Inequality and Growth in the Presence of Competition for Status*

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Abstract

We investigate a simple endogenous growth model where agents care about their social status. As greater equality tends to provide greater incentives to differentiate oneself, redistribution may increase wasteful competitive consumption and lead to lower growth.

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1 Introduction

For a long time there has been an active debate over the relationship between inequality and growth, fuelled further by more recent cross-country empirical studies (Forbes (2000), Banerjee and Duflo (2003)). Aghion, Caroli and García-Peñalosa (1999) (henceforth ACG) provide an excellent survey of the theoretical side of the argument, where there is little consensus either. They also discuss an important theoretical argument in favour of growth-enhancing redistribution. In an endogenous growth model, where output is produced at the household level and depends on accumulated production experience, if the production technology exhibits decreasing returns, endowment redistribution is unequivocally growth-enhancing. This is because resources are shifted from the "low-return" rich to "high-return" poor individuals.

In this paper we explore whether the above argument that redistribution enhances growth holds in the presence of competition for social status. We investigate a variant of ACG's endogenous growth model where agents have a concern for status as determined by their ordinal rank in the distribution of (conspicuous) consumption. Here, each individual's problem is strategic as her utility depends on the consumption choices of others, so that equilibrium consumption and investment choices depend on the distribution of endowments. As greater equality provides greater incentives to differentiate oneself, it tends to promote greater consumption. As in ACG's argument, what is crucial here is the behaviour of the relatively less-endowed individuals. In a society where low social status leads to complete social exclusion, redistribution leads to *lower* investment by those relatively poor as any extra resources are diverted to conspicuous consumption. However, in the societies where social competition is relatively "mild", the argument of ACG may still hold, and redistribution lead to faster growth.

The effects of status concerns on savings and growth have been considered recently by Cole et al. (1992), Corneo and Jeanne (1998), Cooper et al. (2001). Here we integrate the model of status concerns in Hopkins and Kornienko (2004) with the growth model of ACG. However, here we develop a new technique which allows us to explore how a linear taxation scheme affects decisions of the same *individual*, or of individuals with the same *rank* (rather than of individuals with the same *endowment* as was done in Hopkins and Kornienko (2004)), and thus show that in an even in ACG's growth model, shifting wealth from the rich to the poor may not always generate higher growth.

2 Endogenous Growth with Concerns for Status

Consider the simple overlapping-generations model with endogenous growth and market imperfections found in Aghion et al. (1999) (ACG). There is only one good that serves both as capital and consumption good. Each period, there is a continuum of agents, indexed by $i \in [0, 1]$, each living for two periods. Each agent i upon birth at date t is randomly endowed with endowment $z_{i,t}$, an independently and identically distributed random variable with mean μ, distribution G, and density g, that is strictly positive on the support $[\underline{z}, \bar{z}]$.

We assume that when agents are young, their consumption is observable and confers social status. This may be because, as Veblen (1899) suggested, status may bring intrinsic satisfaction, or because, as Postlewaite (1998) argues, some goods (such as marriage partners) are not supplied by the market but are allocated according to one's social status. We follow the later, *instrumental*, explanation for concerns with status, and thus assume that when young, individuals attempt to build up their status and hence, implicitly, marriage opportunities. In their old age, they are only interested in consumption (the result would be very different if instead individuals cared about their status when old - c.f. Corneo and Jeanne (1998)).

For expositional purposes, we consider an extreme case where agents when young, rather than being concerned with the absolute level of their consumption, they only care about their social status as determined by their relative consumption (allowing agents also to care about their absolute level of consumption when young complicates the argument without changing its qualitative outcome). Thus, the utility of an individual i born at date t is given by:

$$U_{t,i} = \log S(c_{i,t}, F_t(c_{i,t})) + \rho \log c_{i,t+1} \tag{1}$$

where $c_{i,t}$ and $c_{i,t+1}$ denotes consumption when young and when old, respectively, and $S_{i,t} = S(c_{i,t}, F_t(c_{i,t}))$ is this individual's status when young. We assume that an agent's status will be determined by her position in the distribution of visible (conspicuous) consumption, with higher consumption meaning higher status. Following Hopkins and Kornienko (2004), status is defined as

$$S(c, F(\cdot)) = \delta F(c) + (1-\delta)F^{-}(c) + S_0 \tag{2}$$

where c is individual's consumption, $\delta \in [0, 1)$, $F(c)$ is the mass of individuals with consumption less or equal to c, and $F^{-}(c) = \lim_{c' \to c^{-}} F(c')$ is the mass of individuals with consumption strictly less than x. The parameter $S_0 \geq 0$ is a constant representing a guaranteed minimum level of status, and it represents the "mildness" of social pressures.

Each individual can either consume her endowment, or invest it into the production of the future consumption good. In the extreme case of capital market imperfections, when borrowing is not possible, each individual faces the following constraints: $c_{i,t} + k_{i,t} \leq z_{i,t}$, $c_{i,t+1} \leq y_{i,t}$, $c_{i,t} \geq 0$ and $c_{i,t+1} \geq 0$. When individual i invests an amount of physical or human capital $k_{i,t}$ at date t, production of the future consumption good takes place according to the technology

$$y_{i,t} = A_t k_{i,t}^{\alpha} \tag{3}$$

where $0 < \alpha < 1$. A_t is the level of human capital or technological knowledge available in period t, and it is common to all individuals.

