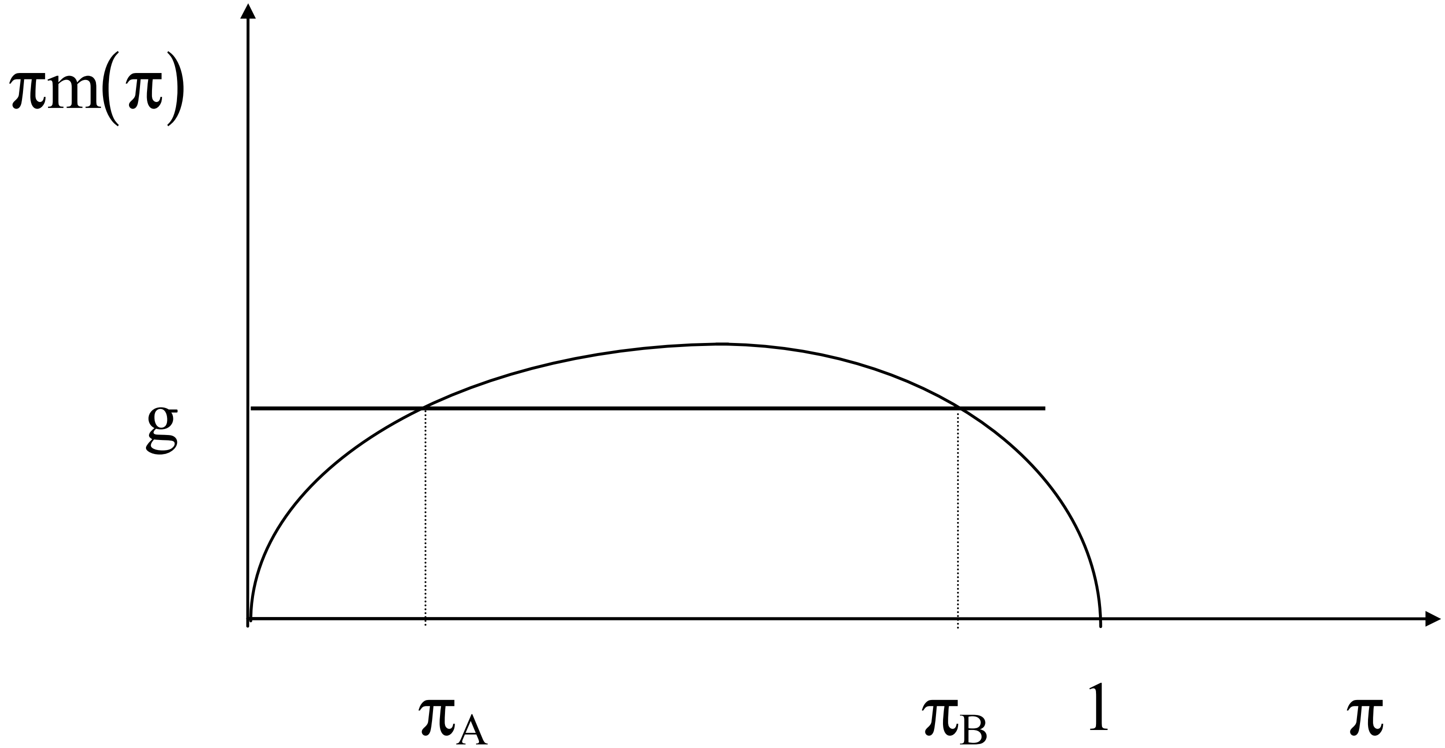
Previous model could be reinterpreted to represent money demand and inflation.

Wealth is now real money (m)

Inflationary tax rate: $\pi = \frac{\hat{p}}{1+\hat{p}}$

Money demand is decreasing in inflationary tax: $m'(\pi) < 0$

Inflationary tax collect: $\pi m(\pi)$



Low inflation equilibrium: if people expect $\pi_A \Rightarrow$ demand $m(\pi_A) \Rightarrow$ government chooses π_A

High inflation equilibrium: if people expect $\pi_B \Rightarrow$ demand $m(\pi_B) \Rightarrow$ government chooses π_B

Hyperinflation equilibrium: if people expect $\pi = 1 \Rightarrow$ demand $m(1) = 0 \Rightarrow$ government chooses $\pi = 1$, or $\hat{p} \to \infty$

Hyperinflation = full expropriation

According to this story, hyperinflation could be a self-fulfilling prophecy.

6.1.3 Nominal public debt (Calvo 1989)

Motivation: some Latin American countries (Argentina, Bolivia, Brazil, etc.) have experienced huge fiscal deficits due to large interest bills stemming from high interest rates.

Alternative views on the fiscal deficit-interest rate relationship:

(i) Traditional: deficit $\Rightarrow$ high inflation $\Rightarrow$ high interest rates

(ii) Calvo: high interest rates $\Rightarrow$ deficit $\Rightarrow$ high inflation

Key element in Calvo's story: nominal debt (b)

$$\text{Real debt service} = \frac{B_0(1+i)}{p_1} = \frac{b(1+i)}{1+\hat{p}}$$

$\Rightarrow$ Government is tempted to inflate to erode public debt.

Ex-ante: low inflation to induce low interest rate…

Ex-post: interest rate is a given, hence inflation becomes a non distortionary tax $\Rightarrow$ full expropriation of public debt!

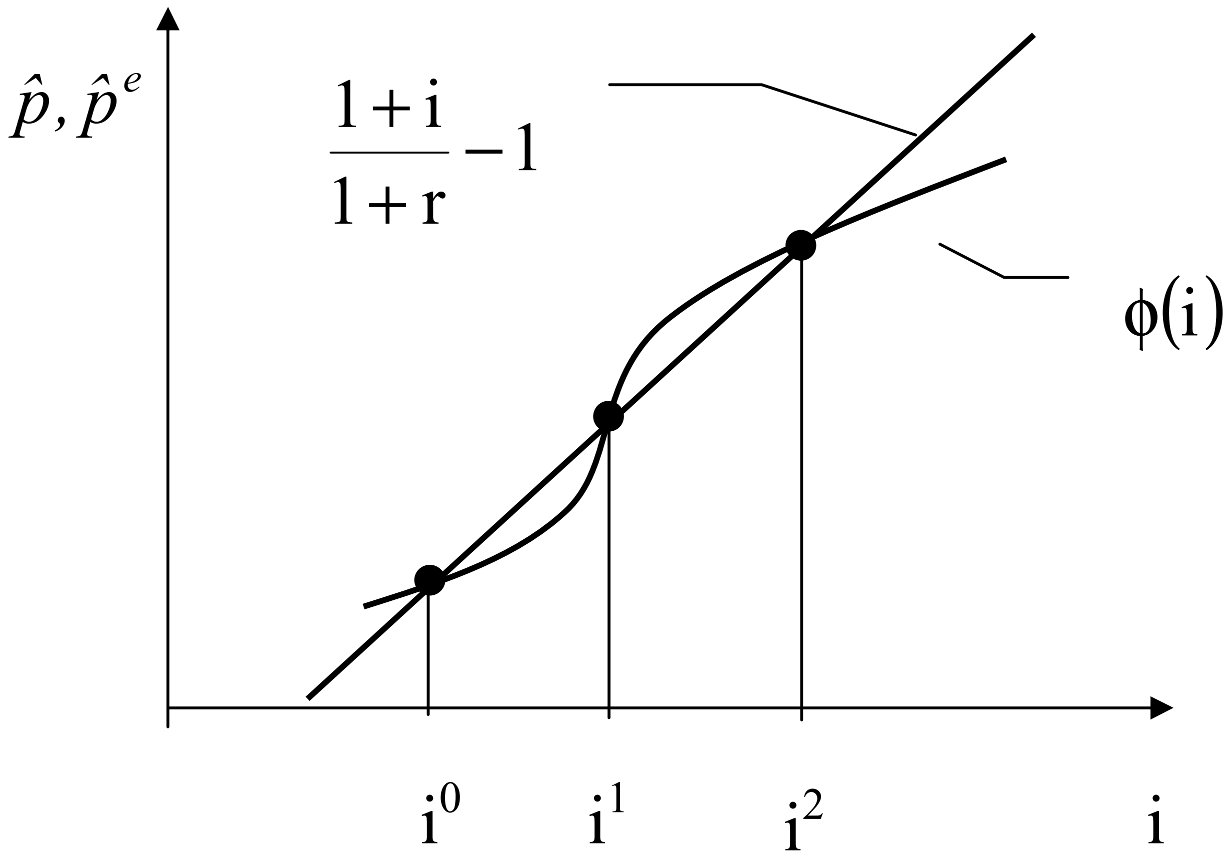
Assumption: there is a cost associated to inflation…

$\Rightarrow$ partial expropriation of public debt.

