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Political Economic of Growth with a Preference for Status

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Abstract

This paper develops a positive theory of growth and redistribution in which agents care about both their absolute and relative levels of consumption. As in Alesina and Rodrik (1994), public goods are productive and are financed by a tax on capital. Equilibrium tax policy is chosen by a pivotal voter and is shown to reflect the strength of status preferences and the distributions of wealth and political power. The model indicates the existence of three types of societies, a status-oriented oligarchy, a plutocratic democracy and a proletarian democracy. In a status-oriented oligarchy, status concerns lead an economic and political elite to set the tax rate below the growth maximizing rate. In such a society, democratic reform increases growth and lowers income inequality. In a plutocratic democracy, the tax rate is above the growth maximizing level and the growth rate is increasing in the taste for status. In a proletarian democracy, increases in status preferences, democracy or wealth inequality lead to lower growth. These results suggest that status preferences interact with democracy and wealth inequality in a significant and non-linear fashion to determine economic policy outcomes that influence growth and redistribution.

Key Words: Social Status, Relative Income Preferences, Political Economy, Growth, Democracy, Inequality, Redistribution

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Section 1: Introduction

> "Together with the legally codified inequality intrinsic to slavery, the greater inequality of wealth (in Latin American colonies) contributed to the evolution of institutions that protected the privileges of the elites and restricted opportunities for the broad mass of the population to participate fully in the commercial economy…." Sokoloff and Engerman (2000: 224)

As highlighted in the quote above, Sokoloff and Engerman (2000) argue that the political and economic elites in the sugar and mining colonies of the new world established "rules, laws and other government policies that advantaged members of the elite relative to non-members" (p. 224). Moreover, Sokoloff and Engerman argue that such restrictive polices came at a huge economic and human cost, giving rise to the substantial per capita income gaps between the countries of North and South America that are only now beginning to close. Acemoglu, Johnson and Robinson (2001, 2002) also highlight growth-retarding effects of policies designed to serve elite interests, noting that elites in extractive colonies tend to establish institutions that "concentrate power in the hands of a small elite and create a high risk of expropriation for the majority of the population, [and thus] are likely to discourage investment and economic development." (2002: 1235)

Inefficient policies cry out for an explanation.[2] While some such policies may have resulted from sincere but misguided attempts to foster economic development, a category that includes early attempts to foster import substitution industrialization, most explanations focus on the distributional consequences of such policies. For example, inefficient policies may be adopted because they redistribute income to well-organized lobbies, politically powerful ethnic groups, or government bureaucrats, e.g. Olson (1982), Easterly and Levine (1997), Djankov et al. (2002). More broadly, a politically empowered elite may seek to restrict economic growth because it fears the consequences of losing political power to the emergent middle class, as in Acemoglu et al (XXX0 and Bourguignon and Verdier (2000). This paper investigates an alternative explanation, rooted directly in the structure of preferences rather than the inefficiencies of political markets. It develops a model in which growth-retarding equilibrium policies arise because agents have a preference for social status.

[2] Acemoglu (2003) has pointed out that the unenforceability of political contracts may lead to inefficient policies as political equilibria.

Some economists shy away from explanations that rely on heterodox preferences, on the argument that doing so opens a Pandora's box in which any social outcome may be justified by referring to arbitrary taste: "Perhaps they are poor because they like poverty." However, in our case this argument is of limited relevance, as a preference for social status is far from arbitrary. Indeed, Frank (1985) has argued that a preference for status is both evolutionarily adaptive for human psychology and entirely rational, as many important good may be allocated based on an individual's relative rather than absolute performance. Moreover, the fast-emerging literature on the determinants of subjective wellbeing has left little doubt of the empirical reality of social comparisons and, in particular, of the importance of relative income and consumption levels as arguments of individual utility functions. For example, researchers have found evidence of a preference for status using a variety of comparison groups including co-workers (Brown et al. 2003; Clark and Oswald, 1996), siblings (Kuegler 2009), those in the same neighborhood (Luttmer 2005), and others within one's state of residence (Blanchflower and Oswald 2004). See Clark et al. (2008) and Heffetz and Frank (2011) for a recent reviews of this literature. Finally, using data from the World Values Survey, Davis and Wu (2012) find evidence of systematic international variation in the taste for status, with the strength of status preferences linked to key dimension of national culture. If the taste for status is measureable, then statements regarding the role of status preferences in economic life are falsifiable and, thus, meet Karl Popper's criterion for being the legitimate focus of scientific inquiry.

Status preferences take the form of a disutility to the average level of consumption, introducing a negative consumption externality. Production in the model developed below is identical to Alesina and Rodrik's (1994) well-known model of political economy of development. In particular, the model assumes that the government supplies productive public goods that complement private inputs of labor and capital and the provision of public goods is financed through a tax on capital. Alesina and Rodrik's model has two properties that recommend it for our use here. First, there provision of productive public goods provides a legitimate role for government, and critically, allows the possibility that these may be undersupplied relative to the growth maximizing level. This contrast, for example, with Tabellini and Persson (1994) paper, in which tax revenues are used solely to finance redistribution. Second, political economy mechanisms as work in the model will be familiar to most readers, allowing us to focus here on the innovations introduced here.

The model produces a strong dichotomy between the role of the taste for status in the public and private decision making. In particular, taking the tax rate as given, the taste status preferences play no role in the level or growth rate of consumption and, furthermore, we find that the time-path of consumption is optimal. This result may come as a surprise, given the link between status preferences and over-consumption, most notably in the work of Frank (1985, 2005). Here, the taste for status does not lead to over-consumption because it influences the marginal utilities of present and future consumption equally, leaving the trade-off between them unchanged. In contrast, the taste for status plays a key role in public sector outcomes. In particular, the demand for public goods is increasing in the taste for status for poor individuals, and decreasing in the taste for status for rich individuals. Thus, in the language of Frank (1985), public goods are *positional* for poor individuals while private goods are positional for rich individuals.

Status preferences interact with the distributions of wealth and political power in highly non-linear ways to determine the equilibrium tax policy. In particular, the model indicates that these three factors, the taste for status, the level of democracy and the distribution of capital, jointly sort societies into one of three types, which are differentiated by their comparative statics of growth and inequality. In a proletarian democracy, the pivotal voter is poor and an increase in the taste for status leads to higher taxes, lower growth and lower income inequality. At other extreme, a status oriented oligarchy is characterized by a extreme levels of political inequality and the taste for status. In these societies, concerns over relative consumption lead the elite to undersupply public goods relative to the growth-maximizing level, leading to low rates of growth and high levels of income inequality, an outcome that corresponds to the historical account provided by Sokoloff and Engerman. Finally, in plutocratic democracies, political power is less concentrated and status preferences are relatively moderate. In this case, the taste for status acts to moderate the pivotal voter's inclination to tax capital, raising the rate of economic growth.

In addition to predictions regarding the taste for status, the model generates new predictions regarding the relationships between democracy and wealth inequality and the rate of economic growth. Political economic interactions between the taste for status and democracy and wealth inequality generate non-linear, inverted-U shaped relationships between democracy and growth and inequality, with both growth in the level of democracy and falling in the level of wealth inequality in status oriented oligarchies. In contrast, when status preferences are absent, these relationships are monotonic.

The remainder of the paper proceeds as follows. Section 2 introduces the model. Section 3 solves for optimal private behavior. Section 4 solves the political equilibrium. Section 5 discusses the model's implications and relates them the existing empirical literature. And section 6 concludes.

Section 2: Growth and Inequality with a Taste for Status

2.1. Production

Production in this model is identical to that in Alesina and Rodrik (1994). There is a unit measure of individuals, indexed by *i*, and endowed with one unit of labor and $k_i(t)$ units of capital. Individual output depends on technology *A*, the capital-labor ratio *k*, the flow of productive public goods *z*:

$$q_i(t) = Ak(t)^{\alpha} z(t)^{1-\alpha} l_i^{1-\alpha} \tag{1}$$

The provision of productive public goods is funded by a tax on the capital stock, so that the stock of public goods available for production at any time is given by

$$z(t) = \tau k(t)\,. \tag{2}$$

Individual *i* is endowed with a single unit of labor and an initial stock of capital, k_{i0}, which is assumed to differ across individuals. Individual heterogeneity may be summarized by the ratio of an individual's relative labor endowment, which we measure relative to the economy average,

$$\sigma_i = \frac{\ell_i / k_i}{\overline{\ell} / \overline{k}} = \overline{k} / k_i \in (0, \infty)\,, \tag{3}$$

where the second equality follow from $\ell_i = \overline{\ell}$. Equivalently, $\sigma_i k_i = \overline{k}$. Thus, an individual's relative labor endowment is decreasing in her share of the aggregate stock of capital, so that a rise in σ_i corresponds to a reduction in the relative wealth of individual *i*. We further assume that individuals are ordered by their relative labor endowments and that σ_i is strictly increasing and continuously differentiable in *i*: $\frac{d\sigma_i}{di} > 0$.

Individual *i*'s labor income, after tax capital income and total income are given by

$$\begin{aligned} y_i^l &= \sigma_i \omega(\tau) k_i \\ y_i^k &= r(\tau) k_i \\ y_i &= \left(\sigma_i \omega(\tau) + r(\tau)\right) k_i, \end{aligned} \tag{4}$$

where

$$\omega(\tau) = (1-\alpha) A \tau^{1-\alpha} \tag{5}$$

is the wage-capital ratio, which we will call the normalized wage rate, and

$$r(\tau) = \alpha A \tau^{1-\alpha} - \tau \tag{6}$$

is the net, or after tax, return to capital.

2.2. Preferences

Veblen's seminal work on conspicuous consumption remains an important touchstone for the literature on social status. However, recent research has formalized the taste for status in a variety of ways, exploring the implications of a preference for high relative consumption, relative income and relative capital ownership. While much of the empirical literature on status effects relies on relative income, to a large degree this reflects the availability of data, with most major surveys including a question on household income levels, rather than a conscious theoretical commitment, with many empirical papers explicitly formulating indirect utility functions to indicate that consumption rather than income remain the primary source of utility. In addition, some recent papers have explored the implications of preference for high relative capital ownership, citing sky scrapers as a plausible example. However, Trump Towers notwithstanding, this emphasis on "conspicuous accumulation" seems out of place for modern economies, in which most wealth is securitized. Moreover, it cuts against Frank's (1985) concern that the status effects associated with visible consumption goods may crowd out saving and empirical work on visible consumption by Charles et al. (2009).

Here we follow both Veblen (1915) and Frank (1985) in formalizing status preferences around the notion of relative consumption. In particular, we assume that an individual's instantaneous utility is given by

$$u_{it} = ln(c_{it}) - \gamma ln(\overline{c}_t) \tag{7}$$

where $\gamma \in [0,1)$ and $c_i(t)$ and $\overline{c}(t)$ are the levels of individual and average consumption at time t.

The structure of preferences captured by (7) may be best understood by rewriting it as $u_i(t) = (1-\gamma)ln\left(c_i(t)\right) + \gamma ln\left(c_i(t)/\overline{c}_t(t)\right)$. Expressed in this fashion, it is clear that instantaneous utility depends both on the absolute level of an individual's consumption, $c_i(t)$, and on her relative consumption, as measured by the ratio of individual to average consumption, $c_i(t)/\overline{c}_t(t)$. The parameter γ determines the relative weights of absolute and relative consumption in instantaneous utility, with a higher value of γ indicating a greater relative weight on relative consumption. Because of this, we will refer to γ as the *strength of relative consumption preferences* or as *the taste for status*. When $\gamma = 0$, we will call this an *egoistic society*, as utility depends only on own consumption, while if $\gamma \in (0,1)$, we will say we have a *status-oriented society* since in this case agents have a preference for status as indicated by a taste for high relative consumption. Finally, if $\gamma = 1$, we will say we have a *pure status society*, since in this case individual utility depends only on relative consumption; that is, it is independent of absolute consumption levels. Relative to Alesina and Rodrik (1994), equation (7) is the only formal innovation in the model, and, indeed, a version of their model is nested within this one in the case of $\gamma = 0$.

Lifetime utility is the discounted stream of instantaneous utility:

$$V_i = \int_0^\infty e^{-\rho t} u_{it} dt, \tag{8}$$

where $\rho > 0$. Provided individual and average consumption grow at a common uniform rate, as will be the case in the steady state equilibria explored below, lifetime utility may be expressed as the weighted average of the initial level of instantaneous utility and the rate of consumption growth:

$$V_i\left(g, c_{i0}, \overline{c}_0\right) = \frac{(1-\gamma)g}{\rho^2} + \frac{1}{\rho}\left[ln(c_{i0}) - \gamma ln(\overline{c}_0)\right]. \tag{9}$$

(See appendix for derivation.) This relatively compact form for lifetime utility is useful for understanding how relative income preferences affect these three components of utility. Differentiating the ratios of marginal utilities with respect to γ, we have

$$\begin{aligned} \frac{d\left(-V_{\overline{c}} / V_c\right)}{d\gamma} &= \frac{c}{\overline{c}} > 0 \\ \frac{d\left(-V_{\overline{c}} / V_g\right)}{d\gamma} &= \frac{\gamma^2 \rho}{\overline{c}} > 0 \\ \frac{d\left(V_g / V_c\right)}{d\gamma} &= \frac{-c}{\rho} < 0 \end{aligned} \tag{10}$$

The first two lines of (10) indicate that an increase in the strength of status preferences increases the marginal disutility of average consumption relative to both own consumption and economic growth. Note, in particular, that the second effect indicates a rise in the importance of distributional concerns relative to dynamic performance in an individual's preferences, a characteristic of preferences that plays a key role in the political economy of the model. As indicated by the third line of (10), that a rise in γ also reduces the importance of growth relative to current consumption, a result that reflects the common growth rate of individual and average consumption.

