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SOCIAL STATUS, EDUCATION AND GROWTH*

by

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Abstract

A common feature of recent growth models is the existence of externalities associated with human capital. Each worker, in choosing his level of schooling or occupation, ignores the impact of his choice on future generations. Thus, in general, the level of investment in human capital is suboptimal. One possible corrective mechanism is to reward investment in human capital with social status. As recognized by sociologists, the occupational social status is an important factor in occupational choice. The paper investigates the implications of social rewards on the distribution of talents in society and consequently on the process of economic growth. We consider two sources of heterogeneity among workers: non wage income and ability. We find that the thrive for status may be counter productive, inducing an inefficient allocation of talent. A greater emphasis on status may induce the "wrong" individuals i.e those with low ability and high wealth to acquire schooling, causing workers with high ability but low wealth to leave the growth enhancing occupations. This crowding out effect, taken alone, discourages growth. In general, growth may be enhanced by an increase in the number of workers who invest in education. However, the inefficiency in the allocation of talent persists.

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Introduction

A common feature of recent growth models is the existence of externalities associated with human capital. Each worker, in choosing his level of schooling or occupation, ignores the impact of his choice on future generations. Thus, in general, the level of investment in human capital is suboptimal (see Lucas[1988]). One possible corrective mechanism is to reward such activities with social status (see Davis and Moore [1945]). For instance, scientists and professors often obtain rewards in the form of social esteem in addition to a monetary reward (see Hodge et al. [1966], Treiman [1977], an illustrative list of occupational ranking by status is provided in an Appendix table). One might think, therefore, that societies which have developed such mechanisms will grow faster. However, a special feature of occupational status is its collective nature, all the participants in a group share the occupational status irrespective of their characteristics or actions. Because of the collective nature of occupational status, awarding social status to educated workers may cause a **reduction** of the growth rate, even though schooling generates growth. This may happen because, as status becomes important, workers with high income but low ability are more likely to invest in schooling, crowding out the high ability low income workers.

Social status is not necessarily associated with activities which enhance economic growth. For instance, priests, and lawyers often have high social status. In this paper we **assume** that higher social status is bestowed in occupations which enhance growth. We then investigate the implications of this social reward to the distribution of talents in society. We recognize two sources of heterogeneity among workers: non wage income and ability. We show that if workers differ only in ability or only in non-wage income then awarding social status to growth enhancing occupations will attract additional workers, possibly of lower ability, without inducing any defections. Hence, the aggregate supply of talent to the growth enhancing occupations increases. However, if both types of heterogeneity are present, then a greater emphasis on status may induce the "wrong" individuals i.e those with low ability and high wealth to acquire schooling, causing workers with high ability but low wealth to leave. This crowding out effect, taken alone, discourages growth. The strength of this effect depends on the elasticity of substitution between skilled and unskilled workers. If the elasticity is high then, as more workers acquire schooling, there is a only a small change in relative wages and the crowding out effect is weak. If the elasticity is low, then wages in the high status occupation may decline to the point that the aggregate skill of workers in this sector declines, causing the growth rate to decline.

In a culture that emphasizes status, the aggregate choices influence individual choice not only through pecuniary rewards such as wages but also through a nonmonetary reward such as social esteem. This added interaction can have a marked impact on the structural relationships between economic variables. As our analysis illustrates, in societies where occupational status is important, the **distribution** of non-wage income influences observable measures of economic performance such as aggregate output or economic growth. We show that equalization of wealth can lead to higher growth rate in economies where the highly skilled and high status workers constitute a minority.

The paper builds on past work of the authors. As in Murphy et al.(1991), we recognize that the allocation of ability across occupations influences economic growth. As in Fershtman and Weiss (1993), we recognize that the thrive for social status is an important factor in the allocations of workers into occupations. We combine these two ideas and show that, since the demand for status is motivated by considerations which are separate from ability, non-wage income in particular, it is quite possible that non-monetary rewards in the form of occupational status will lead to an inefficient allocation of talent. In particular, higher status for growth inducing activities can lead to a lower growth rate of the economy.

It is often noted that cultural differences can have important economic consequences. For instance, it has been argued that the despise of the entrepreneur, especially in manufacturing, and the high status of idle gentlemen in 19'th century England is the main cause for its economic decline (e.g. Wiener [1981]). Part of the controversy concerning this hypothesis (see Perkin [1989]) results from the fact that social attitudes are varied and hard to measure. We, therefore, emphasize occupational status, a variable often measured by sociologists, as a the key cultural factor. Cultures in which occupational status is an important part of the reward system are likely to have different levels of physical output and grow at different rates, they will also display different structural relationships between purely "economic" variables, such as wealth inequality and growth.

Social rewards and social norms, often emphasized by sociologists, have been neglected by economists. There are, however, some notable exceptions. Arrow (1971) mentions norms as a mode for internalizing externalities. (see Elster [1989] for a critic of this view). The special role of social status in the context of growth has been recognized by Hirsch (1976) who argues that the relative nature of social rewards implies social scarcity (e.g. there is only one person who can be number one) leading to crowding and rent seeking which limits growth. He also assumes that positional goods, including social status, tend to be normal goods which implies that social scarcity increases as the economy grows. Cole, Mailath and Postlewaite (1992) argue that social status is used to regulate marriage patterns and therefore affects wealth accumulation and growth.

The linkage between wealth distribution and growth has been the focus of several recent studies. There is some evidence for a positive correlation between inequality in income and growth (see, for example, Persson and Tabellini [1990]). Theoretical models attempting to explain this relation are provided by Banerjee and Newman (1993) who link occupational choice to risk aversion and Galor and Zeira (1993) who discuss the possible relationship between wealth distribution and growth under imperfect capital market. A model which predict a negative relation between growth and inequality is provided by Murphy, Shleifer and Vishny (1989) who consider the effects of the distribution of income on the composition of demand and the techniques of production.

1. Framework for Analysis

Consider an overlapping generations model in which each cohort is of size N and lives for two periods. Individuals differ with respect to two characteristics: non-wage income and learning ability. Non-wage income, denoted by y, is derived from ownership claims for the profits of production firms. We let θ denotes the individual's share in aggregate profits. We denote by μ the innate learning ability of the individual. The joint distribution of θ and μ in the population is denoted by $F(\mu, \theta)$ with a density denoted by $f(\mu,\theta)$, were, $(\mu,\theta) \in \Omega$ and Ω is a compact fixed set of characteristics. We assume that all generations are identical with respect to the distribution of the above characteristics.

