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Inequality, Economic Growth and Social Mobility

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Inequality, economic growth and social mobility¹

ABSTRACT

This paper develops a model of intergenerational mobility and intragenerational inequality that allows us to explore the relationship between economic growth and social mobility. The model is used to analyse the neo-liberal theory of stratification and to assess the consequences of some of the criticisms that have been made of it. In particular, the intergenerational transmission of wealth and privilege, and the existence of ethnic, gender and other forms of ascriptive disadvantage, reduce economic efficiency, although they do not always diminish the extent of social mobility. Furthermore, excessive intragenerational inequality may inhibit, rather than encourage, economic growth. We show that there is no necessary link between rates of social mobility and levels of economic growth. This, we suggest, provides an explanation of why rates of social mobility show very little cross-national variation and display no very evident trend over time towards greater societal openness.

KEYWORDS: Stratification theories; intergenerational social mobility; intragenerational inequality; economic growth

INTRODUCTION

This paper addresses the question of the relationship between inequality, economic growth and social mobility. This question is of interest, we suggest, not least because, while it is widely assumed that high levels of social mobility are necessary to secure economic growth ('making the best use of the nation's resources'), it is also assumed that high levels of inequality will tend to restrict rates of social mobility. Yet inequality in occupational rewards is thought to provide a necessary incentive structure which promotes growth. Thus there is a paradox: both inequality and mobility are good for growth, yet one militates against the other. In our analyses we investigate these assumptions and conclude that they are likely to be incorrect. In particular, our results may be added to the small, but growing, body of literature which suggests that a high level of inequality, rather than improving economic performance, may have negative effects (Persson and Tabellini 1994). We also find that the relationship between economic growth and the amount of social mobility in a society is largely indeterminate. We suggest that this may account for why, both cross-nationally and through time, changes in patterns of social fluidity do not display any very

evident trend towards greater openness but, rather, are better described as, in the words of Erikson and Goldthorpe (1992), a 'constant flux'.

In sociology the relationship between inequality and economic growth has perhaps been most extensively addressed in the neo-liberal tradition. Although approaches in this tradition have been widely criticized they nevertheless continue to inform both debate (academic and popular) and policy: accordingly we take this model as our point of departure. We begin with a mathematical formalization of the neo-liberal account of the way in which certain elements of economy and society interrelate. Our purpose in doing this is to investigate the corollaries of the theory and of elaborations that seek to take into consideration some critiques of its validity. When we make changes to the model so as to incorporate these criticisms we find that many of the results that flow from the original model are very much altered. In particular we show that the outcomes are often considerably less benign and unproblematic than proponents of the neo-liberal approach allow.

INEQUALITIES AS INCENTIVES

The idea that inequalities of rewards provide a necessary structure of incentives is both long standing and enjoys a great deal of contemporary currency. This was nowhere more evident than in Britain during the Thatcher years, when, for example, reductions in rates of personal income tax, particularly for high earners, were justified on the basis of the need to provide incentives to retain and attract the most talented personnel.² The idea is also pervasive in the social sciences, especially, of course, in economics, where, in the relevant contexts, individual agents are assumed to seek to maximize their utility, which, in practice, is often a function of monetary rewards. In sociology the idea is prevalent in neo-liberal treatments of stratification. In some cases this is explicit, as in Davis and Moore (1945) and other functionalist accounts (Davis 1949; Parsons 1957), while elsewhere it provides the implicit underpinning for macro-sociological theories. A good example of the latter is the so-called 'liberal theory of industrialism' (Kerr et al. 1960; Parsons 1964). This posits that, among other things, economic development leads countries to become ever more meritocratic in the sense that positions in society will increasingly come to be filled on the basis of achievement rather than ascription. This, it is argued, is a functional necessity of industrial society: the acquisition by individuals of positions on the basis of anything other than merit or ability will be sub-optimal both for individual firms competing among themselves within a country and for that country's competitive position *vis-à-vis* other nations. Furthermore, as the production of goods and services comes to rely increasingly on the application of scientific and technical knowledge, so greater importance will be attached to educational qualifications. Thus educational and other credentials will play an ever larger part in securing

positions while ascriptive characteristics – such as race, gender and class background – will decline in importance.

The liberal theory of industrialism is couched at the macro level and concerns how economic and social structures evolve during development. Competition both within and between nations leads to a greater emphasis on ensuring that the most 'able' people come to occupy the 'correct' positions in society. But, to have any claim to plausibility, the theory must be underpinned by some account of how this arises as the result of 'the action and interaction of individuals' (Elster 1989: 13). The neo-liberal theory of stratification provides one such account, according to which people are persuaded or encouraged to behave in the appropriate way by incentives.

The liberal theory of industrialism has received very little empirical support.³ Research in social mobility has shown that, far from rates of social fluidity increasing over time (as one might expect given greater emphasis on achievement at the expense of ascription), no such trend is discernible (Erikson and Goldthorpe 1992).⁴ And similarly, while one might have anticipated substantial cross-national variation in mobility rates (and particularly in rates of social fluidity) according to the degree to which different societies had evolved along the path prescribed by the liberal theory, this is equally hard to discern (Lipset and Bendix 1959; Erikson and Goldthorpe 1985; 1992). Rather, the so-called FJH thesis (Featherman, Jones and Hauser 1975) has largely been confirmed.

