Fiscal Policy versus Monetary Policy in an R&D Growth Model with Money in Production

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Agenda

- Motivation
- Overview
- Key findings and contributions

Motivation

- Source of tax revenue
- Distortionary tax instruments: τ_k and inflation tax
- Countries $\theta = -0.825\%$ $\tau_k = 65\%$ in Austria, $\theta = 0.075\%$ $\tau_k = 34\%$ in United Kingdom,
- Countries $\theta = 19.75\%$ $\tau_k = 23\%$ in China, and $\theta = 25.05\%$ $\tau_k = 15\%$ in Cambodia.
- Optimal tax instruments?

Motivation

- Palivos and Yip (1995) ———$\tau_k <$ inflation tax
- Ho, Zeng and Zhang (2007)———inflation tax $<\tau_c$
- Cooley and Hansen (1991)——— $\tau_k/\tau_l < \tau_c$ and inflation tax

Motivation

- Why money in production
- Empirical support: Sinai and Stokes (1972) (Cobb-Douglas production function, $\varepsilon = 0.17$) Khan and Kouri (1975)
- Fischer (1974): facilitate production, economize the use of other inputs, and spares the cost of running short of cash
- Shaw et al. (2005): $x_i = k_i^{\gamma} m_i^{1-\gamma}$
- Why R&D models
- Chu and Lai (2013)–1% increase in inflation would decrease R&D share of GDP by 0.026%
- Why monetary policy versus fiscal policy
- Monetary policy is an important determinant of the fiscal multiplier Canova and Pappa (2011)

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Overview

- Fiscal policy & Monetary policy (τ_c, τ_k, θ) in variety expansion R&D model with money-in-production.
- Growth and welfare effects
- Optimal combination of different policies

Overview

Recall of important equations

- $x_i = k_i^{\gamma} m_i^{1-\gamma}$
- $T,\ \tau_k,\ \theta = \frac{dot\{\bar{M}\}}{\bar{M}}$
- $G = xY$

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Key findings and contributions

- In the presence of lump-sum tax: τ_k and θ has a negative growth and innovation effect
- $i \uparrow$ overall negative effect on growth and R&D ——Chu and Cozzi (2012)

Key findings and contributions

- $\tau_k^* = 1 - \frac{1-x}{\alpha(\alpha\gamma+1-\alpha)}$, θ approaches to $-\rho$ (i approaches to 0)
- Welfare goes up as inflation decreases and is maximized as the nominal interest rate approaches zero, Chu and Lai (2013)
- U.S., 0.25%, Japan 0.1%, since Dec 2008

Key findings and contributions

- In the absence of lump-sum tax
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Table 1:Costs under equalized government expenditure share.

x=0.05	τ_k growth	θ growth	τ_k welfare	θ welfare
$\gamma = 0.8$	-0.0083	-0.00765	-2.8893	-5.2464
$\gamma = 0.5$	-0.0127	-0.0087	-4.468	-6.1007
$\gamma = 0.2$	-0.0672	-0.0287	-25.3611	-15.9932

Key findings and contributions

- γ affects optimal capital income tax and money growth rate
- $x_i = k_i^{\gamma} m_i^{1-\gamma}$
- $\frac{\alpha^2(1-\gamma)\theta}{\sigma g+\rho+\theta-g} = x - \alpha^2\gamma\tau_k$

Key findings and contributions

- We contribute to this literature by incorporating MIP into a standard R&D-driven growth framework with horizontal innovation
- The ranking of inflation tax and capital income tax may differs in relation to its aim and how developed is the financial system

Key findings and contributions

Policy discussion

- Milton Friedman (1969) "different productive activities may differ in cash-intensity, just as they differ in labor - or land - intensity"
- Sinai and Stokes (1972) $\gamma = 0.775$
- higher γ: capital income tax low γ: inflation tax
- Further estimate money intensity for country-specific studies

- Thank you!