2.3. The Consumer's Problem

The consumer's problem is to choose a consumption stream to maximize lifetime utility subject to the accumulation equation and taking the tax rate and the time paths of average consumption and average capital as given:

$$\max_{c_i(t)} V_i = \int_0^\infty e^{-\rho t} \left\{ ln(c_i(t)) - \gamma ln(\overline{c}(t)) \right\} dt$$

subject to

$$\dot{k}_i(t) = \omega(\tau)\overline{k}(t) + r(\tau)k_i(t) - c_i(t)$$

and

$$k_i(0) = k_{i0}.$$

The Hamiltonian for this problem is given by:

$$H = e^{-\rho t}\left(ln(c_i(t)) - \gamma ln(\overline{c}(t)) \right) + \mu\left(\omega(\tau)\overline{k}(t) + r(\tau)k_i(t) - c_i(t) \right)$$

which has as first-order conditions:

$$H_c = 0: \quad c_i(t)^{-1} e^{-\rho t} - \mu = 0, \tag{11}$$

and

$$-H_k = \dot{\mu}: \quad \dot{\mu} = -\mu r(\tau) \tag{12}$$

Log differentiating (11) and using (12) to eliminate the multiplier, we have

$$g_c \equiv \frac{\dot{c}_i}{c_i} = r(\tau) - \rho \tag{13}$$

It remains to solve for the initial levels of individual and average consumption. On a balanced growth path, capital and consumption will grow at the same rate, implying:

$$g_k \equiv \frac{\dot{k}_i(t)}{k_i(t)} = r(\tau) - \rho \tag{14}$$

for all *i*. Noting that the growth rate of capital is independent of *i*, the levels of individual and average capital will grow at common rate, so that these variables maintain a constant ratio over time:

$$\bar{k}(t) = \sigma_i k_i(t). \tag{15}$$

Substituting (14) and (15) into the accumulation equation, we get expressions for the initial levels of individual and average consumption:

$$c_{i0} = \left(\sigma_i \omega(\tau) + \rho\right) k_{i0} \tag{16}$$

and

$$\bar{c}_0 = \left(\omega(\tau) + \rho\right) \bar{k}_0 . \tag{17}$$

Equation (16) indicate that at each point in time an individual consumes her entire labor income as well as a portion ρ of her capital stock. Note also that the return to capital does not play a role in determining the level of the steady state consumption path.

2.4. Taxation and Economic Inequality

We complete our description of the economy by computing three measures of steady state economic inequality related to the distribution of wealth, consumption and income. Wealth inequality is determined by the distribution of capital. In the steady state rate, the rate of capital accumulation is uniform across individuals, so that the distribution of capital is constant over time and, thus, fully determined by initial capital endowments. We represent the distribution of wealth by the Gini coefficient for the initial capital stock, which is given by

$$G^k = \frac{1}{2}\int_0^1\int_0^1 \left|\sigma_i^{-1} - \sigma_j^{-1}\right| di dj \tag{18}$$

Unlike the distribution of wealth, the distributions of income and consumption depend on factor returns and thus on the provision of public goods and the prevailing tax rate. The Gini coefficients for income and consumption are given by

$$G^y(\tau, G^k) = \left[\frac{r(\tau)}{r(\tau)+\omega(\tau)}\right] G^k \tag{19}$$

and

$$G^c\left(\tau, G^k\right) = \left[\frac{\rho}{\omega(\tau)+\rho}\right] G^k \tag{20}$$

It follows that given any unequal initial distribution of capital endowments, e.g. $G^k > 0$, the inequality of income and consumption are decreasing in the rate of taxation:

$$G_\tau^y = \left[\frac{-\alpha(1-\alpha)\tau^{1-\alpha}}{\left(r(\tau)+\omega(\tau)\right)^2}\right] G^k < 0 \tag{21}$$

and

$$G_\tau^c = \left[\frac{-\rho\omega'(\tau)}{\left(\omega(\tau)+\rho\right)^2}\right] G^k < 0, \tag{22}$$

These results reflect the positive relationship between taxation and the wage rate and the equal distribution of labor endowments across individuals.

Having completed our description of the model, we summarize our findings regarding the relationship between the taste for status and steady state economic outcomes in the following proposition:

Proposition 1: *The Irrelevance of the Taste for Status for Steady State Economic Outcomes.*

Given a constant tax rate, $\tau \geq 0$, and $\gamma \in \left[0,1\right)$, other than utility levels, the taste for status has no effect on steady state economic variables. In particular, the following variables are independent of the strength of status preferences in the steady state: the rate of per capita income growth, the time paths of individual levels of consumption and the capital stock, factor prices, including the wage rate and the return to capital, and the distributions of wealth, consumption and income.

Proof: *Proposition 1* follows directly from equations (13) - (20).

2.5. Optimal Consumption and the Positionality of Consumption

The independence of steady state economic outcomes from the taste for status is, perhaps, less surprising once one recalls that, in making their own consumption and investment decisions, individuals take the time path of average consumption as given. As a result, the weight placed on the level of average consumption cannot influence individual behavior. Instead, as status effects imply the existence of a negative consumption externality, it may be that they affect the optimal rather than equilibrium pattern of consumption over time. To investigate this issue further, we follow the lead of Frank's (1985) seminal article, and consider a cooperative equilibrium in which agents act cooperatively to determine their levels of consumption.

In particular, we assume that in the cooperative equilibrium, individuals contract at time = 0 to constrain their consumption decisions so that they maintain the initial pairwise ratios of capital stocks: $\frac{k_i(t)}{k_j(t)} = \frac{k_{i0}}{k_{j0}}$.[3] Under the cooperative consumption contract, average consumption maintains a constant relative relationship personal consumption: $\overline{c}(t) = \psi_i c_i(t)$, where $\psi_i = \frac{\sigma_i\left(\omega(\tau)+\rho\right)}{\sigma_i\omega(\tau)+\rho}$ depends on the consumer's initial relative labor endowment and the tax rate, both of which she takes as given. In this case, individual *i*'s instantaneous utility is given by

$$u_i(t) = (1-\gamma)ln\left(c_i(t)\right) + \gamma ln\left(\psi_i\right). \tag{23}$$

Comparing (23) to (7), we see that the cooperative consumption contact leads the individual to internalize the negative consumption externality, as reflected by the coefficient $(1-\gamma)$ on own

[3] Note that the cooperative consumption contract does not dispel the second externality in the model, which is that private agents assume that the effect of investment on tax revenues, as in Barro (1991).

consumption. That is, constrained by the contract, consumers realize that an increase in individual consumption leads to a proportional increase in average consumption.

Under the cooperative consumption contract, the consumer's problem is:

$$\max_{c_i(t)} V_i = \int_0^\infty e^{-\rho t}\left((1-\gamma)lnc_i(t)-\gamma ln\psi_i\right)dt,$$
subject to
$$\dot{k}_i(t)=\omega(\tau)k(t)+r(\tau)k_i(t)-c_i(t),$$
$$k_i(0)=k_{i0},$$
$$\psi_i=\frac{\sigma_{i0}\left(\omega(\tau)+\rho\right)}{\sigma_{i0}\omega(\tau)+\rho}.$$

The present value Hamiltonian for this problem is:

$$H=e^{-\rho t}\left((1-\gamma)lnc_i(t)-\gamma ln\psi_i(\tau)\right)+\mu\left(\omega(\tau)k(t)+r(\tau)k_i(t)-c_i(t)\right),$$

which has as first-order conditions:

$$H_c=0:\quad (1-\gamma)e^{-\rho t}c_i(t)^{-1}-\mu=0, \tag{24}$$

and

$$-H_k=\dot{\mu}:\quad \dot{\mu}=-\mu r(\tau) \tag{25}$$

Comparing (24) to (11), we that the effect of the cooperative consumption contract is to reduce the marginal utility of consumption by a factor $(1-\gamma)$, reflecting the internalization of the negative consumption externality. Solving as above for the time path of consumption, we find that the time path of consumption under cooperative consumption agreement is given by

$$c_i^{coop}(t)=\left(\sigma_i\omega(\tau)+\rho\right)k_{i0}e^{\left(r(\tau)-\rho\right)t}, \tag{26}$$

which is exactly the same result as we obtained in the decentralized equilibrium. Oddly, the use of the cooperative consumption agreement to internalize the negative consumption externality leaves the time path of consumption unchanged.

Thus, in spite of the preference for high relative consumption, and the resulting negative consumption externality, the time paths of consumption in the decentralized and cooperative equilibria coincide. This finding is counter-intuitive and, at first glance, appears to conflict with the analysis in Frank (1985), who finds that relative consumption preferences generate in a negative consumption externality that leads to greater-than-optimal consumption of the positional good. Indeed, Frank (1985, p. 101) suggests that for many types of goods consumption should be positional relative to saving, arguing "we may know very well what kind of cars acquaintances drive or what types of houses they live in, but we are much less likely to know who much they save…."

In fact, however, the apparent conflict between Frank and the analysis presented here is easy to reconcile. The reason our model does not generate over-consumption is that the key trade-off in the model is not between the positional good "consumption" and the non-positional good "saving" but, rather, between current and future levels of consumption. As noted in the discussion of equation (24), under the cooperative consumption contract, individuals internalize the consumption externality, recognizing that an increase in personal consumption increases average consumption as well. However, a change in the taste for status affects the marginal utilities of present and future consumption equally, leaving the marginal rate of substitution between current and future consumption unchanged. Alternately, recall that in Frank's terminology a *positional good* is one that responds "relatively strongly" to the consumption of others. In terms of Frank's (1985) analysis, current consumption fails to meet this criterion because the alternative good, future consumption, is equally sensitive to strength of status preferences. We summarize these results in the following proposition:

Proposition 2*: The Positionality of Consumption.*

> Consumption is not a positional good. Consequently, the time path of consumption is identical in the decentralized equilibrium and the equilibrium under the cooperative consumption agreement, and both are independent of the taste for status. These results

reflect the fact that the taste for status affects the marginal utilities of current and future consumption equally, leaving intertemporal consumption tradeoffs unchanged.

Proof: *Proposition 2* follows from *Proposition 1* and (26).

Section 3: Policy Preferences and Political Equilibrium

In the previous section, we found that, taking the tax rate as given, economic outcomes are independent of the taste for status. The same does not hold true for political outcomes. In this section we investigate the politics of tax policy formation. We begin by characterizing the individual's preferred tax rate and investigating how the level of tax rate varies with her relative labor endowment and intensity of relative income preferences. Next, we develop a simple model of the allocation of political decision making authority in a range of political systems that varies continuously from a capitalist dictatorship to a pure democracy. Finally, we combine these results to characterize the equilibrium tax policy and derive the comparative statics of the equilibrium tax rate with respect to the taste for status and the distributions of wealth and political power.

Section 3.1: Preferred Tax Rates

In the analysis that follows, it will be useful to express lifetime utility in terms of more primitive elements of the model. Substituting values for the equilibrium growth rate and initial levels of own and average consumption, we may express lifetime utility as a function of the tax rate, the individual's relative labor endowment and the strength of relative income preferences:

$$V\left(\tau;\sigma_i,\gamma\right)=\frac{(1-\gamma)g(\tau)}{\rho^2}+\frac{1}{\rho}\Big[ln\Big(\big(\sigma_i\omega(\tau)+\rho\big)k_{i0}\Big)-\gamma ln\Big(\big(\omega(\tau)+\rho\big)\overline{k}_0\Big)\Big] \qquad (1)$$

Note that in this expression, the only source of interpersonal heterogeneity is the relative labor endowment, which is an argument of V. Because of this, we drop the subscript i on the function above.

We denote the preferred tax rate of individual *i* as $\tau^*(\sigma_i,\gamma)$, where $\tau^*(\sigma_i,\gamma)$ maximizes $V(\tau;\sigma_i,\gamma)$ over $\tau\in\mathbb{R}^+$. The existence of a preferred tax rate is guaranteed by the intermediate value theorem. In particular, we have the following proposition:

***Proposition 3**: Existence of a Preferred Tax Rate.*

1. Given $\gamma\in[0,1)$, a solution to the voter's problem exists and may be represented as a continuously differentiable function $\tau^*(\sigma_i,\gamma)\geq 0$, where $V_\tau(\tau^*(\sigma_i,\gamma);\sigma_i,\gamma)=0$ and $V_{\tau\tau}(\tau^*(\sigma_i,\gamma);\sigma_i,\gamma)<0$ for $\tau^*(\sigma_i,\gamma)>0$.
2. There exists a threshold level of the relative labor endowment $\underline{\sigma}(\gamma)=\dfrac{\gamma-\alpha}{1-\alpha}<1$ such that $\tau^*(\sigma_i,\gamma)>0$ for $\sigma_i>\underline{\sigma}(\gamma)$ and $\tau^*(\sigma_i,\gamma)=0$ for $\sigma_i\leq\underline{\sigma}(\gamma)$.

Proof: See appendix.

It may initially be surprising, however, that some individuals prefer a zero tax rate, as indicated by part 2 of the proposition, since at this rate there are no public goods and the return to both labor and capital is zero. The intuition behind this result may best be understood by considering the situation of a pure capitalist, for whom $\sigma_i=0$. With no labor income, a capitalist's utility depends positively on the return to capital and negatively on the level of average consumption, both of which are increasing in the tax rate near $\tau=0$. Proposition 2 implies that if the taste for status is greater than the elasticity of output with respect to capital, $\gamma>\alpha$, then the latter effect dominates, and the capitalist prefers a zero tax. Relative to a pure capitalist, an individuals with a positive relative labor endowment has an additional incentive to raise taxes, since that increases her wage income and the utility derived from her consumption. Note also that the threshold for preferring a positive tax rate is strictly less than one. For an individual with $\sigma_i\geq 1$, the marginal utility of taxation from own consumption is at least as great as the marginal disutility of taxation acting through average consumption, so these individuals prefer a positive tax rate.

Next we derive the comparative statics of the preferred tax rate. Let $\gamma \in [0,1)$ and $\tau^*(\sigma_i, \gamma) > 0$ be the preferred tax rate of an agent with $\sigma_i > \underline{\sigma}(\gamma)$. Applying the implicit function theorem, we have:

$$\frac{d\tau^i}{d\sigma_i} = -\frac{V_{\tau\sigma}}{V_{\tau\tau}} = \frac{\rho^2 \omega'(\tau)}{\left(\sigma_i \omega(\tau) + \rho\right)^2} \left[\frac{-1}{V_{\tau\tau}}\right] > 0, \tag{2}$$

where the sign follows from part 1 of proposition 1. Thus, an individual's preferred tax rate is increasing in her relative labor endowment. This result is familiar from Alesina and Rodrik, and the mechanism is well understood. Since the wage is increasing in the tax rate, greater the weight of labor income in an agent's total income, the higher her preferred tax rate.