A basic similarity in patterns of social fluidity . . . will be found across all nations with market economies and nuclear family systems where no sustained attempts have been made to use the power of the modern state apparatus in order to modify the processes or the outcomes of the processes through which class inequalities are intergenerationally reproduced. (Erikson and Goldthorpe 1987: 162)

But although cross-national and temporal invariance in social fluidity has been well documented, it has proved difficult to explain, except in rather general terms. Here recourse is made to the ability of those in positions of power to maintain their privileges even in the face of economic changes and policy innovations (such as free education). In this paper, however, we argue that this invariance in mobility rates can be explained quite simply. We suggest that, contrary to earlier belief, and even within the terms of the liberal theory itself, economic growth and the level of social mobility bear no necessary relationship to each other. But to explain this result we need to examine more closely the neo-liberal micro-level theory of stratification which, we have suggested, underpins the liberal theory of industrialism. To this end we return to the seminal work of Davis and Moore (1945).

DAVIS AND MOORE AND THEIR CRITICS

Davis and Moore (1945) present a functionalist theory to explain 'the universal presence of stratification' (op. cit.: 242).

Social inequality is thus an unconsciously evolved device by which societies insure that the most important positions are conscientiously filled by the most qualified persons. (op. cit.: 243)

The pattern of reward inequalities is in turn governed by two factors: these are the relative functional importance of positions and the level of training or talent required. Thus, a position requiring relatively low levels of training or talent will be less well rewarded than one of equal functional importance that demands high levels of one or both of these. This is because the supply of applicants for positions will be inversely related to the position's requirements in terms of skills and abilities. Thus the stratification system evolves in response to the functional importance of positions and to the supply of people qualified to fill them.

This theory has been the subject of several important critiques. For example, Davis and Moore themselves (op. cit.: 244) noted the difficulty of establishing the functional importance of positions in any given society. But the most telling criticisms have focused on three issues. First, it is argued that their treatment of the distribution of rewards in society ignores the 'power element' in stratification. For example

The unequal rewards in wealth and prestige 'attached to' the positions also give their incumbents greater opportunities to influence the general distribution of rewards in society and to protect or augment their own privileges. (Wrong 1958:774)

Second, given that unequal rewards are necessary, the theory is silent as to the magnitude of such rewards. Nothing rules out the possibility that certain positions are over-rewarded relative to what would be needed in order to ensure that a sufficient number of suitably skilled individuals would be willing to enter them (Tumin 1953). And third, critics have pointed to the role of ascription and the intergenerational transmission of rewards, as factors that will interfere with the efficient allocation of talented persons to appropriate positions (see also Davis 1949).

Notwithstanding these and other criticisms, the neo-liberal model remains influential. In this paper we subject it to a mathematical analysis, the aim of which is to bring to light the consequences that derive from it and to show how these change once the model is extended to incorporate the kinds of criticisms already outlined. In order to do this the model is dynamic: it investigates not simply the short run or cross-sectional outcomes in terms of economic growth and social mobility but also the longer term (across generations) results associated with particular accounts of a society's stratification system.⁵ Accordingly, we begin with a model of the neo-liberal theory. Having investigated its consequences we then extend it. First we include the possible effects of the intergenerational transmission of advantage: inheritance for short. Second we look at what happens when we allow for the existence of an incentive structure that leads individuals to seek to occupy positions in a manner that does not maximize what we term

'economic efficiency'. This typically arises when groups acquire sufficient power to shape the allocation of rewards to their own and their family's advantage. Lastly, we examine the results that arise when ascription associated with ethnic group and gender are taken into account. In the paper's concluding sections we draw out some consequences of our results for policy and for our understanding of the link between social mobility and economic development.

FORMALIZING THE NEO-LIBERAL THEORY

We begin by assuming that individuals are endowed with a quality called 'ability', which is randomly and normally (mean zero and unit variance) distributed over the members of each generation. We further assume that there exists a distribution of positions and that the aggregate output of the economy depends upon, *inter alia*, the match between the ability requirements of these positions and the ability of their incumbents. The closer the match the greater the output; hence, output is higher the stronger the correlation between the distributions of ability and position.⁶ In the spirit of the neo-liberal treatment of stratification, differential rewards play the central role of persuading those with the highest level of ability to take up those positions in which it is most required. We refer to the correlation between ability and position as 'economic efficiency'.⁷

Note that this formulation of the rank ordering of positions in society overcomes certain common criticisms of Davis and Moore – namely that functional importance cannot be assessed on the basis of empirical observations concerning, say, the prestige attached to occupations, and that in any society there will be conflicts as to the importance to be attached to various occupations. In our formulation all that is required is that there should *in theory* be some way of ordering positions that will make optimum use of the ability distribution for the particular goal of maximizing economic growth. The assumption of one dimension of ability is innocuous here, since to allow for several dimensions would complicate the mathematics but not alter the conclusions.

Given the existence of this ordering of positions, by what mechanisms might individuals come to occupy specific positions? Here there are two issues. First, according to neo-liberal theories, individuals must be offered incentives. Hence each position must have a set of rewards (economic and non-economic) attached to it and the ordering of rewards should match the ordering of positions. Frequently, of course, this will not be so. As the critics of Davis and Moore pointed out, the reward distribution in society cannot be assumed so unproblematic. Even leaving aside such complications for the moment, an important issue is the magnitude of these incentives or the degree of reward inequality that is needed to persuade the most able to fill the highest ranking positions. This is the issue we will focus on initially.

The second issue relates to the way in which, in the labour market, positions are allocated. Since ability is unobservable some proxy measure must be used. Most commonly some forms of educational or other certification play this role (at least in the initial allocation of young people to positions). Ideally these resources (as we shall call them) for acquiring a position should directly reflect ability, but in practice this is unlikely to be the case. While ability influences the resources that individuals bring with them into the labour market, class, gender, ethnic group membership and other ascribed differences continue to be important.