The fact that, in each time period, the young are in competition for status implies that their choice of consumption is strategic. We look for a symmetric equilibrium where all agents adopt the same strategy, a strictly increasing consumption rule $c(z)$. If all other agents do adopt the strategy $c(z)$, the status for an individual with consumption $c_{i,t}$ will be $S = S_0 + G(c^{-1}(c_{i,t}))$. Maximising with respect to choice of consumption gives first order conditions that implicitly define a differential equation. Its solution (see Hopkins and Kornienko (2004)) gives the symmetric equilibrium choice of consumption $c(z_{i,t})$ from which we can derive equilibrium investment:

$$k(z_{i,t}) = z_{i,t} - c(z_{i,t}) = \frac{\int_{\underline{z}}^{z_{i,t}} (S_0 + G(z))^{\nu} dz + \underline{z} S_0^{\nu}}{(S_0 + G(z_{i,t}))^{\nu}} \tag{4}$$

where $\nu = (\alpha\rho)^{-1}$. Note that the choice made by the least endowed agent with endowment $\underline{z}$ is of crucial importance here, and it depends on the "mildness" of concern with status, S_0. In particular, if $S_0 = 0$, then $c(\underline{z}) \leq \underline{z}$ with $\lim_{z \to \underline{z}^+} c(z) = \underline{z}$, the poorest consume nearly all their endowment when young, but if $S_0 > 0$, the individual with the lowest endowment $\underline{z}$ does the opposite and consumes nothing. That is,

$$(c(\underline{z}); k(\underline{z})) \quad = \quad \begin{cases} (\underline{z}; 0) & \text{if } S_0 = 0 \\ (0; \underline{z}) & \text{if } S_0 > 0 \end{cases} \tag{5}$$

The point is that in a symmetric equilibrium, the individual with lowest endowment will have the lowest expenditure and so will have status equal to S_0. For S_0 close to zero, this specification of preferences (1) implies very low utility even if second period consumption is well above zero. That is, $S_0 = 0$ represents complete social rather than material exclusion. For example, in polygamous societies low ranked men are unable to marry even though their consumption is above subsistence levels. This gives very strong incentives to avoid low social position and low ranked individuals spend heavily on visible consumption.

Following ACG, we will now consider a pure linear redistributive taxation scheme, whereby everyone is taxed at a flat rate $\tau \in [0, 1)$, and the tax revenue is redistributed back equally, so that $z_{i,t}^{\tau}(z_{i,t})$ is the post-tax endowment of an agent with pre-tax endowment $z_{i,t}$:

$$z_{i,t}^{\tau}(z_{i,t}) = (1-\tau) z_{i,t} + \tau\mu \Rightarrow z_{i,t} = \frac{z_{i,t}^{\tau}}{1-\tau} - \frac{\tau\mu}{1-\tau} \tag{6}$$

As the result, the initial before-tax distribution G is a mean-reserving spread of the after-tax distribution G^{τ}. Being a lump-sum tax, the policy does not change the returns to investment. However, it affects the incentives to invest insofar as it changes the individual's endowment, as well as changing the return to status as this is determined by the endowment distribution. To see that, observe that the after-tax distribution of endowments $G^{\tau}(z^{\tau})$ is *the same type* as the before-tax distribution $G(z)$, so that $G^{\tau}(z^{\tau}) = G(z)$ and $g^{\tau}(z^{\tau}) = g(z)/(1-\tau)$ (see, for example, Feller (1968)). That is, while the linear redistributive tax scheme preserves individual social rank, the density of individuals is, however, increased at every social rank which, in turn, increases the returns to conspicuous consumption.

We analyse the effects of redistribution on consumption and investment decisions by taking an individual i, born at time t, with before-tax endowment $z_{i,t}$ and comparing her equilibrium choices before and after tax. In what follows, $k^{\tau}(z_{i,t}) = k(z^{\tau}_{i,t}(z_{i,t}))$ denotes equilibrium after-tax investment for individual i born at time t with before-tax endowment $z_{i,t}$. For each period t, and each individual i, we compare the equilibrium choices given by the equation (4) for the pre-tax distribution of endowments $G(z)$ and for the post-tax distribution of endowments $G^{\tau}(z^{\tau})$.

Proposition: *When individuals care about status when young, the relationship between the before-tax and after-tax symmetric equilibrium investment decisions of a fixed individual i born at time t with before-tax endowment $z_{i,t}$ is described by:*

$$k^{\tau}(z_{i,t}) = (1-\tau)k(z_{i,t}) + \tau\mu\frac{S_0^{\nu}}{(S_0 + G(z_{i,t}))^{\nu}} \tag{7}$$

In turn, this implies that:
(i) if $S_0 = 0$ then $k^{\tau}(z_{i,t}) < k(z_{i,t})$ for all $z_{i,t} > \underline{z}$, and
(ii) if $S_0 > 0$, then there exists $\hat{z} \in (\underline{z}, \mu)$ such that, for all $z_{i,t} < \hat{z}$, $k^{\tau}(z_{i,t}) > k(z_{i,t})$, and for all $z_{i,t} > \hat{z}$, $k^{\tau}(z_{i,t}) < k(z_{i,t})$.

