‘Love of Wealth’ and Economic Growth

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Motivation

- The title 'Love of Wealth' relates to Plutarch's (45-125 AD) essay

  De Cupiditate Divitiarum (gr. Περὶ φιλοπλουτίας)

  in his *Moralia*.
- Plutarch relates to Aristotele who distinguishes
  - natural wealth: necessary for life, useful for society
  - non-natural wealth: money and other things in potentially unlimited supply

Motivation

- ’Love of Wealth’ is a perennial phenomenon.
- People derive utility from the mere possession of wealth, not simply its expenditure.
- Important for investment behaviour and economic growth.
- Important implications for welfare and efficiency.

Relation to Literature

- Wealth in utility ('Love of Wealth')
  - E.g. Weber (1930), Pigou (1941), and Markowitz (1952).
- Love of Wealth and optimal growth
  - See Kurz (1968) for a general analysis.
- Love of Wealth and "The Spirit of Capitalism"
  - E.g. Zou (1994), Bakshi and Chen (1996), and Carroll (2000)
- Love of Wealth, Overaccumulation and Dynamic Efficiency
  - E.g. Zou (1994), Corneo and Jeanne (1997), Corneo and Jeanne (2001)

Relation to Literature

- Recent applications of the idea
  - Kaplow (2009), Kumhof and Rancière (2010)

This Paper

- Use simple model to analyze the effect of preferences for capital on accumulation and intertemporal welfare.
- Framework: Ramsey (1928)-Cass (1965)-Koopmans (1965).
- Concentrate on steady state *and* transitional analysis.
- Compare planner solution and decentralized outcome.
- Compare standard (textbook) model with one where capital directly yields welfare.

The Model

- Social planner economy.
- The planner is benevolent and cares about the representative individual.
- The economy's resource constraint

$$\frac{k(t)}{dt} = y(t) - c(t) - \delta k(t)$$

$k(t)$	per capita capital stock
$y(t)$	per capita income
$c(t)$	per capita consumption
δ	(constant) depreciation rate

The Model

- Aggregate production function is Cobb-Douglas.
- Per capita output is produced according to

$$y(t) = f(k(t)) = k(t)^{\alpha} \tag{1}$$

- The planner rewards production factors by marginal product.

$$r(t) = \alpha k(t)^{\alpha-1} \quad \text{and} \quad w(t) = (1-\alpha)k(t)^{\alpha}$$

$r(t)$ reward to capital (return to capital)
$w(t)$ reward to labour (wage rate)

The Model

- The social planner's intertemporal welfare

$$\int_0^\infty u(c,k)\, e^{-\rho t} dt$$

- The planner 'loves wealth'. Period utility satisfies

$$u_c > 0, \quad u_{cc} < 0, \quad u_k > 0 \quad \text{and} \quad u_{kk} < 0.$$
$$\lim_{c \to 0} u_c = \infty, \quad \lim_{c \to \infty} u_c = 0, \quad \lim_{k \to 0} u_k = \infty \quad \text{and} \lim_{k \to \infty} u_k = 0.$$

- Concentrate on simple log case

$$u(c,k) = \ln c + \gamma \ln k \quad \text{where} \quad \gamma \in [0, \infty). \tag{2}$$

- γ measures 'love of wealth' (LOW).

The Model

- The planner's problem

$$\max_c \int_0^\infty [\ln c + \gamma \ln k] \; e^{-\rho t} dt$$
$$s.t. \quad \dot{k} = f(k) - c - \delta k, \quad k_0 = \text{given}.$$
$$\rho : \quad \text{rate of time preference}$$

- The optimum must satisfy

$$\frac{\dot{c}}{c} = f'(k) + u_k/u_c - (\rho + \delta) = f'(k) + \gamma \cdot \frac{c}{k} - (\rho + \delta). \tag{3}$$

$$\lim_{t \to \infty} k \cdot \lambda \cdot e^{-\rho t} = 0 \tag{4}$$

u_k/u_c marginal rate of substitution between consumption and wealth
λ (current value) shadow price of additional capital