$\Rightarrow$ ex-post optimal inflation increasing in interest rate:

$$\hat{p} = \phi(i) \quad , \quad \phi'(i) > 0$$

Fisher equation: $1 + i = (1 + r)(1 + \hat{p}^e)$

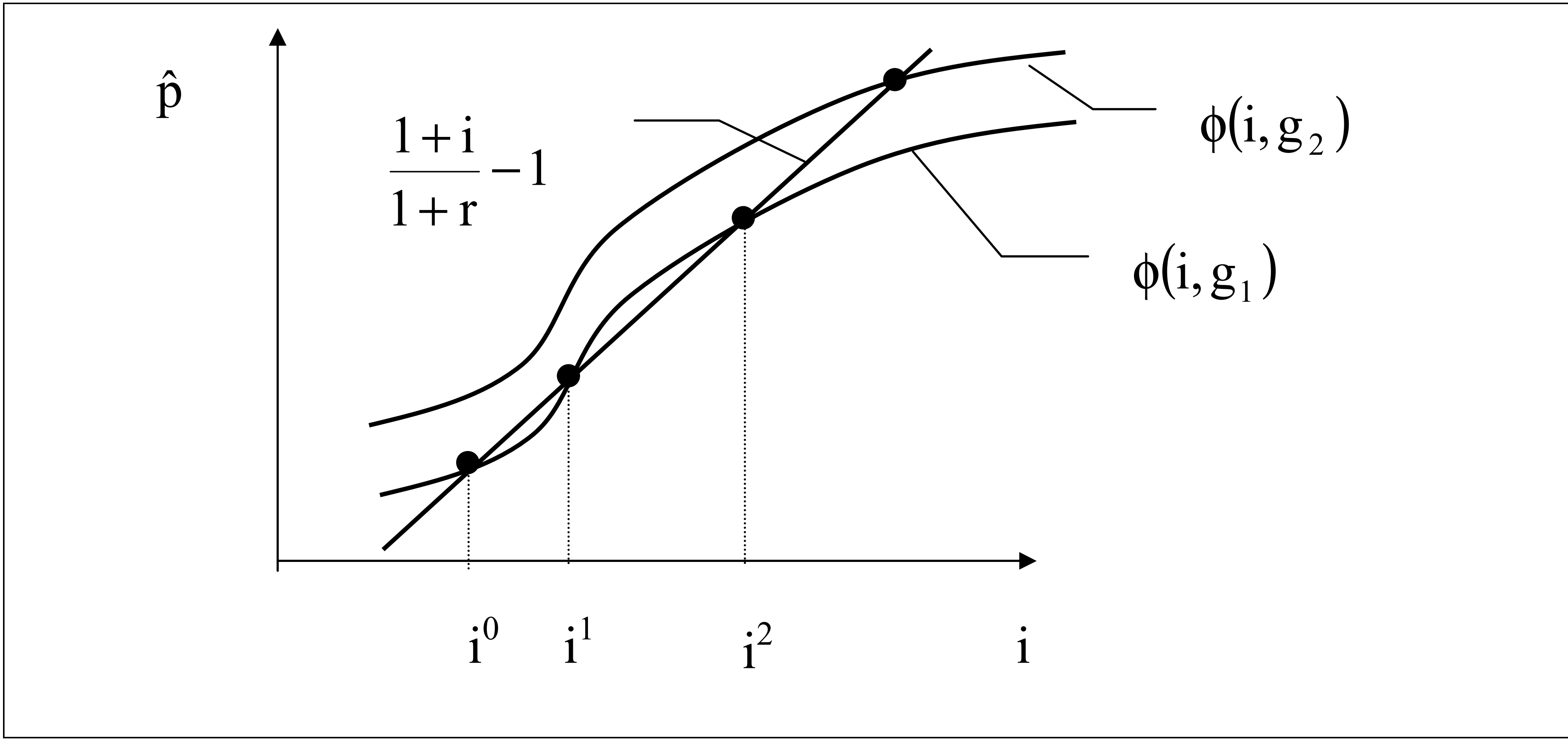


$\Rightarrow$ Three equilibria with the same fundamentals.

How could government spending affect these results?

$$\hat{p} = \phi(i, g) \quad , \partial\phi/\partial i > 0 \, , \qquad \partial\phi/\partial g > 0$$

The larger g, the larger government necessity of fund rising, the larger the optimum expost inflation…



$\Rightarrow$ low inflation equilibria could disappear due to fiscal expansion.

Notice: no surprises in equilibrium.

What would happen if debt were fully indexed?

$$\text{Real indexed debt service} = \frac{b(1+r)(1+\hat{p})}{1+\hat{p}} = b(1+r)$$

$\Rightarrow$ no incentives to inflate, if *indexed debt*.

Puzzle: if debt indexing solves the credibility problem, why do governments usually issue nominal debt?

Answer: uncertainty… (Calvo and Guidotti, 1993)

Assume government expenditure is random:
Negative shock $\Rightarrow$ large g $\Rightarrow$ increase distortionary taxes, including inflationary tax…

Tradeoff credibility (indexed debt) – flexibility (nominal debt). Similar to contemporaneous wage indexation.

6.1.4 Public sector net position in domestic currency
(Persson, Persson, and Svensson (1987)

Three assets:

- Money = central bank liability in domestic currency.
- Indexed government bonds.
- Nominal (domestic currency) private bonds.

Problem: Money creates incentives to inflate.

Solution: zero net position in domestic currency.

How? Government sells indexed bonds in exchange for nominal private bonds $\Rightarrow$

Government holdings of nominal private bonds = money

Qualification: under uncertainty, it could be optimal to hold a net debtor position.

6.1.5 Capital vs labor

Wealth taxation problem overstated in 6.1.1 and 6.1.2…

Strategic delegation: Voters might avoid the capital levy problem electing a "conservative" politician.

6.1.5.1. *The model*

i) Individuals live two periods

Period 1: * Initial wealth: $1-e^i$, $E\left[e^i\right]=0$, $e^m>0$,

* Consume part of initial wealth: c_1^i
* Save (= invest) the rest: k^i

$\Rightarrow$ First period families budget constraint: $c_1^i + k^i = 1 - e^i$

Period 2: * Time endowment ($1+e^i$) devoted to labor (l^i) and leisure (x^i): $1+e^i = l^i + x^i$

* Notice: e^i captures the relative importance of labor and capital in income. Initial wealth and time endowment are perfectly negatively correlated.
* Receive wage earnings: $(1-\tau_L)1l^i$
* Receive capital earnings: $(1-\tau_k)Rk^i$

Unitary gross returns: R=1

⇒ Second period families budget constraint:

$$c_2^i = (1-\tau_k)\,k^i + (1-\tau_L)l^i$$

Individuals decisions?
Period 1: how much to save (how much to consume).
Period 2: how much to work and to consume.

These decisions depend on:

- preferences: $U\left(c_1^i, c_2^i, x^i\right) = u\left(c_1^i\right) + c_2^i + v\left(x^i\right)$
- possibilities: budget and time constraints

ii) Government collects taxes on labor and capital income to finance a given spending (G). No lump sum taxes available.
Government budget constraint: $G \leq \tau_L l + \tau_k k$

iii) Alternative assumptions on politicians:

- office-seeking candidates
- citizen candidates

6.1.5.2. *Equilibrium taxation with office-seeking candidates*

i) Ex-ante elections

Period	Actions	Active player
0	τ_k, τ_L	Government
1	Vote	Citizens
2	k^i	Citizens
3	l^i	Citizens

Solving (Backward induction)

1) Families decide in periods 2 and 3 how much to save and to work, knowing the tax rates.

$$\max_{c_1^i, c_2^i, x^i} U(c_1^i) + c_2^i + V(x^i)$$

$$\text{s.t. } c_1^i + k^i = 1 - e^i$$

$$c_2^i = (1 - \tau_K)k^i + (1 - \tau_L)l^i$$

$$l^i + x^i = 1 + e^i$$

or:

$$\max_{k^i, l^i} U(1 - e^i - k^i) + (1 - \tau_K)k^i + (1 - \tau_L)l^i + V(1 + e^i - l^i)$$

FOCs:

$$-U_c\left(1-e^i-k^i(\tau_K)\right)+(1-\tau_K)=0$$

$$-V_x\left(1+e^i-l^i(\tau_L)\right)+(1-\tau_L)=0$$

$\Rightarrow$

$$k^i(\tau_K)=1-U_c^{-1}(1-\tau_K)-e^i=K(\tau_K)-e^i \quad , \quad K'(.)<0$$

$$l^i(\tau_L)=1-V_x^{-1}(1-\tau_L)+e^i=L(\tau_L)+e^i \quad , \quad L'(.)<0$$

2) Citizens vote in period 1. Citizen i's preferred tax rates:

$$\underset{\tau_K,\tau_L}{\text{Max}} \; U\left(1 - e^i - k^i(\tau_K)\right) + (1 - \tau_K)k^i(\tau_K) + (1 - \tau_L)l^i(\tau_L) +$$
$$+ V\left(1 + e^i - l^i(\tau_L)\right)$$

$$\text{s.t.} \qquad G \le \tau_L L(\tau_L) + \tau_k K(\tau_K)$$

Notice:

- Citizens are aware of the government's budget constraint.
- This constraint depends on aggregate labor and capital supply.