Applying the implicit function theorem with respect to the taste for status, we have

$$\frac{d\tau^*}{d\gamma} = -\frac{V_{\tau\gamma}}{V_{\tau\tau}} = \frac{\rho^2 \omega'(\tau)}{(1-\gamma)} \left[\frac{\sigma_i - 1}{\left(\sigma_i \omega(\tau) + \rho\right)\left(\omega(\tau) + \rho\right)}\right] \left[\frac{-1}{V_{\tau\tau}}\right] = \begin{cases} < 0, & \sigma_i < 1 \\ = 0, & \sigma_i = 1 \\ > 0, & \sigma_i > 1 \end{cases} \tag{3}$$

Intuitively, for an individual with a relatively high endowment of labor, $\sigma_i > 1$, the share of wages in her consumption is greater than the share of wages in average consumption. Therefore, an increase in the tax rate increases her relative consumption. An increase in the strength of relative income preferences raises the weight of relative consumption matters in her lifetime utility function, and thereby increases her preferred tax rate. In contrast, for an individual with a lower than average relative labor endowment, relative consumption is decreasing in the wage. Therefore an increase in the strength of relative income preferences will decrease the preferred tax rate of a relatively wealthy individual. These results provide a key insight into the relationship between an individual's relative labor endowment, the taste for status, and the desired level of public goods, and are summarized in the following proposition:

Proposition 4*: The Positionality of Public Goods.*

For agents with a greater than average relative labor endowment, public goods are *positional* relative to private goods in that the desired level of public finance is increasing in the taste for status. In contrast, for individuals with a lower than average relative labor endowment, private goods are *positional*, in that the desired level of public finance is decreasing in the taste for status.

Proof: *Proposition 4* follows from (3).

Section 3.2: Political Equilibrium

To make the model tractable, we assume that the distributions of wealth and political power interact in a simple way to determine political outcomes. In particular, we develop a simple political model in which policies are chosen by a pivotal voter with relative labor endowment, σ^p, so that the pivotal voter's preferred tax rate $\tau^*(\sigma^p, \gamma)$ is a political equilibrium, and the distribution of wealth and political power influence political outcomes through their impact on the relative labor endowment of the pivotal voter.

We model differences in the distribution of political power by permitting the weight of an individual in political decision making to vary with her relative labor endowment. In particular, we assume each enfranchised citizen is endowed with equal political power in the form of a single vote. However, differential suffrage gives rise to political systems with different degrees of democracy, with the suffrage depending on an individual's position in the hierarchy of wealth.[4] In particular, under a political system $D \in [0,1]$, an individual *i* may vote provided $i \in [0, D]$. This approach encompasses a continuum of political systems ranging from a *pure democracy*, $D = 1$, in which political power is evenly distributed, to a *capitalist dictatorship*, $D = 0$, in which political power is held by the most wealthy individual. In general, for $D < 1$, voting is restricted to a fraction D of population comprised of the wealthiest individuals. In this set up, the identity of the pivotal voter is given by

[4] Benabou (2000) notes that even in the absence of formal restrictions on the right to vote, the intensity of political participation increases in human capital, a form of wealth.

$$i^p = D/2 \tag{4}$$

.

According to Przeworkski (2009), the assumption that suffrage is restricted by wealth is in broad accord with the historical record, with most democracies restricting the vote on the basis of assets, income or tax payments at the beginning of the nineteenth century. Moreover, the extension of the franchise has often taken the form of changes in the economic requirements for suffrage. For example, in their history of suffrage in 19th century England, Lizzeri and Persico (2004) stress that all of the major parliamentary suffrage reforms of the century, the Great Reform Act of 1832, the 1867 Representation of the People Act, and the 1884 Franchise Act, relaxed the property restrictions on the franchise, from a significant property threshold to payment of a (nominal) property tax, expanding the enfranchised share of the population to nearly twenty percent. Similarly, according to Engerman and Sokoloff (2005) the extension of the franchise in the new world took the form of the gradual reduction of restrictions based on property ownership, with their gradual replacement by restrictions base on race in the US and on literacy, another form of capital ownership, in Latin America. Moreover, the most common non wealth-based criteria used to restrict the franchise, including age, gender and race, are in practice highly correlated with wealth, so that relaxing any of these restrictions has the *de facto* impact of decreasing the wealth of the median voter.

According to the median voter theorem, Downs (1957), in this political set up, the preferred tax of median voter will be a political equilibrium provided tax preferences are single-peaked, in that each voter's preferences have a unique local maximum in the policy space. In the absence of single-peaked preferences, voters may form winning coalitions around policy outcome that are second-best outcomes for some coalition members, giving rise to multiple equilibria. In order to avoid the complications inherent in the analysis of coalition politics, in the remainder of the paper we will assume that parameter values are such that policy preferences are single-peaked. The following proposition shows that such a set of parameters exists:

Proposition 5*: Single Peaked Preferences*

1. Given any $\gamma \in [0,1)$, there exists a non-degenerate set of parameters, $S_\gamma = \{(\alpha, \rho, A)\} \subset (0,1)^2 \times \mathbb{R}^+$, such that given $(\alpha, \rho, A) \in S_\gamma$, $\tau^*(\sigma_i, \gamma) \geq 0$ is the unique local maximum of $V(\tau, \sigma_i, \gamma)$ on $\tau \geq 0$.
2. Given $(\gamma_0, \alpha_0, \rho_0, A_0) \in S \equiv (\gamma, S_\gamma)$, $(\gamma_1, \alpha_1, \rho_1, A_1) \in S$ for $\gamma_1 \leq \gamma_0$, $\alpha_1 \geq \alpha_0$, $\rho_1 \leq \rho_0$, and $A_1 \geq A_0$. That is, the sufficient condition for $\tau^*(\sigma_i, \gamma)$ to be a unique local maximum is more likely to hold the greater the values of α and *A* and the smaller the values of γ and ρ.

Proof: *Proposition 5* is proved in the appendix.

The sufficient condition for the preferred tax rate to be a unique local maximum is derived from requirement for a critical point of *V* to be a local maximum. While *V* is concave in both the growth rate and the level of own consumption, it is convex in the level of average consumption. The proposition guarantees that a set of parameters exist such that at any critical point the concavity of *V* with respect to the growth rate exceeds its convexity with respect to average consumption, or more precisely, $V_{gg} r''(\tau) + V_{\overline{c}\overline{c}} \omega''(\tau) < 0$. Intuitively, this occurs when the return to capital is large relative to the disutility of average consumption, or equivalently, when α and *A* are relative large and γ and ρ are relatively small, which is the basis of part 2 of the proposition.

A final consideration has to do with the role of wealth inequality in political outcomes. Because political outcomes are determined by the relative labor endowment of a single voter, a given level of wealth inequality is consistent with a wide variety of political equilibria, depending on how a given distribution affects the relative labor endowment of the pivotal voter. To avoid this indeterminacy, when we refer to an increase in inequality, we will restrict attention to what may be considered the canonical case of rising inequality, in which "the rich get richer and the poor get poorer." In particular, given an initial distribution of capital with Gini coefficient G^k, we will define a *canonical change in wealth inequality* to be a mean preserving redistribution of capital such that

$$\frac{d\sigma_i}{dG^k} = \begin{cases} >0, & \text{for } \sigma_i > 1 \\ =0, & \text{for } \sigma_i = 1. \\ <0, & \text{for } \sigma_i < 1 \end{cases} \quad (5)$$

Thus, individuals with higher than average initial capital stocks see their share of capital rise, and those with lower than average capital shares see their share of capital fall. While not part of the analysis below, the model may easily be applied to analyze other types of changes in wealth inequality, such as the case in which the middle class gains with respect to both the rich and the poor, as often happens in industrializing countries.

We may now describe the political equilibrium:

Proposition 6*: Political Equilibrium*

Given $(\gamma, \alpha, \rho, A) \in S$, an initial distribution of wealth $F(i) = k_{i0}$, and a political system D as described above, there is a unique political equilibrium. The equilibrium tax is the determined by the relative labor endowment of the pivotal voter, $\tau^*(\sigma^p, \gamma) \geq 0$, which is a function of the levels of wealth inequality and democracy, $\sigma^p = \sigma^p(D, G^k)$. Moreover, the relative labor endowment of pivotal voter is

1. increasing in level of democracy: $\sigma_D{}^p(D, G^k) > 0$,
2. equal to that of the median voter in a pure democracy, $\sigma^p(1, G^k) = \sigma^m$,
3. equal to one in an egalitarian society, $\sigma^p(D, 0) = 1$, and
4. and may be increasing or decreasing with canonical changes in wealth inequality, depending on the relative labor endowment of the pivotal voter:

$$\sigma_G{}^p(D, G^k) \begin{cases} >0, & \text{for } \sigma^p > 1 \\ =0, & \text{for } \sigma^p = 1 \\ <0, & \text{for } \sigma^p < 1 \end{cases}.$$

Proof: *Proposition 6* follows from *Proposition 5* and equations (4) and (5).

The partial derivatives in Proposition 6 follow directly from the manner in which we model democracy in (4) and the restrictions placed on changes in wealth inequality in (5). For a given level of democracy, an increase in wealth inequality increases the relative labor endowment of the pivotal voter. In addition, given the initial distribution of capital, an increase in democracy shifts political power toward less wealthy individuals, such that the pivotal voter has a higher relative labor endowment.

Applying proposition 6 also allows us to identify the interaction of wealth and political inequality in determining the relative labor endowment of the pivotal voter. Totally differentiating $\sigma^p = \sigma^p(D, G^k)$ and setting $d\sigma^p = 0$, we have

$$\frac{dD}{dG^k} = -\frac{\sigma^p_{G^k}}{\sigma^p_D}\begin{cases} < 0 & \sigma^p > 1 \\ = 0 & \sigma^p = 1. \\ > 0 & \sigma^p < 1 \end{cases} \qquad (6)$$

Thus, for societies in which the pivotal voter is rich, political and economic inequality act as substitutes in determining the relative labor endowment of the pivotal voter. An increase in the level of democracy may be offset by a rise in wealth inequality to maintain the same political equilibrium. Alternately, in a society in which the pivotal voter is poor, political and economic inequality act as complements. In this case, a rise in democracy requires a fall in wealth inequality to maintain a political equilibrium.

Section 3.3: Comparative Statics of Growth and Redistribution with a Pivotal Voter

In the previous section, we showed that under certain assumptions, the political equilibrium results in the selection of the preferred tax policy of a pivotal voter and considered how the identity of the pivotal voter varies for societies with different levels of democracy and wealth inequality. Here, we ignore the process by which the pivotal voter is selected. We assume that some particular individual has been selected to choose the national tax policy, and consider the implications of that individual's preferred tax rate for economic growth and inequality.

A good starting point for our analysis is to ask under what conditions the pivotal voter will choose the growth maximizing tax rate. Recall that the return to capital and the growth rate rise and then fall in the tax rate, with the maximum growth rate occurring at $\hat{\tau} = \left(\alpha(1-\alpha)A\right)^{1/\alpha} > 0$, at which we have $g'(\hat{\tau}) = r'(\hat{\tau}) = 0$. Expressing the first order condition parametrically in terms of the growth rate and normalized wage, $V_\tau\left(g(\tau),\omega(\tau)\right)=0$, we see that at the preferred tax rate, the utility gains from a higher normalized wage must be just offset by the change in utility due to the change in the growth rate:

$$V_g\left(g(\tau),\omega(\tau)\right)g'(\tau)+V_\omega\left(g(\tau),\omega(\tau)\right)\omega'(\tau)=0. \tag{7}$$

Since $V_g\left(g(\tau),\omega(\tau)\right)=(1-\gamma)>0$ and $\omega'(\tau)>0$, $g'(\tau)=0 \Leftrightarrow V_\omega\left(g(\tau),\omega(\tau)\right)=0$. Intuitively, for the pivotal voter to prefer tax rate that maximizes the rate of economic growth, she must target the growth rate exclusively. For this to happen, she must be indifferent to the effects of the tax of the level of wages. More formally, $V_\omega(\tau^p;\sigma^p,\gamma)=0$ will hold provided

$$\frac{\sigma^p\omega(\tau^p)}{\sigma^p\omega(\tau^p)+\rho}=\gamma\frac{\omega(\tau^p)}{\omega(\tau^p)+\rho}. \tag{8}$$

This condition is met when the share of wages income in the pivotal voter's own consumption equals gamma times the share of wages in average consumption. Given $\gamma\in(0,1)$, there will be a single value of the relative labor endowment that satisfies this relationship. If the pivotal voter's relative labor endowment is above this value, the marginal utility of wages will be positive, and she will prefer a tax rate that is above the growth maximizing level. Alternately, if the pivotal voter's relative labor endowment is below this level, then she will prefer a tax rate that is below the growth maximizing level. These remarks are summarized formally in proposition 7:

Proposition 7*: Political Equilibrium and the Growth-Maximizing Tax Rate*

Given $\left(\gamma,\alpha,\rho,A\right)\in S$, there exists a threshold level of the relative labor endowment,

$\hat{\sigma}(\gamma)=\dfrac{\gamma\rho}{(1-\gamma)\omega(\hat{\tau})+\rho}\geq 0$, where $\hat{\sigma}'(\gamma)\geq 0,\ \hat{\sigma}(0)=0,$ and $\hat{\sigma}(1)=1$, such that:

1. If $\sigma^p=\hat{\sigma}(\gamma)$, then the pivotal voter prefers the growth maximizing tax rate, $V_\omega\left(g\left(\tau^*(\sigma^p,\gamma)\right),\omega\left(\tau^*(\sigma^p,\gamma)\right)\right)=0$, $\tau^*(\sigma^p,\gamma)=\hat{\tau}$, and the economy grows at its maximum rate, $g\left(\tau^*(\sigma^p,\gamma)\right)=\hat{g}$.

