The Inflation Rate and Financial Premium

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Introduction

- Conventional wisdom: official exchange rate $\uparrow \rightarrow$ financial premium $\downarrow$.
- This paper attempts to investigate whether a trade-off between the inflation rate and financial premium does exist.

Introduction (cont.)

- Relevant literature:time-consistency problem in macroeconomics was first noted by Kydland and Prescott (1977).

- Barro (1983), Grossman and Huyck (1986) employed it to the decision about inflation tax. Uribe (1997), Leitemo et al. (2005) found that a credible exchange rate policy could reduce costs of inflation policies

Contribution of this paper:

- 1. could be the first model to study the dynamics of inflation and financial premium with time-consisitency.
  2.provides a new mechanism through stimulating exports.
  3. adds a dynamic commitment formulation.
  4.quantifies the effect of time preference.

Theoretical Model

- timing of setting up for two rates:
  t: E_t
  t+1:X_{t+1}, which in turn determines the spread, X_{t+1}-E_t, say, ξ_{t+1}.
  The working of parallel exchange market :

$$\xi = \xi^* - (E_{t+1} - E^e)$$

$$= \xi^* - \gamma_{t+1} \qquad (1)$$

Theoretical Model (cont.)

- Two situations thus can be found:
- If $E^e = E_{t+1}$ then $\gamma_{t+1}=0$
- Otherwise $\gamma_{t+1}\neq 0$
-

$$0 \le t \le t^* : E^e + \xi^*$$

$$t > t^* : E^e + \xi^* + \gamma$$

Theoretical Model (cont.)

- $$\dot{X} = \dot{E} = \gamma \qquad (2)$$

- $$\cos t = \gamma^2 - (\gamma - \gamma^e) \qquad (3)$$

Theoretical Model (cont.)

$$\int_0^T \{\gamma^2 - [\gamma - (X - 1 - \xi^*)]\} \exp(-\delta t) dt \qquad (4)$$

- $$\begin{cases} \dot{X} = \gamma \\ X(0) = X(T) = 1 + \xi^* \\ \gamma(t) \geq 0 \end{cases} \qquad (5)$$

Behavior of γ

- $\gamma(t)=0 \quad 0\le t<t^*$

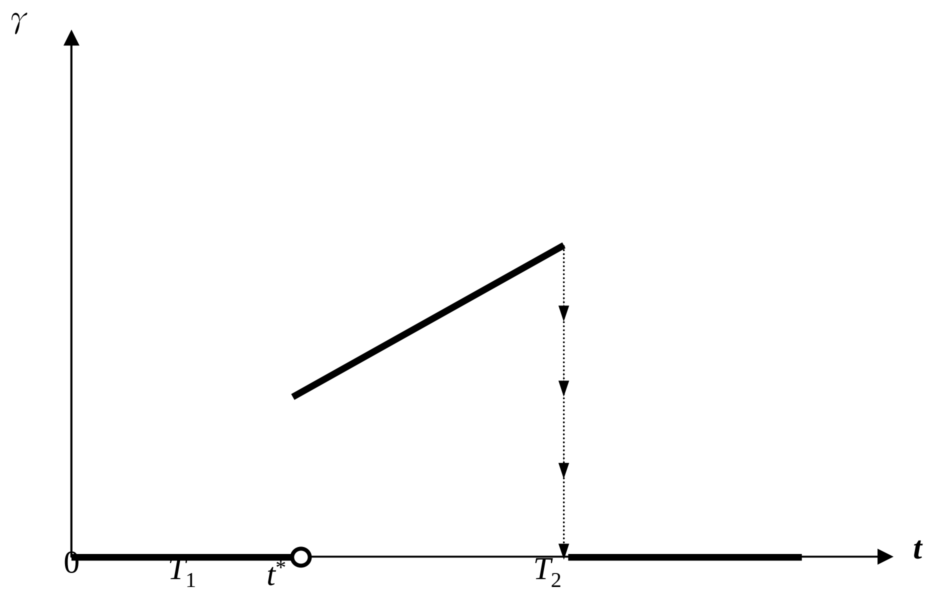
- $\gamma(t)=\frac{1}{2}(1-\frac{1}{\delta})+\frac{1}{2}(\frac{1}{\delta}-1)\exp[(\delta(t-t^*))] \quad t^*\le t\le T$ (6)