Hence, the Lagrangian is:

$$\mathcal{L} = U\left(1-K\left(\tau_K\right)\right) + \left(1-\tau_K\right)K\left(\tau_K\right) + \left(1-\tau_L\right)L\left(\tau_L\right) + \\ + V\left(1-L\left(\tau_L\right)\right) + \left(\tau_K - \tau_L\right)e^i + \lambda\left(G - \tau_L L\left(\tau_L\right) - \tau_k K\left(\tau_K\right)\right)$$

FOCs (using the envelope theorem):

$$\frac{\partial \mathcal{L}}{\partial \tau_L} = -L\left(\tau_L\right) - e^i + \lambda\left(-L\left(\tau_L\right) - \tau_L L_\tau\left(\tau_L\right)\right) = 0$$

$$\frac{\partial \mathcal{L}}{\partial \tau_K} = -K\left(\tau_K\right) + e^i + \lambda\left(-K\left(\tau_K\right) - \tau_K K_\tau\left(\tau_L\right)\right) = 0$$

$$\frac{\partial \mathcal{L}}{\partial \lambda} = G - \tau_L L\left(\tau_L\right) - \tau_k K\left(\tau_K\right) = 0$$

$\Rightarrow$ "Modified" Ramsey rule:

$$\frac{K(\tau_K^i) - e^i}{K(\tau_K^i)}\left[1 + \varepsilon_L(\tau_L^i)\right] = \frac{L(\tau_L^i) + e^i}{L(\tau_L^i)}\left[1 + \varepsilon_K(\tau_K^i)\right] \qquad \textbf{(5)}$$

Consider the preferred tax rates of different individuals:

a) Individual with average relative income from labor and capital

$$e^i = 0 \;\Rightarrow\; \varepsilon_K(\tau_K^*) = \varepsilon_L(\tau_L^*)$$

the individual with average relative income prefers the tax rates associated with commitment in the model without redistribution (section 7.1.1).

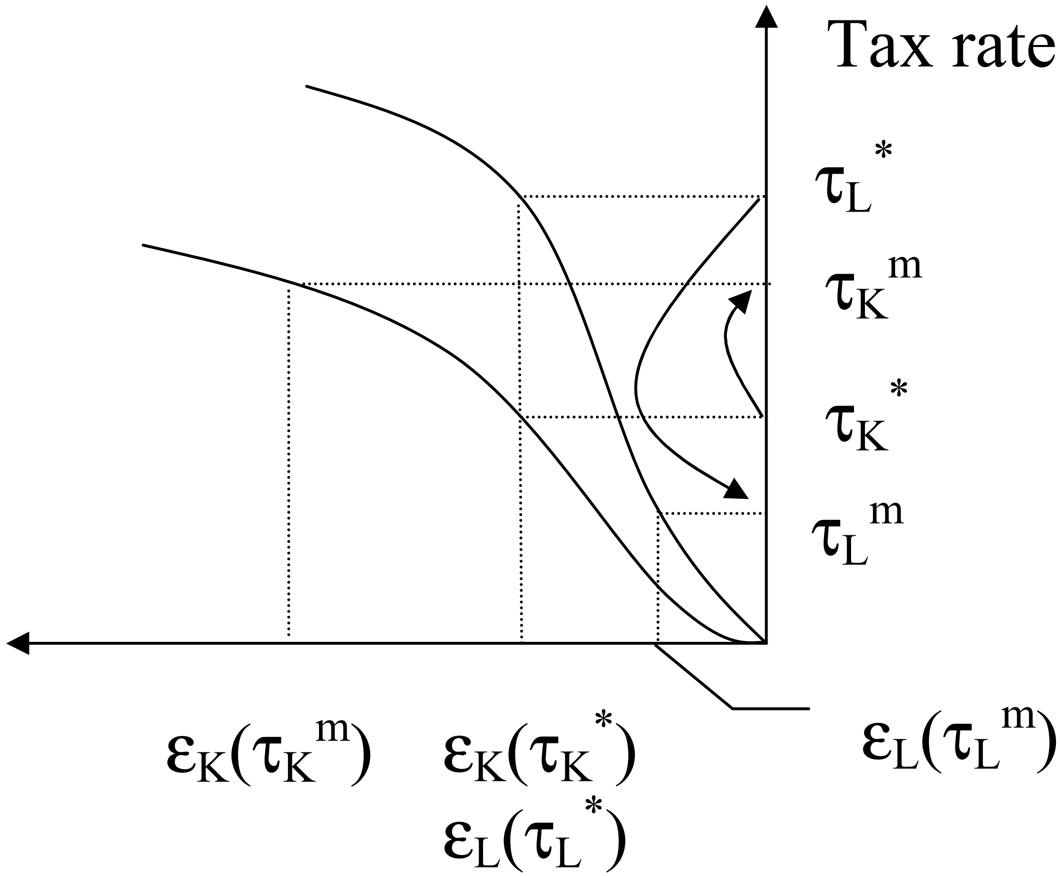
b) The median voter has relative income $e^m > 0$
(he is more a worker than the individual with average relative income)

Hence, from (5):

$$\frac{\left[1+\varepsilon_L\left(\tau_L^*\right)\right]}{\left[1+\varepsilon_K\left(\tau_K^*\right)\right]} = 1 < \frac{\left[L\left(\tau_L^m\right)+e^m\right]/L\left(\tau_L^m\right)}{\left[K\left(\tau_K^m\right)-e^m\right]/K\left(\tau_K^m\right)} = \frac{\left[1+\varepsilon_L\left(\tau_L^m\right)\right]}{\left[1+\varepsilon_K\left(\tau_K^m\right)\right]}$$

... implying that the redistributive motive raises taxes on capital and reduces taxes on labor:

$$\tau_K^* < \tau_K^m \, ; \, \tau_L^* > \tau_L^m$$



Nota: en este ejemplo se supuso que el trabajo es menos elástico que el capital, pero este supuesto es irrelevante para el argumento.

ii) Ex-post elections

Period	Actions	Active player
0	k^i	Citizens
1	τ_k, τ_L	Government
2	Vote	Citizens
3	l^i	Citizens

Solving (Backward induction)

1) In period 3, individuals decide how much to work as before:

$$l^i(\tau_L) = 1 - V_x^{-1}(1 - \tau_L) + e^i = L(\tau_L) + e^i \quad , \quad L'(.) < 0$$

2) Citizens vote. At this stage, $\varepsilon_K(\tau_K) = 0$
Hence, the median voter ($e^m > 0$) prefers taxes on capital as high as needed to finance government expenditures.

Assuming G is "large": $\tau_K^m = 1$,i.e. full expropriation!

3) In period 1, office-seeking politicians choose political platforms to please the median voter. Full convergence to $\tau_K^m = 1$.

4) In period 0, individuals save nothing: $k^i(\tau_K = 1) = 0$

6.1.5.3. *Equilibrium taxation with citizen candidates*

Distinctive assumptions:

- Motivation of "citizen candidates": ideology.
- No commitment ability.

Main implication:

Strategic delegation = each citizen votes for someone more "conservative" than himself. Citizen i, with endowment e^i, would vote for someone with less labor relative to capital than himself:

$$e^{iP} < e^i$$

Puzzle: individual with endowment e^{iP} does not want to be in office, he votes for someone else! An endless story?

Entry of candidates: add a previous stage in which citizens decide whether to run as candidates. Assume there is a cost of being candidate.

Two-candidates equilibrium: two candidates with e^R and e^L, each providing the other with a reason to enter.

Candidates must have a chance to win (otherwise they would not incur in the cost of being candidate),

⇒ The median voter must be indifferent between both candidates

⇒ They must be on the opposite sides of the median voter preferred candidate: $e^R < e^{mP} < e^L$

Notice:

- Many equilibria
- No convergence of political platforms, (no commitment).
- Strategic delegation ameliorates the capital-levy problem.

6.2 Fiscal deficit and public debt

6.2.1 Some facts and questions

(Alesina and Perotti, 1994; Alesina et al., 1995)

Large fiscal deficits and public debts since the seventies… (not before)

Why now? Why some countries?