Proof: Since before-tax and after-tax endowment distributions are of the same type, one can write (4) as follows:

$$k^{\tau}(z_{i,t}) = k(z^{\tau}_{i,t}(z_{i,t})) = (1-\tau)k(z_{i,t}) + \tau\mu\frac{S_0^{\nu}}{(S_0 + G(z_{i,t}))^{\nu}}$$

Substituting into (4), the investment schedules cross at $\hat{z}$ such that

$$\int_{\underline{z}}^{\hat{z}} \left(1 + \frac{G(z)}{S_0}\right)^{\nu} dz = \mu - \underline{z}$$

Finally, define $Q(G(z)/S_0, \nu) = (1 + G(z)/S_0)^{\nu} - 1 > 0$, and rewrite the above as:

$$\int_{\underline{z}}^{\hat{z}} \left(1 + Q\left(\frac{G(z)}{S_0}, \nu\right)\right) dz = \mu - \underline{z} \Rightarrow \mu - \hat{z} = \int_{\underline{z}}^{\hat{z}} Q\left(\frac{G(z)}{S_0}, \nu\right) dz > 0$$

which implies that $\hat{z} \in (\underline{z}, \mu)$. ∎

The above proposition says the following. Fix an individual i with endowment $z_{i,t}$ and note that redistribution increases endowments of all below average individuals. Yet, if the competition is "cut throat", i.e. $S_0 = 0$, after-tax investment is lower at *all* levels of endowment. However, if $S_0 > 0$, redistribution results in higher investment by the poor, and lower investment by the relatively rich - including some "lower middle class" agents (endowments between $\hat{z}$ and μ) who have higher endowments after redistribution.

We further explore how these equilibrium investment choices translate into economic growth. Following ACG, we assume that the output of each individual productive unit $y_{i,t}$ is aggregated into aggregate production y_t simply as $y_t = \int y_{i,t} di$. Furthermore, learning-by-doing and knowledge spillovers are captured by the following dynamics of productivity parameter: $A_t = \int y_{i,t-1}di = y_{t-1}$. That is, accumulation of knowledge results from past aggregate production, but because of learning-by-doing, growth depends on individual investments. Thus, the rate of growth is

$$\gamma_t = \ln\left(\frac{y_t}{y_{t-1}}\right) = \ln\frac{\int A_t k_{i,t}^{\alpha}di}{A_t} = \ln\int k_{i,t}^{\alpha}di \tag{8}$$

When status concerns are present, redistribution may or may not lead to faster growth. This is because relatively poor individuals may consume, rather than invest, their higher post-redistribution endowment. To see that, write the equilibrium before-tax growth rate as:

$$\gamma_t = \ln\int_{\underline{z}}^{\bar{z}} k(z)^{\alpha}g(z)dz$$

and the equilibrium after-tax growth rate is:

$$\gamma_t^{\tau} \;=\; \ln\int_{\underline{z}}^{\bar{z}} k^{\tau}(z)^{\alpha}g(z)dz = \ln\int_{\underline{z}}^{\bar{z}}\left((1-\tau)k(z)+\tau\mu\frac{S_0^{\nu}}{(S_0+G(z))^{\nu}}\right)^{\alpha}g(z)dz$$

For $S_0 = 0$ the above expression becomes simply:

$$\gamma_t^{\tau} \;=\; \ln\int_{\underline{z}}^{\bar{z}}\left((1-\tau)k(z)\right)^{\alpha}g(z)dz = \alpha\ln(1-\tau)+\gamma_t < \gamma_t$$

so that the after-tax economy unambiguously grows slower than the before-tax economy.

However, if $S_0 > 0$, we have seen that investment by the poor may increase. The diminishing marginal returns to investment imply that it is possible that the fruits of the increased investment by the relatively poor outweigh the consequences of the decreased investment by those in the middle and at the top of the distribution. Whether this happens or not, depends on the "mildness" of social pressures, S_0. The "milder" is social competition (i.e. the higher S_0), the greater rate of economic growth, and if S_0 is small so that social competition is "cut throat", linear taxes are harmful for growth, but if the "mildness" S_0 is sufficiently high then linear taxes bolster growth. Thus, the growth-maximising tax rate is zero for small values of S_0, but positive for higher values of S_0.

3 Conclusions

The present paper joins the growing body of literature that emphasizes the importance of social arrangements. We show here that the same redistributive taxation scheme may have opposing effects on economic growth in societies that differ only in their social norms. In a simple model of endogenous growth where agents, when young, compete for status in terms of visible consumption, the effects of greater equality on economic growth is ambiguous and is determined by how society treats its lowest ranked members. When low social rank leads to complete social exclusion, redistribution diverts resources to wasteful consumption rather than productive investment and leads to lower growth.

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