1.1 The production technology

The production process requires two types of workers, skilled and unskilled, which jointly produce a single good. The two types of workers perform different tasks: skilled workers engage in management while unskilled workers work as laborers. We define an occupation as a combination of job and workers' characteristics and consider two occupations management and labor, denoted by m and l respectively. The aggregate level of output depends on the number of workers and managers, their productive capacity as indicated by their human capital and on the level of technological knowledge in society. The aggregate amounts of human capital embodied in laborers and managers in period t are denoted by $H_{t,l}$ and $H_{t,m}$, respectively. Society also possesses a stock of technological knowledge (blueprints) that can be viewed as a public good, freely accessible to all members of society. Let A_t be an index of the stock of technological knowledge at time t then the aggregate production function in this economy is

$$Q_t = Q(H_{t,l}, H_{t,m}, A_t) = A_t^{1-\gamma}\Big((\beta H_{t,l})^{\rho} + H_{t,m}^{\rho}\Big)^{\frac{\gamma}{\rho}}. \qquad (1)$$

where, $1 \geq \rho > -\infty$ and $\beta > 0$ and $0 < \gamma < 1$. The production function is homogeneous of degree 1 in the three inputs, but displays decreasing returns with respect to labor and management alone. The parameter γ represents the extent of decreasing returns. The parameter β specifies the relative importance of managers and laborers. The parameter $\sigma = 1/(1-\rho)$ represents the elasticity of substitution between managers and laborers.

Firms maximize profits taking wages as given. We let $w_{t,m}$ and $w_{t,l}$ be the wage per unit of human capital of a managers and laborers, respectively, at period t. The price of output is normalized to one. Aggregate profits are positive since access to technological knowledge is free and commands no price and there are decreasing returns for the other inputs. The aggregate profits are allocated to the workers according to a predetermined distribution of ownership. Thus, the non wage income of an individual who owns the share θ of aggregate profits is

$$y_t(\theta) = \theta(1-\gamma)Q_t . \qquad (2)$$

By definition, $0 \leq \theta \leq 1$ and, because individual non-wage income must sum up to aggregate profits, the average share must equal 1/2N.

1.2 The learning technology

A person born in period t can become a manager in period t+1 by spending the first period of his life in school. Alternatively, he can work for two periods as a laborer. We denote by $\Omega_{t,l}$ and $\Omega_{t,m}$ the subsets of Ω which induce choices of work and schooling, respectively, by members of the cohort entering in t. Let $h^{o}_{t,l}$ and $h^{y}_{t,l}$ denote the productive capacity (human capital) of an old and young laborer, respectively, in period t. Similarly, let $h^o_{t,m}(\mu)$ be the productive capacity of a manager with ability μ. We assume that ability matters only for workers who engage in the skilled job (i.e for managers).

Workers can acquire skills either by learning on the job or by learning in school. The purpose of training is to embody the existing technological knowledge into workers. On the job, workers obtain immediate access to the available technology, yielding

$$h^o_{t,l} = h^y_{t,l} = A_t . \tag{3}$$

Schooling raises the capacity of workers to absorb and apply technological knowledge. An individual with ability μ who learns in school in period t, will have in the subsequent period an amount of human capital given by

$$h^o_{t+1,m}(\mu) = \mu A_{t+1} , \tag{4}$$

where, $\mu > 1$. By assumption, learning in school is more efficient than learning on the job, however, it is also more costly since the worker has to forego the first period of work.

Each person who goes to school at time t also produces $a_t(\mu)$ units of new knowledge which he cannot appropriate. This occurs in addition to the increase in the worker's future earning capacity. Let

$$a_t(\mu) = aA_t\mu \quad , \tag{5}$$

where, a is a fixed parameter. Thus, learning in school is viewed as a joint production process where students learn and create new knowledge. The model also incorporates the assumption that new knowledge is created exclusively in schools, while on the job training is mainly a vehicle for the transmission of existing knowledge.

The aggregate amount of human capital embodied in laborers is

$$H_{t,l} = NA_t\left(\iint_{\Omega_{t-1,l}} f(\mu,\theta)\, d\mu\, d\theta + \iint_{\Omega_{t,l}} f(\mu,\theta)\, d\mu\, d\theta\right) = NA_t L_t, \tag{6}$$

where, NL_t is the size of occupation l at period t,consisting of young workers who choose to become laborers in period t and older workers who made this choice in period t-1. Similarly, the aggregate amount of human capital embodied in managers is

$$H_{t,m} = NA_t\left[\int \int_{\Omega_{t-1,m}} \mu f(\mu,\theta)\, d\mu\, d\theta\right] = NA_t M_t. \tag{7}$$

where, NM_t is the aggregate ability of entrants who chose to acquire schooling in period t-1. and are working as managers in period t.

Using (6) and (7), we can eliminate human capital from the production function and work with the reduced form specification

$$Q_t = A_t\, Q(NL_t,\ NM_t, 1) = A_t N^{\gamma}((\beta L_t)^{\rho} + M_t^{\rho})^{\frac{\gamma}{\rho}} \tag{8}$$

where, aggregate output depends on the stock of technological knowledge and the distribution of ability in the two occupations.

The growth rate in the stock of knowledge is obtained by aggregating (5) over all workers who acquire schooling

$$g_t = \frac{A_t}{A_{t-1}} - 1 = aN \int\int_{\Omega_{t-1,m}} \mu f(\mu,\theta) d\mu d\theta \quad = NM_t. \tag{9}$$

As seen, the growth rate depends on the aggregate ability of entrants who acquire schooling and later become managers and not merely on their number.

1.3 Social Status

Sociologists have established that the social status of an occupation depends mainly on the **average** schooling and **average** wages of its members (see Weber [1978] and Duncan [1961]). Of the two occupational characteristics, education appears to be the more important determinant of social status (see Featherman and Stevens [1982]). To simplify our analysis, we assume here that the social status of each of the two occupations increases with the average human capital of its members relative to the average human capital in the other occupation[1].

The average amount of human capital of managers at period t is given by $H_{t,m}/N_{t,m}$, where $H_{t,m}$ is the aggregate human capital of managers defined in (7) and $N_{t,m}$ is their number in period t. Since all laborers at time t have the same amount of human capital, A_t, we obtain

[1] By assumption, managers have more education, which by itself should imply higher status. The addition of average ability partially incorporates differences in average wages, holding the wage per efficiency unit fixed. A more complete analysis would allow variations in the wages per efficiency units to affect the status of the two occupations.

$$s_{t,m} = \left[\frac{H_{t,m}}{N_{t,m}} / A_t\right]^{\delta} = \left[\frac{\int\limits_{\Omega_{t-1,m}}\int \mu f(\mu,\theta)\, d\mu\, d\theta}{\int\limits_{\Omega_{t-1,m}}\int f(\mu,\theta)\, d\mu\, d\theta}\right]^{\delta}, \tag{10}$$

and $s_{t,l} = 1/s_{t,m}$. Thus, the ranking of the two occupations by status is fully determined by the **average** ability of managers. The parameter δ, $\delta \geq 0$, is a shift parameter indicating cultural differences in attitudes towards schooling (human capital) as a source of social status. The higher is δ the more important are the differences in status associated with differences in average human capital in the two occupations. If $\delta = 0$ then the status of the two occupations is the same. Since $\mu > 1$ the average human capital of managers is higher than that of laborers and thus, for $\delta > 0$, we have $s_{m,t} > 1 > s_{l,t}$.