Some explanations:

i) Budget deficits are socially optimal: Barro 1979, Lucas and Stokey 1983.

ii) Fiscal illusion: Buchanan, Tullock (Public choice)

iii) Intergenerational redistributions

iv) Strategic role of debt: conditioning future governments
v) Distributive conflicts and wars of attrition

6.2.2 Optimal budget policy

(Barro 1979, Lucas and Stokey, 1983)

Ricardian equivalence ⇒ public debt is not relevant.

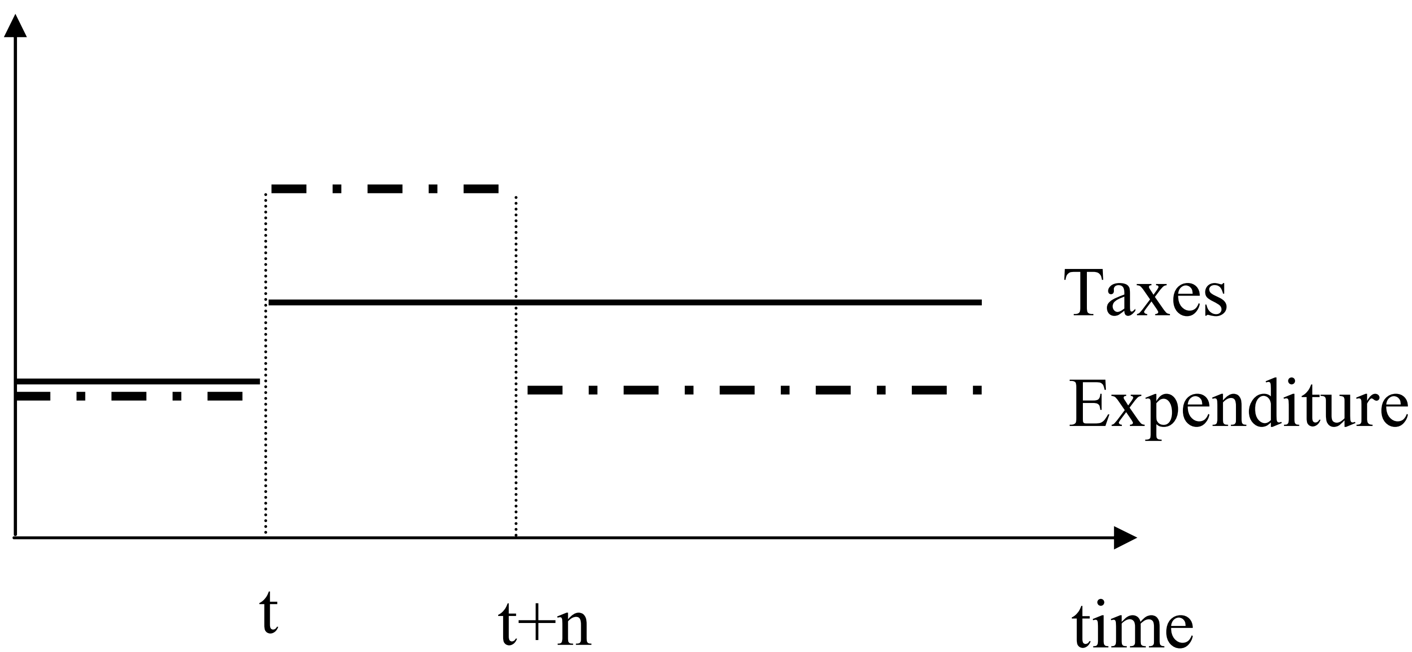
But…, if only distorting taxes available ⇒ use budget deficits and debt to minimize tax distortions.

Tax smoothing = it is optimal to keep tax rates constant along time and across states of nature.

Why? Ramsey rule applied to dated and contingent goods.

⇒ Optimal policy with (only) distortionary taxes involves budget deficit when public spending is exceptionally large and surplus when it is small.

Example: Unanticipated “war” in ‘t’, expected to last ‘n’ periods.



Empirical evidence: Barro provides evidence for US and UK

Still … tax smoothing does not answer the two initial questions: why large deficits now? Why some countries?

This theory provides:

- Positive explanation of many episodes.
- Normative economics: the optimal policy.
- Benchmark case for other analysis: the reference should not be a balanced budget in each period.

6.2.3 Optimal waiting (The optimality of Mañana)

Delay might be optimal…

Two variants:

i) Temporary shock + policy lags ⇒ doing nothing might be the best response

ii) Permanent shock + some other external conditions affecting the probability of success of the policy ⇒ wait until favorable circumstances (Orphanides 1993).

A Model of optimal waiting

Government decides whether to adopt a fiscal adjustment package.

Assumptions:

- Infinite horizon.
- Government per period (gross) utility:
  u^R , if fiscal reform is adopted.
  $u^N < u^R$, if it is not adopted.
- Random per period cost of doing fiscal adjustment: c_t
- One-time decision to do the fiscal reform: do it in t, getting net utility $u^R - c_t$ from then onwards, or wait, receiving u^N in t and drawing c_{t+1} next period.

Solution: reservation level $\hat{c}$.
Government reforms when $c_t \leq \hat{c}$.

Government reforms in the first period in which the discounted utility with reform is larger than or equal to the expected discounted utility of waiting one more period:

$$U_t(R) = \left(u^R - c_t\right) + \beta\left(u^R - c_t\right) + \beta^2\left(u^R - c_t\right) + \ldots = \frac{1}{1-\beta}\left(u^R - c_t\right)$$

$$U_t(N) = u^N + \frac{\beta}{1-\beta}\left(u^R - E[c_{t+1}]\right)$$

Hence, the condition for reform in the current period is:

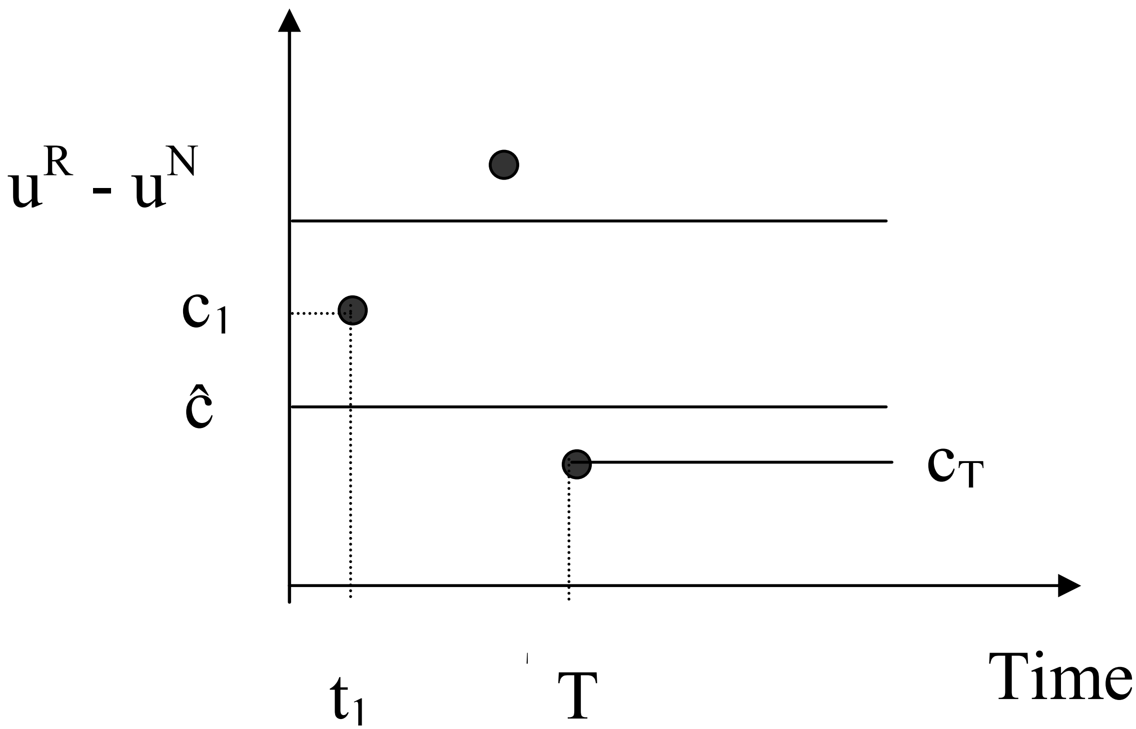
$$\frac{u^R - c_t}{1-\beta} \geq u^N + \frac{\beta}{1-\beta}\left(u^R - E[c_{t+1}]\right)$$

or:

$$c_t \leq \hat{c} = (1-\beta)\left(u^R - u^N\right) + \beta E[c_{t+1}]$$

Notice:

- Reform will take place when conditions are favorable.
- Optimal delay of beneficial reforms: there will be periods in which the reform is beneficial $c_t < u^R - u^N$, and still it is not adopted, for $c_t > \hat{c}$.



