Journal of Public Economics 70 (1998) 115–132

JOURNAL OF PUBLIC ECONOMICS

Self-fulfilling beliefs about social status

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Abstract

Human beings care a lot about being viewed as 'smart'. This paper defines social status as the public beliefs about one's 'smartness' inferred from one's publicly observed social mobility experience. This status motive can easily generate multiple equilibria based upon self-fulfilling beliefs. It also tends to amplify the inequality of economic success between agents with different social origins. This theory of persistent inequality is compared with other theories of inequality based upon self-fulfilling beliefs, such as the model of statistical discrimination and the model of learning about one's chances of mobility in the absence of a status motive, as well the sociological theories of Merton, Boudon and Bourdieu.

Keywords: Social mobility; Social status

JEL classification: H31; J62

1. Introduction.

Human beings care a lot about being viewed as 'smart', even if this has no direct consequence on their economic well-being. This paper defines social status as the public beliefs about one's 'smartness'. If these attributes of 'smartness' or 'ability' are correlated with one's probability of economic success, then these public beliefs will depend upon one's publicly observed social mobility experience. This generates a two-way interaction between beliefs and inequality which this paper seeks to analyze.

First, this status motive can easily generate multiple equilibria in effort levels

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PII: S0047-2727(98)00063-2

based upon self-fulfilling beliefs. If upwardly mobile agents are viewed as lucky ‘nouveaux riches’ and get limited social recognition, this will reduce the motivation to move up and may validate the public beliefs about the limited informativeness of social mobility, and conversely if upward mobility is expected to be a strong signal of ‘ability’. We characterize the conditions under which this will occur.

This multiplicity may explain why the social rewards to economic success vary so widely over time and across societies. In some countries, e.g. in the US, upwardly mobile individuals are generally viewed as very talented and enjoy a great deal of social prestige, and conversely for downwardly mobile individuals. In some other countries, e.g. in India’s caste system or in Ancien Régime Europe, successful individuals with lower-class origins tend to be viewed as ‘nouveaux riches’ who were just lucky and do not deserve any particular recognition, whereas upper-class dynasties continue to command high social prestige during many generations long after their fall in economic fortune. Even if this difference between Europe and the US has probably declined enormously since the time of Tocqueville, until today disdainful expressions such as ‘nouveaux riches’ have remained more common in Europe than in the US, and equilibrium multiplicity may account for that.

Next, assuming away this multiplicity, this status motive also tends to amplify the inequality of economic success between agents with different social origins. Since they are not expected to be successful as often, lower-class agents have less to loose than upper-class agents from a weak economic performance, so that inequality across generations will tend to be more persistent when the status motive is stronger. This will arise in societies where ex ante inequality between agents with different social origins is already perceived to be quite high as compared to the impact of ability and effort on economic success. Since these parameters are notoriously uncertain, this may again explain why different societies end up with different effects of the status motive on inequality.

We view this theory of persistent inequality through the status motive as very similar to the sociological theory of limited social mobility through ‘reference group comparisons’ developed by Merton (1953); Boudon (1973). According to this theory, individuals evaluate their economic performance by comparing it to the ‘reference group’ which they come from, so that agents with lower-class origins are more easily ‘satisfied’ with their performance and less motivated to reach very high economic positions than agents with upper-class origins.[1] Our

[1]The typical empirical evidence proposed by these sociologists to support their claims was that for given educational achievements (degrees, standardized tests,..) agents with upper class origins do better than agents with lower class origins. See Goux and Maurin (1996) for recent evidence along these lines (although they adopt a fairly restrictive interpretation of the existing theories). They show in particular that this ‘residual’ inequality is very strong all along one’s occupational career (even more so than at the entry level). Although one plausible interpretation of this evidence is that lower-class individuals are less motivated, it could also be that some family-transmitted skills are mismeasured by educational achievements, or that other self-fulfilling mechanisms apply (see below).

interpretation of the 'reference group' story is that since lower-class agents are less often expected to be very successful they loose less in social recognition for not doing so.

It is interesting to note that the major intellectual and political conflict among french sociologists dates back to the early 70s when Raymond Boudon developed this 'reference group' theory while Pierre Bourdieu was advocating a different theory of persistent inequality.[2] Bourdieu and his followers criticized the 'reference group' theory because the latter attributes the poor performance of agents with lower-class origins to their lack of motivation, which was stigmatized as very 'right-wing'. In contrast, Bourdieu's theory attributes persistent inequality to the dominant discourse in capitalist societies and the way it discourages lower-class individuals by directing them toward less prestigious and more 'reasonable' educational and occupational tracks. One possible interpretation of Bourdieu's theory in terms of self-fulfilling beliefs is the well-known model of statistical discrimination: since employers expect lower-class agents to be less qualified for top jobs, they promote them less often, so that lower-class agents are discouraged and adopt a behavior that validates the employers' expectations. In Piketty (1995), we show that this kind of 'self-fulfilling inequality' can arise even in the absence of any employer or 'dominant discourse' to blame: with costly experimentation, sincere Bayesian learning about the extent to which individual actions alone can lead to high economic positions naturally leads some dynasties to be discouraged and to put too little effort into learning whether high effort would make a difference, whereas some other dynasties are in the opposite situation. In effect, persistent inequality is generated between dynasties that are intrinsically identical.

We believe that these conflicting theories are not purely academic constructions but also reflect widespread popular views about how inequality is generated and what makes it persistent across generations: is inequality persistent because the poor are not sufficiently motivated to move up, or is it that they are being discouraged by employers and society, or is it that they discouraged themselves through their failed past attempts to move up? Note that all these theories imply that the poor remain poor because they end up being not sufficiently motivated. The important distinction does not lie in the consequence (lack of mobility) but in the origin, and whether political action could act on persistent inequality depends on this. Making explicit these different theories of persistent inequality based upon self-fulfilling beliefs helps to clarify the nature of these intellectual and political conflicts about the opportunity for political action. For example, Bourdieu's leftist criticism of the 'reference group' story is 'justified' in the sense that the policy recommendations associated to the status model are indeed very laissez-faire. We will see that if the main reason why inequality is so persistent is that agents are mostly motivated by social status and lower-class agents don't have a lot to loose from a poor economic performance, then it is indeed true that there exists no strong efficiency rationale to intervene. Moreover, no policy would be effective

[2]See, e.g., Bourdieu and Passeron (1970).

since agents would not react to changes in financial incentives... In contrast, if persistent inequality is not due to the existence of a strong status motive but rather to self-fulfilling beliefs of the 'Bourdieu type' (statistical discrimination and/or imperfect rational learning), then political action should and could reduce inequality by changing the beliefs produced by the 'dominant discourse', through quotas, affirmative action or simply an opposite discourse, at least in theory.[3] Unfortunately, there does not seem to exist any obvious empirical test that could help us to determine which of these models is empirically most relevant (if any), which probably explains why these conflicts are so persistent.