Social status is gained by association with a particular group, in this case a particular occupation, and **all** members share the same status irrespective of their ability and non wage income. The collective good aspect of occupational status is the main driving force of our analysis and requires some clarification. Generally, a person's esteem throughout the society can depend on his own deeds or talents. However, except for exceptional cases, the specific merits of each individual are hard to verify. Schooling and occupation are easily recognized signals for individual accomplishments. Our presumption is that, in the absence of other information, the best available predictor of a person's "worth" is the average value of his group See Marshall [1977 ch. 8]).

Since social status is a relative measure of human capital, it is impossible to increase the status of one occupation without reducing the status of the other (hence, $s_{t,m}s_{t,l} = 1$). For the same reason, a uniform increase in human capital, due to a higher stock of technological knowledge, does not change the social status of the two occupations. The **ranking** of the two occupations by status is invariant over time (see Weiss and Fershtman [1992]). However, social status is endogenously determined in our model and might change over time depending on the ability of the workers that choose to acquire education. These changes in status influence the evaluation of the two occupations by new entrants.

1.4 Consumers.

Given his non-wage income y and his learning ability μ, each new entrant makes his educational or occupational choices. In making his choice, the entrant takes the wage and the social status of each occupation as given. He also knows the current and future values of aggregate knowledge (we assume perfect foresight). Life-time utility depends on the individual's consumption levels in the two periods of his life and on his occupational status. For simplicity, we assume that status is generated only from work in the second period of life, after training has been completed. Preferences of each entering cohort are the same and are represented by a homothetic utility function

$$u_i = (c_i^y)^{\alpha}(c_i^o)^{1-\alpha} s_i^o \,. \tag{11}$$

where, c_i^y and c_i^o are the consumption levels of an entrant at the first and second periods of his life, respectively, and s_i^o is the occupational status enjoyed in the second period of life. We assume a perfect capital market and denote the interest by r.

An important property of the preferences represented by the utility function (11) is that the marginal rate of substitution between social status and private consumption increases (in absolute value) with the level of consumption. This means that status is viewed as a "normal good" i.e. the demand for status increases with wealth (see Weiss [1976]).

Under the described preferences, the indirect utility function of a person entering at period t with characteristics (μ, θ) is given by

$$u_{t,m}(\mu,\theta) = s_{t+1,m}\left[y_t(\theta) + \frac{y_{t+1}(\theta)}{1+r} + \frac{w_{t+1,m}\ \mu A_{t+1}}{1+r} \right]\lambda . \tag{12}$$

$$u_{t,l}(\mu,\theta) = s_{t+1,l}\left[y_t(\theta) + \frac{y_{t+1}(\theta)}{1+r} + w_{t,l} A_t + w_{t+1,l}\frac{A_{t+1}}{1+r} \right]\lambda . \tag{13}$$

where, $\lambda = \alpha^{\alpha}(1-\alpha)^{1-\alpha}(1+r)^{1-\alpha}$.

We can now characterize the subsets $\Omega_{t,l}$ and $\Omega_{t,m}$ which determine the partition of the entering cohort into managers and laborers. By definition,

$$\Omega_{t,l} = \left\{(\mu,\theta) \mid u_{t,l}(\mu,\theta) > u_{t,m}(\mu,\theta)\right\}. \tag{14}$$

while $\Omega_{t,m}$ is the complement of $\Omega_{t,l}$ in the whole set of characteristics Ω. Using equations (2),(12) and (13), the boundary between the two subsets $\Omega_{t,l}$ and $\Omega_{t,m}$, denoted by $\mu_t(\theta)$, is a straight line with a **negative** slope (see Figure 1). This reflects two main features of the model: (i) Individuals with high learning ability are more inclined to acquire schooling and become managers, since the return for their investment is higher. (ii) Individuals with high non wage income are more inclined to become managers, since their demand for status is higher. Thus, the region of indifference between the two occupations must have a negative slope. This implies that in equilibrium workers who self select to become managers must have either high ability or high non wage income or both.

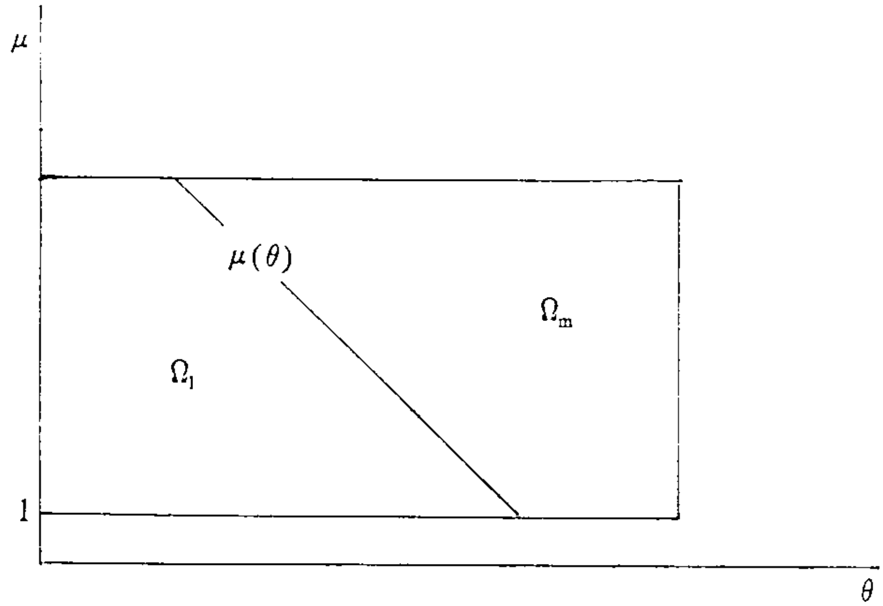

Figure 1

The different social status of the two occupations gives rise a compensating wage differential. That is, in equilibrium, the discounted life time wages that a laborer receives is higher than the discounted wage for a manager with the **same** amount of human capital. If this condition is not satisfied all workers will choose to work in the high skill occupation as they will get both higher wages and higher status. This, however, does not imply that the overall wage of a manager is below the one of an unskilled worker as the high skill worker is compensated according to his ability.

Current and future market conditions, reflected in wages, technological knowledge and attitudes towards status determine the location of the indifference line $\mu(\theta)$. If the wages or status of management increase (relative to simple labor) or if the growth rate of wages rises then the number of entrants choosing management will rise. However, all the above factors are endogenous to the model. We thus need to close the model by imposing market clearing and steady growth.

1.5 The market Clearing Conditions

There are three markets in the model. In the labor market workers exchange the services of their human capital for wages. In the product market consumers use their wage and non wage income to buy the numeraire good. There is also a credit market where consumers who go to school can borrow while those who decide to work right away may save. We shall make the simplifying assumption that the credit market need not clear locally and all agents can borrow at an internationally set interest rate which we take to be zero. Given the interest rate, the market clearing can be described only in terms of the labor market (the product market will clear automatically if the labor market clears). Note that we do not have a separate market for schooling or on the job training. The simplifying assumption is that no marketable goods are used in the learning process. (Each trainee uses only his own time and ability together with the knowledge of others which is provided as a public good.)