THE SIMPLE CASE

We begin by writing a simple model in which the resources for acquiring a position depend only on ability and the reward distribution matches the rank ordering of positions as defined earlier. The model has three equations

$$S_{it} = A_{it} \quad (1)$$

$$P_{it} = \left[\frac{S_{it} - \bar{S}_t}{\sigma_s} \right] + \frac{1}{\beta} \epsilon_{it} \quad (2)$$

$$R_{it} = \beta P_{it} \quad (3)$$

Since we will later want to look at the relationship between resources, S , position, P and rewards, R , across successive generations we use the subscript t to index generations. For simplicity we assume that the numbers in each generation are constant and thus a 'family' or 'dynasty' can be thought of as a sequence of individuals linked across generations. We use i to indicate families. Thus in this first version of the model, resources, S_{it} , are given by ability, A_{it} , which is assumed to be randomly distributed. The position, P , occupied by the i^{th} family in the t^{th} generation depends upon resources (standardized to have mean zero and unit variance) and a random component, ϵ , which is a draw from a standard normal distribution. Finally, in equation (3), each position is linked to a particular level of rewards via the parameter β (>0) which determines the degree of reward inequality between positions.⁸ β is thus a measure of reward inequality. Note that it enters into equation (2) where the larger is β the smaller is the random element in allocating individuals to positions. This reflects the impact of incentives: the stronger the incentives to occupy a position (that is, the greater the inequality in rewards associated with different positions) the closer will be the match between resources and positions.⁹

We can use this model to calculate two statistics. The first of these is the

correlation between ability and position, $\rho(A,P)$, which we label ϕ . This is a measure of economic efficiency in the sense in which we earlier used the term. Economic efficiency is by definition maximized if this correlation is perfect. The second statistic we label θ , defined as one minus the correlation between positions in successive generations (that is $1 - \rho(P_t, P_{t-1})$). This captures inter-generational mobility since it measures the extent to which the position occupied by a family in one generation is related to its position in the next.¹⁰

In the simple form of the model given above there is no relationship between successive generations because we assume that ability is randomly distributed within each generation. This absence of heritability means that there is complete social mobility with $\theta = 1$. The size of the correlation between ability and position, which defines economic efficiency, depends on the magnitude of the random component in equation (2), namely ϵ/β .¹¹ This becomes smaller, and the correlation becomes larger, as β itself increases in size. So, simply maximizing reward inequality will cause economic efficiency to increase.

This is a model of society that might be said to encapsulate a liberal, free-market ideology. Positions are allocated on the basis of ability alone and while reward differences can be very great indeed they can be justified on the grounds that they serve to increase economic efficiency and do not obstruct social mobility.¹² To the extent that social mobility is less than complete this must be due to the inheritance of ability. One means of allowing for this in our model is to replace the assumption that ability is randomly distributed with

$$A_{it} = \gamma A_{it-1} + \zeta_{it} \quad (4)$$

which expresses ability in one generation as a function of that in the previous generation plus a random term. In this case the degree of social mobility is inversely related to the strength of γ , the parameter measuring the extent of inheritance of ability. Again, the argument that deviations from perfect mobility are due, to some important degree at least, to ability differences between families located in different parts of the occupational distribution or the class structure is often made – Saunders (1994) and Herrnstein and Murray (1994) being two recent examples of this long standing tradition. However, when we incorporate into the model some of the criticisms of the neo-liberal theories to which we earlier referred, these results no longer hold.

INTERGENERATIONAL TRANSMISSION OF RESOURCES

As a first step we incorporate the intergenerational transmission of rewards as a factor in shaping the level of resources individuals bring with them to the labour market. Once again reverting to our assumption that ability is

randomly distributed (rather than inherited) we can replace equation (1) with

$$S_{it} = \alpha A_{it} + (1 - \alpha) R_{it-1} \quad (1a)$$

This expresses the resources possessed by each individual as a function of endowments comprising parental rewards R_{it-1} and their own ability, A_{it} . The relative importance of each depends on the value of the parameter α which can vary between zero and one.

Making this modest change has some far-reaching consequences (the following results are proved in the appendix). First, the extent of social mobility is now given by

$$\theta = 1 - (1 - \alpha) \frac{\beta}{\sigma_s} \quad (5a)$$

Whereas in the simpler model (under the assumption of non-heritability of ability) mobility was always equal to one, now it depends on both α and β . The greater is the contribution of inherited rewards to resources (in equation (1a)) relative to the contribution of ability, the less mobility will there be. This is intuitively sensible: the greater the contribution of the non-inherited factor (ability) in determining resources and thus position, the weaker the inter-generational relationship between positions. But perhaps more striking is that, whereas in the simpler model, mobility and inequality were unrelated, now the greater is inequality the less mobility will be observed.¹³ For any given balance of ability and inherited rewards in shaping resources, the greater the reward inequality the more immobile will a society become, simply because the variation in inherited rewards will be large relative to the variation in ability.

Second, economic efficiency will now be given by

$$\phi = \frac{\alpha}{\sigma_s \sigma_p} \quad (5b)$$

Here the impact of increasing α on efficiency is the same as on mobility – it increases it. Given that efficiency is defined as the correlation between ability and position and α is the parameter that links ability and resources this result is hardly surprising. However, what is perhaps surprising is the effect on efficiency of increasing inequality. Whereas in the simpler model more inequality meant more efficiency, this is now only partially true. Although efficiency increases as inequality grows from a relatively low level, continued increases in inequality will cause efficiency to *decline*. The point at which this occurs is

$$\beta^* = \left[1 + \frac{\alpha^2}{(1 - \alpha)^2} \right]^{1/4} \quad (6)$$

β^* is the value of the inequality parameter that maximizes economic efficiency. Any value of β greater or less than this represents a level of inequality that is sub-optimal for economic efficiency.