This model presented in this paper may also help to explain why the emphasis on the importance of private concern for social status is usually associated with activist policy recommendations among economists, while the reverse is true among sociologists. This probably reflects the fact that economists primarily look at private concerns for relative status as an externality and are mostly concerned with the rationale for progressive taxation and monetary transfers that this status-induced externality can provide.[4] This contrasts greatly with the sociologists' approach, who are mostly concerned with the origins of persistent intergenerational inequality, and for whom the status motive is primarily viewed as a way to rationalize limited social mobility.

The rest of this paper is organized as follows. Section 2 describes the basic model and gives equilibrium conditions. Section 3 deals with the multiplicity effects of the status motive, while Section 4 deals with the inequality effects of the status motive.

2. Model and definitions

We consider an economy with two possible income/occupational levels $y_1 > y_0 \geq 0$. The set of agents $I = [0;1]$ can be partitioned into the set of agents I_0 with lower-class origins (i.e. whose parents' income level was y_0) and the set of agents I_1 with upper-class origins (i.e. whose parents' income level was y_1). Each agent i is characterized by some ability parameter β_i drawn independently from some distribution with density $f(\beta)$, mean β_m and variance σ^2.[5] The probability that an

[3] The idea that discourse alone can have an impact on economic inequality sounds very doubtful to economists, and empirical evidence is obviously needed to support such a claim. On the other hand, it is plausible, for example, that when Gandhi claims repeatedly in public meetings that the untouchables are as able and rightful as other human beings to escape their initial position and take up upper-level occupations, this does have a stronger impact on the lives of the untouchables that any redistributive tax policy would ever have.

[4] See, e.g., Frank (1997); Ireland (1998) and subsequent references.

[5] The distribution $f(\beta)$ could be different for agents with lower-class origins and agents with upper class origins, with obvious, unimportant changes in the notations and propositions below.

agent i obtains a high income $y_i = y_1$ depends positively on his social origins (0 or 1), his ability (β_i) and his effort (e_i):

$$\text{If } i \in I_0,\ \text{Proba}(y_i = y_1) = \pi + \theta\beta_i e_i$$

$$\text{If } i \in I_1,\ \text{Proba}(y_i = y_1) = \pi + \Delta\pi + \theta\beta_i e_i$$

$\Delta\pi \geq 0$ measures ex ante inequality between agents with different social backgrounds.[6] $\theta \geq 0$ measures the extent to which higher effort and higher ability can translate into higher probabilities of economic success. $\pi \geq 0$ measures the extent to which economic success can be determined by 'luck' alone (i.e. irrespective of one's effort and ability).

Agents care about obtaining a high income (for consumption reasons) and dislike effort. They also care about being viewed as 'smart', i.e. they care about the public beliefs μ_i about their ability parameter β_i. We note β_i^{P} the expected ability of i according to the public beliefs μ_i, and we define β_i^{P} as the 'social status' of agent i. The objective function U_i of agent i is given by:

$$U_i = (1-\lambda)y_i + \lambda\beta_i^{\mathrm{P}} - C(e_i)$$

$\lambda \in [0;1]$ measures the extent to which agents care about their social status: if $\lambda = 0$, they only care about their income per se and we are back to conventional preferences; if $\lambda = 1$, they only care about being viewed as smart as possible.[7]

Initially, no information is publicly observable about individual ability parameters: the public beliefs μ_i about agent i's ability initially coincide with the distribution $f(\beta)$ from which individual abilities are drawn, so that everybody's 'initial social status' is β_{m}. We assume however that individual social mobility trajectories are publicly observable (at least from those people one cares about), so that one's status β_i^{P} depends indirectly on one's economic success, to the extent that the latter is informative about one's ability.

Consider first the case of an upwardly mobile trajectory, i.e. one where an agent i with lower-class origins ($i \in I_0$) obtains a high income y_1. We assume individual effort levels are not publicly observable. Assume everybody expects agents with lower class origins to put effort e_0. The updated public beliefs after everybody has observed the upwardly-mobile trajectory are given by the application of Bayes' rule:

$$\mu_i(\beta | i \in I_0, y_i = y_1) = [(\pi + \theta\beta e_0)/(\pi + \theta\beta_{\mathrm{m}} e_0)]\, f(\beta)$$

[6] $\Delta\pi$ might reflect the inequality of family-transmitted human capital and/or the inequality of inherited collateral in case of credit constraints.

[7] In this paper, we do not model explicitly why agents care about being viewed as smart. One reason might be the existence of non-market goods (e.g. women) that are allocated on the basis of one's smartness. See Cole et al. (1992) (and subsequent papers published in this issue of the Journal of Public Economics) for a model where such non-market goods are allocated on the basis of some self-enforced social ranking, which generates endogenously a status motive.

That is, rational updating implies that society puts a higher weight on above-average abilities and a lower weight on below-average abilities for upwardly-mobile agents. According to these updated beliefs, the expected ability parameter β_i^{P} is given by:

$$\beta_i^{\mathrm{P}} = \int \beta[(\pi + \theta\beta e_0)/(\pi + \theta\beta_{\mathrm{m}} e_0)] f(\beta)\, \mathrm{d}\beta$$

$$\text{i.e.} \beta_i^{\mathrm{P}} = \beta_{\mathrm{m}} + \theta e_0 \sigma^2/(\pi + \theta\beta_{\mathrm{m}} e_0)$$