1.6 Steady Growth Equilibria (SGE)

SGE is a stationary partition of the characteristics set, (Ω_l^*,Ω_m^*), a wage structure, (w_l^*,w_h^*), a social status ranking, (s_h^*,s_l^*), and a growth rate, g^*, such that given the wages firms maximize profits by employing the same number of laborer and managers who wish to work in these occupations given the wages, the status and the growth rate induced by the partition (Ω_l^*,Ω_m^*).

Note that in SGE it is the allocation of workers into groups, status and wages per unit of human capital which are stationary while knowledge, consumption and output increase in the rate of g^*.

1.7 The determination of SGE

As equation (9) indicates, the steady state growth rate, g, is uniquely determined by the partition $\{\Omega_l, \Omega_m\}$ which specifies the characteristics of entrants choose to become laborers and managers. However, by (15) the partition itself depends on the growth rate g which affects life time income conditional on ability and occupational choice. We are thus looking for a fixed point of this mapping.

For a given rate of growth, g, and assuming $r=0$, the boundary between the two regions Ω_l and Ω_m is the line $\mu(\theta)$ given by

$$\mu(\theta) = \frac{s_l w_l - (s_m - s_l)\theta y(\theta))}{s_m w_m}\Gamma(g), \quad where, \ \Gamma(g) = \frac{2-g}{1-g}. \tag{15}$$

All individuals with (μ,θ) such that $\mu \geq \mu(\theta)$ work in the high skill, high status occupation, while all individuals with (μ,θ), such that $\mu < \mu(\theta)$, work as unskilled workers. The wages, the status levels, and the aggregate profits, which also influence the boundary $\mu(\theta)$, must be determined endogenously using the profit maximizing conditions which requires that wages are equated to marginal products of each factor, condition (10) which determines the status ranking as a function of the average skill in each occupation and condition (2) which relates profits to the allocation of workers into occupations. In subsequent analysis we shall use some simplifying assumptions which enable us to determine all these variables simultaneously as functions of g. A common feature of these models is that an increase in the growth rate g induces entry of qualified workers into schooling and management. More precisely, let the growth rate be fixed at g and let NM(g) be the aggregate ability of entrants who acquire schooling and then go into management in this steady state, after we allow all other variables such as wages and status to adjust. Now consider two steady states differing in g then NM(g) is increases with g. On the other hand, by assumption, the steady state growth is fully determined by M. An SGE is characterized by the requirement

$$g = aNM(g). \tag{16}$$

Because of the positive feedback between the growth rate and the number of workers choosing the growth inducing occupation, we generally obtain a multiplicity of SGE (see Figure 2).

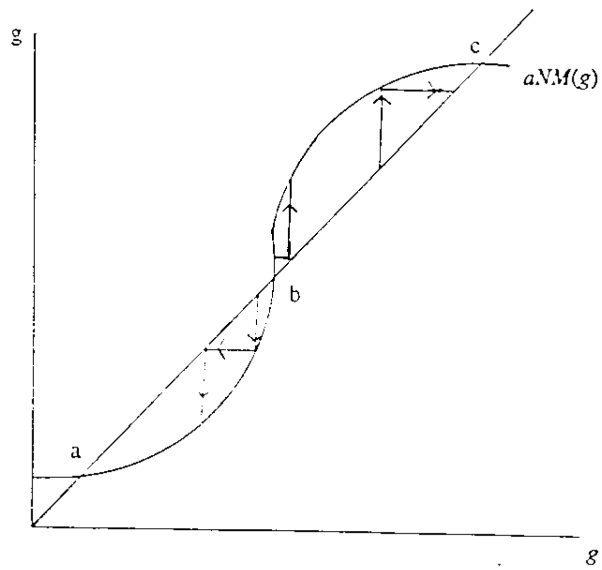

Figure 2

Of the three equilibria illustrated in Figure 2, only two, a and c, are locally stable. In the unstable equilibrium, b, a small decrease (increase) in g will reduce (raise) M and therefore cause a further reduction (increase) in g. Generally, in the higher steady state, c, where more talented students acquire schooling, the high skill occupation has a higher status and the growth rate is higher.

2. Social Status and Growth.

In this section we analyze the impact of differences in culture on the distribution of talents in society and examine the implications for the steady state growth rate. In our model culture is summarized by the parameter δ which indicates the importance of differences in human capital (more generally schooling and wages) as sources of social status. One would expect that societies which award higher status to growth enhancing activities, such as schooling and management, would grow faster. However, growth depends not only on the number of workers who choose the growth enhancing activities but also on their quality. Since occupational status is a collective good, all workers who would acquire schooling enjoy an increase in status. The question, then, is whether or not the high ability workers are attracted into management when its status rises.

A talented worker may withdraw from school, despite the increased status of this activity, if the relative wages of managers declines, thus reducing the returns for the investment, or if aggregate profits decline and, therefore, his demand for status diminishes. We thus need to trace the effects of cultural change in a general equilibrium context where other variables influencing the schooling decision, such as status, wages and non-wage incomes, are allowed to adjust. The extent of these adjustments depends on the elasticity of substitution between laborers and managers and on the joint distribution of ability and non-wage income.

We distinguishes three aspects of the adjustment process following a cultural change. The first is the impact on the number of entrants who acquire schooling, the second is the impact on the quality of the added workers and the third is impact on the difference in quality between those who join and those who leave the high status occupation. We shall discuss three special cases of the general model. The relative strength of these effects will determine whether or not social status can perform its corrective role.

2.1 The Expansion Effect

The most direct effect of an increased emphasis on social status is an increase in the number of entrants who join the high status occupations. As long as no worker is induced to leave, the increase in number implies an increase in aggregate ability of entrants who choose schooling, planning to become managers. Consequently, the steady state growth rate increases. To illustrate circumstances in which only the expansion effect is present, we consider the case in which workers are of equal ability, $\mu=\mu^0$, and differ only in their non-wage income. In this case the propensity of a new entrant to acquire schooling and then enter management depends only on his non-wage income which in turn depends on his share in aggregate profits, θ. Since status is a normal good, there is a critical value, θ_0, such that all individuals with θ exceeding θ_0, choose the high status occupation. Observe that an increase in θ_0 is associated with an increase in the number of laborers and a reduction in the number of managers.

Proposition 1: In an economy where workers vary only by their non-wage income, an increased emphasis on social status (i.e a "small" increase in δ) will raise the number of managers, reduce their relative wage and increase the steady state growth rate.

Proof: The proof proceeds in two steps. (i) We first prove, given δ, NM(g) is an increasing function of g. (ii) We then show that, for any given g, an increase in δ shifts the function NM(g) to the right yielding a higher steady state growth rate.