2. If $\sigma^p < \hat{\sigma}(\gamma)$, then $\tau^*(\sigma^p,\gamma) < \hat{\tau}$, $V_\omega\left(g\left(\tau^*(\sigma^p,\gamma)\right),\omega\left(\tau^*(\sigma^p,\gamma)\right)\right) < 0$, $g\left(\tau^*(\sigma^p,\gamma)\right) < \hat{g}$, and $g'\left(\tau^*(\sigma^p,\gamma)\right) > 0$.
3. If $\sigma^p > \hat{\sigma}(\gamma)$, then $\tau^*(\sigma^p,\gamma) > \hat{\tau}$, $V_\omega\left(g\left(\tau^*(\sigma^p,\gamma)\right),\omega\left(\tau^*(\sigma^p,\gamma)\right)\right) > 0$, $g\left(\tau^*(\sigma^p,\gamma)\right) < \hat{g}$, and $g'\left(\tau^*(\sigma^p,\gamma)\right) < 0$.

Proof: *Proposition 7* is proved in the appendix.

Proposition 7 has a nice graphic interpretation. Rearranging terms in (7), we may write the first-order condition for the pivotal voter's preferred tax rate as

$$\frac{g'(\tau)}{\omega'(\tau)} = -\frac{V_\omega\left(g(\tau),\omega(\tau)\right)}{V_g\left(g(\tau),\omega(\tau)\right)}. \tag{9}$$

In this expression, the preferred tax rate is such that the marginal rate of transformation between growth and the normalized wage rate equals the marginal rate of substitution between these two variables. The left hand side of this expression is the slope of the locus of feasible combinations of growth and wages, which we define parametrically, $\left(g(\tau),\omega(\tau)\right)$. Intuitively, this ratio reflects the tradeoff between the growth rate and the normalized wage rate as a function of level of taxes. The right hand side of this expression, $-V_\omega / V_g$, is the slope of an indifference curve in $g-\omega$ space and equals the relative contribution of wages and growth to lifetime utility.

Figure 1 illustrates growth and wage outcomes for three potential pivotal voters with relative labor endowments given by $\sigma_1 < \sigma_2 < \sigma_3$ where $\sigma_2 = \hat{\sigma}(\gamma_0)$ and $\gamma_0 \in (0,1)$. Because $\sigma_1 < \hat{\sigma}(\gamma_0)$, the first individual's utility is decreasing in the wage, $V_\omega\left(\tau;\sigma_1,\gamma_0\right) < 0$, implying a positively sloped indifference curve, so that $\tau^*(\sigma_1,\gamma_0) < \hat{\tau}$ .and $g'\left(\tau^*(\sigma_1,\gamma_0)\right) > 0$. For the second individual, $\sigma_2 = \hat{\sigma}(\gamma_0)$ implies $V_\omega\left(\tau;\sigma_2,\gamma_0\right) = 0$, so that this individual prefers the growth maximizing tax rate: $\tau^*(\sigma_2,\gamma_0) = \hat{\tau}$ and $g'\left(\tau^*(\sigma_1,\gamma_0)\right) = 0$ Finally, due to her relatively high relative labor endowment, $\sigma_3 > \hat{\sigma}(\gamma_0)$, the third individual's utility is increasing in the wage, $V_\omega(\tau;\sigma_2,\gamma_0) > 0$, resulting in a negatively sloped indifference curve and an equilibrium with $\tau^*(\sigma_2,\gamma_0) > \hat{\tau}$ and $g'(\tau^*(\sigma_1,\gamma_0)) < 0$.

Note that the rates of growth at the preferred tax rate of the first and third agents are both less than the maximum growth rate, though for different reasons. In the first case, with $\sigma_1 < \hat{\sigma}(\gamma_0)$, the growth rate is lower than its maximum value because the pivotal voter is wealthy and her taste for status leads her to prefer a tax rate that results in the undersupply of productive publics goods, relative to the level that would maximize growth. In contrast, in the third case, with $\sigma_3 > \hat{\sigma}(\gamma_0)$, the relative labor endowment of the pivotal voter is high, and an interest in the effect of public goods on wage rates leads to a high tax rate that reduces the incentive to accumulate capital goods.

Next we derive the effects of changes in the taste for status and the relative labor endowment of the pivotal voter on income and consumption inequality. Given $(\gamma,\alpha,\rho,A) \in S$ and $\sigma_i > \underline{\sigma}(\gamma) = \dfrac{\gamma-\alpha}{1-\alpha}$, such that the equilibrium tax rate is positive, it follows that income and consumption inequality are decreasing in the relative labor endowment of the pivotal voter:

$$\begin{aligned} \frac{dG_y}{d\sigma^p} &= \left[\frac{dG_y}{d\tau}\right]\left[\frac{d\tau^p}{d\sigma^p}\right] < 0 \\ \frac{dG_c}{d\sigma^p} &= \left[\frac{dG_c}{d\tau}\right]\left[\frac{d\tau^p}{d\sigma^p}\right] < 0 \end{aligned}. \tag{10}$$

As noted earlier, an increase in the taste for status increases the strength of preferences over distributional outcomes relative to individual consumption or economic growth. This is reflected in the comparative statics of income and consumption inequality with respect to the taste for status:

$$\frac{dG_y}{d\gamma}\begin{cases} > 0, & \sigma^p < 1 \\ = 0, & \sigma^p = 1 \\ > 0, & \sigma^p > 1 \end{cases}$$
$$\frac{dG_c}{d\gamma}\begin{cases} > 0, & \sigma^p < 1 \\ = 0, & \sigma^p = 1 \\ > 0, & \sigma^p > 1 \end{cases} \tag{11}$$

These results follow directly from Proposition 4 and the negative relationship between the prevailing tax rate and the levels of consumption and income inequality. Intuitively, they reflect the fact that a rise in the taste for status increases the weight of distributional outcomes in an individual's utility function. Thus, if the pivotal voter is relatively wealthy, a rise in the taste for status results in greater inequality of income and consumption, whereas if the pivotal voter is relatively poor, a rise in the taste for status results in a decrease in these forms of inequality.

Section 4: Political Economy of Growth with Relative Income Preferences

In the discussion below, we group individual societies into four categories reflecting the comparative statics of growth and inequality and discuss the political economy of growth and inequality for each category. Holding production parameters and the discount rate constant, a society is uniquely identified as a member of one of these categories by an order triple indicating its level of democracy, its level of initial wealth inequality and its taste for status, $\left(D, G_k, \gamma\right)$. However, since political and wealth inequality affect comparative static outcomes through their impact on the relative labor endowment of the pivotal voter, these societies may also be characterized by the ordered pair, $\left(\sigma^p, \gamma\right)$, which permits a simple graphic illustration.

Figure 2 shows the relationship between the taste for status, the pivotal voter's relative labor endowment, and the equilibrium tax rate. Each of the dashed lines in figure 2 consists of combinations of $(\sigma^p, \gamma) \in \mathbb{R}^+ x\left[0,1\right]$ that generate the same equilibrium tax rate. We also use heavy lines to highlight parameter combinations associated with three equilibrium tax rates. First, the heavy line indicating the $\tau^* = \overline{\tau}$ locus is vertical at $\sigma^p = 1$ for $\gamma \in \left[0,1\right)$ and consists of combinations of parameter values such that the average voter is pivotal. This is the tax rate that would prevail in an egalitarian society in which all agents had the same initial capital endowment. Second, the heavy line identified as the $\tau^* = \hat{\tau}$ locus is defined by $\sigma^p = \hat{\sigma}(\gamma)$ and consists of combinations of $(\sigma^p, \gamma) = (0, \alpha)$ such that the preferred tax rate of the pivotal voter maximizes the growth rate. This locus is upward sloping and concave in $\sigma^p - \gamma$ space and passes through the points $(0,0)$ and $(1,1)$. Third, the heavy line identified as the $\tau^* = 0$ locus is defined by $\underline{\sigma}(\gamma) = \dfrac{\gamma - \alpha}{1 - \alpha}$. It consists of a straight line through the points $(\sigma_i, \gamma) = (0, \alpha)$ and $(\sigma_i, \gamma) = (1,1)$ and corresponds to parameter combinations such that the preferred tax rate is zero. The equilibrium tax rate rises as one moves from left to right on the graph. From (XX), iso-tax lines are also iso-growth lines. Moving left to right, the growth rate rises until one reaches the $\tau^* = \hat{\tau}$ locus and falls thereafter.

The four regions defined by these thresholds, the axes and the line $\gamma = 1$, define areas of the parameter space within which the comparative statics of growth and inequality have the same signs. A society's location in region I-IV serves to characterize it as being one of four types, which may be descriptively characterized as a proletarian democracy, a plutocratic democracy, a status-oriented oligarchy, and a non-developmental oligarchy. Figure 3 illustrates the equilibrium growth rate and normalized wage rate for a proletarian democracy, a plutocratic democracy and a status-oriented oligarchy. In interpreting this figure, recall that income inequality is decreasing in the normalized wage, such that equilibria further to the right are associated with lower levels of income inequality.

Region I consists of combinations of $(\sigma^p, \gamma) \in \mathbb{R}^+ x\left(0,1\right]$ that lie to the right of the line $\sigma^p = 1$ that is $R^I = \left\{(\sigma^p, \gamma) \mid (\sigma^p, \gamma) \in \left(1, \infty\right) x\left(0,1\right]\right\}$. These are societies in which political power is sufficiently evenly distributed that the pivotal voter is poorer than the average individual. Note also that this region includes a subset of egoistic societies, which are located along the horizontal axis in Figure 2. Because the pivotal voter in this region has a greater than average labor endowment, we characterize these societies as *proletarian democracies*. With political power in the hands of a relatively poor individual, tax rate is higher, and the growth rate lower, than they would be in an egalitarian society: $\tau^* > \overline{\tau}$ and $g(\tau^*) < g(\overline{\tau})$.

Region II consists of combinations of $(\sigma^p, \gamma) \in \mathbb{R}^+ x(0,1]$ that lie between the *maximum growth locus* and the *egalitarian tax locus*, e.g. $R^{II} = \{(\sigma^p, \gamma) \,|\, (\sigma^p, \gamma) \in (\hat{\sigma}(\gamma), 1)\, x(0,1]\}$. Like Region I, this region includes a subset of egoistic societies, located along the horizontal axis. However, in this region the pivotal voter is still relative wealthy, as indicated by $\sigma^p < 1$. Thus, political power and wealth are more concentrated than in a proletarian democracy, with the pivotal voter richer than the average individual. In view of these distinctions, we refer to societies in Region II as *plutocratic democracies*.

Region III consists of combinations of $(\sigma^p, \gamma) \in \mathbb{R}^+ x(0,1]$ that lie between the *zero-tax locus* and the *maximum growth locus*, e.g. $R^{III} = \{(\sigma^p, \gamma) \,|\, (\sigma^p, \gamma) \in (\underline{\sigma}(\gamma), \hat{\sigma}(\gamma))\, x(0,1)\}$. In this region, political power is highly concentrated among the wealthy. Moreover, societies in this region are status-oriented in that this region does not include any points along the horizontal axis. Given these characteristics, we refer to societies in Region III as *status-oriented oligarchies*.

In a status-oriented oligarchy, the equilibrium tax rate the provision of public goods is below the level necessary to maximize the growth rate. This outcomes reflects the low relative labor endowment of the pivotal voter and a preference for status, which together imply that the marginal utility of the normalized wage rate is negative for the pivotal voter. With low levels of taxation, these societies are also characterized by relatively high levels of income inequality for a given initial distribution of capital. Recalling that the relative labor endowment of the pivotal voter will tend to be low in societies high levels of economic and political inequality, these outcomes nicely capture the intuition behind Sokoloff and Engerman's (2000) assertion that in colonies with highly concentrated political and economic power, elites deliberately adopted policies designed to maintain their relative status, even though these same policies simultaneously tend to undermine economic growth. Examples include the under provision of public education.

Region IV lies above $\tau^*(\sigma^p, \gamma) = 0$ locus and the consists of societies with either extreme concentrations of political power among the wealthy or an extreme taste for status, which together result in an equilibrium tax rate that is zero: $R^{IV} = \{(\sigma^p, \gamma) \,|\, (\sigma^p, \gamma) \in (0, \underline{\sigma}(\gamma))\, x(0,1)\}$. Intuitively, for an increase in the tax rate above zero, the gains from an increase in the return to capital, consisting of higher income for capital owners and a faster growth rate, are outweighed by the loss of status due to rising wages. Because this region is associated with a wealthy political elite that refuses to provide productive public goods, we refer to societies in this region as "non-developmental oligarchies."

In a non-developmental oligarchy, output and the returns to capital and labor are identically zero, each individual consumes her capital stock at a constant rate, $c_i(t) = e^{-\rho t} k_{i0}$, the growth rate of consumption is negative, and the inequality of capital and consumption are equal. Moreover, the equilibrium tax is insensitive to marginal changes in the distribution of capital and political power, which influence economic outcomes through their impact on the relative labor endowment of the pivotal voter, have no impact on the rate of economic growth.

These relatively unrealistic outcomes are a result of modeling choices in which we limit the political and economic actions available to agents in the model. There are two alternatives for establishing a lower bound on income levels and growth rates that might provide more realistic outcomes. First, if the poor may revolt if the tax rate falls below some critical level, e.g. XXX. Second, in the absence of revolt, it may be possible for wealthy individuals to engage in the private, and therefore excludable, production of public goods. The private provision of otherwise non-rival goods is not uncommon in developing countries, particularly among large land owners, including private physical infrastructure such as roads and airports, and militias for the private enforcement of property rights.