The Model

- The transversality condition in (4) requires

$$\lim_{t\to\infty} k \cdot \lambda \cdot e^{-\rho t} = 0$$

- Integration implies that the following must hold

$$\lim_{t\to\infty} k_t \cdot \lim_{t\to\infty} e^{-\int_0^t (f'(k_v)-\delta)dv} \cdot \left(\lambda_0 - \lim_{t\to\infty} \int_0^t \left(\frac{\gamma}{k_s}\right) e^{-\int_0^s (\rho - f'(k_v)+\delta)dv} ds\right) = 0.$$

- The analysis of that yields

Lemma (1)

The transversality condition requires that $f'(k^*) > \delta$ where k^* denotes the steady state capital stock.

The Steady State

- Consumption in steady state satisfies

$$c^* = (w + \rho k)\left(\frac{1}{\gamma + 1}\right) \quad \text{and} \quad c^* = f(k^*) - \delta k^*$$

- Steady state capital stock

$$k^* = \left(\frac{\alpha + \gamma}{(\gamma + 1)\delta + \rho}\right)^{\frac{1}{1-\alpha}} \quad \text{where} \quad \frac{dk^*}{d\gamma} > 0$$

- Effect of higher LOW on steady state consumption

$$\frac{dc^*}{d\gamma} = f'(k^*) \cdot \frac{\partial k^*}{\partial \gamma} - \delta \frac{\partial k^*}{\partial \gamma}.$$

$$\frac{dc^*}{d\gamma} \gtreqless 0 \quad \text{iff} \quad f'(k^*) \gtreqless \delta.$$

Lemma (2)

If $f'(k^*) = \delta$, then steady state consumption would be maximized and the "Golden Rule" of capital accumulation would be satisfied.

The Steady State

- In long-run optimum one needs $f'(k^*) > \delta$ from the transversality condition. Thus,

$$f'(k^*) = \alpha {k^*}^{\alpha-1} > \delta \quad \text{that is,} \quad \frac{\alpha[(\gamma+1)\delta+\rho]}{\alpha+\gamma} > \delta.$$

- γ must satisfy

$$\widehat{\gamma} \equiv \frac{\alpha}{1-\alpha} \cdot \frac{\rho}{\delta} > \gamma.$$

- $\widehat{\gamma}$ is critical level for LOW.

The Steady State

Proposition (1)

- *More "love of wealth" implies higher k^* and implies a relatively lower r^*.*
- *It raises c^* if $\gamma < \frac{\alpha}{1-\alpha} \cdot \frac{\rho}{\delta} \equiv \widehat{\gamma}$.*
- *If $\gamma \to \widehat{\gamma}$, accumulation is close to the Golden Rule.*
- *If $\gamma > \widehat{\gamma}$, no long-run optimum exists.*
- *In the optimum there is dynamically efficient accumulation.*
- *In the optimum more love of wealth implies a lower consumption and a higher investment share.*

- Interesting relationship between ρ and γ.

Transitional Dynamics

- Two-dimensional system

$$\frac{\dot{k}}{k} = \frac{f(k)}{k} - \frac{c}{k} - \delta \quad \text{and} \quad \frac{\dot{c}}{c} = f'(k) - (\rho + \delta) + \gamma \frac{c}{k}$$

- Log-linearization reveals saddle path stability.
- The negative root for stability is given by

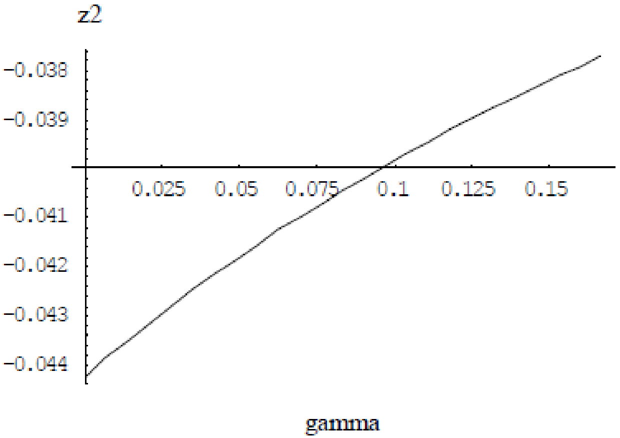
$$2z_2 = \rho - \left[\rho^2 + 4(a+\gamma)^{-1}\left((1-\alpha)((1-\alpha)\delta + \rho)(\delta(1+\gamma)+\rho)\right)\right]^{1/2}.$$