(i) We want to show that for any given δ, an increase in g causes θ_0 to decline. Assume, to the contrary, that θ_0 increases. This means that in the steady state there will be fewer managers and, therefore, w_m rises and w_l declines. If an entrant is induced to acquire schooling, the change in output is given by, $2Q_1 - \mu^0 Q_2$, where, Q_i denotes the partial derivative of Q with respect to its i'th argument (i.e. the marginal product). Since, in equilibrium, the life time wages of laborers must exceed the life time wages of managers we have $2w_l > \mu^0 w_m$. By profit maximization, we also have, $Q_1 = w_1$ and $Q_2 = w_2$. Therefore, shifting workers away from management must increase output and, by (2), aggregate profits must also increase. Since status is a normal good and profits have increased and since w_m has risen while w_l declined, no worker who would willingly switch from management to labor. We thus obtain a contradiction, proving that θ_0 must decline. Hence, M(g) is an increasing function of g.

(ii) We want to show that, holding g fixed, an increase in δ causes θ_0 to decline. Holding wages and profits constant, δ and g have the **same** initial impact, an increased preference for m relative to l indicated by a reduction in θ_0. The indirect effects on wages and profits following this initial impact are also the same in both cases. Thus, the proof is similar to (i). $\square$

The extent to which changes in the demand for status affects the equilibrium, depends on the elasticity of substitution between managers and laborers, captured here by the parameter $\sigma=1/(\rho-1)$. If the elasticity is low the increased demand for status will be partially offset by the reduction in the wages of managers relative to workers. In the extreme case of fixed proportions, $\rho=-\infty$, relative wages will change without any change in the number of entrants who acquire schooling.

2.2 The Dilution Effect

When more entrants are induced to acquire schooling, the added students are likely to be of lower quality and the average quality of students may therefore decline. To illustrate this effect, consider the case in which workers differ in their ability but all have the same non-wage income. Since workers with higher μ get a higher return for their investment in schooling, there is a critical value of learning ability, μ_0, such that only individuals with ability exceeding μ_0 choose the high status occupation. Observe that an increase in μ_0 is associated with an increase in the number of laborers and reduction in the number of mangers. In addition, an increase in μ_0 is associated with an increase in the average ability of managers and a reduction in their aggregate ability. We now have

Proposition 2: In an economy where workers vary only by their ability, an increased emphasis on social status (i.e a "small" increase in δ) will increase the number of managers and reduce their average quality, their status and their relative wage. However, the aggregate ability of managers and the growth rate will rise.

Proof: The proof is similar to the that of Proposition 1 and follows the same steps. We first show that an increase in g reduces μ_0 implying that M(g) is an increasing function. We then show that an increase in δ also reduces δ causing M(g) to shift to the right. We finally use stability and Figure 2 to prove that the new SGE has a higher growth rate. There are two minor differences in the proof. The effect of an increase in μ_0 on aggregate output is given by, $2Q_1 - \mu_0 Q_2$ multiplied by the density at μ_0. By assumption, the marginal worker is indifferent between the two sectors. Hence, we must have $2w_1 > \mu_0 w_m$. By profit maximization, $Q_1 = w_1$ and $Q_2 = w_2$. Therefore, as in the case where all workers have the same ability, shifting workers away from management must increase output and, by (2), aggregate profits must also increase. In contrast to the previous case, the assumed increase in μ_0 implies that the average ability of managers rises and, by (10), their relative status increases. This, however, only reinforces the contradiction derived in Proposition 2. □

The dilution effect is a direct consequence of the expansion effect, provided that it is the high ability workers who acquire schooling. Again, the strength of these effects depends on the demand conditions. In the extreme case of fixed proportions the number of workers and their quality will not be affected by a cultural change.

2.3 The Crowding Out Effect

We shall now discuss in detail the case in which workers vary in both their learning ability and in their non-wage income. The main new feature is that increased entry measured in **number** of workers choosing a particular occupation, does not necessarily imply an increase in the amount human capital supplied to this occupation, since workers with low ability but high non- wage income may replace workers with high ability and low non-wage income. To give the maximum scope for this crowding out effect, and to simplify the analysis, we shall analyze here only the case of fixed proportions where, $\rho=-\infty$, and (3) becomes

$$Q_t = A_t^{1-\gamma}(\min[\beta L_t, M_t])^{\gamma}. \tag{17}$$

where, the parameter β governs the fixed proportion between the two inputs.

As noted above, the expansion and dilution effects do not exist under the fixed proportion technology. Under the assumed technology, the following two conditions must be satisfied in equilibrium:

$$\beta L = M, \tag{18}$$

and

$$\gamma M^{\gamma-1} = \frac{w_l}{\beta}+w_m . \tag{19}$$

The first condition, merely restates that firms demand managers and laborers in fixed proportion. The second condition requires that the marginal product of a laborer-manager bundle, satisfying equation (18), equals the joint wage costs. Recall that the supply conditions dictate that L is twice the area on the left side of $\mu(\theta)$, while M is the area above these curve, weighted by μ. Conditions (18) and (19) restrict the possible equilibrium shifts of the line $\mu(\theta)$. Given condition (18), any shift of the line to the right or to the left cannot be an equilibrium shift as it will imply an imbalance between the two types of workers. Thus a shift which maintains equilibrium in the labor market must be either a right rotation (clockwise) or a left rotation of the line $\mu(\theta)$.

Lemma 1: A right rotation of the $\mu(\theta)$ line implies that L and M decrease while a left rotation implies that L and M increase.

Proof: We will prove the lemma for a right rotation. The lemma for the left rotation is proven similarly. In Figure 1 we describe a right rotation of the line $\mu(\theta)$. As a result of such a rotation workers with high ability i,e; high μ, moves from the high skill occupation to the low skill occupation (area A in the figure) while workers with low ability (but larger non-wage income) move to the high skill occupation (area B in Figure 3). In equilibrium $M=\beta L$. It is

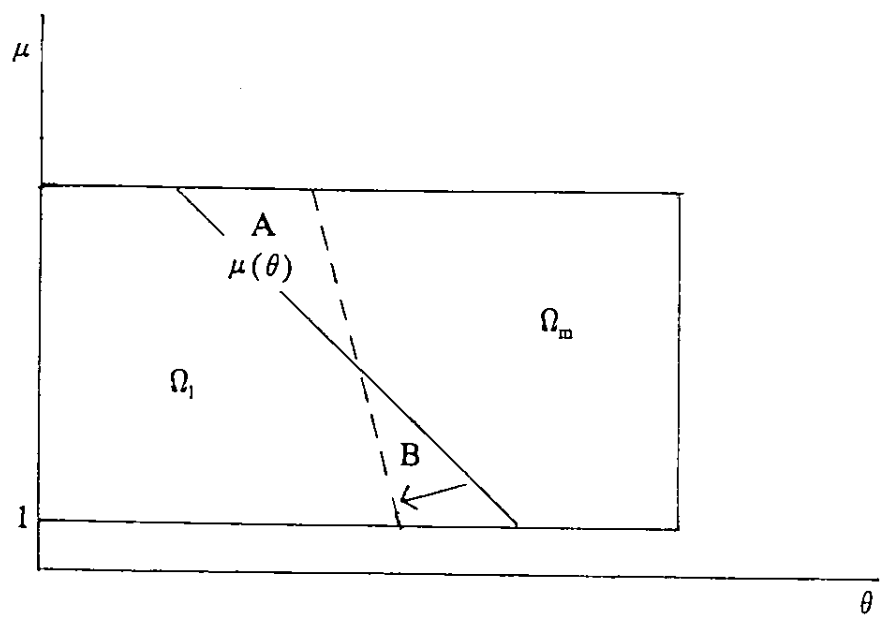

Figure 3.