Section 4.2: Growth, Income Inequality and the Taste for Status across Societies

In this section we investigate how the taste for status affects the rate of economic growth and level of income inequality, and how these relationships vary across the different types of societies defined above. Differentiating growth with respect to taste for status, we have the following relationship:

$$\frac{dg}{d\gamma} = \begin{cases} \overset{-}{\frac{dg}{d\tau}} \overset{+}{\frac{d\tau}{d\gamma}} < 0 & \left(\sigma^p, \gamma\right) \in R^I \\ \overset{-}{\frac{dg}{d\tau}} \frac{d\tau}{d\gamma} = 0 & \sigma^p = 1 \\ \overset{-}{\frac{dg}{d\tau}} \overset{-}{\frac{d\tau}{d\gamma}} > 0 & \left(\sigma^p, \gamma\right) \in R^{II} \\ \frac{dg}{d\tau} \overset{+}{\frac{d\tau}{d\gamma}} = 0 & \sigma^p = \hat{\sigma}(\gamma) \\ \overset{+}{\frac{dg}{d\tau}} \overset{-}{\frac{d\tau}{d\gamma}} < 0 & \left(\sigma^p, \gamma\right) \in R^{III} \end{cases} \quad (1)$$

The comparative statics of an increase in the taste for status for a proletarian democracy, plutocratic democracy and status-oriented oligarchy are illustrated in Figure 4.

In a proletarian democracy, the equilibrium tax rate is increasing in the taste for status. This occurs because the pivotal voter's level of consumption is more sensitive to changes in the wage than is average consumption, and as a result, her relative wage is increasing in the tax rate. It follows that a rise in the taste for status increases the marginal utility of the wage rate, resulting in a higher equilibrium tax. Furthermore, because Region I is to the right of the growth-maximizing tax locus, growth is decreasing in tax rate. Take together, these relationships imply that growth is decreasing in the taste for status.

In contrast, in a plutocratic democracy, a the pivotal voter is richer than average, so a rise in the taste for status leads to a decrease in the equilibrium tax rate. Intuitively, an increase in status preferences causes the pivotal voter to moderate her tendency to tax the rich for redistributional purposes, resulting in higher growth rate and higher level of income inequality. By a similar logic, a rise in the taste for status reduces the equilibrium tax rate in a status oriented oligarchy. However, in this case, the level of public goods is less than that required to maximize the growth rate, so a fall in the tax rate reduces the rate of economic growth.

Thus, the analysis suggests that the relationship between growth and the taste for status is non-linear and depends in part on the distribution of political authority in a given society. In highly democratic or highly oligarchic societies, the pivotal agent is near the ends of the distribution of relative factor endowments and therefore has preferences that differ relatively strongly from the those of the average voter. An increase in the taste for status increases the weight of distributional outcomes in the determination of the equilibrium tax rate. Relative to the growth-maximizing tax rate, this increases the over-taxation of society if the pivotal voter is poor, and increases the under-provision of public goods if the pivotal voter is rich. In contrast, in a society with an intermediate level of political inequality, an increase in the preference for status leads the relatively wealthy pivotal voter to reduce the weight places on current consumption, raising the rate of economic growth.

A similar logic underlies the relationship between the taste for status and income inequality. In this case, however, the relationship is somewhat simpler, as income inequality is decreasing in the tax rate for all societies. Thus, we have

$$\frac{dG^y}{d\gamma} = \begin{cases} \frac{\overset{-}{dG^y}}{d\tau}\frac{\overset{+}{d\tau}}{d\gamma} < 0 & \sigma^p > 1 \\ \frac{\overset{-}{dG^y}}{d\tau}\frac{d\tau}{d\gamma} = 0 & \sigma^p = 1 \\ \frac{\overset{-}{dG^y}}{d\tau}\frac{\overset{-}{d\tau}}{d\gamma} > 0 & \sigma^p < 1 \end{cases} \tag{2}$$

Thus, income inequality is decreasing in the taste for status in an proletarian democracy and increasing in the taste for status in a plutocratic democracy or status-oriented oligarchy. On the threshold between regions I and II, the pivotal voter has the average relative labor endowment and consumes the average consumption bundle. Because of this, her tax preferences are unaffected by changes in the taste for status. Note that in both proletarian and plutocratic democracies, changes in the taste for status generate a trade-off between growth and equality, in a status-oriented oligarchy no such trade-off exists. Comparing two otherwise similar status oriented oligarchies, the one with the lower taste for status will have higher growth rates and a lower level of income inequality.

Section 4.3: Growth, Income Inequality and Democracy across Societies

In all societies, a democratizing political reform will change the identity of the pivotal voter, resulting in a political equilibrium in which the pivotal voter has a greater relative labor endowment and, thus, prefers a higher tax rate. However, the implications for growth of the increase in the tax rate differs across societies. Differentiating the growth rate with respect to the level of democracy, we have

$$\frac{dg}{dD} = \begin{cases} \overset{-}{\frac{dg}{d\tau}} \overset{+}{\frac{d\tau}{d\sigma^p}} \overset{+}{\frac{d\sigma^p}{dD}} < 0, & \sigma^p > \hat{\sigma}(\gamma) \\ \overset{0}{\frac{dg}{d\tau}} \overset{+}{\frac{d\tau}{d\sigma^p}} \overset{+}{\frac{d\sigma^p}{dD}} = 0, & \sigma^p = \hat{\sigma}(\gamma) \\ \overset{+}{\frac{dg}{d\tau}} \overset{+}{\frac{d\tau}{d\sigma^p}} \overset{+}{\frac{d\sigma^p}{dD}} > 0, & \sigma^p < \hat{\sigma}(\gamma) \end{cases} \tag{3}$$

Thus, democratization reduces growth in proletarian and plutocratic democracies, but increases growth in a status oriented oligarchy. For the two types of democracies, the comparative statics of growth and democracy, and the mechanisms underlying them, are identical to those outlined by Alesina and Rodrik (1994): an increase in democracy reduces the relative wealth of the pivotal voter, raising the equilibrium tax rate and decreasing growth and income inequality. In a a status oriented oligarchy, however, the initial tax rate is below the level necessary to maximize the rate of economic growth, so a rise in the tax rate increases the growth rate.

Because income inequality is decreasing in the tax rate, an increase in democracy reduces the level of income inequality in all three types of societies:

$$\frac{dG^y}{dD} = \overset{-}{\frac{dG^y}{d\tau}} \overset{+}{\frac{d\tau}{d\sigma^p}} \overset{+}{\frac{d\sigma^p}{dD}} < 0\,. \tag{4}$$

The comparative statics of a rise in democracy are illustrated in Figure 5. Our results indicate that democratization generates a trade-off between growth and equality in societies that are relatively democratic and not too status-oriented. However, for a status oriented oligarchy, no such trade-off exists. An increase in democracy simultaneously increases the growth rate and decreases the level of income inequality.

Section 4.4: Growth, Income Inequality and Wealth Inequality across Societies

A canonical increase in wealth inequality corresponds to a redistribution of capital such that the rich get richer and the poor get poorer. In this framework, this results in an increase on the relative labor endowment of poor individuals and a decrease in the relative labor endowments of rich individuals. Differentiating the growth rate with respect to the level of wealth inequality, we have

$$\frac{dg}{dG^k}=\begin{cases}\overset{-}{\frac{dg}{d\tau}}\overset{+}{\frac{d\tau}{d\sigma^p}}\overset{+}{\frac{d\sigma^p}{dG^k}}<0 & \left(\sigma^p,\gamma\right)\in R^I\\ \overset{-}{\frac{dg}{d\tau}}\overset{+}{\frac{d\tau}{d\sigma^p}}\overset{0}{\frac{d\sigma^p}{dG^k}}=0 & \sigma^p=1\\ \overset{-}{\frac{dg}{d\tau}}\overset{+}{\frac{d\tau}{d\sigma^p}}\overset{-}{\frac{d\sigma^p}{dG^k}}>0 & \left(\sigma^p,\gamma\right)\in R^{II}\\ \overset{0}{\frac{dg}{d\tau}}\overset{+}{\frac{d\tau}{d\sigma^p}}\overset{-}{\frac{d\sigma^p}{dG^k}}=0 & \sigma^p=\hat{\sigma}(\gamma)\\ \overset{+}{\frac{dg}{d\tau}}\overset{+}{\frac{d\tau}{d\sigma^p}}\overset{-}{\frac{d\sigma^p}{dG^k}}<0 & \left(\sigma^p,\gamma\right)\in R^{III}\end{cases} \tag{5}$$

Thus, the effect of a rise in wealth inequality on economic growth differs across societies. In a proletarian democracy, it increases the relative labor endowment of the pivotal voter, raising the equilibrium tax rate, and decreasing the growth rate. In a plutocratic democracy, however, the pivotal voter is richer than average, so an increase in wealth inequality reduces the relative labor endowment of the pivot voter, reducing the equilibrium tax rate and increasing the rate of growth. The logical progression underlying a status oriented society is similar, except that a fall in the tax rate reduces the rate of economic growth. Thus policies that tend to concentrate a country's wealth among a relative narrow elite will tend to tend to reduce growth in societies already characterized by high levels of wealth and political inequality. These comparative statics are illustrated in Figure 6.

Changes in wealth inequality affect income inequality through to channels. First, there is the direct effect of wealth inequality on the distribution of capital income. Second, there is the indirect political economy effect of wealth inequality on income inequality, which acts through the impact of wealth inequality on the tax preferences of the pivotal voter. In particular, we have

$$\frac{dG^y}{dG^k} = \begin{cases} \overset{+}{\frac{G^y}{G^k}} + \overset{-}{\frac{dG^y}{d\tau}} \overset{+}{\frac{d\tau}{d\sigma^p}} \overset{+}{\frac{d\sigma^p}{dG^k}} >< 0 & \sigma^p > 1 \\ \overset{+}{\frac{G^y}{G^k}} + \overset{-}{\frac{dG^y}{d\tau}} \overset{+}{\frac{d\tau}{d\sigma^p}} \overset{0}{\frac{d\sigma^p}{dG^k}} > 0 & \sigma^p = 1 \\ \overset{+}{\frac{G^y}{G^k}} + \overset{-}{\frac{dG^y}{d\tau}} \overset{+}{\frac{d\tau}{d\sigma^p}} \overset{+}{\frac{d\sigma^p}{dG^k}} > 0 & \sigma^p > 1 \end{cases} \quad (6)$$

In each case, the direct effect of an increase in wealth inequality is to increase income inequality. However, in a proletarian democracy, the indirect political economy effects works in the opposite direction, with an increase in wealth inequality increasing the preferred tax of the pivotal voter, which raises the normalized wage and reduces the inequality of income. Thus, the total effect is indeterminate, as direct effect may be partly or fully offset by the indirect effect.

Section 5: Democracy, Wealth Inequality and Economic Growth with a Taste for Status

Attempting to compare the model's predictions to the existing empirical record, one faces several challenges. First, many of model's key predictions involve the role of status preferences in economic outcomes, and while the empirical literature on subjective well-being has identified a taste for status as a key departure from the standard assumption of egoistic preferences, to the best of our knowledge Davis and Wu (2012) is the only paper that attempts to estimate the international variation in the taste for status. Moreover, there has been no work to date exploring the central issue addressed in this paper, namely how variations in the taste for status interacts with the distributions of wealth and political power to generate economic outcomes related to growth and income inequality. However the model also generates predictions regarding the roles of democracy and wealth inequality in economic growth, and if a statistically "average" country has a positive taste for status, then existing empirical work may be expected to reflect patterns associated with a taste for status. We begin by considering the relationship between democracy and economic growth in a status-oriented society.

Section 5.1: Democracy and Growth in a Status-Oriented Society

Here we draw on the results above to summarize the relationship between the taste for status, democracy, and growth. This highlights some important distinctions between our results and those of Alesina and Rodrik (1994). To begin with, consider an egoistic society over the range of political systems from a dictatorship to a full democracy. In an egoistic dictatorship, political power in concentrated in the hands in a pure capitalist, such that $(\sigma^p, \gamma) = (0, 0)$, which corresponds to the origin in the graph in Figure 2. Since she has no labor income, an egoistic capitalist prefers the growth maximizing tax rate. If we permit the level of democracy to rise, this society moves along the horizontal axis, so that more democratic societies are associated with higher rates of taxation, lower growth rates, and lower levels of income inequality. These results are familiar from Alesina and Rodrik (1994), who present a model that is identical to the one developed here for an egoistic society. The relationship between democracy and growth in an egoistic society is shown in figure 7 by the line $g(D \mid \gamma = 0)$.

Next, consider a status oriented society with $\gamma_0 \in (0, \alpha)$. Again, we begin with a dictatorship, such that $(\sigma^p, \gamma) = (0, \gamma_0)$, indicating that the society is a status-oriented oligarchy located on the vertical axis in Figure 2. However, because the capitalist dictator is status-oriented, she will choose a tax rate that is below the growth-maximizing level. That is, she sacrifices both capital income and economic growth in order to increase her relative consumption. As before, successive democratic reforms will increase the relative labor endowment of the pivotal voter and raise the equilibrium tax rate. In a status-oriented society, however, the growth rate will initially rise in the tax rate, as the society approaches the $\tau = \hat{\tau}$, reaching its highest point at $g(\hat{\tau})$. Thereafter the growth rate falls in the level of democracy after the society transitions to being a plutocratic democracy. The relationship between democracy and growth is illustrated in figure 3 by $g(D \mid \gamma_0 > 0)$.