- $z_2 < 0$ is increasing in γ. z_2 measures the speed of convergence.

Proposition (2)

An increase in the love of wealth is accompanied by a decrease in the speed of convergence, that is, $\frac{dz_2}{d\gamma} > 0$.

Transitional Dynamics



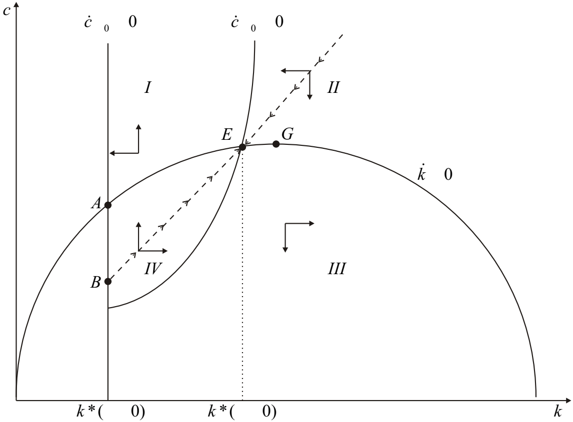
- Parameter settings
  - $\alpha = 1/3$, $\rho = 0.01$, $\delta = 0.03$. $\gamma \in [0, \widehat{\gamma}]$.

Transitional Dynamics - Qualitative Features

- Suppose a non-LOW social planner switches to LOW preferences.
- Suppose we start from non-LOW steady state position and after the switch take it as the initial position for the LOW accumulation path.

Transitional Dynamics - Qualitative Features

Figure: The Phase Diagram



Decentralization

- The model so far describes a convex economy.
- As for Ramsey-Cass-Koopmans setups apply the Second Welfare Theorem to the planner solution.
  - See e.g. Debreu (1959), Mas-Colell et al. (1995), and Acemoglu (2009), ch. 5.

Result (1)

The economy with LOW preferences can be decentralized as a private ownership, competitive market economy.

- Following e.g. Zou (1994) one may then equate

'love of wealth' $\Leftrightarrow$ “spirit of capitalism”

for a decentralized economy.

Decentralization

Result (2)

All the results derived for the effects of 'love of wealth' on the economy studied here carry over to a decentralized economy with otherwise identical features and identifies LOW with the "spirit of capitalism".

- One important upshot

Result (3)

An excessive "spirit of capitalism" is nonoptimal in a dynamic economy.

Concluding Remarks

- In a simple model it is found that
  1. excessive ’love of wealth’ precludes an optimum for a social planner.
  2. a ’right’ level of ’love of wealth’ is beneficial in the long run.
  3. it is possible to get arbitrarily close to the Golden Rule.
  4. with ’love of wealth’ convergence to the steady sate is slower.
  5. the planner solution can be decentralized. Then ’love of wealth’ can be equated with the “spirit of capitalism”.
  6. all results carry over to a decentralized setup of the model.
  7. in a decentralized dynamic economy an excessive “spirit of capitalism” is nonoptimal.

Extension 1

- Consider an open economy version of the model, where capital is free to move.
- Suppose the home country has LOW preferences and the foreign country has not.
- Since there is a mechanism of the domestic return to capital to decrease if domestic $\gamma > 0$, this will potentially lead to capital outflows.
- Contribution: Usually in neoclassical models, the high growth country attracts (imports) capital.
  - But what about Germany in 50s, Japan in 70s and China and India now?
  - In post-Keynesian models (demand-driven growth models) this can be explained.
  - Challenge: Show high growth with capital exports in a supply-driven (Solow growth model) is possible.
  - Conjecture: LOW may make this possible.