In t_1 the reform would be beneficial in the sense that the *present value* of the cost is outweighed by the *present value* of the benefits. Still, it is optimal to wait, since it is likely that in a next drawing the reform can be implemented with even larger net benefits (lower costs).

In T the reform is implemented. It is beneficial, as it was already in t_1, and now waiting would be too risky: it is not likely that future drawings would yield lower cost, while instead it is likely that costs will rise.

- No bias towards delay, in the sense of waiting though times are good.

Assessment:

- Drazen: this view "explains why delays may occur if policymakers believe bad times are transitory and conditions will improve. It doesn't however explain why there is delay in the often-observed case where the economic situation is deteriorating and expected only to get worse. This view suggests that reforms should be adopted most often in good times; in fact, we more often see the opposite, with reforms adopted in times of crisis." (Drazen and Grilli 1993)
- However, in accordance with the story of optimal waiting, we find that stabilization programs in L.A. more often took place with favorable external conditions.
- Following extension shows that stabilizations taking place in bad times is consistent with optimal waiting.

The Initiation of Exchange Rate Based Stabilization Programs in L.A.

Probit model. Dependent variable: $E1_{i,t}$

Variables	Estimate	Error	t-statistic		P-value
$LPI_{i,t-1}$	0.615	0.166	3.704	***	[.000]
$LIR_{i,t-2}$	0.551	0.269	2.045	**	[.041]
$PARELE_{i,t-2}$	0.945	0.417	2.267	**	[.023]
$SP500_t - SP500_{t-1}$	2.559	1.198	2.137	**	[.033]
$IGDPG_t$	40.874	16.777	2.436	**	[.015]
CONSTANT	3.366	4.193	0.803		[.422]
Number of observations					160
Number of positive observations					12
Pseudo R-Squared (Cragg and Uhler 1970) a/					0.388
Pseudo R-Squared (McFadden 1974) a/					0.328

Notes: Period of estimation: 1964 to 1995. Countries: Argentina, Brazil, Chile, Mexico and Uruguay. One, two and three stars indicate significance at 10, 5 and 1 per cent, respectively.

a/ See Maddala (1983). Sources: see the appendix.

Source: Echenique and Forteza (2000)

Optimal waiting with deterioration of the status quo

Assumption: u^N is decreasing, representing the deterioration of the status quo.

It can be shown that the reservation cost is then increasing.

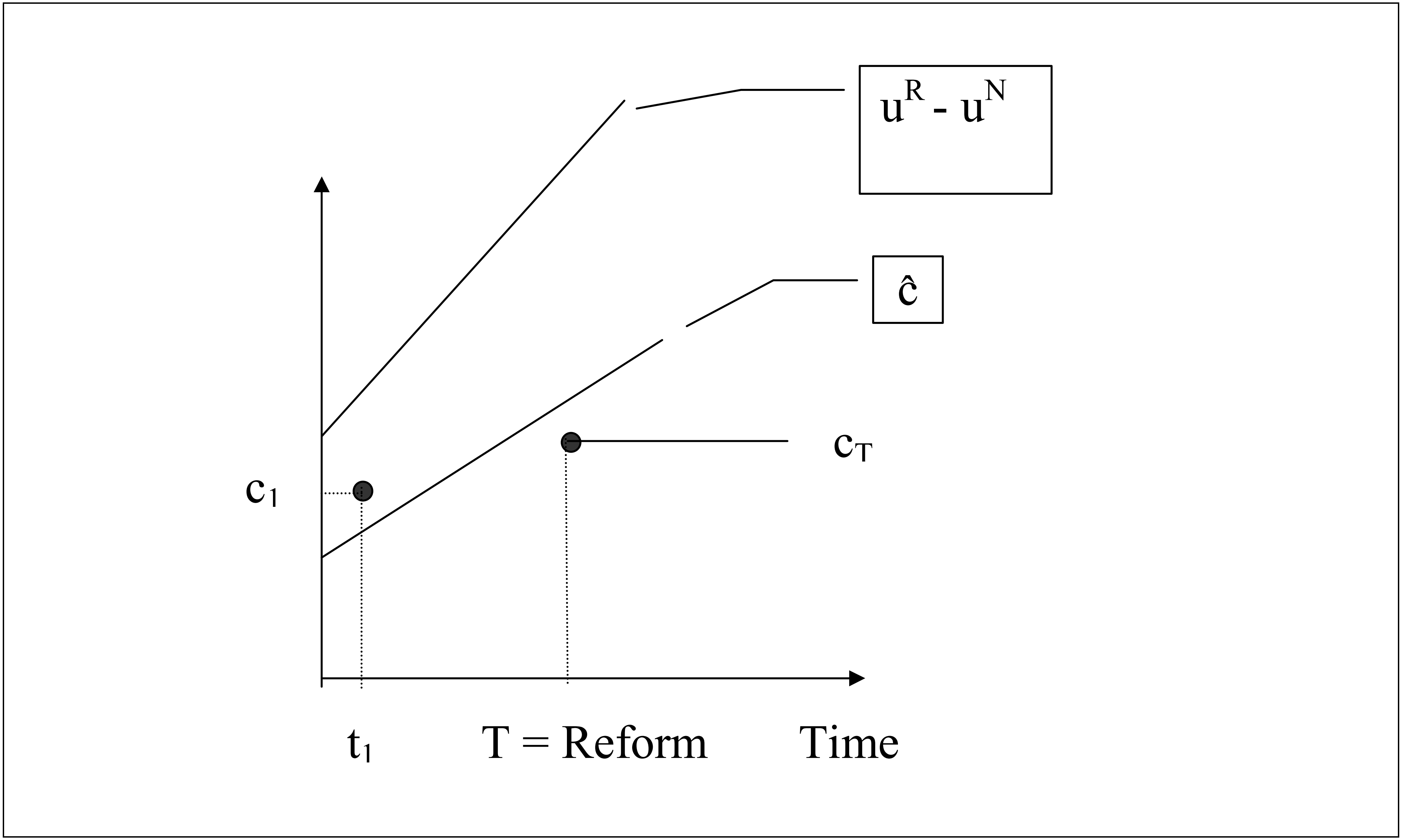


Figure 1

Notice: the reform is adopted in T even though c_T is high compared to both

a) previous periods cost,

b) gross benefit of the reform (u^R).

Hence this simple extension of Orphanides model addresses the two points raised by Drazen (1993 page 7):

a) "…there is delay in the often observed case where the economic situation is deteriorating and expected only to get worse."
b) "This view (…referring to Orphanides…) suggests that difficult reforms should be adopted most often in good times; in fact, we more often see the opposite…"

6.2.4 Fiscal illusion (public choice)

Fiscal illusion:

- Voters do not understand the intertemporal budget constraint of the government.
- Opportunistic politicians take advantage of this confusion, raising spending more than taxes.

Asymmetric stabilization policies: "politicians are willing to run deficits in recessions, but never willing to run surpluses when recessions are over".

Criticism:

- Systematic errors
- Why now? Why some countries?

6.2.5 Intergenerational redistribution

Public debt is a way of shifting the burden of taxation to the future. Selfish current generations might vote for such policies, while future generations are not here to vote against them!

Cukierman and Meltzer (1989):

- Rich altruistic individuals do not care about public debt; they can compensate their offspring leaving bequests.

- Poor individuals would like to leave negative bequests, vote for budget deficit.

$\Rightarrow$ Rich indifferent and poor favor deficit $\Rightarrow$ deficit prevails

Why should future generations honor public debt obligations?

Tabellini (1991): because *intra*generational linked to *inter*generational redistribution. (Coalition between the old and the young poor).

Criticism:

- These models do not answer the initial questions.
- Experiences in which large debts are accumulated and reduced within the lifetime of one generation.

6.2.6 Strategic role of debt

Party in office issues debt to condition following government. Several models on this idea:

a) Disagreement over *composition* of public expenditure (Alesina and Tabellini, 1990).

Current government issues debt, thus limiting future government ability to spend in something that current government does not like.

b) Disagreement over *amount* of spending (Persson and Svensson, 1989).

Conservative politician in office (Reagan) wants to reduce public spending during current and next period. How? Reduce taxes and leave a large debt. Then future government will have to spend on interest bill, which is a transfer to the taxpayers, reducing its ability to extract more resources from private sector for new programs.

c) Debt to manipulate electoral results.

Aghion and Bolton (1990): If left party more prone to default, right party issues debt, making a larger fraction of the population debt-holder, eroding left party political support.

Milesi-Ferretti (1993): If left party more inflationary, right party issues nominal debt; nominal debt-holders would never vote for the left party.

These models share with those based on redistribution the problem of explaining why future governments or generations should honor a debt that has been issued to manipulate them. Similar solutions…

Empirically testable implications:

⇒ political instability and polarization should be associated to large debts.