therefore sufficient to show that L increases. Now assume, a-contrario, that L increases (or stay the same) in such a case A is greater or equal B. But now we can see that condition (18) is violated. The workers in area A are the ones that leave the high skill occupation and not just that there are more of them than in B but they also have higher ability than those in B. hence M must decline. From this contradiction we can conclude that a right rotation implies a decrease in L and M. □

Under the fixed proportion technology, L and M must move together. In addition, several other variables of interest move together with L. Profits increase in L and wages decline with L. Since M increases with L while the number of managers must decline, we also have that average ability of managers and their relative status must increase in L. Finally, since a change in L must be associated with a rotation there is an individual who continues to be indifferent between the two occupations. But if the status of management goes up with L as well the demand for status (due to increase in non wage income) such a person exists only because the relative wages of management decline. The assumption of fixed proportions between managers and workers is thus seen to provide an enormous simplification allowing us to trace out quite easily all the repercussions of a change in the underlying economic or cultural circumstances. We can now prove

Proposition 3: In an economy where workers vary both by ability and by their non- wage income, and where management and labor (measured in efficiency units) are demanded in a fixed proportion, an increased emphasis on social status (i.e a "small" increase in δ) will increase the number of managers but **reduce** their aggregate ability and the steady state growth rate.

Proof: The proof follows the same steps as in propositions 1 and 2. In part (i) we show that M(g) is an increasing function. In part (ii) we show that an increase in δ causes M(g) to shift down yielding, using Figure 2, a lower steady state growth rate.

(i) We want to show that an increase in g causes M to increase. Assume, a-contrario, that M decreases. Because of the assumption of fixed proportions, L also decreases and, by Lemma 1, there must be a right rotation of the line $\mu(\theta)$. By (29), the reduction in L and M implies that $w_l/\beta + w_m$ increases while output and profits decrease. The increase in the aggregate quality M accompanied by a reduction in the number of managers as L increases implies that average ability declines and s_m must go down. Since there is a right rotation, the line $\mu(\theta)$ becomes steeper. The slope of $\mu(\theta)$ is given by

$$\mu'(\theta) = \frac{(s_m - s_l)\,\pi}{w_m s_m}\,\Gamma(g), \quad \textit{where}, \ \pi = (1-\gamma)M. \tag{20}$$

Clearly, $\Gamma(g)$ is a decreasing function of g. Thus, for $\mu(\theta)$ to become steeper it must be that w_m decreases. Since $w_l/\beta + w_m$ increases as L decreases w_l must increase.

We can now establish a contradiction. Consider the intersection of the $\mu(\theta)$ line with the $\mu=0$ line. (Although we assume that all individuals have ability exceeding 1 we can make such an hypothetical exercise, since $\mu(\theta)$ is a straight line.) Using equation (15), the intersection is at $\theta = s_l w_l/(s_m - s_l)\pi$. Now, since we have a right rotation it must be that this intersection point moves to the left, but this contradicts the analysis above which indicates that w_l increases while, s_m and π decrease and implies that the critical θ should moves to the right.

(ii) We want to prove that an increase in δ causes a reduction in L and M. Assume a-contrario that an increase in δ leads to an increase of L and M. Such a change implies that π increases and $w_l/\beta + w_m$ decreases. From Lemma 1 we obtain that as L increases we have a left rotation of the $\mu(\theta)$ line. Such a left rotation implies also that able workers join the high skill occupation while workers with low μ leave it. Such a change contribute even further to the increase of the status of managers and thus s_m must increase relative to s_l. Since there is a left rotation of $\mu(\theta)$, the slope of this line decreases. From (20), since both π and $(s_m-s_l)/s_m$ have increased, for the slope to decrease it must be that w_m will also increase. Now notice that since $w_l/\beta+w_m$ decreases, w_l must decrease. Given the above changes, it is impossible that there will be individuals who choose to move from the high skill occupation to the low skill occupation. The wage at the low skill occupation decreases while both the wage and the status of the high skill occupation increases and since π also goes up the non wage income of all individuals increase implying that individual put even a larger emphasis on status. Thus such a left rotation is impossible as it will contradict condition (18) which requires that the balance between the two occupations must be maintained. Given this contradiction, we conclude that an increase of δ implies that, for a fix g, the equilibrium size of the unskilled occupation i,e: L, decreases. Hence, by (18), the aggregate ability managers, M, must also decrease note, however, that the reduction i,e; L implies that the **number** of managers rises. $\square$

The stark contrast from the two previous cases can be traced to the following features. When workers differ in two characteristics, ability and non-wage income, which influence their occupational choice, it is not true anymore that only high ability workers take schooling and become managers. Similarly, it is not the case that only high income workers choose the high status occupation. Instead, workers with high income and low ability together with workers of high ability and low income are present in the high status occupation. In Proposition 3 we have shown that as the status of schooling and management rises, high ability individuals leave the managerial occupation and are replaced by low ability individuals.

In the general case, where no restrictions on the distribution or on the technology are imposed, there will be a mixture of the three effects which we illustrated. That is, as occupational status becomes more important, a larger number of workers will be induced to acquire schooling and then work as managers. The new managers will be generally of lower quality and in particular, high ability -low income workers will be replaced by low ability -high income managers. The net impact of these contrasting effects on output and growth is in general not clear.

3. Wealth distribution and growth.

One may think of social status not as a regulatory instrument but as an institutional factor which influences economic decisions much like the legal or value system of the society. In our previous work (Fershtman and Weiss [1993]) we have shown how the social system and economic system influence each other within the framework of a static model. One result which we emphasized was that if workers care about status then new relationships between **economic** variables arise which would not be present under a different social environment. We illustrated this general point by tracing out the implied relationships between the distribution of wealth and the level of aggregate output. We now wish to illustrate the relationship between the distribution of wealth and the growth in output which arises when individuals in society care about social status.

Our basic presumption is the weight which workers give to non-monetary rewards such as social status, as compared with monetary rewards in the form of wages, is influenced by their wealth. Our assumptions about consumers' preferences imply that social status is a normal good, that is, as workers become wealthier they put more emphasis on social status. This assumption creates a link between changes in the wealth distribution and occupational choice which can strongly influence economic growth. In order to demonstrate these effects we assume that workers are uniformly distributed over $[\mu_a,\mu_b]\times[\theta_a,\theta_b]$. We will then perform a stretching, with respect to wealth, such that workers are uniformly distributed over $[\mu_a,\mu_b]\times[\theta_a-\epsilon,\theta_b+\epsilon]$. We denote the original distribution by $f(\mu,\theta)$ while after the stretching we denote it as $f_\epsilon(\mu,\theta)$. As in section 2.3, we assume that the technology required a fixed proportion of laborers and managers (see eq(17)). We will investigate the effect of increasing wealth inequality (defined as a stretching) on the equilibrium steady state growth rate.