We note β_{01}^{P} the social status β_i^{P} associated to an upwardly mobile agent i. Note that β_{01}^{P} is higher than the 'initial status' β_{m}, and all the more so if the ex ante expected probability of being upwardly mobile $\pi + \theta\beta_{\mathrm{m}} e_0$ is small, if the productivity θ of effort and ability is high, if expected effort e_0 is high and/or if the variance σ^2 of the distribution of abilities is high: all these factors make economic success more informative about one's ability and will play a crucial role in the analysis of equilibria. In the same way, we define β_{00}^{P}, β_{11}^{P} and β_{10}^{P} the social status associated to agents with lower-class origins who remain poor ($i \in I_0$, $y_i = y_0$), to agents with upper-class origins who remain rich ($i \in I_1$, $y_i = y_1$) and to agents with upper-class origins who become poor ($i \in I_1$, $y_i = y_0$). We have:

$$\beta_{01}^{\mathrm{P}} = \beta_{\mathrm{m}} + \theta e_0 \sigma^2/(\pi + \theta\beta_{\mathrm{m}} e_0)$$

$$\beta_{00}^{\mathrm{P}} = \beta_{\mathrm{m}} - \theta e_0 \sigma^2/(1 - \pi\theta\beta_{\mathrm{m}} e_0)$$

$$\beta_{11}^{\mathrm{P}} = \beta_{\mathrm{m}} + \theta e_1 \sigma^2/(\pi + \Delta\pi + \theta\beta_{\mathrm{m}} e_1)$$

$$\beta_{10}^{\mathrm{P}} = \beta_{\mathrm{m}} - \theta e_1 \sigma^2/(1 - \pi - \Delta\pi - \theta\beta_{\mathrm{m}} e_1)$$

From these equations one compute the 'status differentials' associated to economic success:

$$\beta_{01}^{\mathrm{P}} - \beta_{00}^{\mathrm{P}} = \theta e_0 \sigma^2/[(\pi + \Delta\pi_{\mathrm{m}} e_0)(1 - \pi - \theta\beta_{\mathrm{m}} e_0)]$$

$$\beta_{11}^{\mathrm{P}} - \beta_{10}^{\mathrm{P}} = \theta e_1 \sigma^2/[(\pi + \Delta\pi + \theta\beta_{\mathrm{m}} e_1)(1 - \pi - \Delta\pi - \theta\beta_{\mathrm{m}} e_1)] \qquad (1)$$

Note that the status differential $\beta_{01}^{\mathrm{P}} - \beta_{00}^{\mathrm{P}}$ is higher if the product $(\pi + \theta\beta_{\mathrm{m}} e_0)(1 - \pi - \theta\beta_{\mathrm{m}} e_0)$ is lower: the total gain in status associated to a high income instead of low income is higher if the expected probability of moving up is either very low or very high, and is lower if the latter probability is close to 1/2. Together with $\theta e_0 \sigma^2$, this product term measures the informativeness of economic success.

An equilibrium is then defined as a vector $(\beta_{01}^{\mathrm{P}} - \beta_{00}^{\mathrm{P}}, \beta_{11}^{\mathrm{P}} - \beta_{10}^{\mathrm{P}})$ of social status differentials, given by Eq. (1) above, such that the utility-maximizing effort levels generated by these social payoffs coincide with the expected effort levels e_0 and e_1 for agents with lower-class origins and upper-class origins.

Assume for simplicity that ex ante agents don't have any information about their ability (they always share the public beliefs).[8] The utility-maximizing effort levels e_0 and e_1 are given by:

$$e_0 = \mathrm{ArgMax}_{e\geq 0}(\pi + \theta\beta_m e)[(1-\lambda)y_1 + \lambda\beta^P_{01}] + (1-\pi-\theta\beta_m e)[(1-\lambda)y_0 + \lambda\beta^P_{00}] - C(e)$$

$$e_1 = \mathrm{ArgMax}_{e\geq 0}(\pi + \Delta\pi + \theta\beta_m e)[(1-\lambda)y_1 + \lambda\beta^P_{11}] + (1-\pi-\Delta\pi-\theta\beta_m e)[(1-\lambda)y_0 + \lambda\beta^P_{10}] - C(e)$$

The first-order conditions are:

$$C'(e_0) = \theta\beta_m[(1-\lambda)(y_1 - y_0) + \lambda(\beta^P_{01} - \beta^P_{00})]$$

$$C'(e_1) = \theta\beta_m[(1-\lambda)(y_1 - y_0) + \lambda(\beta^P_{11} - \beta^P_{10})]$$

Assume for analytical simplicity that $C(e)=e^2/2a$, with $a>0$. Ignoring corner solutions in probabilities (see Section 3 below), we then have:

$$e_0 = a\theta\beta_m[(1-\lambda)(y_1 - y_0) + \lambda(\beta^P_{01} - \beta^P_{00})]$$

$$e_1 = a\theta\beta_m[(1-\lambda)(y_1 - y_0) + \lambda(\beta^P_{11} - \beta^P_{10})] \quad (2)$$

Eq. (1) for $\beta^P_{01} - \beta^P_{00}$ as a function of e_0 and $\beta^P_{11} - \beta^P_{10}$ as a function of e_1 and Eq. (2) for e_0 as a function of $\beta^P_{01} - \beta^P_{00}$ and e_1 as a function of β^P_{11}, β^P_{10} define the interior equilibrium conditions. Note that for $\lambda=0$, i.e. without any status motive, Eq. (1) are irrelevant and Eq. (2) trivially define a unique equilibrium where all agents take the same effort level $e_0 = e_1 = e^* = a\theta\beta_m(y_1 - y_0)$, so that the inequality of economic success between agents with different social origins is simply measured by the exogenous parameter $\Delta\pi$.

The questions we are asking are therefore the following:

- Does there still exist a unique equilibrium when agents care about their social status (i.e. $\lambda>0$)? (Section 3)
- What is the effect of the status motive on the inequality of economic success between agents with different social origins? (Section 4).

[8] With the quadratic cost function for effort assumed below, it would make no difference if agents knew their own ability: the average expected effort by social origins would still be given by exactly the same formula.

3. The multiplicity effect of the status motive

First, note that if we take Eqs. (1) and (2) literally, i.e. ignoring corner solutions in probabilities, they imply that whenever the concern for status is positive ($\lambda > 0$) there will be an explosive equilibrium in effort: as the expected effort e_0 gets closer to e s.t. $\pi + \theta\beta_m e = 1$, the social status β^P_{00} goes toward $-\infty$, so that everybody is ready to take an infinitely high effort level to avoid this infinitely negative social payoff, even if one's concern for social status is very small. This is rather extreme, so from now on we make the following natural assumptions in order to keep everything within bounds:

- the distribution $f(\beta)$ of abilities is defined over some compact support $[b;B]$, with $0 \leq b < \beta_m < B$, and so are the possible levels of social status.
- there exists some exogenous maximum effort level $E > 0$ (i.e. $C(e) = +\infty$ for $e > E$) such that:

$$\pi + \Delta\pi + \theta BE < 1 \tag{A0}$$

$$e^* = a\theta\beta_m(y_1 - y_0) < E \tag{A1}$$

Assumption Eq. (A0) guarantees that for any possible social origin, ability and equilibrium effort level the probability of economic success falls strictly between 0 and 1, so that Eq. (1) defining $\beta^P_{01} - \beta^P_{00}$ and $\beta^P_{11} - \beta^P_{10}$ as a function of e_0 and e_1 are valid as long e_0, $e_1 \leq E$. In turn, Eq. (2) for e_0 and e_1 as a function of $\beta^P_{01} - \beta^P_{00}$ and $\beta^P_{11} - \beta^P_{10}$ are valid as long as they define effort levels that are smaller or equal to E (otherwise, the utility-maximizing effort level is equal to E). This allows us to forget about corner solutions in probabilities. Assumption Eq. (A1) guarantees that in the absence of any status motive ($\lambda = 0$), the unique equilibrium effort level e^* is smaller than the maximum effort level E.