Alesina and Perotti (1994); and Grilli, Masciandaro and Tabellini (1991) provide favorable evidence:

- More political instability and polarization during 70s and 80s than before (OECD).
- More unstable and polarized countries more indebted.

6.2.7 Distributive conflicts and wars of attrition

Policies that are known to be unfeasible in the long run are often observed.

Puzzle: Why do governments delay stabilization?

Answers:
- Optimal waiting (section 6.2.3)
- Conflicting interests, disagreement on who bears the costs of stabilization, and attempts to shift the burden to other groups.

Two necessary conditions for delay:

1. Unequal distribution of stabilization costs ⇒ winner and loser.
2. Participants do not know others' strength when the game begins.

⇒ No one concedes from the beginning, and waits for the other to concede first.

Some stylized facts

1. “There is agreement over the need for a fiscal change, but a political stalemate over how the burden of higher taxes or expenditure cuts should be allocated”.

2. “When stabilization occurs it coincides with a political consolidation”.

3. “Successful stabilizations are usually preceded by several failed attempts; often a previous program appears similar to the successful one.”

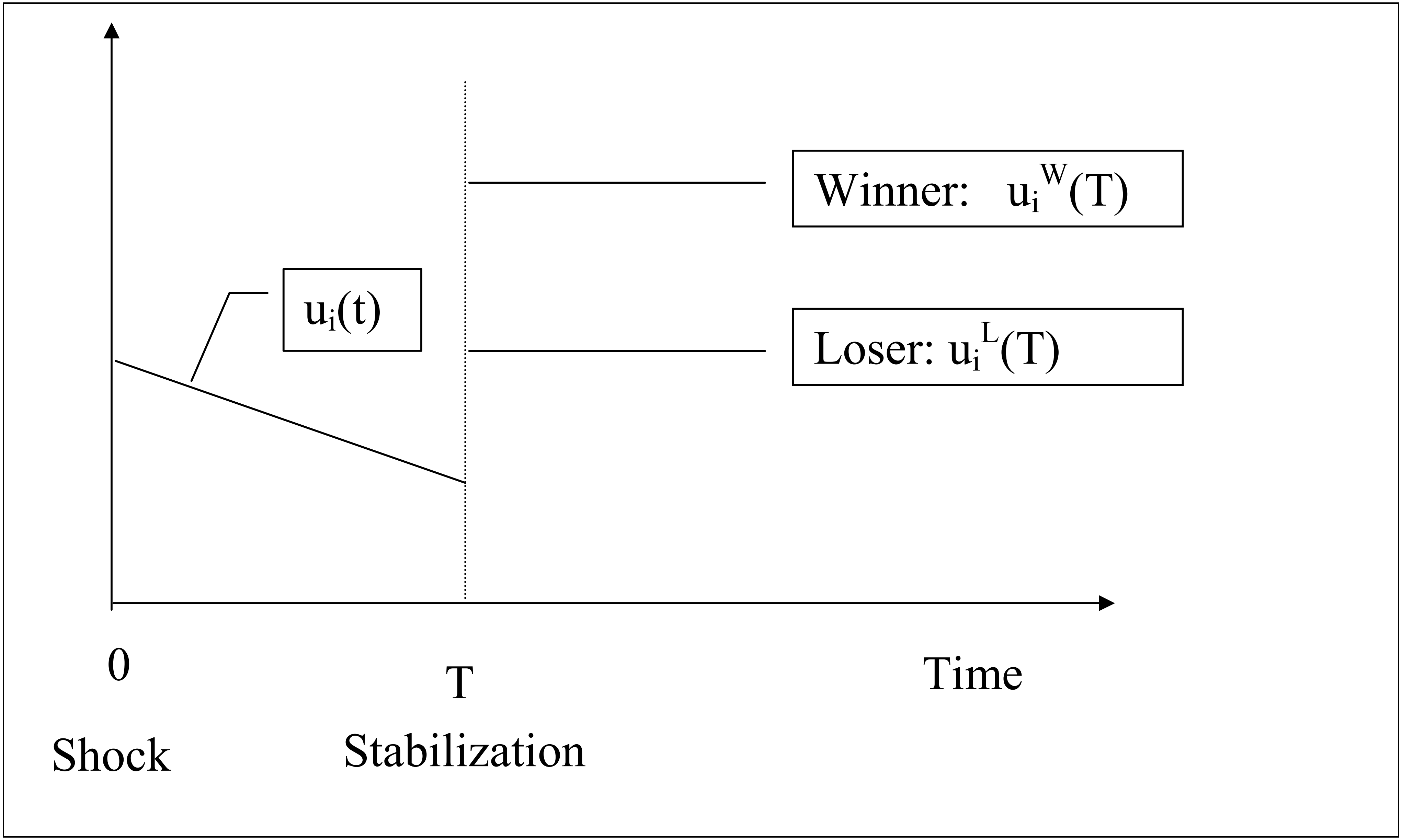
The model

$u_i(t)$ = agent i's utility during unstable times (after the shock, before stabilization)

$u_i^W(T)$ = agent i's utility after stabilization taking place in T, if 'i' is the winner, i.e. if his opponent concedes first.

$u_i^L(T)$ = agent i's utility after stabilization taking place in T, if 'i' is the loser.

At the stabilization date: $u_i^W(T) > u_i^L(T) > u_i(T)$


Winner: $u_i^W(T)$
$u_i(t)$
Loser: $u_i^L(T)$
0
Shock
T
Stabilization
Time

Lifetime utility of the winner (j=W) or the loser (j=L) from the date of stabilization onward, if the stabilization occurs at time T:

$$V^j(T) = \int_0^{\infty} u_i^j(T) e^{-rt} dt = \frac{u_i^j(T)}{r}$$

Lifetime utility of the winner (j=W) or the loser (j=L) from the date of the shock, if the stabilization occurs at time T:

$$U^j(T) = \int_0^{T} u_i(t) e^{-rt} dt + e^{-rT} V^j(T)$$

Information asymmetry: agents do not know other's cost of living in an unstable economy $u_i(t)$, hence there is uncertainty over who will concede first.

$H(T_i)$ = probability that opponent to agent i concedes in T_i or before, according to agent i.

$\Rightarrow$ Agent i's expected utility, if he decides to concede in T_i:

$$E[U(T_i)] = \underbrace{[1 - H(T_i)]}\,\underbrace{U^L(T_i)} + \int_0^{T_i} \underbrace{U^W(t)}\,\underbrace{h(t)}dt$$

$[1 - H(T_i)]$: Probability that i's *opponent* has not conceded in or before T_i

$U^L(T_i)$: i's lifetime utility, if *he* concedes in T_i

$U^W(t)$: i's lifetime utility, if *opponent* concedes in t

$h(t)$: "Probability" that *opponent* concedes in t

Agent i chooses T_i to maximize his expected utility:

$$\frac{dE[U(T_i)]}{dT_i} = -h(T_i)U^L(T_i) + [1 - H(T_i)]\frac{dU^L(T_i)}{dT_i} + U^W(T_i)h(T_i) = 0$$

$\Rightarrow$

$$\underbrace{\frac{h(T_i)}{1 - H(T_i)}\left[U^W(T_i) - U^L(T_i)\right]}_{\text{Expected benefit of continuing another instant after } T_i} = \underbrace{-\frac{dU^L(T_i)}{dT_i}}_{\text{Cost of continuing another instant after } T_i} \qquad (6)$$

Expected benefit of continuing another instant after T_i

Cost of continuing another instant after T_i

Where:

$\frac{h(T_i)}{1-H(T_i)}=$ "Probability" (density) that i's opponent concedes in T_i,

given that he did not concede before.

$U^W(T_i)-U^L(T_i)=$ i's "prize", if opponent concedes in T_i

$$-\frac{dU^L(T_i)}{dT_i} = \left[\underbrace{u^L(T_i) - u_i(T_i)} - \underbrace{\frac{dV^L(T_i)}{dT_i}} \right] e^{-rT_i}$$

Reduced utility after stabilization

Loss associated to continuing with unstable economy

How do agents determine $H(T_i)$?