Extension 2

- Consider an endogenous Lucas (1988) model with two human capital stocks.
  - E.g. high-skilled vs. low-skilled human capital.
  - E.g. two equally skilled but different human capital stocks (e.g. engineers vs. economists).
- The Social planner likes one stock better than the other.
- Question: What does the SP's optimum imply for economic growth and income inequality?
- Preliminary checks reveal the following:

Finding

In terms of factor rewards and given a neoclassical world, the relative reward to the factor the SP likes more is lower.

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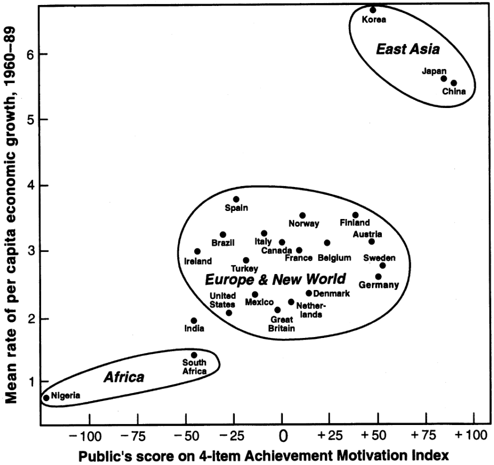
Appendix

Figure 1. Economic growth rate by achievement motivation scores of publics.



Taken from Granato et al. (1996), p. 612.

Table 1. OLS Estimation of Economic Growth Models
Dependent Variable: Mean Rate of Per Capita Economic Growth (1960–89)

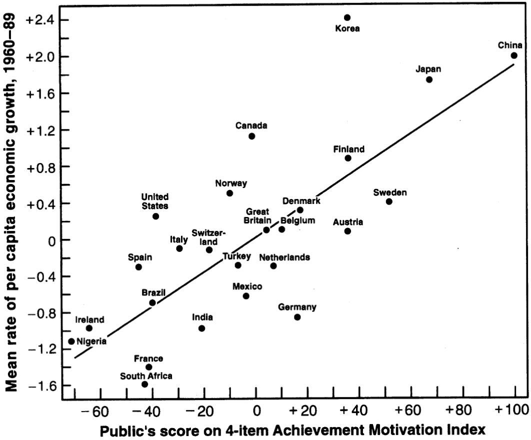
Model Variable	Model 1	Model 2	Model 3	Model 4
Constant	−0.70	7.29*	3.16	2.40*
	(1.08)	(1.49)	(1.94)	(0.77)
Per Capita GDP in 1960	−0.63*		−0.42*	−0.43*
	(0.14)		(0.14)	(0.10)
Primary Education in 1960	2.69*		2.19*	2.09*
	(1.22)		(1.06)	(0.96)
Secondary Education in 1960	3.27*		1.21	
	(1.01)		(1.08)	
Investment	8.69*		3.09	
	(4.90)		(4.40)	
Achievement Motivation		2.07*	1.44*	1.88*
		(0.37)	(0.48)	(0.35)
Postmaterialism		−2.24*	−1.07	
		(0.77)	(1.03)	
R^2 Adjusted	.55	.59	.69	.70
SEE	.86	.83	.72	.71
LM ($\chi^2(1)$)	.42	.65	.68	.87
Jarque-Bera ($\chi^2(2)$)	.05	.30	.18	.57
White ($\chi^2(1)$)	.28	.24	.37	.18
SC	.119	−.117	−.095	−.352

Notes: Mean of dependent variable: 3.04; *N* is 25 for all models; Standard errors in parentheses.
*t test: $p < .05$.

Taken from Granato et al. (1996), p. 617.

Appendix

Figure 2. Partial Regression Plot of Achievement Motivation on Economic Growth.



Taken from Granato et al. (1996), p. 621.