Eqs. (1) and (2) and the above assumptions imply that an effort level e^*_0 will be an equilibrium for agents with lower-class origins if and only if:

$$e^*_0 = \min(g(e^*_0);E) \tag{3}$$

with: $g(e) = a\theta\beta_m[(1-\lambda)(y_1 - y_0) + \lambda\theta\sigma^2 e/[(\pi + \theta\beta_m e)(1 - \pi - \theta\beta_m e)]]$.

Equilibrium effort levels e^*_1 for agents with upper-class origins are defined similarly, by replacing π by $\pi + \Delta\pi$. Note that g is monotonically increasing ($\forall e > 0$, $g'(e) > 0$), which leaves open the possibility of multiple equilibria: higher expected effort leads to higher social rewards to economic success and therefore leads individuals to put higher effort, so that both 'nouveaux riches' and 'selfmade men' ideologies could in principle be self-fulfilling for the same parameter values.[9]

The maximum effort level E will be an equilibrium for agents with lower-class origins if and only:

$$g(E) = a\theta\beta_m[(1-\lambda)(y_1 - y_0) + \lambda\theta\sigma^2 E/[(\pi + \theta\beta_m E)(1 - \pi - \theta\beta_m E)]] > E$$

We already know from assumption Eq. (A1) that $g(E) < E$ if $\lambda = 0$, i.e. that $e^* < E$ is the unique equilibrium effort level if agents do not care at all about their social status. By continuity of the $g(e,\lambda)$ mapping, we also know that there exists $\lambda^* \in]0;1[$ such that if $\lambda \leq \lambda^*$ there exists a unique equilibrium effort level $e_0^*(\lambda)$, with $e_0^*(\lambda) < E$ and $e_0^*(0) = e^*$. Now, consider the following assumption:

$$a\theta^2\sigma^2\beta_m > (\pi + \theta\beta_m E)(1 - \pi - \theta\beta_m E) \quad \text{(A2)}$$

Assumption Eq. (A2) means that $g(E) > E$ if $\lambda = 1$. By continuity, Eq. (A2) implies that there exists some $\lambda^{**\prime} \in]0;1[$ such that E is an equilibrium for agents with lower-class origins if and only if $\lambda \geq \lambda^{**\prime}$, i.e. if and only if the status motive is sufficiently strong. Intuitively, assumption Eq. (A2) requires the informativeness of economic success (as measured by $a\theta^2\sigma^2\beta_m$) to be sufficiently strong in case of high effort, so that the expectation of high effort is self-fulfilling if agents care sufficiently about their social status.

Conversely, consider the following assumption:

$$a\theta^2\sigma^2\beta_m < \pi(1 - \pi) \quad \text{(A3)}$$

Eq. (A3) means that $g'(0) < 1$ for $\lambda = 1$. Since $g(0) = 0$ for $\lambda = 1$, Eq. (A2) implies that $g(e) < e$ if $\lambda = 1$ and e is sufficiently small (but positive). Using the fact that $g(0) > 0$ for any $\lambda > 0$, this implies by continuity that there exists $\lambda^{**\prime\prime} \in]0;1[$ such that for $\lambda > \lambda^{**\prime\prime}$ there exists $e_0^{**}(\lambda) < e^*$ such that $e_0^{**} = g(e_0^{**})$ and $e_0^{**}(\lambda) \to 0$ as $\lambda \to 1$. Intuitively, Eq. (A3) guarantees that the informativeness of economic success is sufficiently small in case of low effort, so that the expectation of low effort is self-fulfilling if agents care sufficiently about their social status.

Therefore if both Eqs. (A2) and (A3) are satisfied and if the status motive is

[9] This is where the assumption of a multiplicative interaction between effort and ability plays a role: if we were instead assuming that effort and ability are sufficiently strong substitutes (i.e. that higher effort reduces sufficiently the marginal effect of ability on the probability of economic success), then $g(e)$ would be monotonically decreasing and no equilibrium multiplicity could occur. Note however that effort and ability do not need to be complements: with an additive formulation (Proba$(y_i = y_1) = \pi + \theta e_i + \beta_i$), one would get $g(e) = a\theta[(1-\lambda)(y_1 - y_0) + \lambda\sigma^2/[(\pi + \theta\beta e)(1 - \pi - \theta e)]]$, i.e. $g'(e) > 0$ if $\pi + \theta\beta e > 1/2$, which allows for multiple equilibria.

strong enough ($\lambda > \lambda^{**} = \text{Max}(\lambda^{**\prime}; \lambda^{**\prime\prime})$), then there exists (at least) two different equilibrium effort levels, $e_0^* = E > e^*$ and $e_0^* = e_0^{**}(\lambda) < e^*$.[10]

Note that Eqs. (A2) and (A3) are mutually compatible iff:

$$\pi(1-\pi) > (\pi + \theta\beta_m E)(1 - \pi - \theta\beta_m E)]) \tag{A4}$$

$$\textit{i.e. } \pi > 1/2 - \theta\beta_m E/2$$

Eq. (A4) is a very intuitive necessary condition for equilibrium multiplicity: it simply says that low effort is less informative about ability than high effort. For example, Eq. (A4) always holds if $\pi > 1/2$: if the expected probability of economic success is higher than 50% even in the absence of any effort, then higher effort will always make economic success more informative. Under assumption Eq. (A4), multiple equilibria will actually exist if both Eqs. (A2) and (A3) hold, i.e. if the informativeness of economic success $a\theta^2\sigma^2\beta_m$ is appropriately bounded above or below by $\pi(1-\pi)$ and $(\pi + \theta\beta_m E)(1 - \pi - \theta\beta_m E)])$.