The effect of increased inequality, however, depends crucially on the proportion of managers to workers demanded by firms. To make our framework more realistic we will consider only the case in which the majority of the workers with the lowest ability, μ_a, work as laborers[2].

Proposition 4: In an economy, where laborers are the majority of workers, and where management and labor (measured in efficiency units) are demanded in a fixed proportion, higher inequality in the distribution of wealth (defined as a stretching) results in a lower equilibrium growth rate g^*. In the new steady state, the average quality and social status of managers is lower.

Proof: We will show that an increase of the wealth variability implies a leftward shift of M(g) yielding a SGE at a lower g (see Figure 2). We thus hold g constant and analyze the effect of the stretching on the aggregate ability of workers who acquire schooling and go to management, M(g). Let $\mu(\theta)$ be the critical line for the original distribution $f(\mu,\theta)$. We define now the line $m(\theta)$ with respect to the distribution $f_\epsilon(\mu,\theta)$ such that the line $m(\theta)$ implies the same L and M as before the stretching i,e., as defined by the line $\mu(\theta)$ with respect to the distribution $f(\mu,\theta)$. Now note that, since more than one half of the workers with the lowest ability, μ_a, are laborers, for low values of μ, the line $m(\theta)$ must be on the right side of the line $\mu(\theta)$ and that $\mu'(\theta) > m'(\theta)$. Consequently there is a worker with characteristics in between the two lines (point j in Figure 4) who chose the managerial occupation prior to the stretching and after the

[2] Note that although for convenience we make the assumption directly on the equilibrium allocation of workers, we can guarantee that the equilibrium is characterized by such a property by assuming that β is not too large (see eq(18)).

stretching switches to become a laborer (see Figure 4).

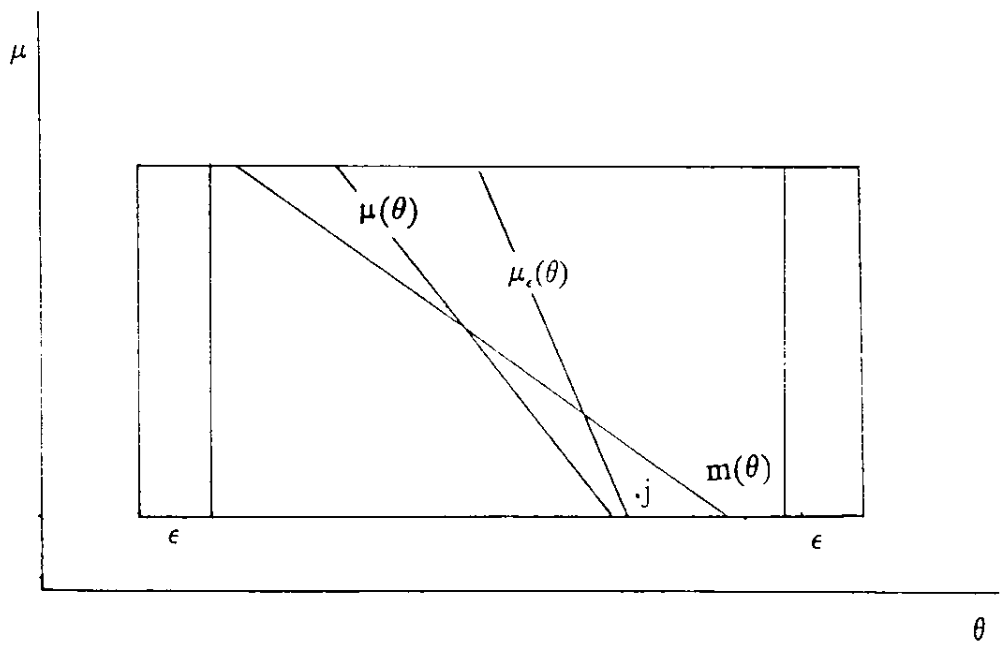

Figure 4

The line $m(\theta)$ satisfies only one of the equilibrium conditions with respect to the distribution $f_\epsilon(\mu,\theta)$. The integral on the left side times 2β is equal to the integral on the right side weighted by μ. This line however does not reflect necessarily the workers' optimal occupational choices. Consider a worker of type j in Figure 4. With the original distribution he optimally chose to work in the managerial sector. After the stretching he is on the left side of $m(\theta)$, implying that he switched to become a laborer. The definition of the line $m(\theta)$ implies that there is the same L and M and thus the partition $m(\theta)$ yields the same status, output and profits as the equilibrium values prior to the stretching. However, although the same L and M implies that $w_l/\beta+w_m$ is unchanged, relative wages might be changed. Thus, for a worker type j to optimally switch from management to labor, it must be that w_m declines while w_l increases. This, however, yields a contradiction, since, by eq(20) such a change implies that the equilibrium partition line becomes steeper, while we know that $\mu(\theta)$ is steeper than $m(\theta)$. Thus the line $m(\theta)$ is not the equilibrium partition.

Using by now a familiar argument, the SGE with respect to the distribution $f_t(\mu,\theta)$ is a rotation of the line $m(\theta)$. We now argue that it must be a right rotation. Assume, a-contrario, that there is a left rotation of $m(\theta)$. A left rotation implies an even lower w_l, higher w_m, higher profits and a higher status for managers. All these changes make the managerial occupation more attractive to all types of workers. Yet, a left rotation implies that, contradicting the above incentives, we can still find a worker of type j that switched from a managerial position to become a laborer.

Thus, the equilibrium with respect to the distribution $f_t(\mu,\theta)$ must be a right rotation of $m(\theta)$, denoted as $\mu_t(\theta)$, which, using Lemma 1, implies a crowding out effect which cause a leftward shift of M(g) and a lower equilibrium growth rate. □

Remark: It can be shown that Proposition 4 holds for a small stretching around zero i.e: starting with perfect equality, even without the assumption that the majority of workers are laborers.

The introduction of demand for status provides an additional link between equality and growth which is different from the usual links discussed in the literature. Typically, this literature emphasizes two types of causal relationships. One is that inequality of wealth together with imperfect capital market can reduce investment in human capital. The other is that redistributive taxation can reduce saving (see Arrow [1979] for an early discussion). Our model suggests, that equality may also enhances growth, by reducing the demand for status of the wealthy. Evidence that inequality in both income and in status is lower in developed countries is provide by Treiman and Yip (1987).

4. Externalities and Social Status.

The accumulation of general knowledge, creates external effects whereby the private decisions to acquire schooling and training do not incorporate the benefits to workers and firms in future generations. Therefore, monetary rewards, generated by a competitive price system, are insufficient to guarantee an efficient allocation of talent into different occupations and learning activities. It has been noted that social rewards or norms can provide additional corrective incentives (for an early statement of this functional view see Davis and Moore [1945]). However, social status is a problematic corrective mechanism which is itself based upon and generates external effects. As illustrated in Section 3, if workers differ in both non-wage income and talent, an increased emphasis on status attracts into schools and into management the "wrong" type of workers, that is, workers with high non-wage income and low ability.