Note also that there is a level of democracy at which the two curves cross. At this point, the level of democracy is such that the average individual is pivotal, $\sigma^p = 1$, and the rate of economic growth is given by $g(\bar{\tau})$. Because this individual consumes the average level of consumption, her preferred tax rate is independent of the taste for status. More specifically, let

$$D = D(\overset{+}{\sigma^p}, \overset{-}{G^k}) \tag{1}$$

be implicitly defined by $\sigma^p = \sigma^p(D, G^k)$. Then the intersection of the two growth-democracy curves occurs at $\bar{D} = D(1, G^k)$, where $\sigma^p(\bar{D}, G^k) = 1$, and this level of democracy is invariant to canonical changes in wealth inequality and independent of the taste for status. Furthermore, level of democracy that at which growth is maximized $\hat{D} = D(\hat{\sigma}(\gamma), G^k)$ is given is implicitly defined by $\hat{\sigma}(\gamma) = \sigma^p(\hat{D}, G^k)$. Totally differentiating this expression, we have

$$\begin{aligned} \frac{d\hat{D}}{d\gamma} &= \frac{\hat{\sigma}_\gamma}{\sigma_D^p} > 0 \\ \frac{d\hat{D}}{dG^k} &= \frac{-\sigma_{G^k}^p}{\sigma_D^p} > 0. \end{aligned} \tag{2}$$

This discussion is summarized in proposition 8:

Proposition 8*: Status Orientation, Democracy and Growth*

Given $(\gamma, \alpha, \rho, A) \in S$, so that tax policy preferences are single peaked,

1. The maximum potential growth rate for a society is given by $g(\hat{\tau})$, a value that is independent of the taste for status.
2. In an egoistic society, growth is maximized in a capitalist dictatorship and is monotonically decreasing in the level of democracy.
3. In a status oriented-society, a capitalist dictator chooses a tax rate such that growth is below its maximum rate. The growth rate is initially increasing in the level of democracy, reaches its maximum rate at a critical level of democracy $\hat{D}$, and is falling in the level of democracy thereafter.

4. In societies with greater wealth inequality or a greater taste for status, a higher level of democracy is necessary to maximize growth.
5. Given the initial level of wealth inequality, there exists a level of democracy, $\bar{D} = D(1, G_k)$, such that $\sigma^p(\bar{D}, G_k) = 1$. At $\bar{D}$, the growth rate is given by $g(\bar{\tau})$.

In this exercise, Alesina and Rodrik's finding that growth is maximized in a capitalist dictatorship is shown to be a special case that obtains only in an egoistic society. The more general pattern is that growth is maximized at a level of democracy that is increasing in the taste for status.

The model's prediction that growth rises and falls in the level of democracy for a status oriented society is in keeping with Barro's (1998) finding of quadratic relationship between democracy and growth that generates an inverted U-shape as democracy rises. The mechanism in the model that generates this pattern also closely related the interpretation that Barro provides, namely that at low levels of democracy, there are gains from increases in the rule of law, while at higher levels of democracy these gains are offset by the distortions associated with redistribution. In this interpretation key dimensions of institutional quality, such as the protection of property right and the impersonal administration of justice, are key public goods that are underprovided at low levels of democracy, as suggested by Rivera-Batiz (2002).

Much of the empirical work on the role of democracy in economic growth looks for a linear relationship and would thus be unable test for the existence of the inverted-U shaped relationship noted above. The model's predictions regarding the outcome of a linear regression depends in part on which kind of society one believes the data in question identify most economies as belonging to. In particular, if most of the world countries are characterized as status oriented oligarchies, then we would expect a positive relationship between democracy and growth, whereas if most societies are plutocratic or proletarian democracies, we would expect a negative relationship between inequality and growth.

Section 5.2: Growth and Inequality in a Status-Oriented Society

Next we consider the relationship between inequality and growth. As before, we will restrict the analysis to a family of initial capital distributions $F = \{F_x\}$, where $F_x(i) = k_{i0}(x)$, such that within this family of distributions an increase in the wealth Gini is associated with increases in the relative labor endowment of poor individuals and with decreases in the relative labor endowment of relatively rich individuals. Within this family of wealth distributions, the relationship between growth and inequality depends critically on the level of democracy. Consider a society with an initial wealth distribution $F_0(i)$ with Gini coefficient G^k and level of democracy *D*. If $D > \bar{D}(G^k)$, then the pivotal voter is poor and will be poor for any wealth distribution within *F*, with $\sigma^p_{G^k} > 0$, such that the society is a proletarian democracy. In this case, an increase in inequality increases the relative labor endowment of the pivotal voter, leading to a higher equilibrium tax rate and lower rate of economic growth.

If the level of democracy is below this critical threshold, then the pivotal voter is rich and a rise in wealth inequality reduces the relative labor endowment of the pivotal voter, $\sigma^p_{G^k} < 0$. In this case, the society will be a such that the society is a plutocratic democracy or status oriented oligarchy. Starting with nearly perfect equality, the society is a plutocratic democracy and increases in wealth inequality gradually reduce the preferred tax rate, raising the rate of growth. However, in a status oriented society, inequality eventually reaches the level at which the growth rate is maximized, and beyond this point, additional increases in income inequality reduce the rate of economic growth. In particular, let $\hat{G}^k(\gamma, D)$ be implicitly defined by $\sigma^p(D, \hat{G}^k) = \hat{\sigma}(\gamma)$, such that $\hat{G}^k(\gamma, D)$ is the level of wealth inequality consistent with the political equilibrium being the growth maximizing tax rate. Then the relationship between growth and wealth inequality is given by the following function

$$g_{G^k}(G^k, D, \gamma) = \begin{cases} < 0 & D > \bar{D} \\ = 0 & D = \bar{D} \\ > 0 & D < \bar{D}, G^k < \hat{G}^k \\ = 0 & D < \bar{D}, G^k = \hat{G}^k \\ < 0 & D < \bar{D}, G^k > \hat{G}^k \end{cases} \tag{3}$$

The first line indicates that growth is a decreasing function of inequality in proletarian democracies, the third line reflects the positive relationship between growth and inequality in a plutocratic democracy, while the final line reflects the negative relationship in a status oriented oligarchy. Note also that $\hat{G}^k(0,D)=1$, so that in an egoistic society only the first three lines of (3) are relevant, indicating that growth is maximized when a wealth is concentrated in the hands of a single individual. In addition, we have $\hat{G}^k_\gamma(\gamma,D)<0$, so that the level of inequality consistent with the maximum growth rate is declining in the taste for status. The relationship between growth and wealth inequality for an egoistic and a status oriented society are illustrated in Figure 8.

How does this relationship compare to the empirical growth literature? The relationship between growth and wealth inequality depicted in (XX) is highly non-linear and, in general, more complex than those addressed in the empirical literature on inequality and growth. Moreover, most empirical work in this area addresses the relationship between the growth and the inequality of income, though some researchers address wealth inequality directly or use it as an instrument for income inequality, e.g. Easterly (2007) and Davis and Hopkins (2011). Still, an attempt to relate the theory presented here to existing empirical literature generates some interesting results. First, Barro (2000) finds a that the relationship between growth and (income) inequality is positive for rich countries and negative for poor countries. This result corresponds nicely to our findings here, particularly if one believes that industrial democracies correspond roughly to plutocratic democracies and developing and less developed countries to status oriented oligarchies. This certainly fits with the positive relationships between per capita income, egalitarianism and democracy, e.g. Licht, Goldschmidt, and Schwartz (2007) and Tabellini (2008). Second, cross-country empirical work that looks for a linear relationship between growth and inequality tends to find that this relationship is negative. In term of the model's predictions, this may correspond to behavior in a proletarian democracy or a status-oriented oligarchy. Given that the majority of observations in cross-country studies come from developing countries, it may make sense to interpret this relationship in terms of the mechanics of status-oriented oligarchies.

In sum, the degree to which the model fits the empirical record regarding growth and inequality depends in part on how one maps the three societies the model suggests exist onto the world. If one believes that status matters and that existing political systems are fairly heavily biased toward the interests of the wealthy, then the outcomes plutocratic democracies and status-oriented oligarchies are relevant, and the model is in broad accord with the empirical record on inequality, democracy and economic growth. However, if one believes the world is populated by proletarian democracies, then it may appear less relevant. Resolving this issue will require direct testing of the role of status in economic growth.

Section 6: Conclusion

This paper explores the role of status preferences in economic growth and income inequality. In particular, it augments a long-standing model of growth and inequality by assuming that agents care about their consumption relative to the level of average consumption. Taking the rate of taxation as given, the model finds that economic outcomes are independent of the taste for status. In contrast, the taste for status plays a central role in determining the political equilibrium. In particular, the model suggests that public goods are positional for relative poor individuals while private goods are positional for rich individuals.

The analysis finds the status concerns interact with the levels of democracy and wealth inequality in complex ways to determine the equilibrium rate of taxation and, thereby, economic outcomes. The key result is that societies may be sorted into three types, proletarian democracies, plutocratic democracies and status-oriented oligarchies, each of which exhibit a unique pattern of comparative statics with respect to growth and income inequality. While the political economy of proletarian democracies parallels earlier work, status preferences play a unique and perhaps surprising role in the other two types of societies. In plutocratic democracies, because she benefits less than the average individual, concerns over status cause the relatively rich pivotal voter to moderate her demand for public goods. This raises the rate of economic growth, but also increases income inequality. Finally, in status-oriented oligarchies, the pivotal voter's status concerns are sufficiently strong that she effectively starves the economy of public goods in order to decrease the level of average consumption. These societies fit Sokoloff and Engerman's (2000) that elites in developing countries may choose lower rates of growth in order to maintain their social status. In addition, in these societies, much of the usual logic of growth does not hold. Growth is increasing in the tax rate and the level of democracy and decreasing in income inequality.

The relationship between the model's predictions and the empirical record is unclear. There is no empirical record on the model's central predictions regarding the role of status in economic growth. In addition, the model predicts the potential for highly non-linear relationships between democracy and wealth inequality and economic growth. While aspects of these relationships are consistent with the empirical record, particularly if one focuses primarily on plutocratic democracies and status-oriented oligarchies, other theories could support these patterns as well and any real evaluation must address both the role of status preferences in generating these patterns and the mechanisms involved.

Mathematical Appendix:

This appendix derives equation (9) and proves propositions 3, 5 and 7.

Derivation of equation (9) steady state lifetime utility:

We derive the expression for steady state lifetime utility in equation (9) using integration by parts. From (7) and (8), and we have

$$
\begin{aligned}
V_i &= \int_0^\infty e^{-\rho t}\left[ln(c_i(t)) - \gamma ln(\overline{c}(t))\right]dt \\
&= \int_0^\infty e^{-\rho t}\left[(1-\gamma)gt + ln(c_{i0}) - \gamma ln(\overline{c}_0)\right]dt \\
&= \int_0^\infty e^{-\rho t}\left[ln(c_{i0}) - \gamma ln(\overline{c}_0)\right]dt + (1-\gamma)\int_0^\infty gte^{-\rho t}dt \\
&= \frac{1}{\rho}\left[ln(c_{i0}) - \gamma ln(\overline{c}_0)\right] + (1-\gamma)\int_0^\infty gte^{-\rho t}dt
\end{aligned}
$$

We compute the second integral using integration by parts. Define

$$
\begin{aligned}
&f(t) = e^{-\rho t} \rightarrow f'(t) = -\rho e^{-\rho t} \\
&h(t) = gt \rightarrow h'(t) = g
\end{aligned}
$$

It follows that

$$
\frac{d\left(f(t)h(t)\right)}{dt} = f'(t)h(t) + f(t)h'(t)
$$

$$
\int_{f(0)h(0)}^{f(T)h(T)} d\left(f(t)h(t)\right) = \int_0^T -\rho e^{-\rho t}gtdt + \int_0^T ge^{-\rho t}dt
$$

$$
\left(f(T)h(T) - f(0)h(0)\right) = -\rho\int_0^T e^{-\rho t}gtdt + \frac{g}{\rho}\left[1-e^{-\rho T}\right]
$$

$$
\int_0^T e^{-\rho t}gtdt = \frac{g}{\rho^2}\left[1-e^{-\rho T}\right] - \frac{f(T)h(T)}{\rho}
$$

Applying L'Hopital's rule, the second term converges to

$$\lim_{T\to\infty} e^{-\rho T} gT = \lim_{T\to\infty}\frac{gT}{e^{\rho T}} = \lim_{T\to\infty}\frac{g}{\rho e^{\rho T}} = 0 \Rightarrow \lim_{T\to\infty}\int_0^T e^{-\rho t} gtdt = \frac{g}{\rho^2},$$

and thus,

$$V = \frac{(1-\gamma)g}{\rho^2} + \frac{1}{\rho}\left[ln(c_{i0}) - \gamma ln(\overline{c}_0)\right]$$

Substituting equilibrium values for the growth rate and initial levels of individual and average consumption give the expression found in the text.

Proof of Proposition 3: *Existence of a Preferred Tax Rate*

Let $(\sigma_i,\gamma)\in\mathbb{R}^+ x\left[0,1\right)$. The first order condition for an internal preferred tax rate is $V_\tau(\tau;\sigma_i,\gamma)=0$. Taking the limit of this expression as τ goes to zero, we have:

$$\begin{aligned}
\lim_{\tau\to 0}\rho^2 V_\tau(\tau;\sigma_i,\gamma) &= \lim_{\tau\to 0}(1-\gamma)r'(\tau) + \rho\omega'(\tau)\left[\frac{\sigma_i}{\omega(\tau)\sigma_i+\rho} - \frac{\gamma}{\omega(\tau)+\rho}\right] \\
&= \lim_{\tau\to 0}(1-\gamma)r'(\tau) + \rho\omega'(\tau)\left[\frac{\sigma_i-\gamma}{\rho}\right] \\
&= \lim_{\tau\to 0}(1-\gamma)\left(\alpha(1-\alpha)\tau^{-\alpha}-1\right) + \left(\sigma_i-\gamma\right)(1-\alpha)^2\tau^{-\alpha} \\
&= \lim_{\tau\to 0}(1-\alpha)\tau^{-\alpha}\left\{\alpha(1-\gamma) - \left(\sigma_i-\gamma\right)(1-\alpha) - \phi(\tau)\right\} \\
&= \begin{cases} +\infty & \sigma_i > \underline{\sigma}(\gamma) \\ -\infty & \sigma_i < \underline{\sigma}(\gamma) \end{cases}
\end{aligned}$$

where $\underline{\sigma}(\gamma) = \frac{\gamma-\alpha}{1-\alpha}$. Next, we take the limit as τ goes toward infinity:

$$\begin{aligned}
\lim_{\tau\to\infty}\rho^2 V_\tau(\tau;\sigma_i,\gamma) &= \lim_{\tau\to\infty}(1-\gamma)r'(\tau) + \rho\omega'(\tau)\left[\frac{\sigma_i}{\sigma_i\omega(\tau)+\rho} - \frac{\gamma}{\omega(\tau)+\rho}\right] \\
&= \lim_{\tau\to\infty}(1-\gamma)\left(\alpha(1-\alpha)\tau^{-\alpha}-1\right) + \frac{\rho(1-\alpha)}{\tau}\left[\frac{\sigma_i\omega(\tau)}{\sigma_i\omega(\tau)+\rho} - \frac{\gamma\omega(\tau)}{\omega(\tau)+\rho}\right] \\
&= \lim_{\tau\to\infty}(1-\gamma)\alpha(1-\alpha)\tau^{-\alpha} - (1-\gamma) + \frac{\rho(1-\alpha)(1-\gamma)}{\tau} = -\rho^{-2}(1-\gamma) < 0
\end{aligned}$$

Because $\rho^2 V_\tau(\tau;\sigma_i,\gamma)$ is continuous in τ and $\lim_{\tau\to\infty}\rho^2 V_\tau(\tau;\sigma_i,\gamma)$ is negative and bounded away from zero, there exists some (large) value of τ, $\tilde{\tau}>0$, such that $\rho^2 V_\tau(\tau;\sigma_i,\gamma) < 0, \forall\,\tau\geq\tilde{\tau}$.