Finally, note that similar conditions apply to the case of agents with upper-class social origins, by replacing π by $\pi + \Delta\pi$ in the assumptions Eqs. (A2)–(A4).

Proposition 1. *There exists* $\lambda^*, \lambda^{**} \in]0;1[$ *such that: When the status motive is small* ($\lambda < \lambda^*$), *there exists a unique equilibrium effort level* $e^*(\lambda)$.

Under assumptions Eqs. (A2)–(A4)*, when the status motive is strong* ($\lambda > \lambda^{**}$)*, there exists one low-effort equilibrium* $e^{**}(\lambda) < e^*$ *and one high-effort equilibrium* $E > e^*$.

When there exists multiple equilibria, these equilibria can always be ranked in ex-ante Pareto terms. Indeed, the expected utility derived from the status motive is always equal to the average status β_m, independently of the effort level e, as long as all agents (with the same social origin) choose the same effort level: choosing a higher effort level yields higher status payoff only to the extent not everybody does the same. From an ex ante viewpoint, the socially optimal effort level $e_{FB}(\lambda)$ is given by $e_{FB}(\lambda) = a(1-\lambda)\theta\beta_m(y_1 - y_0)$. It is obvious from Eq. (3) that for $\lambda > 0$ any equilibrium effort level satisfying the equation $e = g(e)$ will be higher than $e_{FB}(\lambda)$: equilibria are never first-best efficient, because of the well-known 'rat race' induced by the status motive. The concavity of the utility function (with respect to effort) then implies that low-effort equilibria are always 'less inefficient'

[10] In general there could exist more than two equilibria, and assumptions Eqs. (A2) and (A3) need not to be necessary to obtain multiple equilibria. In appendix A we give a complete characterization of the different equilibrium regimes under additional assumptions.

than high-effort equilibria, in the sense that everybody's expected utility is higher in the low-effort equilibrium than in the high-effort equilibrium.[11]

Proposition 2. *When multiple equilibria exist, the low-effort equilibrium always Pareto-dominates the high-effort equilibrium in ex ante terms.*

This equilibrium multiplicity is very similar to the multiplicity which is at the core of the theory of statistical discrimination. In both cases, (additional) inequality is generated solely out of self-fulfilling beliefs, because the expectation that the behaviour of one group of agents tends not to be very conducive to economic success forces this group to adopt that kind of behaviour, and conversely. In the statistical discrimination context, y_0 and y_1 are the two possible outcomes of a qualification test, on the basis of which employers will decide whether or not to allocate agents to good jobs. Therefore the traditional difficulties associated to public intervention designed to solve this type of inefficiency (e.g., quotas can lead protected groups to put even less effort, etc..) also apply here.[12] One key difference is that in the social status context there are no employers to blame for the inefficiency, the beliefs and the rewards being held and distributed by the society as a whole. This makes policy analysis even more problematic.

In the statistical discrimination context however, there are policy tools that would always work (assuming we can't just change the equilibrium through discourse alone): income transfers directed towards individuals from discriminated groups who do get promoted.[13] In contrast, such tools might be completely inefficient in the status context because individuals don't care about financial incentives! For example, in the extreme case where $\lambda = 1$ and there are two equilibrium effort levels $e^{**} = 0$ and E, there is nothing an economic policy maker can do in order to force agents to shift from the inefficiently high effort level $e = E$ to the efficient effort level $e = 0$. Note also that the inefficiency here is that agents put too much effort, unlike in the statistical discrimination case, and inducing

[11] Unambiguous Pareto rankings can be obtained only because we assumed that individual agents have no prior knowledge about their own ability parameter. Needless to say, high-ability agents might prefer high-effort, high-informativeness equilibria in case they know who they are from the beginning. In that case, low-effort equilibria dominate high-effort equilibria only in utilitarian terms. Also note that if high effort levels did involve some positive externality (for example on innovation and long-run growth), low-effort equilibria might obviously not dominate high-effort equilibria any more.

[12] See Coate and Loury (1993) for a recent analysis of how policy can make things worst in the statistical discrimination context.

[13] For example, this could take the form of a 'race-specific EITC', i.e. a system of wage subsidies that would only apply to the members of the discriminated group.

everybody to put less effort might be more difficult to motivate as a policy goal than the opposite.[14]

4. The effect of the status motive on inequality

When there is no status motive ($\lambda = 0$), all agents take the same effort level e^*, so that the inequality of economic success between agents with different social origins is limited to the exogenous parameter $\Delta\pi$. Is there any reason to expect upper-class to put more effort than lower-class agents when the status motive becomes large, thereby amplifying the persistence of inequality between dynasties? If the parameters are such both lower-class and upper-class agents face multiple equilibrium effort levels, then one cannot really say in general whether the status motive reduces or amplifies the inequality of economic success between agents with different social origins: it all depends on which equilibrium gets selected for which social origins, which may vary over time and across societies, as was noted in the introduction.

However the status motive does not always generate such ambiguous predictions. The typical situation when the status motive unambiguously amplifies inequality is when inequality is already important in the absence of the status motive, in the sense that the effect of effort and ability on economic success is small and the effect of social origins is large. θ is the parameter measuring the strength of the effect of effort and ability on the probability of economic success. Assume that θ is sufficiently small so that:

$$a\theta^2\sigma^2\beta_m < \mathrm{Min}(\pi(1-\pi); (\pi + \theta\beta_m E)(1 - \pi - \theta\beta_m E)) \quad \text{(A5)}$$

There always exists a threshold $\theta^* > 0$ such that this condition holds iff $\theta < \theta^*$. From the previous section, we know that if Eq. (A5) holds the high effort level E will never be an equilibrium for lower-class agents and the low effort level $e_0^{**}(\lambda) < e^*$ will be an equilibrium for lower-class agents if the status motive is sufficiently large ($\lambda > \lambda^{**}$). Recall that $e_0^{**}(\lambda) \to 0$ as $\lambda \to 1$. That is, lower-class agents will put less and less effort to move up as they care more and more exclusively about their social status, because a very low θ implies that the social rewards to upward mobility are very small.

Now assume that the exogenous inequality parameter $\Delta\pi$ is sufficiently large so that:

$$a\theta^2\sigma^2\beta_m > \mathrm{Max}((\pi + \Delta\pi)(1 - \pi - \Delta\pi); (\pi + \Delta\pi + \theta\beta_m E)(1 - \pi - \Delta\pi - \theta\beta_m E)) \quad \text{(A6)}$$

[14] For example, If everybody expects to have a higher ability parameter than the average individual (a common situation in practice), then all agents might (irrationally) prefer the higher-effort equilibrium.