There are several complementary mechanisms which may mitigate the crowding out effect. If status is awarded directly to individual productive capacity, then status can be an efficient corrective reward. The question is, however, how can ability be recognized and whether peers or firms, who are aware of the workers' ability, take into account the interest of the society at large. If individual ability is easily identifiable, the government could rely on a wage subsidy to managers to achieve the necessary correction for externalities. Thus, the need for social status as a corrective mechanism only arises if information available to firms is not accessible to the government, or if an intervention in the form of taxes and subsidies is not feasible for other reasons (e.g dead weight losses or inability to tax).

An interesting informational structure arises in the professions where peer evaluation is used to judge ability. In this case, members of the group have an interest to regulate quality so as to prevent the dilution effects and the ensuing reduction in status. The history of the professions provide ample evidence for attempts by the professional associations to obtain licensing powers and require educational qualifications (see, for instance, McClelland [1991]). The existence of group externalities, created by occupational status, may explain why professional associations use schooling requirements to regulate entry, despite the inefficiency of this instrument (see Weiss [1985]). However, the profession will not choose the socially efficient levels of entry and schooling, since it does not fully internalize the impact of schooling on growth.[3]

Another mechanism which may reduce the importance of the crowding out effect is a positive correlation between non-wage income and ability. In the extreme case, where wealth and ability are perfectly correlated in the population, there is no crowding out effect, since the model is reduced to the one variable case, discussed in section 2. A positive correlation between ability and wealth arises naturally if one considers the dynamics of wealth accumulation. In our model we assume that a person cannot augment or detract from his inherited wealth (e.g wealth consists of land which cannot be sold but can be rented out). In general, since the more able managers have higher wages, we expect them to bequest more assets to their descendants. These dynamics may give rise to a "Buddenbrook effect", whereby, the first generation works in a low

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[3] Durkheim, in the second edition of "The Division of Labor in Society", addressing the role of occupational groups, expresses this dilemma very clearly: "A moral or juridical regulation expresses, then, social needs that society alone can feel; it rests in a state of opinion, and all opinion is a collective thing, produced by collective elaboration. .... An occupational activity can be efficaciously regulated only by a group intimate enough with it to know its functioning, feel all its needs, and able to follow all their variations." (Durkheim [1947, pp.5]).

status but high pay occupation and accumulates wealth, causing the subsequent generations to switch to a high status low wage occupations (See Rubinstein [1987, ch.3]).

Concluding Remarks.

It is widely held that the quality of the labor force and its allocation among alternative uses plays a key role in the process of economic growth (see Lucas [1993]). However, this "engine of growth" relies heavily on the occupational and educational choices made by workers in the society. If workers do not have the right incentives, growth may not be forthcoming. Past literature focused mainly on the pecuniary incentives of workers and on the extent to which the returns from investment in human capital can be appropriated (see Lucas [1988, 1993], Becker and Murphy [1992] and Becker, Murphy and Tamura [1990]). This paper builds on the assumption that humans are "social animals" and examines the implications of the thrive for social status in addition to pecuniary rewards. We find that the thrive for occupational status may be counter productive, inducing an inefficient allocation of talent. This result derives from three basic but plausible assumptions: (i) entry into occupations is unrestricted. (ii) Status of an occupation depends on the average characteristics of its members and (iii) Wealthy individuals are more willing to sacrifice wages in favor of status. Under these assumptions, the demand for status induces the people of low ability but high wealth to acquire schooling. We have shown that under extreme conditions, fixed proportions of labor and management, an increased emphasis on status may actually **reduce** growth. In general, if management and labor are substitutes, growth may be enhanced via the expansion effect, that is, by an increase in the number of managers. However the inefficiency in the allocation of talent persists.

Testing for the relationship between social status and growth is not a straight forward matter. It has been noted, for instance, that managers in Germany and Japan, who receive substantially lower wages than managers in the U.S. (see Abowd, J.M. and M. Bognanno

[1992]) are partially compensated by higher social status (see the data from Treiman [1977] reproduced in the Appendix Table). Given our analysis, one might expect that the ability and wealth (or family background) of managers will also differ in these countries. Specifically, on the average, managers in the U.S. would be of more modest background and of higher ability. There is some evidence that in the U.S. entry into management is relatively unrestricted (only 16% of the top management are of upper social origin , see Useem and Karabel [1990]). While in Germany, and in Europe in general, entry into management appears to be somewhat more restricted (see Bourdieu and Passeron [1979] and Kaelble [1986]). Differences in ability are much harder to evaluate. However, there seems to be some impressionistic evidence that would suggest that the quality of managers in Japan and Germany is relatively high (see Chandler [1990, pp. 496-502] and Fruin [1992, p.76]), perhaps due to a complementary selection mechanism.

Members of professional associations often complain about the low social status of their occupation (see, for example, Haber [1991, ch.9] and Gispen [1990] on engineers in the U.S and Germany in the late 19 century). Recently, this complaint has been voiced concerning the impact of the feminization on the status of the teaching profession. In most cases, requests to raise the occupational status are thinly disguised requests for restricted entry, via academization, and a wage raise. However, to the extent that social evaluations concerning the social contribution of an occupation can be influenced, the likely outcome of increased status, given wages and schooling, is to reduce wages and to induce entry of low ability workers.

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Appendix A: The empirical relevance of occupational status

Our interest in occupational status stems, in part, from the fact that it is a measurable variable. Rankings of occupations has been elicited in many countries. A sample of such findings is presented in Table 1.

Table 1. Ranking of some occupations by status, selected countries

	Professor	Engineer	Lawyer	Doctor	Manager	Foreman	Carpenter	Truck Driver	Clergyman
U.S	78.3	67.4	75.7	81.5	63.9	45.1	42.5	31.7	70.5
Canada	80.2	69.4	78.1	82.7	65.6	48.4	37.1	31.4	66.8
Germany	76.7	67.9	73.2	75.0	73.2	48.6	46.9	34.6	69.7
Holland	80.6	75.8	73.5	78.7	72.4	46.5	32.1	28.4	69.9
Poland	86.4	71.4	66.3	80.5	-	51.2	38.1	44.0	51.1
Japan	79.7	62.6	70.6	73.0	73.4	-	40.0	29.4	-
Philippines	69.1	71.5	74.0	78.9	64.2	-	32.4	42.1	66.6
Thailand	80.3	54.4	60.6	78.8	-	-	39.4	29.8	62.3
Mexico	79.6	76.8	70.1	80.8	61.3	-	33.8	29.0	51.7
Chile	73.8	77.0	69.5	84.5	73.8	39.8	25.9	31.3	64.2
Uganda	81.7	-	80.7	78.1	76.8	34.9	41.5	27.9	66.7
New Zealand	73.5	72.6	80.6	82.6	72.3	45.9	40.0	25.8	68.2

Source: Treiman [1977]