This result arises because, although inequality contributes to greater efficiency by providing incentives, it also militates against efficiency by increasing the degree of inequality in inherited rewards, so that the individual's resources, S , come to depend more heavily on inherited rewards at the expense of ability. As inequality exceeds β^* this second effect comes to dominate the first: inherited rewards come to exercise an overwhelming influence. Put in simple terms, even if we accept the neo-liberal necessity of incentives to encourage economic efficiency, too great a degree of inequality can have negative effects on such efficiency. On the other hand, if we were to plot the level of economic efficiency against β we would see that in the area around β^* the efficiency curve is relatively flat due to the small power term in equation (6). This suggests that the loss in economic efficiency arising from a β that is only slightly too large or slightly too small will be relatively minor. Nevertheless, increases in inequality above β^* are unwarranted in the sense that they will reduce mobility for no gain in efficiency.¹⁴

Figures I and II illustrate these points. In Figure I values of efficiency and mobility are plotted against β for a value of α fixed at 0.5. This shows steadily decreasing mobility and a level of efficiency that first increases and then declines as β exceeds the critical value of 1.189. At this point – the point at which economic efficiency is maximized (the correlation between ability and position is here 0.41) – the level of mobility, given by θ , is 0.36. In Figure II efficiency and mobility are plotted against α with β chosen so as to maximize efficiency given the particular value of α . So the points plotted here are the maximum values of efficiency and the corresponding values of mobility. Here a steady increase in both efficiency and mobility is evident as the contribution of ability to resources increases at the expense of inherited endowments.

IMPERFECT RELATIONSHIP BETWEEN REWARDS AND POSITIONS

If we further assume that the reward distribution does not correspond perfectly to the optimum distribution of positions, then economic efficiency declines further. Individuals choose to occupy particular positions, within the limits set by the resources they possess, in response to incentives. If these incentives are such as to reward a lower ranked position more than a higher ranked position then we might expect the correlation between resources and position to weaken. We can model such deviations in at least two ways.¹⁵ First, we assume that these deviations in rewards are random within each generation.¹⁶ In such a situation economic efficiency declines, as expected, but mobility increases. The reason for this perhaps initially surprising result is that the pattern of rewards linked to positions is

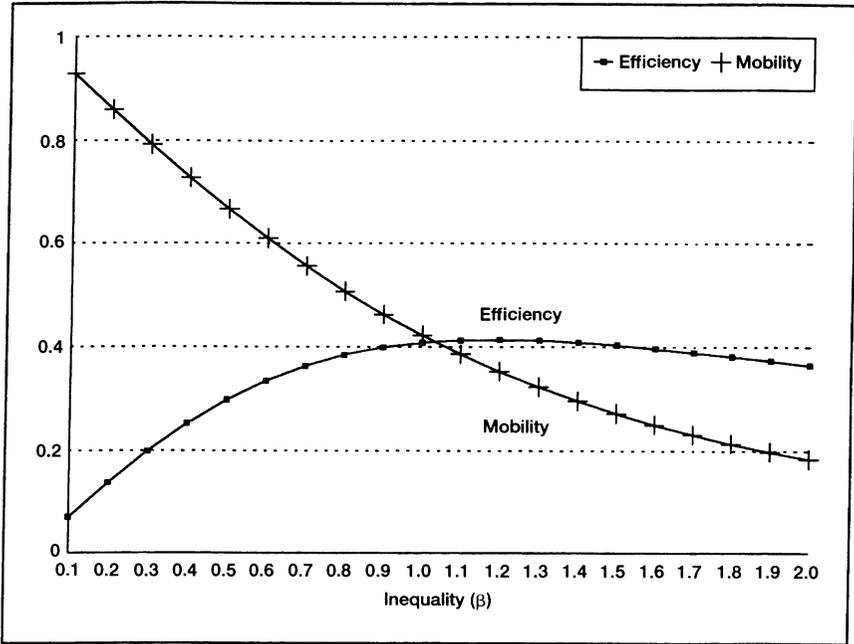


FIGURE 1: *Efficiency and mobility plotted against inequality*

constantly changing in successive generations and thus the correlation between the positions occupied by a family is weakened, so causing mobility to increase.

Second, we might instead assume that the deviations in rewards are maintained from one generation to the next. So this might correspond, for example, to a situation in which certain positions were now systematically over-rewarded, relative to their ranking, while others were under-rewarded, and the families who occupied such positions in one generation were able to restrict entry such that the same families tended to occupy these positions over generations. This would cause social mobility between positions to decline, for the obvious reason that we have introduced a further factor linking the positions occupied by the members of a given family over generations. It would also reduce economic efficiency to the same degree and for the same reasons as in the foregoing case – namely that the distribution of rewards now no longer matches the optimum ranking of positions.

ETHNICITY AND GENDER

Thus far we have assumed that non-random variation between individuals in the resources they possess arises from the inter-generational transmission