For any $\theta > 0$, there exists $\Delta\pi^*(\theta) > 0$ such that iff $\Delta\pi > \Delta\pi^*(\theta)$. From the previous section, we know that if Eq. (A6) holds the high effort level E will be an equilibrium for upper class agents if the status motive is sufficiently large ($\lambda > \lambda^{**}$). Intuitively, if $\Delta\pi$ is very large, then agents with upper-class origins are expected to be economically successful with a very high probability, so that a poor economic performance will be interpreted as the sign of a very low ability, and therefore status-oriented upper-class agents will put very high effort to maintain their status.

It follows that if both Eqs. (A5) and (A6) hold, that is if $\theta < \theta^*$ and $\Delta\pi > \Delta\pi^*(\theta)$, then a stronger status motive will amplify the inequality of economic success between agents with different social origins: for $\lambda = 0$ the probability of upper-class agents of getting a high income is higher than that of lower-class agents by just $\Delta\pi$ (since they all put the same effort level), whereas for $\lambda = 1$ the same probability differential is equal to $\Delta\pi + \theta\beta_m E$ (since upper-class agents put effort E and lower-class agents put effort $e_0^{**}(1) = 0$). In general however, assumptions Eqs. (A5) and (A6) are not sufficient guarantee that $e_0^{**}(\lambda)$ (resp. E) will be the unique equilibrium effort level for lower-class agents (resp. upper-class agents) when $\lambda > \lambda^{**}$. In appendix A we show that if we further assume $\pi > 1/2$ then: (i) Eqs. (A5) and (A6) are sufficient to rule out equilibrium multiplicity; (ii) if it has any predictable effect at all, the status motive always tends to amplify the inequality between agents with different social origins and never reduces it.

Proposition 3. *There exists $\theta^* > 0$ and $\Delta\pi^*(\theta) > 0$ (for any $\theta > 0$) such that if the impact on economic success of effort and ability is very low as compared to the effect of social origins ($\theta < \theta^*$ and $\Delta\pi > \Delta\pi^*(\theta)$), then the status motive increases the inequality of economic success between agents with different social origins and reduces social mobility. I.e., in equilibrium $e_1^*(\lambda) - e_0^*(\lambda)$ increases as λ increases from $\lambda = 0$ to $\lambda = 1$.*[15]

As was argued in the introduction, the intuition why the status motive amplifies inequality by making it more persistent across generations is similar to that of the Merton-Boudon theory of social mobility based upon the concept of 'reference group'. The conditions of proposition 3 (θ low, $\Delta\pi$ high) correspond exactly to the situation where upper-class agents have a lot to loose if they don't maintain their initial social position, whereas lower-class agents are not expected to reach the same level and therefore are less motivated. In other words, everyone has an interest to maintain one's initial social position. If this is the right theory explaining why inequality is so persistent across generations, then we need not worry about the low effort and upward mobility levels of lower class agents: they are right to put little effort, given what they care about, and there is not much one should do about it. The only welfare-improving policy would actually be to reduce

[15]Strictly speaking, we only know that $e_1^*(\lambda) - e_0^*(\lambda)$ goes up from 0 for $\lambda = 0$ to E for $\lambda = 1$, which does not necessarily imply that $e_1^*(\lambda) - e_0^*(\lambda)$ is monotonically increasing.

their effort even further and especially to reduce the inefficiently high effort of upper-class agents (for example through taxation, which may be completely ineffective if they almost do not care about income per se).[16] In that sense the social status/reference group theory of limited social mobility can be viewed as 'right-wing': it rationalizes the persistence of inequality between dynasties and says that we should not worry. In contrast, the Bourdieu/statistical discrimination theory of persistent inequality says that limited social mobility is due to the fact that lower-class agents are being inefficiently discouraged from trying to move up the social ladder, and that we should try to do something about it.

Finally, note that whether the conditions of proposition 3 are met in practice is a matter of 'perceptions' at least as much as a matter of 'reality'. As we have shown in Piketty (1995) in the case with no status motive, parameters like π, $\Delta\pi$ and θ are very difficult to learn about since one only observes success or failure and not the actual probabilities of these events. For example, if the 'true' parameters are π^*, $\Delta\pi^*$ and θ^*, then rational Bayesian learning during infinitely many periods will not be sufficient to distinguish the true parameters from any parameters π, $\Delta\pi$, θ such that:

$$\pi + \theta\beta_m e_0^* = \pi^* + \theta^*\beta_m e_0^*$$

$$\pi + \Delta\pi + \theta\beta_m e_0^* = \pi^* + \Delta\pi^* + \theta^*\beta_m e_0^*$$

Learning would be even more limited if the parameter β_m was also uncertain and/or if the parameter θ could be different for different social origins. In other words, whatever the true parameters might be, some societies might have perceptions of these parameters that satisfy the conditions of proposition 3, while some other societies have not. Here again, the natural example is the transatlantic comparison: extensive survey evidence that americans believe in a higher θ than europeans, while europeans believe in a higher $\Delta\pi$.[17] In other words, the reason why upwardly mobile agents are more often treated as 'nouveaux riches' in Europe than in the US, which makes incentives for upward mobility lower in Europe, might not be that there are multiple equilibria in effort and that Europe and the US picked different equilibria (proposition 1), but rather that upward mobility through effort and ability alone is thought to be so unlikely in Europe that individuals just try to maintain their initial status (proposition 3).

[16]As we saw in the previous section (proposition 2), equilibrium effort levels are always too high as long as $\lambda > 0$, and even more so for agents who take the highest effort level (i.e. upper-class agents under the assumption of proposition 3).

[17]See, e.g., Smith (1989); Evans (1993).

Acknowledgements

I am grateful to the participants of the 1996 ISPE Conference on the 'Economics of Status' and to two anonymous referees for their comments.