- $X(t)=1+\xi^* \qquad 0\le t<t^*$

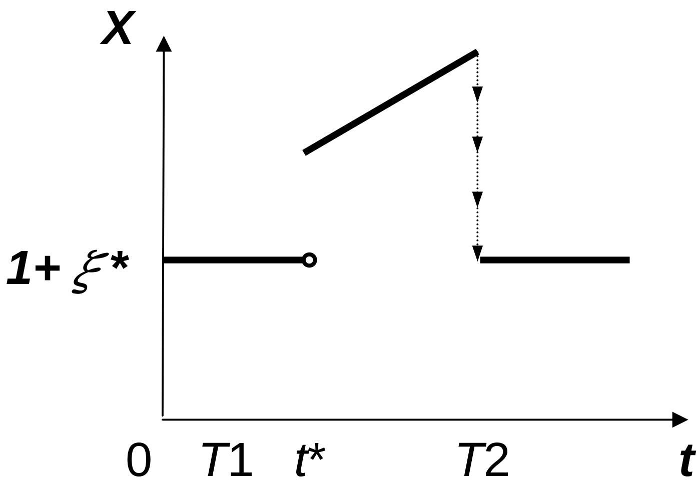
$X(t)=\frac{1}{2}\{(t-\frac{1}{\delta}t)+(\frac{1}{\delta}-1)\frac{1}{\delta}\exp[(\delta(t-t^*))] \quad t^*\le t\le T$ (7)

$$t^* = T-\frac{1}{\delta}\ln\frac{2\delta^2}{1-\delta}(1+\xi^*-\frac{T}{2}+\frac{T}{2\delta}) \quad (8)$$

■ Time-inconsistency of monetary policy(a)



Time-inconsistency of monetary policy(b)



Proposition

- ***Proposition 1**: Given a finite horizon T, for , government keeps to its promise; γ_t =0 X=1+ ξ*. On the other hand, for $t_* \leqq t \leqq T$, time-inconsistency occurs, then γt>0. Should the actual rate of commercial depreciation not equal zero, both the expected commercial depreciation rate and the financial exchange rate adjust simultaneously at the same rate. The government bears the cost of inflation but will not benefit from remedying unemployment.*

Table 1

Table 1 Dependence of t^* on δ in commercial depreciation and inflation

T=100	δ									
	0.05	0.10	0.15	0.20	0.25	……	0.80	0.85	0.90	0.95	1.00
t^*	68	77	82	85	88	……	95	95	95	95	100
γ_{t*}	0.487	0.473	0.459	0.443	0.426	……	0.153	0.118	0.081	0.042	0
X_{t*}	1.737	1.723	1.709	1.693	1.676	……	1.403	1.368	1.331	1.292	1.25
t^*+1	69	78	83	86	89	……	96	96	96	96	100
γ_{t*+1}	0.999	0.996	0.991	0.984	0.973	……	0.494	0.395	0.281	0.15	0
X_{t*+1}	2.249	2.246	2.241	2.234	2.223	……	1.744	1.645	1.531	1.4	1.25

The credibility problem

- $temptation = -[\cos t(\gamma^{e} \neq \gamma, \gamma^{e} = 0) - \cos t(\gamma^{e} = \gamma = 0)]$

- $temptation = -(\gamma_{t^*}^{2} - \gamma_{t^*})$ (10)

- temptation: an increase in utility, resulting from cheating rather than playing honestly.

The temptation is 0.244524.

The enforcement, is $7.70092278 \times 10^{-10}$ An optimal commercial exchange rate policy (γ=0) is not a time-consistent decision.

Credibility problem (cont.)

$$enforcement = \int_{t^*+1}^{T} (\gamma_{t^*+1}^{2}) \exp(-\delta t) dt$$

$$= -\frac{1}{\delta} \gamma_{t^*+1}^{2} \{\exp(-\delta T) - \exp[-\delta(t^* + 1)]\} \qquad (11)$$

Optimal policy and the best enforceable rule

- Search the optimal depreciation rate

$$temptation = -[\cos t(\gamma_{t^*} \neq \gamma^a) - \cos t(\gamma_{t^*} = \gamma^a)]$$

$$= -[(\gamma_{t^*})^2 - (\gamma_{t^*} - \gamma^a) - (\gamma^a)^2] \quad (12)$$

Necessary condition for minimizing temptation is

$$\frac{dT}{d\gamma^a} = 2\gamma^a - 1 = 0 \quad (13)$$

Sufficient condition for minimizing temptation is

$$\frac{d^2T}{d(\gamma^a)^2} = 2 > 0 \quad (14)$$

The best enforceable rule

- Minimising

$$enforcement = \int_{t^*+1}^{T} (\gamma_{t^*+1}^2) \exp(-\delta t) dt - \int_{t^*+1}^{T} [(\gamma^a)^2] \exp(-\delta t) dt$$

- subject to

$$\int_{t^*+1}^{T} (\gamma_{t^*+1}^2) \exp(-\delta t) dt - \int_{t^*+1}^{T} [(\gamma^a)^2] \exp(-\delta t) dt$$

$$\geq [(\gamma^a)^2 - \gamma^a - (\gamma_{t^*})^2 + \gamma_{t^*}] \qquad (16)$$

- $$\gamma^a = \frac{\lambda}{2\{\lambda + (\frac{1}{\delta} - \frac{\lambda}{\delta})[\exp(-\delta T) - \exp[-\delta(t^* + 1)]]\}} \qquad (17)$$