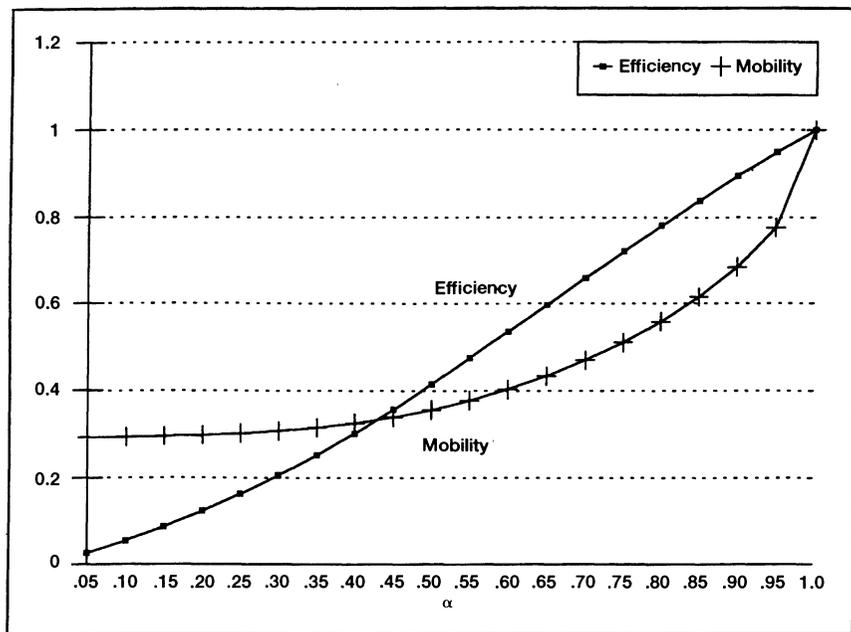


FIGURE II: *Maximum values of efficiency and corresponding values of mobility plotted against α*

of rewards within a family. However, there are at least two forms of stratification that do not arise in this way. For example, ethnic inequalities certainly differentiate between families, but the source of this differentiation is not the rewards accumulated by the previous generation: rather, the disadvantages that flow from the membership of a minority ethnic group are ascriptive not simply from the point of view of the individual in the t^{th} generation (as is the case with inherited resource endowments) but are ascriptive from the point of view of the entire dynasty. Thus in modelling this form of stratification, we must treat it not as a characteristic of individuals but, rather, as a characteristic of families. Assuming, for simplicity, that there are two ethnic groups in society, one of which is disadvantaged relative to the other, we can rewrite equation (1a) as follows

$$S_{it} = \alpha A_{it} + (1 - \alpha) R_{it-1} + \pi_i \tag{1b}$$

Here π is a parameter with mean zero, that takes a common (and constant across generations) positive value for all members of the advantaged ethnic group and a common negative value for all members of the disadvantaged group. Disadvantage, in this specification, is modelled as reducing the individual's resources for obtaining a position.

The effects are reasonably straightforward.¹⁷ The variance of resources is increased, so reducing the amount of economic efficiency in the society. Intuitively this is because the relative influence of ability on resources is

weakened by the addition of the ethnic group disadvantage parameter: members of the disadvantaged group find themselves in positions lower than those occupied by members of the advantaged group when both have the same level of ability. Mobility is also reduced because another factor has been introduced that links the positions of a group of families through generations. Recall that mobility is maximized, for any level of β , the larger is the influence of ability relative to inherited endowments. The addition of π is an extra inherited 'endowment' (a negative endowment from the point of view of members of the disadvantaged group) that, accordingly, reduces the overall amount of social mobility.

In contrast to ethnic group inequalities, gender inequality operates within rather than between families: it is an ascriptive characteristic that applies to the individual and not to the family or dynasty. But thus far our model has not distinguished, within a given generation, between individuals and families because of our assumption that a family in a generation comprises a single individual. We now relax this assumption. Let us suppose that each family has two children, a girl and a boy, and let the subscript j identify the two sexes ($j = 0$ for men, $j = 1$ for women). Then we might replace equations (1a) and (1b) with

$$S_{ijt} = \alpha A_{ijt} + (1 - \alpha) R_{ijt-1} + \delta_j \quad (1c)$$

Here the resources available to women are less than those available to men by a quantity, 2δ , ($\delta_0 > 0$, $\delta_1 = -\delta_0$) that is meant to capture women's disadvantage in the competition for positions. The impact of this on economic efficiency is the same as ethnic disadvantage: arbitrary distinctions in the distribution of resources serve to diminish economic efficiency. It is also worth noting that the existence of gender and ethnic disadvantages also serve to reduce the value of β^* , making it more likely that a given level of reward inequality will itself act to reduce economic efficiency.

Once we turn to the question of mobility, however, matters become more complicated. Some readers will have already noted that, by adopting our earlier assumption that the individual and the family were identical, we avoided difficulties that arise in deciding whether the 'unit of analysis' in measuring mobility should be persons or families. This, of course, has been a much debated issue in the context of class analysis.¹⁸ Once we introduce gender into our model several possibilities become open to us: do we define mobility destination according to the individual's own position or in terms of the family's position; and do we define mobility origins in terms of the position of one or other parent or as some weighted average of the two?¹⁹ And if we use individual position to identify both origins and destinations we must decide whether we want to measure intra-gender mobility (mother to daughter and father to son) or inter-gender mobility. If we concentrate on intra-gender mobility we will find identical levels of mobility for both sexes, for both of which the model given by equations (1a), (2) and (3) applies.²⁰ But such a model is not really capturing the mobility process, since, for women in particular, their mother's resources are unlikely to be

a good indicator of the resources available to a woman when she was growing up. And, of course the same might be said in respect of men and their fathers, though here the neglect of the mother's resources would, empirically, have been less problematic, at least up until very recent times. Nevertheless, such considerations would seem to argue for taking the latter position: that is, using some weighted average of both parents' positions from which to measure mobility.

If we do this then we are faced with the necessity of incorporating into our model an account of how individuals come together to form families: what, in earlier times, might have been termed 'the marriage market'.²¹ The operation of this market will be a significant factor influencing social mobility, and to deal with this fully would require that the model be greatly extended.²² However, we can gain some insights into the effects of gender distinctions using a very simple example of a marriage market. Suppose that there is no mobility through marriage: in other words, individuals form families with other individuals having exactly the same inherited resources and suppose further that origin and destination position are measured as the average of the positions occupied by individuals and their partner. We then find, comparing the position of *families* over generations, that mobility is marginally less than it was in the simpler model. This is because the variances of the resource and position distributions, being the sums of the variances of random variables, are now somewhat smaller than previously, so decreasing mobility. If we allow for more marriage mobility through decreasing the correlation between fathers' and mothers' positions, then mobility increases because the variance of inherited rewards becomes larger.