Appendix 1

Recall that the equilibrium condition for lower class-agents is:

$$e = \max(g(e); E)$$

with: $g(e)=a\theta\beta_{\mathrm{m}}[(1-\lambda)(y_1-y_0)+\lambda\theta\sigma^2 e/[(\pi+\theta\beta_{\mathrm{m}}e)(1-\pi-\theta\beta_{\mathrm{m}}e)]]$

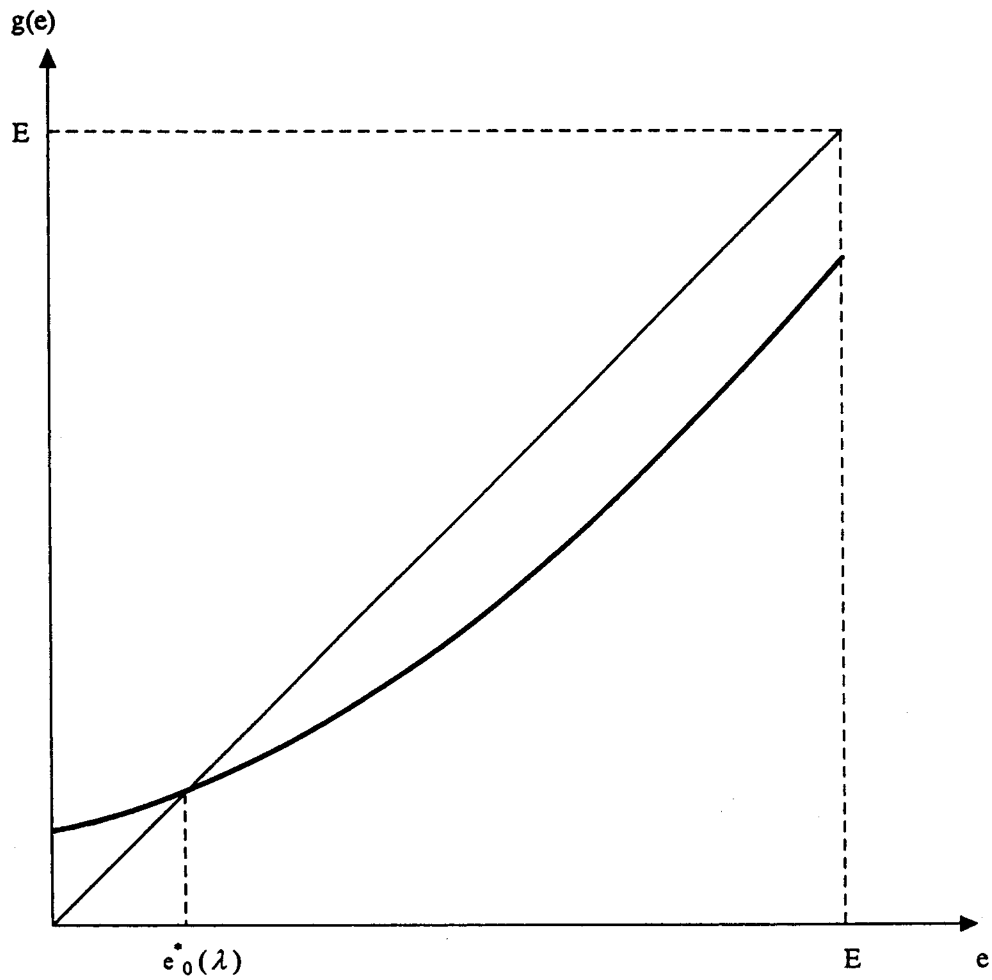

Fig. 1.

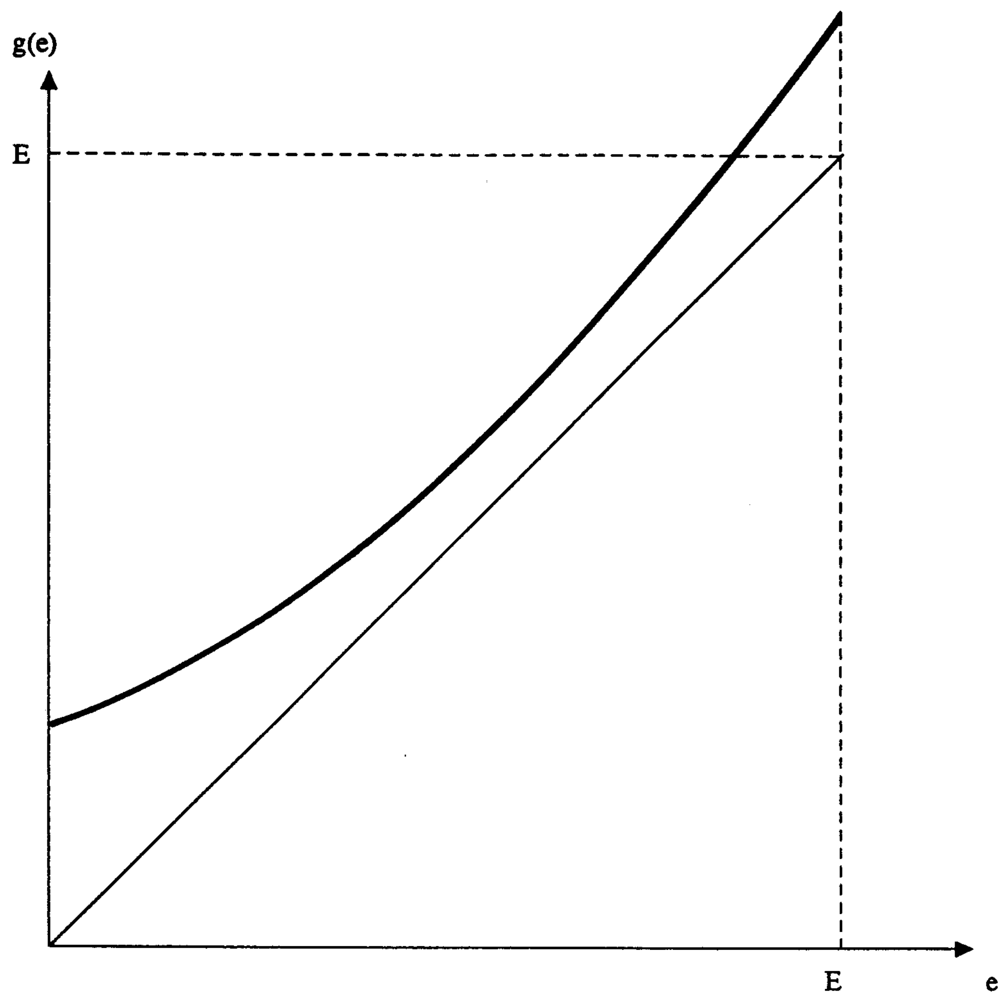

Fig. 2.