Second derivative test of enforcement curve

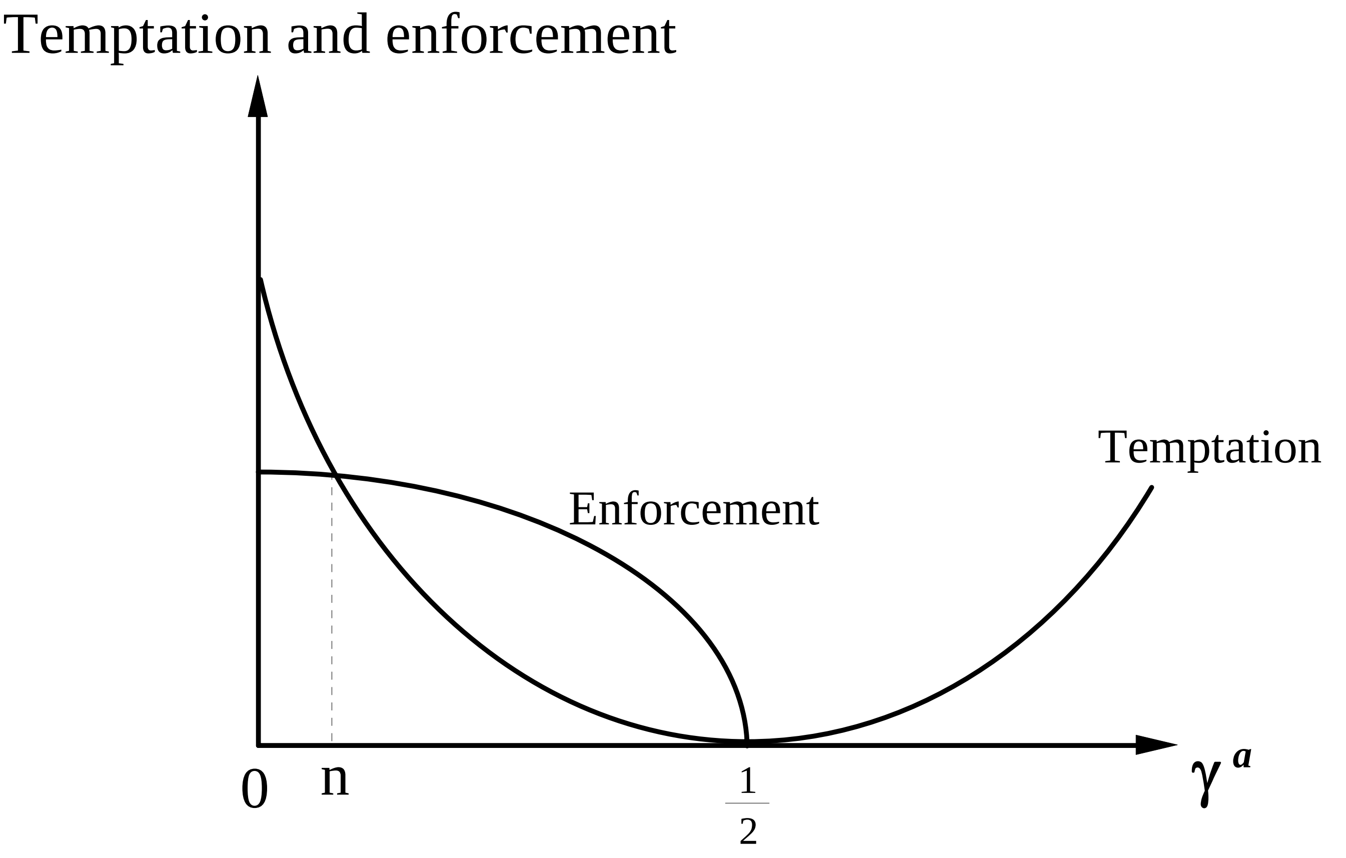
- Second derivative

$$\frac{d^2 N(enforcement)}{d(\gamma^a)^2} = \frac{1}{\delta}\{\exp(-\delta T) - \exp[-\delta(t^* + 1)]\} < 0$$

$$n = \frac{\lambda}{2\{\lambda + (\frac{1}{\delta} - \frac{\lambda}{\delta})[\exp(-\delta T) - \exp[-\delta(t^* + 1)]]\}}$$

- λ >1, n< $\gamma^a = 1/2$
- λ <1, n> $\gamma^a = 1/2$
- λ =1, n= $\gamma^a = 1/2$

Temptation and Enforcement



Conclusions

- Providing the clarification of time consisitency of monetary policy for exchange rate management.
- Focusing on the credibility issues rather than on characterising the optimal policy.
- A trade-off between the inflation rate and financial premium is extremely fragile.
- The less patient, the more stability of domestic price and financial premium.