

# Social Status, Inflation, and Endogenous Growth in a Cash-in-Advance Economy: A Reconsideration

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- “Social Status” (“Spirit of Capitalism”) → Capital Stock (Wealth/Human Capital) in the Utility Function;
- *Cassel (1924), Smith (1937), Weber (1958), Keynes (1971), Marx (1977), Kurz (1968), Cole et al., (1992), Zou (1994), Bakshi and Chen (1996), Corneo and Jeanne (1997) and Futagami and Shibata (1998)* → individuals care about their social status in a market economy → pursue capital accumulation to advertise their wealth to achieve social position and power;
- (Initial works by) *Chang et al., (2000) and Gong and Zou (2001)* in one-sector economies (Solow-type or AK-type) with cash-in-advance (CIA) constraint [*Zou (1998): MIU*] → increase in money growth rate leads to higher steady-state capital stock (Tobin, 1965) or steady-state growth rate.

# Intuition and Problem

- Intuitively,  $\uparrow$  Money Growth Rate  $\rightarrow \uparrow$  Inflation  $\rightarrow \uparrow$  Opportunity Cost of Consumption (CIA constraint)  $\rightarrow$  substitute capital goods for consumption goods (given social status)  $\rightarrow \uparrow$  capital accumulation;
- In endogenous growth models:  $\uparrow$  money growth rate  $\rightarrow$  inflation  $\rightarrow \downarrow$  real money balances  $\rightarrow \downarrow$  consumption, substitute towards physical capital as real rate of return on physical capital is constant  $\rightarrow$  Capital accumulation promotes higher social status  $\rightarrow$  further incentive to accumulate capital  $\rightarrow$  CRS with respect to capital  $\rightarrow$  growth rate  $\uparrow$  due stimulated capital accumulation.
- Problem: Inconsistent with the Negative Growth-Inflation Empirical relationship (and even the idea of Threshold Inflation).

- One-Sector Economy: Following Stockman (1981), CIA constraint applies both to consumption and investment  $\rightarrow$  money growth rate leads to lower steady-state capital stock or growth rate (Gong and Zou, 2001; Chang and Tsai, 2003; Chen and Guo 2009);
- Result contingent on the weights on social status in the Utility function and Investment in the CIA constraint;
- Two-sector Economy: Social status represented by capital, and CIA constraint applies to both consumption and investment with a generalized human capital formation process (i.e., includes physical capital, besides human capital)  $\rightarrow$  money growth rate negatively impacts growth rate (Chen, 2011);
- *If Lucas (1988)-type process of human capital  $\Rightarrow$  Money is superneutral (CIA constraint on consumption only and on both consumption and investment).*

- Reconsider the One-Sector (AK) Endogenous Growth Model with “Social Status” or “Spirit of Capitalism” of *Chen et al.*, (2000) and introduce a *Competitive* Banking Sector subjected to a Mandatory Cash-Reserve Requirement (besides Consumers, Firms and Government), and revisit the Growth-Inflation relationship;
- The banks pool consumer’s deposits and loans them to firm for investment (after meeting the reserve requirement);
- **What does the reserve requirement do?** *Zero Profit Condition* → a wedge between the deposit rate and the loan rate → Real loan rate = constant marginal product of capital, but the real deposit rate negatively affected by inflation: ***Real Deposit Rate = [(1-Reserve Requirement) × MP of Capital - Reserve Requirement × Inflation]***;
- As long as reserve requirement exceeds a *critical* value, growth and inflation are negatively related.

Consumers Maximize:

$$\int_0^{\infty} [\log(c) + \beta \log(d)] e^{(-\rho t)} dt$$

subject to:

$$\dot{m}_1 = r_d d + \tau - c - \pi m_1 - \dot{d}$$

$$m_1 \geq c$$

Note  $\beta \geq 0 \rightarrow$  degree (desire) for the spirit of capitalism.

Banks Maximize:

$$(1 + i_l)l + m_2 - (1 + i_d)d$$

subject to:

$$m_2 + l \leq d$$

$$m_2 \geq \varepsilon d$$

Firms Maximize:

$$\int_0^{\infty} [Py + Pi - (i_l - \frac{\dot{P}}{P})PI - P\dot{k}]e^{(-rt)} dt$$

subject to:

$$P\dot{k} \leq Pi$$

Assume that  $y = Ak$  and depreciation rate is zero. Chari et al., (1995) shows that with binding financing constraint, the firm's problem reduces to a static one  $\rightarrow r$  becomes irrelevant.



# Model: Government

Following Stockman (1981), Orphanides and Solow (1990), Marquis and Refett (1991), Wang and Yip (1992) and Chang *et al.*, (2000) → Government keeps a constant money growth rate  $\mu$  and distributes seigniorage to the consumers as lump-sum transfer payment, such that:

$$\tau = \mu m$$

where  $m = m_1 + m_2$ .

# Model: Steady-State Growth

$$g^* = A - \frac{\rho + \varepsilon\mu}{(1 - \varepsilon)[1 + \beta(1 + \mu + \rho)]}$$

- If  $\beta=0; \varepsilon=0 \rightarrow g^* = (A - \rho) \rightarrow \frac{dg^*}{d\mu} = 0$ ;
- If  $\beta \neq 0; \varepsilon=0; \rightarrow g^* = A - \frac{\rho}{[1+\beta(1+\mu+\rho)]} \rightarrow \frac{dg^*}{d\mu} > 0$ ;
- If  $\beta \neq 0; \varepsilon \neq 0 \rightarrow \frac{dg^*}{d\mu} \begin{matrix} \leq \\ \geq \end{matrix} 0$ , If  $\varepsilon \begin{matrix} \geq \\ < \end{matrix} \frac{\beta\rho}{[1+\beta(1+\rho)]} \equiv \varepsilon^*$ .

Numerically,  $\rho = 0.03$  (Chen and Guo, 2010; Chen, 2011);  $\beta = 0.8, 1.0, 1.2$  (Chen, 2011):  $\varepsilon^* = 0.0132, 0.0148, 0.0161$ .

# Conclusion

- Reconsider the One-Sector (AK) Endogenous Growth Model with “Social Status” or “Spirit of Capitalism” of Chen *et al.*, (2000) and introduce a *Competitive Banking Sector subjected to a Mandatory Cash-Reserve Requirement*;
- Revisit the Growth-Inflation (money growth rate) relationship;
- As long as the reserve requirement exceeds a (small) “critical value”, the relationship between the growth rate of the economy and the money growth rate is negative;
- Empirical Consistency using a simpler approach in the “Benchmark” endogenous growth model of social status with a CIA constraint.