The equilibrium condition for upper-class agents is similar (replace π by $\pi + \Delta\pi$), so we will concentrate on the case of lower-class agents. Recall that $\forall e \geq 0\ g'(e) > 0$. Furthermore, elementary algebra yields:

$$g''(e) = 2a\theta^3\sigma^2\beta_m^2[\pi(1-\pi)(2\pi-1) + \theta\beta_m e(3\pi(1-\pi) + \theta^2\beta_m^2 e^2)]/(\pi + \theta\beta_m e)^3(1-\pi-\theta\beta_m e)^3$$

If we assume that $\pi > 1/2$, this implies that $\forall e \geq 0\ g''(e) > 0$. The convexity of g implies that $g(e)$ and the first bisectrix intersect at most twice.[18] Only three cases can happen:

Case 1. $g(E) < E$Since $g(0) > 0$, the convexity of g implies that there exists a

[18]If we were assuming $\pi < 1/2$, then $g(e)$ would be first concave and then convex, which makes the analysis of equilibrium multiplicity more complicated.

unique equilibrium $e_0^*(\lambda)$ satisfying Eq. (3) (see Fig. 1). This unique equilibrium regime will prevail for all $\lambda \in [0;1]$ if we assume $a\theta^2\sigma^2\beta_m < (\pi + \theta\beta_m E)(1 - \pi - \theta\beta_m E)$ $(< \pi(1-\pi)$, since $\pi > 1/2$ also implies that $\pi(1-\pi) > (\pi + \theta\beta_m E)(1 - \pi - \theta\beta_m E))$. Otherwise, this case will apply for $\lambda < \lambda^*$ (see Section 3). This unique, low-effort equilibrium regime also includes the case of lower-class agents under the assumptions of proposition 3 (Section 4).

Case 2. $g(E) > E$ and g does not intersect with the first bisectrix.

In that case, the unique equilibrium is the high effort level E (see Fig. 2).One case where this regime will always apply is when $a\theta^2\sigma^2\beta_m > \pi(1-\pi)$ $(> (\pi + \theta\beta_m E)(1 - \pi - \theta\beta_m E)$, since $\pi > 1/2$ also implies that $\pi(1-\pi) > (\pi + \theta\beta_m E)(1 - \pi - \theta\beta_m E))$ and λ is sufficiently close to 1. This is because $a\theta^2\sigma^2\beta_m > \pi(1-\pi)$

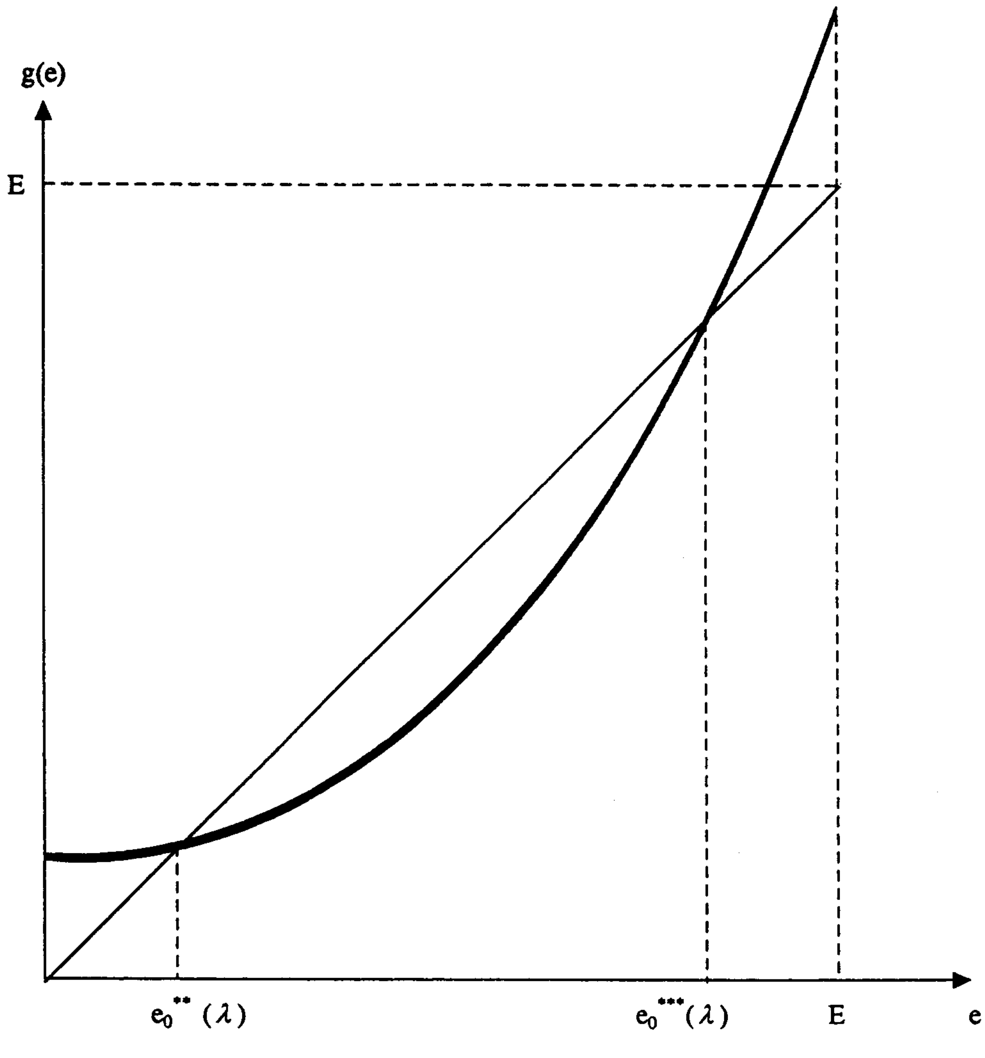

Fig. 3.

implies that $g'(0)>1$ for λ sufficiently close to 1. Since $g(0)>0$ and $g''(e)>0$, this implies that g can never intersect the first bisectrix. This is the case of upper-class agents under the conditions of proposition 3 (Section 4).

Case 3. $g(E)>E$ and g intersects twice with the first bisectrix.

This is the multiple equilibrium case, as described in proposition 1. There are two stable equilibrium effort levels (e_0^{**} and E), and one unstable equilibrium effort level (e_0^{***}) (see Fig. 3).We saw in Section 3 will in particular occur when $\pi(1-\pi)>a\theta^2\sigma^2\beta_m>(\pi+\theta\beta_m E)(1-\pi-\theta\beta_m E)$ and λ sufficiently close to 1.

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