But if, instead, we compare the *individual's* position with that of his or her family of origin we will find more mobility, for both women and men, the greater is the degree of female disadvantage. This is because the correlation between an individual's position and the average position of his or her parents will always be smaller the larger is the degree of female disadvantage (the larger is δ in equation (1c)). It is paradoxical and undesirable that a measure of mobility should increase when gender disadvantage increases, suggesting that this is not a useful approach to measuring mobility.

Thus, although introducing gender distinctions into our model does not change the way in which we measure economic efficiency, it leads to some complications in measuring mobility. But regardless of how we choose to proceed we find that female disadvantage will either have no influence on the amount of mobility in society or, depending on how we define our mobility origins and destinations, will serve to increase it. This follows from the way in which gender disadvantage has been included in the model – namely as a factor that influences all members of one sex or the other in the same way. If we assumed an interaction between gender disadvantage and, say, inherited resources, then this result might not follow. However, studies of the mobility of men and women suggest that gender disadvantage

does indeed operate much as we have specified, in so far as social fluidity is very similar for men and women although absolute mobility patterns are quite different (see, for example, Erikson and Goldthorpe 1992, chapter 7). None of this should be allowed to obscure the central result of this part of our analysis – which is that gender disadvantage will result in women having a higher probability of being found lower in the position distribution than men of the same ability. One consequence of this will be to reduce economic efficiency. At the same time, gender disadvantage will not act to diminish mobility since, although it shifts downward the distribution of women over positions, it leaves the covariances between positions in successive generations undisturbed.

SOCIAL MOBILITY AND ECONOMIC EFFICIENCY

It is a simple matter to calculate the level of mobility compatible with maximum economic efficiency in a given society. In the case of the model given by equations (1a), (2) and (3) it is the level of mobility that arises when we insert β^* in equation (5a). But the level of mobility is in no way determined by the level of economic efficiency in a society. A given level of economic efficiency will arise as a consequence of the values of the two parameters of our model, α and β ,²³ and the same level of efficiency can be arrived at by different combinations of these two. It follows, therefore, that the level of mobility in a society will depend not simply on the degree of economic efficiency but also on the way in which (in terms of the values of α and β) this is arrived at. Thus a given level of economic efficiency can co-exist with either high or low (in relative terms) levels of social mobility. Furthermore, if we allow for some inheritance of ability (as given by equation (4)) then the degree of mobility will be correspondingly less for any given level of efficiency.

As an example, consider a society in which the correlation between ability and position (i.e. the value of ϕ , or economic efficiency) is 0.33. This could be generated by a high level of inequality combined with a moderate level of inheritance of rewards ($\beta = 2$ and $1 - \alpha = 0.53$). This would yield a level of mobility (θ) of .17. Alternatively the same level of economic efficiency could arise from a low level of inequality and a somewhat larger contribution of inherited rewards ($\beta = 1$ and $1 - \alpha = 0.57$). In this case mobility would be 0.37. For intermediate values of the two parameters ($\beta = 1.5$ and $1 - \alpha = 0.56$) that also generate an efficiency score of 0.33 the mobility value is .24.

How do these findings square with what is perhaps the strongest result from empirical research into patterns of social fluidity, namely that, in many countries, this pattern has changed little and that the degree of variation between countries is similarly limited – results which, of course, cast considerable doubt on the accuracy of the liberal theory of industrialism? This theory suggests that competition will lead to a decline in the significance

of ascription relative to achievement and an increase in social fluidity. However our results show that this is not a necessary relationship. Nations may well seek to increase economic growth as a result of competitive pressures but this need not lead to any change in fluidity patterns nor need they seek to achieve this through weakening the role of ascription.

The limited variation that we see in social fluidity, particularly among the industrialized nations in the CASMIN data (Erikson and Goldthorpe 1992) would seem in large part due to the fact that these data all come from the so-called 'golden age of capitalism' (Maddison 1982) when welfare state Keynesianism was institutionalized, albeit to somewhat varying degrees, in all these countries.²⁴ But such variation in social fluidity as has been shown to exist can be understood in terms of the parameters of our model. For example, the Swedish case is one in which there does appear to have been some diminution in the role played by inherited endowments (and thus, in our terms, an increase in the value of α) and in which income inequalities were restrained. This contrasts with countries such as Britain and the Republic of Ireland, where there is little or no evidence of a decline in the role of inherited endowments and rather more income inequality. The result is somewhat greater mobility in Sweden than in either of the latter two countries. Whether this led to greater economic growth in Sweden than in Ireland or Britain would depend on the exact configuration of the various parameters in these countries. However, it is certainly the case that economic growth has been greater in Sweden during this century. Over the period 1913–1987 Britain and Ireland had, respectively, the lowest and second lowest rates of growth in real product per capita in Europe. By contrast, Sweden had the third highest rate of growth after Finland and Norway (Kennedy 1992:7).