Let $\sigma_i > \frac{\gamma-\alpha}{1-\alpha}$ and consider the modified consumer's problem: $\max_\tau V(\tau,\sigma_i,\gamma)$ over $\tau \in [0,\tilde{\tau}]$. Since we are maximizing a continuous function over a compact interval, a solution $\tau^*(\sigma_i,\gamma)$ to this problem exists and occurs at a boundary point or a critical point of *V*. Furthermore, since $\sigma_i > \frac{\gamma-\alpha}{1-\alpha}$, we know that $V(\tau,\sigma_i,\gamma)$ is increasing at $\tau = 0$ and decreasing at $\tau = \tilde{\tau}$, so the maximum does not occur at one of the boundary points, and thus must occur at a boundary point. Finally, since *V* is twice continuously differentiable, the maximum must satisfy $V_\tau(\tau^*(\sigma_i,\gamma);\sigma_i,\gamma) = 0$ and $V_{\tau\tau}(\tau^*(\sigma_i,\gamma);\sigma_i,\gamma) < 0$, which proves part 1 of proposition 1.

Next, let $(\sigma_i,\gamma) \in \mathbb{R}^+ x [0,1)$ such that $\sigma_i < \frac{\gamma-\alpha}{1-\alpha}$. Because $\rho^2 V_\tau(\tau;\sigma_i,\gamma)$ is continuous in tau and $\lim_{\tau\to\infty} \rho^2 V_\tau(\tau;\sigma_i,\gamma)$ is negative and bounded away from zero, there exists some (large) value of tau $\tilde{\tau} > 0$ such that $\rho^2 V_\tau(\tau;\sigma_i,\gamma) < 0, \forall \tau \geq \tilde{\tau}$, which means we need to find a solution to the modified consumer's problem: $\max_\tau V(\tau,\sigma_i,\gamma)$ over $\tau \in [0,\tilde{\tau}]$. Since *V* is continuous in tau and the domain is compact, a solution $\tau^*(\sigma_i,\gamma)$ to this problem exists. Because $V(\tau,\sigma_i,\gamma)$ is decreasing in tau at $\tau = \tilde{\tau}$, either $\tau^*(\sigma_i,\gamma) = 0$ or $\tau^*(\sigma_i,\gamma) > 0$. Assume for the moment that the maximum occurs at an interior point $\tau^*(\sigma_i,\gamma) > 0$ and let the value of lifetime utility at this maximum be $V_{\max}$. However, $\lim_{\tau\to 0+} V_\tau(\tau;\sigma_i,\gamma) = -\infty$, which implies that $\lim_{\tau\to 0+} V(\tau;\sigma_i,\gamma) = \infty$ and, in particular, that there exists an $\varepsilon > 0$ such that $V(\tau;\sigma_i,\gamma) > V_{\max}\ \forall \tau \in (0,\varepsilon)$. This contradicts our assumption of an interior maximum. Thus, we have $\tau^*(\sigma_i,\gamma) = 0$.

Proof of Proposition 5: *Single Peaked Preferences*

Let $\gamma \in [0,1)$ and let $\tau_0 > 0$ such that $V_\tau(\tau_0;\sigma_i,\gamma) = 0$. The FOC for the pivotal voter's problem may be written as

$$(1-\gamma)r'(\tau_0) + \rho\omega'(\tau_0)\left[\frac{\sigma_i}{\omega(\tau_0)\sigma_i + \rho} - \frac{\gamma}{\omega(\tau_0)+\rho}\right] = 0.$$

Taking the limit as $\rho \to 0$, the second term of the FOC goes to zero, indicating that $(1-\gamma)r'(\tau_0) = 0$ and, thus, that $\lim_{\rho \to 0} \tau_0 = \hat{\tau} = \left(\alpha(1-\alpha)A\right)^{1/\alpha} > 0$.

The SOC for the pivotal voter's problem is

$$-\frac{\alpha(1-\gamma)}{1-\alpha} + \rho\omega(\tau)\omega'(\tau)\left[\frac{\gamma}{\left(\omega(\tau)+\rho\right)^2} - \frac{\sigma_i^2}{\left(\omega(\tau)\sigma_i+\rho\right)^2}\right] < 0.$$

Since the coefficient on the brackets is positive and second term within the brackets is negative, a sufficient condition for the SOC to hold is

$$-\frac{\alpha(1-\gamma)}{1-\alpha} + \rho\omega(\tau_0)\omega'(\tau_0)\frac{\gamma}{\left(\omega(\tau_0)+\rho\right)^2} < 0 .$$

Noting that $\omega'(\tau) = (1-\alpha)\omega(\tau)/\tau$, we may write this condition as $\frac{\tau_0}{\rho} > \gamma\left[\frac{\omega(\tau_0)}{\omega(\tau_0)+\rho}\right]^2 \frac{(1-\alpha)^2}{\alpha(1-\gamma)}$, and a sufficient condition for this to obtain is $\frac{\tau_0}{\rho} > \gamma\frac{(1-\alpha)^2}{\alpha(1-\gamma)}$. Recalling $\lim_{\rho \to 0} \tau_0 = \hat{\tau}$, as $\rho \to 0$, this expression converges to $\frac{\left(\alpha(1-\alpha)A\right)^{1/\alpha}}{\rho} > \gamma\frac{(1-\alpha)^2}{\alpha(1-\gamma)}$. Given any permissible set of parameters $(\gamma, \alpha, A) \in [0,1) \times (0,1) \times \mathbb{R}^{++}$, this expression will hold for sufficiently small values of ρ. Moreover, for a given values of the other parameters, it is more likely to hold likely to hold the greater the values of α and A and the smaller the values of γ and ρ.

Proof of Proposition 7: *Political Equilibrium and the Growth Maximizing Tax Rate*

Part 1: Let $(\gamma, \alpha, \rho, A) \in S$, such that $\tau^*(\sigma^p, \gamma) > 0$ is a political equilibrium with $V_\tau(\tau^*(\sigma^p, \gamma)) = 0$, and define $\hat{\sigma}(\gamma) = \frac{\gamma\rho}{(1-\gamma)\omega(\hat{\tau})+\rho}$. Differentiating V with respect to τ, we have,

$$V_\tau = 0 \Leftrightarrow r'(\tau^p) = -\frac{\rho\omega'(\tau^p)}{1-\gamma}\left[\frac{\sigma^p}{\sigma^p\omega(\tau^p)+\rho} - \frac{\gamma}{\omega(\tau^p)+\rho}\right].$$

Thus,

$$r'(\tau^*(\sigma^p,\gamma))=0$$

$$\Leftrightarrow \frac{\sigma^p}{\sigma^p\omega(\tau^*(\sigma^p,\gamma))+\rho}=\frac{\gamma}{\omega(\tau^*(\sigma^p,\gamma))+\rho}$$

$$\Leftrightarrow \sigma^p\left(\omega(\tau^*(\sigma^p,\gamma))+\rho\right)=\gamma\left(\sigma^p\omega(\tau^*(\sigma^p,\gamma))+\rho\right)$$

$$\Leftrightarrow \sigma^p=\frac{\gamma\rho}{(1-\gamma)\omega\left(\tau^*(\sigma^p,\gamma)\right)+\rho}$$

Note that σ^p appears on both sides of this equation. Next we show that such a σ^p exists that satisfies this condition. Let $\hat{\sigma}(\gamma)=\frac{\gamma\rho}{(1-\gamma)\omega\left(\hat{\tau}\right)+\rho}$. This function is continuous on $\gamma\in\left[0,1\right]$, with $\hat{\sigma}(0)=0,\hat{\sigma}(1)=1$ and $\hat{\sigma}'(\gamma)>0$. Thus, given $\gamma\in\left[0,1\right]$, there exists a $\sigma^p\in\left[0,1\right]$ such that $\sigma^p=\hat{\sigma}(\gamma)=\frac{\gamma\rho}{(1-\gamma)\omega\left(\hat{\tau}\right)+\rho}$. This implies that $\tau^*(\sigma^p,\gamma)=\hat{\tau}$, such that $\sigma^p=\frac{\gamma\rho}{(1-\gamma)\omega\left(\tau^*(\sigma^p,\gamma)\right)+\rho}$, which implies $r'(\tau^*(\sigma^p,\gamma))=0$.

Proof of Parts 2 and 3: We have: $V_\tau=0\Leftrightarrow r'(\tau^p)=-\frac{\rho\omega'(\tau^p)}{1-\gamma}\left[\frac{\sigma^p}{\sigma^p\omega(\tau^p)+\rho}-\frac{\gamma}{\omega(\tau^p)+\rho}\right]$. It follows that $r'(\tau^p)>0\Leftrightarrow\sigma^p<\hat{\sigma}(\gamma)$ and $r'(\tau^p)<0\Leftrightarrow\sigma^p>\hat{\sigma}(\gamma)$.

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Table 1
Comparative Statics of Growth and Inequality for
Three Societies and Two Threshold Tax Rates

Societies and Thresholds	$\frac{dg}{d\gamma}$	$\frac{dG^y}{d\gamma}$	$\frac{dg}{dD}$	$\frac{dG^y}{dD}$	$\frac{dg}{dG^k}$	$\frac{\partial G^y}{\partial \tau}\frac{\partial \tau}{\partial G^k}$
Proletarian Democracy	–	–	–	–	–	–
Egalitarian Tax Rate	0	0	–	–	0	0
Plutocratic Democracy	+	+	–	–	+	+
Growth-Maximizing Tax Rate	0	+	0	–	0	+
Status-Oriented Oligarchy	–	+	+	–	–	+

Note: The final column shows the indirect effect of a change in wealth distribution on income inequality acting through the political economy of taxation. The total change in income inequality includes the direct effect of the wealth distribution on the inequality of capital income.

Figure 1
Equilibrium Growth and Wages in a Status-Oriented Society at the
Preferred Tax Rates of Agents with $\sigma_1 < \sigma_2 = \hat{\sigma}(\gamma_0) < \sigma_3$ and $0 < \gamma_0 < 1$.

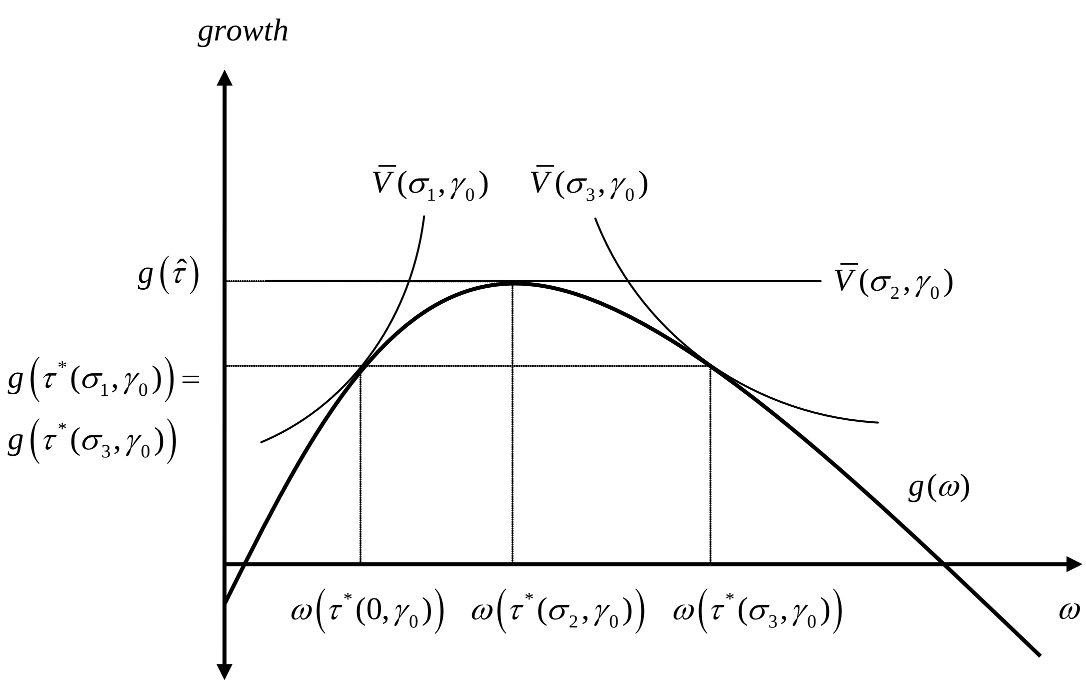

Figure 2:
Iso-Tax Lines by Status Orientation and the Relative Labor Endowment of the Pivotal Voter