Different types of agents:

θ = Idiosyncratic cost of living in unstable economy

$\theta \in [\underline{\theta}, \overline{\theta}]$

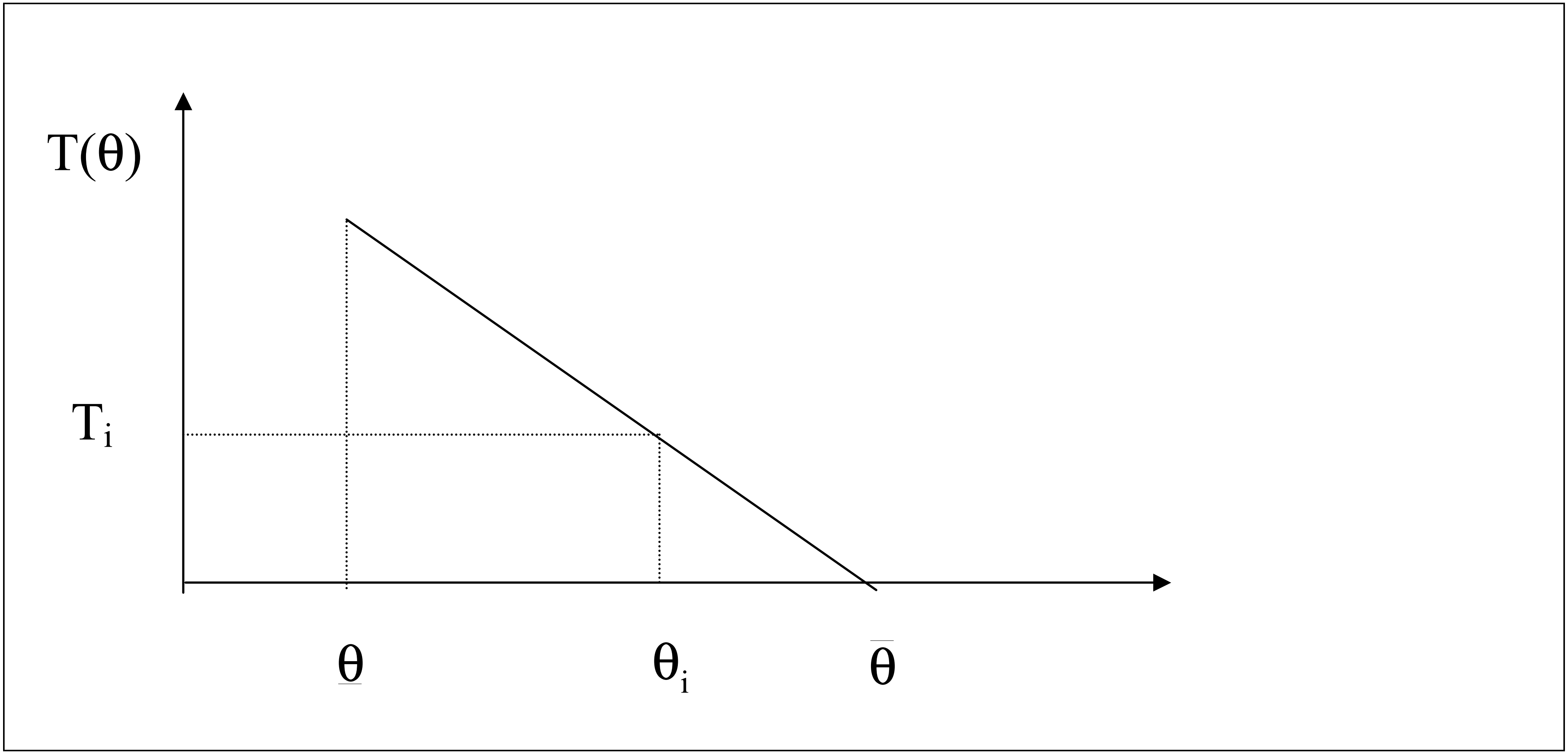
Information: Agents do not know the opponent's type, they know the cumulative distribution function: $F(\theta)$

Expectations: suppose each agent expects his opponent's concession time to be a decreasing function of his opponent's cost of fighting: $T(\theta)$, $T'(\theta)<0$

$\Rightarrow \; H(T_i) = 1 - F(\theta_i)$,

Meaning: Probability that opponent concedes in or before T_i = Probability that opponent be type θ_i or larger

$\Rightarrow \; T_i = T(\theta_i)$



$$\Rightarrow \quad h[T(\theta)]T'(\theta) = -f(\theta) \qquad \text{and} \qquad 1 - H(T_i) = F(\theta)$$

Hence, the FOC (6) can be rewritten as:

$$\frac{-f(\theta)}{F(\theta)T'(\theta)}\underbrace{\left[U^{W}(T_i)-U^{L}(T_i)\right]}_{=v(T_i)\ =\ \text{prize of continuing fighting}}=\underbrace{-\frac{dU^{L}(T_i)}{dT_i}}_{=c(T_i)\ =\ \text{cost of continuing fighting}}$$

= $c(T_i)$ = cost of continuing fighting

= $v(T_i)$ = prize of continuing fighting

$$\Rightarrow \qquad T'(\theta) = -\frac{f(\theta)}{F(\theta)} \frac{v(T_i)}{c(T_i)} < 0$$

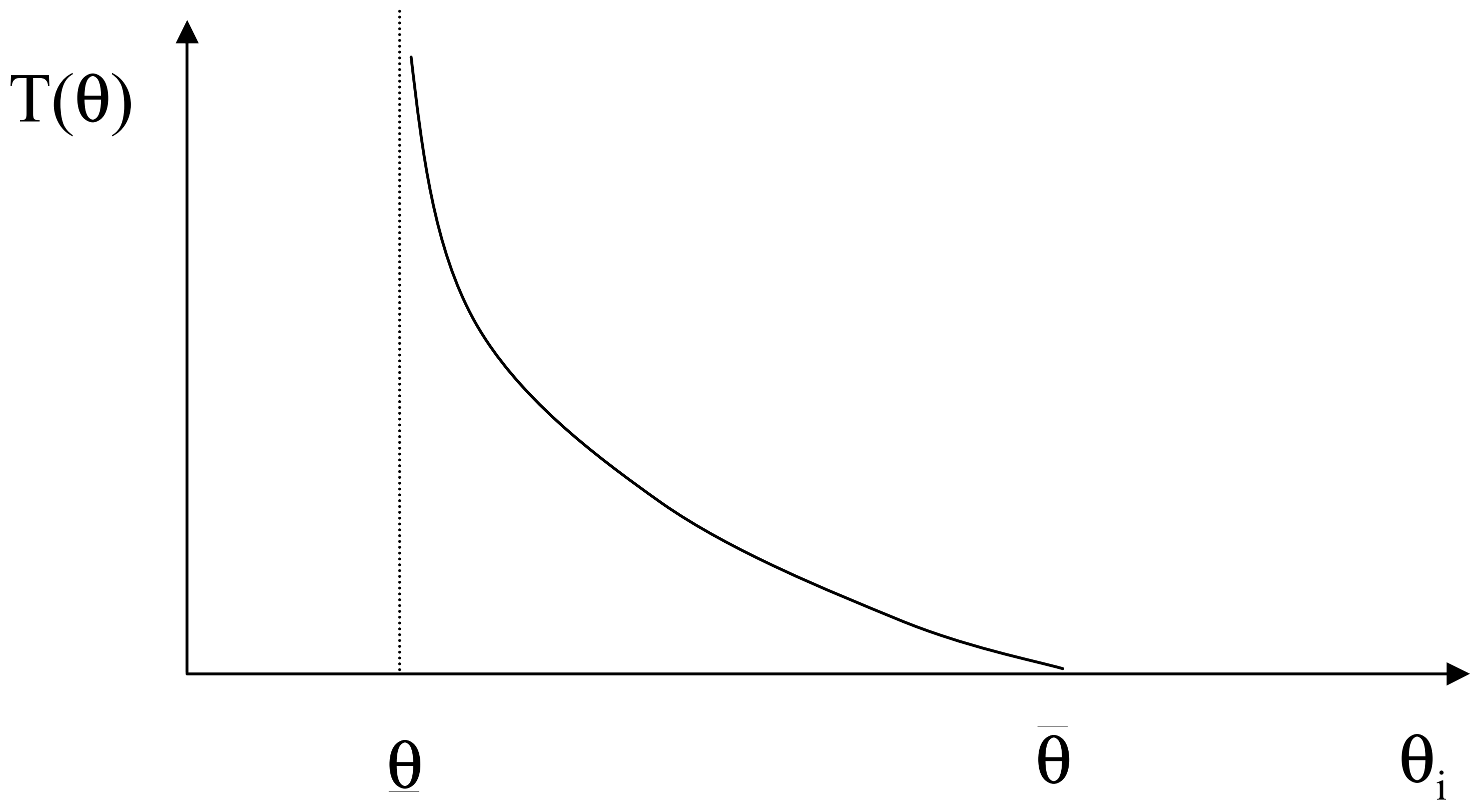
(7)

Optimal concession time for the most costly type will be zero:

$$T(\bar{\theta}) = 0$$

(8)