A more formal test of the link between equality and economic performance is provided by Persson and Tabellini (1994). They report a negative relationship between inequality and economic growth in empirical analyses based on two samples of countries, the first of which comprises the USA and eight European countries and spans the period 1830 to 1985, while the second includes 56 countries and covers the post-Second World War years. In so far as economic growth depends upon making the optimum use of the abilities of a nation's people, the present paper provides some clues as to why high levels of inequality may be injurious to such growth.²⁵

CONCLUSIONS

This paper has presented a model of the relationship between social mobility and economic efficiency, where the latter has been used as a shorthand to refer to the correlation between ability and the ranking of positions according to their ability requirements. We began by constructing a formal mathematical model that sought to capture the role played by incentives in neo-liberal accounts of stratification in sociology. This led to a scenario in

which increasing inequality stimulates economic growth and any deviations from perfect mobility are attributable to the inheritance of ability. We then introduced changes to our model that sought to incorporate some of the major criticisms made of such neo-liberal accounts. On the one hand we explored the consequences of the intergenerational transmission of advantage and, on the other, the results of admitting that the pattern of reward incentives may not correspond to that which would optimize the match between abilities and positions. These changes led to some quite different results. Most noticeably, the relationship between inequality and economic efficiency is no longer linear: it is now possible to have too much inequality from the point of view of maximizing economic growth. The relationship between economic efficiency and social mobility is also now shown to be indeterminate. By this we mean that very different rates of social mobility can be compatible with a given level of economic efficiency. This is because, in our relatively simple model, both are functions of two parameters that capture the degree of inequality in rewards and the extent to which inherited endowments determine an individual's resources. This provides a relatively simple explanation of why we fail to observe any clear relationship between the economic growth of nations and their rates of social mobility either through time or cross-sectionally.

Our results suggest that a policy much favoured by governments during the 1980s and 1990s – that of increasing inequality so as to provide a sharper structure of incentives – will not necessarily cause economic efficiency to improve. If the level of inequality in the society is already at or around the value we have called β^* then any further increases in inequality will, at best, be of no benefit and may be counter-productive. Thus β^* sets an upper limit on the level of 'useful' inequality and the size of this limit will, itself, depend upon other factors. So, in a society in which α is small, the scope for increasing economic growth by increasing inequality will be correspondingly limited. Similarly, the positive impact of inequality will also be restricted according to the extent to which the incentive structure systematically over-rewards some positions at the expense of others. This typically occurs when interest groups are able to shape the reward distribution in their own favour. On the other hand, an increase in the value of α will always increase economic efficiency (as Figure II shows), all other things held constant.²⁶ It is also the case that were gender and ethnic group inequalities to be diminished this would lead to an increase in economic efficiency. Thus an increase in inequality is not the only policy that might be used to try to stimulate economic growth and in some circumstances it may not be the best way of seeking to accomplish this.

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APPENDIX

We begin by considering the three equation model

$$S_{it} = \alpha A_{it} + (1 - \alpha) R_{it-1} \tag{1a}$$

$$P_{it} = \frac{S_{it} - \bar{S}_t}{\sigma_s} + \frac{\epsilon_{it}}{\beta} \tag{2}$$

$$R_{it} = \beta P_{it} \tag{3}$$

The numbering of the equations is as in the text. Note that if we replace (1a) with (1) this merely leads to a simpler, special case. Bearing in mind that both ϵ and A are random and $N(0, \sigma)$ we can calculate the constant variances of the random variables S , P and R . Assuming (for concreteness) that both ϵ and A have unit variance we find that

$$\sigma_s^2 = \alpha^2 + (1 - \alpha)^2 \sigma_R^2$$

$$\sigma_P^2 = 1 + \frac{1}{\beta^2}$$

$$\sigma_R^2 = \beta^2 \sigma_P^2 = 1 + \beta^2$$

If we now substitute equation (3) into (1a) and the result into (2), and bearing in mind that S has a zero mean, we get

$$P_{it} = \frac{\alpha A_{it} + (1 - \alpha) \beta P_{it-1}}{\sigma_s} + \frac{\epsilon_{it}}{\beta}$$

from which it follows (because A and P are independent) that the correlation between ability and position is given by

$$\phi = \frac{\alpha}{\sigma_s \sigma_P} \tag{5b}$$

and between P_{it} and P_{it-1} by

$$\frac{(1 - \alpha)\beta}{\sigma_s} \tag{5a}$$

and so mobility is given by

$$1 - \frac{(1 - \alpha)\beta}{\sigma_s}$$

Note that if we do not assume that the variances of A and ϵ are equal to one the variances of S and P will change accordingly and (5b) will be rewritten as

$$\phi = \frac{\alpha \sigma_A}{\sigma_s \sigma_P}$$

The partial derivatives

$$\frac{\partial \phi}{\partial \beta}, \frac{\partial \theta}{\partial \alpha} \text{ and } \frac{\partial \theta}{\partial \beta}$$

are all linear and reasonably straightforward to compute and so are not reported here.

$$\begin{aligned} \frac{\partial \sigma}{\partial \beta} &= \frac{(\alpha / \sigma_S \sigma_P)}{\partial \beta} \\ &= -\alpha \frac{\partial (\sigma_S \sigma_P)}{\partial \beta} \end{aligned}$$

$$\sigma_S \sigma_P = \left[(\alpha^2 = (1 - \alpha)^2) (1 + \beta^2) \left(1 + \frac{1}{\beta^2}\right) \right]^{-1/2}$$

$$\frac{\partial (\sigma_S \sigma_P)}{\partial \beta} = \frac{1}{2(\sigma_S \sigma_P)} [-2\alpha^2 \beta^{-3} - 2(1 - \alpha)^2 \beta^{-3} + 2\beta(1 - \alpha)^2]$$

Therefore

$$\frac{\partial \phi}{\partial \beta} = \frac{-\alpha}{\sigma_S^2 \sigma_P^2} \left[\frac{-\alpha^2 \beta^{-3} - \beta^{-3} (1 - \alpha)^2 + \beta(1 - \alpha)^2}{\sigma_S \sigma_P} \right]$$

And so

$$\frac{\partial \phi}{\partial \beta} > 0 \text{ if}$$

$$\frac{\alpha^2 + (1 - \alpha)^2}{\beta^3} > \beta(1 - \alpha)^2$$

$$= \frac{\alpha^2 + (1 - \alpha)^2}{(1 - \alpha)^2} > \beta^4$$

from which it follows that the condition holds if and only if

$$\beta < \left[1 + \frac{\alpha^2}{(1 - \alpha)^2} \right]^{1/4}$$

NOTES

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1. An earlier version of this paper was delivered as my inaugural lecture at Queen's University, Belfast, in June 1992.