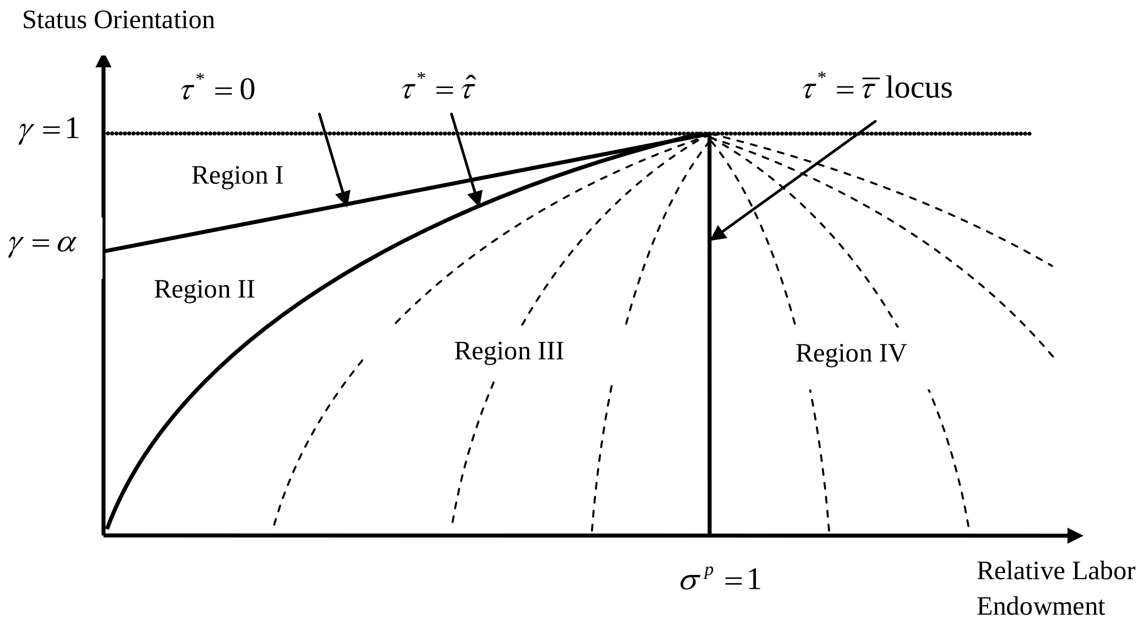

Figure 3:
Growth and Wages in Three Societies: A Status Oriented Oligarchy (SOO), a Plutocratic Democracy (PLD) and a Proletarian Democracy (PRD)

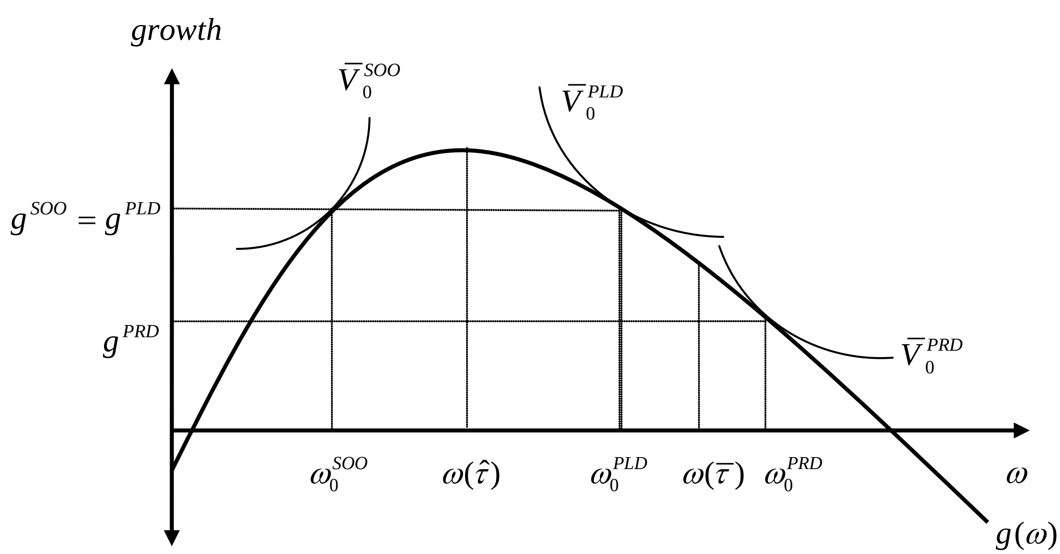

Figure 4:

The Effects of an Increase in the Taste for Status on Growth and Wages in a Status Oriented Oligarchy (SOO), a Plutocratic Democracy (PLD) and a Proletarian Democracy (PRD)

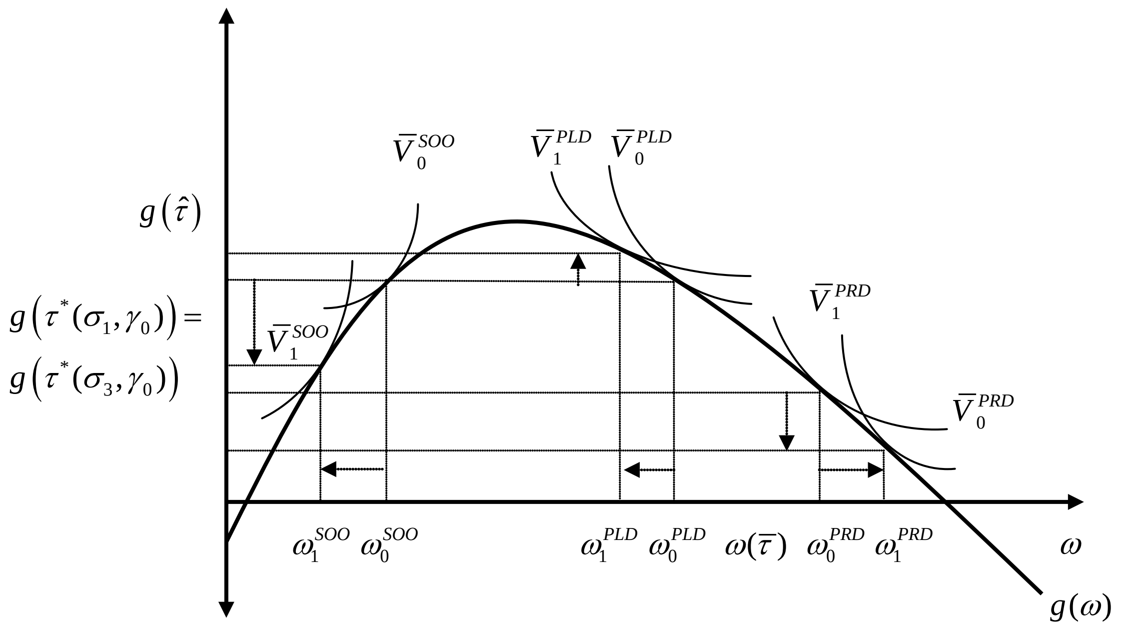

Figure 5:

The Effects of an Increase in Democracy on Growth and Wages in a Status Oriented Oligarchy (SOO), a Plutocratic Democracy (PLD) and a Proletarian Democracy (PRD)

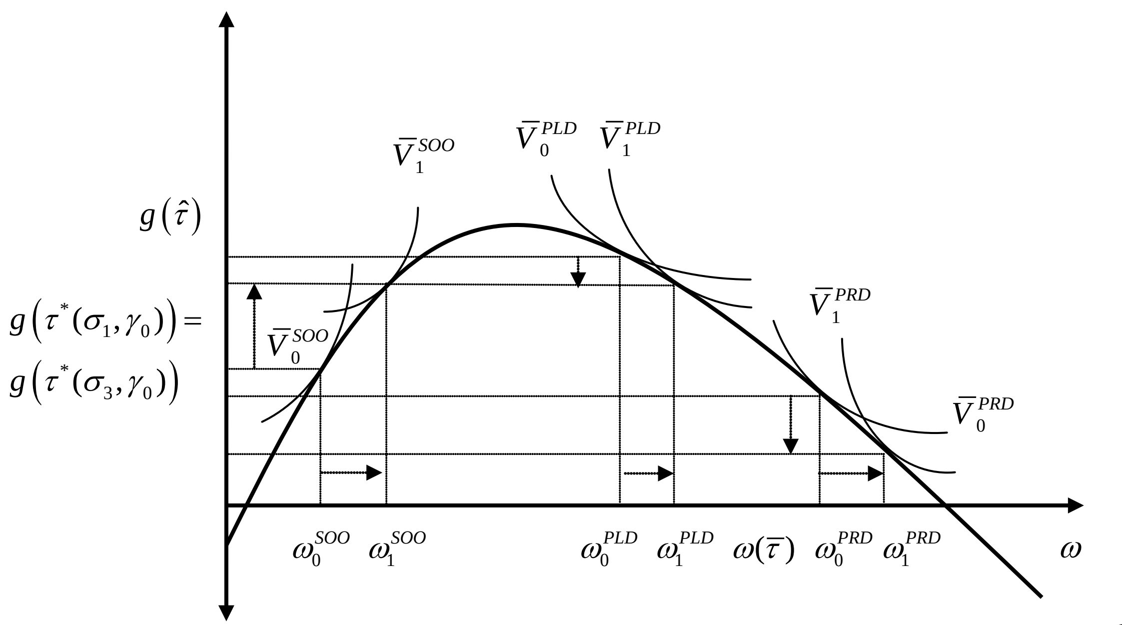

Figure 6:

The Effects of an Increase in Wealth Inequality on Growth and Wages in a Status Oriented Oligarchy (SOO), a Plutocratic Democracy (PLD) and a Proletarian Democracy (PRD)

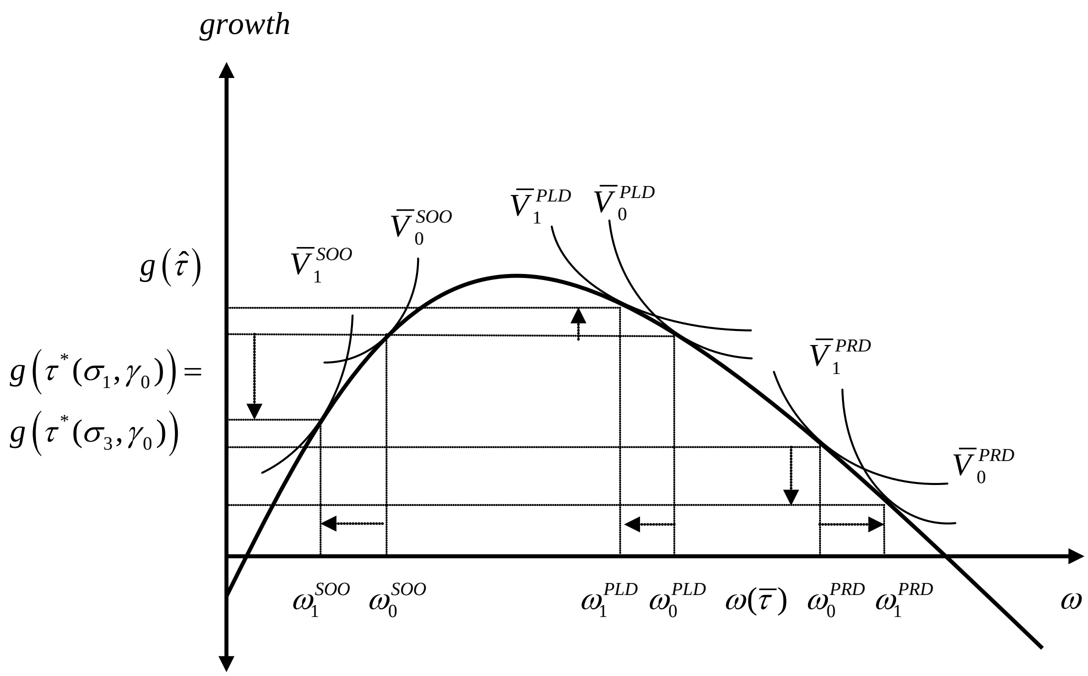

Figure 7

Democracy and Growth in Egoistic and Status-Oriented Societies

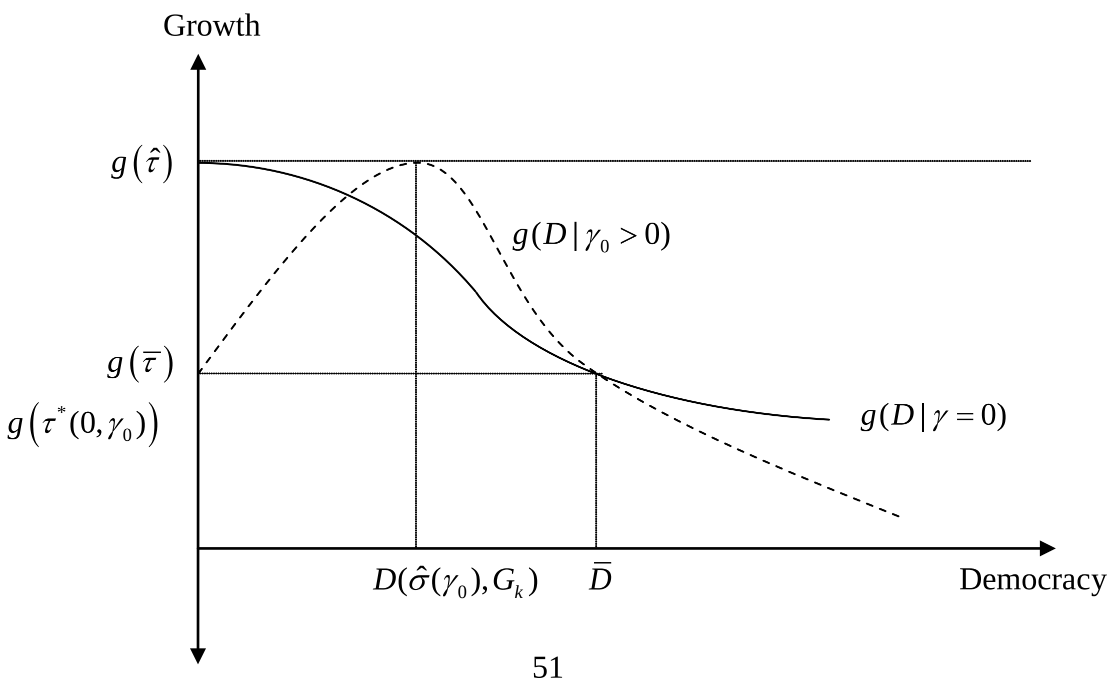

Figure 8

Inequality and Growth in Egoistic and Status-Oriented Societies