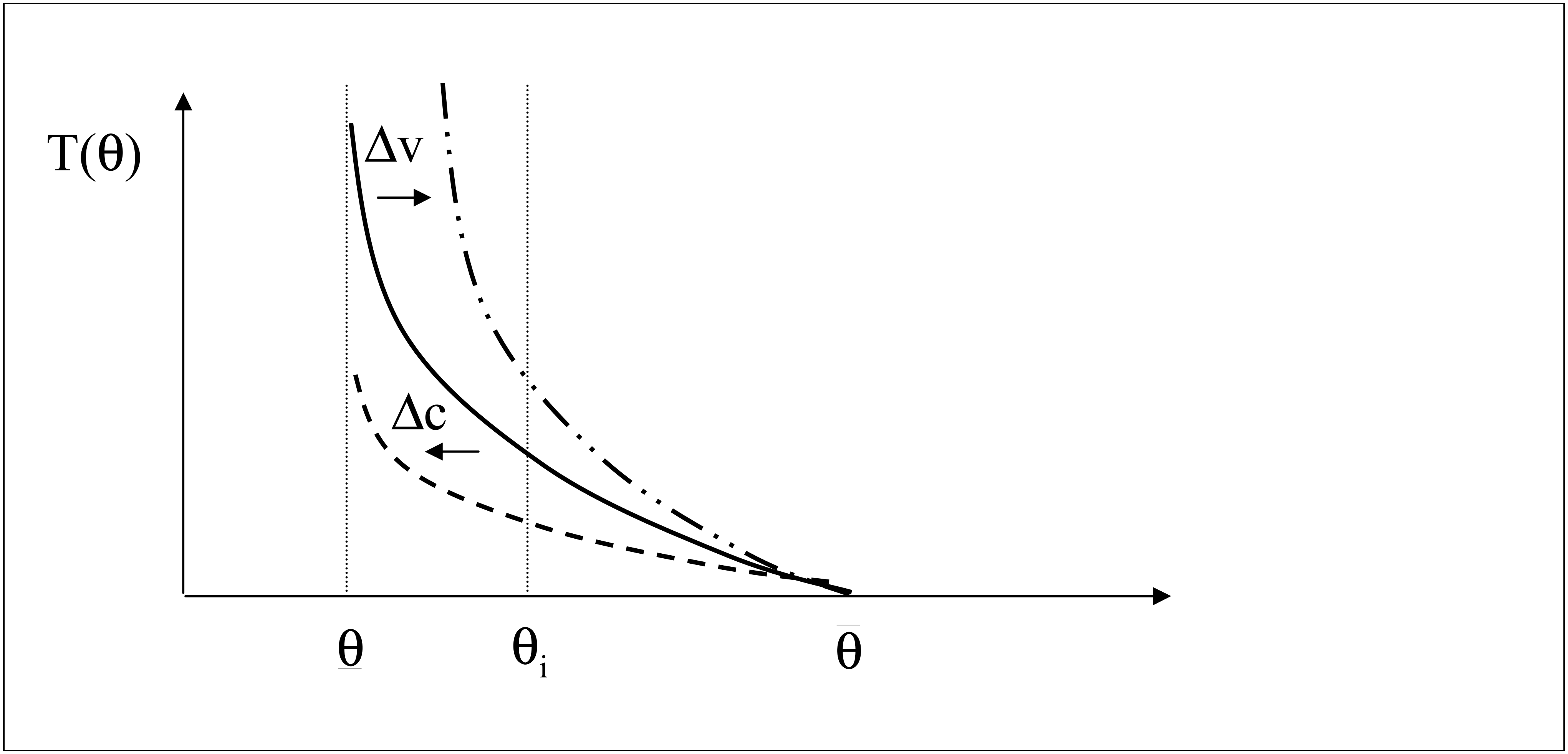
Conditions (7) and (8) fully define T(θ):



Using the model…

a) Costs of distortions: reducing losses associated to living in an unstable economy delays stabilization (indexation,…)

b) Polarization: unequal distribution of costs of stabilization, i.e. large (U^W- U^L), implies long delay. Much at stake, nobody concedes.



(More results in specific applications: see problem set…).

Empirical assessment

- Why large debts in OECD countries in 70s and 80s? Oil crisis. (Tax smoothing model works fine before the 70s)

- Why some countries? “Weak coalition governments have typically postponed fiscal adjustment…” Coalitions more prone to wars of attrition…

El caso de los programas de ajuste fiscal

(Casella y Eichengreen 1996: Can foreign aid accelerate stabilization?)

- La economía sufre inflación
- Dos grupos enfrentados en guerra de desgaste. Poder de veto sobre el paquete de ajuste.

- Utilidad asociada a vivir en la economía "inestable":

$$u_i(t) = -\left(\theta_i + \frac{1}{2}\right)\tau_t \quad ; \quad \theta_i \in \left[\underline{\theta}, \overline{\theta}\right]$$

donde τ_t son los impuestos distorsionantes recaudados por el gobierno.

- El gasto del gobierno es: $f_t = rb_t + g_0$.
- Una proporción μ del gasto público se financia con impuestos y el resto con acumulación de deuda:

$$\tau_t = \mu f_t \quad ; \quad \dot{b}_t = (1-\mu) f_t$$

- En el momento en que la estabilización tiene lugar (T), el gobierno empieza a financiar el gasto enteramente con un impuesto no distorsionante, dejando de emitir deuda:

$$\dot{b}_t = 0 \quad t \geq T$$

- “Perdedor” de la guerra de desgaste carga con proporción $\alpha > 1/2$ del financiamiento del gasto público a partir de T y obtiene utilidad instantánea: $u^L(T) = -\alpha f_T$.
- “Ganador” financia una proporción menor y obtiene utilidad: $u^W(T) = -(1-\alpha) f_T$

Estos supuestos nos permiten determinar las funciones de “premio” (v(T)) y de “costo” (c(T)) de seguir en la guerra de desgaste en este caso.

Determinaremos primero las funciones de utilidad: $u_i(t), u^L(T), u^W(T)$.

$$u_i(t) = -(\theta_i + 1/2)\tau_t = -(\theta_i + 1/2)\mu f_t$$
$$u^L(T) = -\alpha f_T$$
$$u^W(T) = -(1-\alpha) f_T$$

Las tres dependen del gasto, que a su vez depende de la deuda:

$$f_t = r b_t + g_0$$

La dinámica de la deuda está dada por la siguiente ecuación:

$$\dot{b}_t = (1-\mu) r b_t + (1-\mu) g_0$$

Solución:

a) Solución de la ecuación homogénea:

$$b_t = A\exp[(1-\mu)rb_t]$$

b) Solución particular de la no homogénea:

$$b = -g_0/r$$

c) Solución general:

$$b_t = A\exp[(1-\mu)rt] - g_0/r = (b_0 + g_o/r)\exp[(1-\mu)rt] - g_0/r$$

El gasto público resulta:

$$f_t = (rb_0 + g_0)\exp[(1-\mu)rt]$$

Finalmente, las utilidades instantáneas son:

$$u_i(t) = -(\theta_i + 1/2)\mu(rb_0 + g_0)\exp[(1-\mu)rt]$$
$$u^L(T) = -\alpha(rb_0 + g_0)\exp[(1-\mu)rT]$$
$$u^W(T) = -(1-\alpha)(rb_0 + g_0)\exp[(1-\mu)rT]$$

y, por lo tanto, el "premio" de seguir en la guerra es:

$$v_i(T_i) = \left(u^W(T_i) - u^L(T_i)\right)/r = (2\alpha - 1)(b/r)\exp[(1-\mu)rT_i]$$

y el "costo" de seguir en la guerra es:

$$c_i(T_i) = u^L(T_i) - u_i(T_i) - \frac{dV^L}{dT_i}(T_i) = \left(\theta_i + \frac{1}{2} - \alpha\right)\mu b \exp[(1-\mu)rT_i]$$

Entonces, en el problema de ajuste fiscal propuesto por Casella y Eichengreen la función T'() resulta:

$$T'(\theta_i) = -\frac{f(\theta_i)}{F(\theta_i)} \frac{2\alpha - 1}{(\theta_i + 1/2 - \alpha)\mu r}$$

Conclusiones:

- Mayor polarización (mayor α) aumenta la duración de la guerra, porque aumenta el "premio" y reduce el "costo" (de oportunidad) de la guerra de desgaste.

- Mayor tasa de interés (mayor *r*) reduce la duración de la guerra. Dos efectos:
    - o Aumenta la deuda, aumentando el "costo" y el "premio" de la guerra en igual proporción.
    - o + Reduce el valor presente del "premio", dado un stock de deuda.
- Reducción de la proporción del gasto que se financia con impuestos distorsionantes (reducción de μ) aumenta la duración de la guerra. Dos efectos:
    - o Aumenta la deuda, aumentando el "costo" y el "premio" de la guerra en igual proporción.
    - o Reduce el "costo" de la guerra, para un nivel de deuda dado.
- El efecto de la ayuda externa: supongamos que, antes del ajuste fiscal, nos condonan la mitad la deuda pública (no anticipado). ¿Efectos sobre el tiempo en que tiene lugar el ajuste? Nulos!