2. Analyses show that income inequality

increased greatly in the UK during the 1980s. For example

Considering the fact that income distributions often tend to change slowly, the increase (in inequality) particularly in the United Kingdom must be considered substantial (Fritzell 1993: 59, parentheses added)

3. The liberal theory has been subject to criticism on several grounds, not least the fact that ascription has shown little sign of diminishing in importance in industrial societies: nevertheless it continues to flourish. In particular, one corollary of the thesis is a convergence between societal types, and this has received considerable stimulus from the collapse of the communist regimes (see, for example, Fukuyama 1989).

4. Though a dissenting view can be found in Ganzeboom, Luijckx and Treiman (1989).

5. Economists have produced several models that seek to account for intragenerational inequality and intergenerational mobility. Among the most notable are Conlisk (1974) and Becker and Tomes (1979, 1986). Goldberger (1989) provides a trenchant critique of the latter two papers.

6. We refer to 'positions' rather than jobs, since all positions in society, and not simply those that we call jobs, can, in theory, be ranked in this way.

7. Technically we are assuming a single good economy and that individuals are identical with respect to their preferences. Note that the use of the term 'efficiency' here needs to be distinguished from its conventional uses in economics – as in, for example, the concept of the 'Pareto efficiency' of a particular distribution (see Krep 1990: 154 for a definition).

8. Just as we assumed only one dimension of ability so we assume only one dimension of rewards. As critics of Davis and Moore (notably Tumin (1953), but also Davis (1953)) pointed out, rewards can come in a variety of forms, and people might seek to perform particular roles for a variety of reasons. The assumption of one dimension of rewards in our model is, once again, made for the sake of simplicity. None of the results changes if we assume several dimensions (e.g. economic and

non-economic) of rewards, though the mathematics become more awkward.

9. Provided, of course, that rewards and position are perfectly correlated, as they are in this simple model.

10. Note that we do not need to attend to the distinction between absolute mobility and relative mobility (or social fluidity) which is often drawn (see, for example, Breen 1985 or Goldthorpe et al. 1980). This is because in our model the structure of positions does not change over generations. Absolute and relative mobility are therefore identical.

11. The correlation is equal to

$$\left[1 + \frac{1}{\beta} \right]^{-1}$$

which clearly goes to 1 as $\beta \rightarrow \infty$.

12. Though such a perfectly open society may be undesirable on other grounds (Young 1958).

13. The partial derivatives of θ with respect to α and β are everywhere positive and negative, respectively.

14. Galor and Zeira (1993) present a model in which the distribution of inherited wealth negatively influences economic performance not only in the short run but also has longer term negative economic effects associated with social immobility.

15. Proofs of the results presented in this and the next section of the paper are available on request from the author.

16. This is very plausible. We are assuming that random factors preclude an exact match between the economic efficiency ranking of a position and the rewards it receives.

17. This case is identical to that dealt with at the end of the foregoing section as we can see if we write the equation for P in full. In the case where we have a disturbance factor fixed over generations we have

$$P_{it} = \frac{\alpha A_{it} + (1 - \alpha) R_{it-1}}{\sigma_S} + u_i + \frac{\epsilon_{it}}{\beta}$$

while in the case of the two ethnic groups we have

$$P_{it} = \frac{\alpha A_{it} + (1 - \alpha) R_{it-1} + \pi_i}{\sigma_S} + \frac{\epsilon_{it}}{\beta}$$

Defining $\pi/\sigma = u$ the two equations are identical.

18. For recent summaries of the debate see, for example, Breen and Whelan (1994); Breen and Rottman (1995, Ch. 7); Crompton (1993, Ch. 4); Dex, (1990); Goldthorpe (1990); McCrae (1990); Payne and Abbot (1990) and Roberts (1993).

19. Assuming that all individuals have two parents.

20. The reason for this is that, once we focus on only one gender, the parameter δ , now being a constant, plays no part in computing the correlation between positions in successive generations.

21. In fact, any measure of mobility except intra-gender mobility will require that we attend to the working of a marriage market. This is because any such measures will entail some degree of cross-gender mobility – for example, we might measure the mobility of individuals using their father's (mother's) position as the origin. This will mean that there is cross-gender mobility between women (men) and their father (mother). Similarly, using a weighted combination of positions (both parents or persons and their spouse or partner) will entail the same.

22. Not least would be extending the model to allow for differential chances of having a partner and differential fertility.

23. And also of δ and π if we include gender and ethnic group distinctions. In most of what follows we use the simpler model for simplicity of exposition.

24. The exceptions are Hungary and Poland which were state socialist societies.

25. Persson and Tabellini provide a somewhat different explanation of their result to the one that follows from our argument. They suggest that since growth is a function of individual investment, high levels of inequality are bad for growth because they lead to political support for precisely those redistributive policies that blunt incentives to invest. However, their empirical results do not provide a basis on which to prefer any particular account of why inequality is negatively related to economic growth. As they themselves note, their attempts to test their specific theory are tentative (1994: 617-8). Similar arguments about the political consequences of

inequality can be found in Perotti (1993: see also Piketty (1995).

27. Though it might be argued that the opportunity to pass on to one's children the returns that one has accumulated itself functions as an important incentive which might be weakened by any reduction in the impact of inherited endowments.

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