Beating the odds (2): a new index of intergenerational social mobility

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ABSTRACT

The twin starting points for this paper are recent discussions in economic theory concerning the normative foundations for indices of intergenerational mobility, and the development of a human capital score intended (in conjunction with a parallel measure of individual wealth) to act as an indicator of social class. The paper specifies an intergenerational Gini-type mobility index, based on the mean expected earnings of the children of fathers in each class. It makes a series of estimates of mobility in Britain from BHPS lifetime employment history files. The first of these uses the Goldthorpe three-category class schema for both origins and destinations; the resulting estimates suffer from (1) the systematic exclusion of those (particularly women) outside employment, and (2) the effects of the changes in the sizes of the class categories. The second estimation is a hybrid using Goldthorpe (seven category) origins and human capital quintile destination categories; this deals with problem (1) but not problem (2), The third estimation uses human capital quintiles for both origin and destination categories, and avoids both problems. But it is dominated by the fourth approach, a continuous version of the Gini index using scalar variables (the fathers' human capital scores and the children's expected earnings). The women's intergenerational Gini score now shows substantial increases from the 1935-44 birth cohort to the 1955-64 birth cohort; the men's score shows small increases over the same period. The conclusion is that in terms of this index, intergenerational mobility in Britain has become more unequal overall.

This paper is part of the "Social Position and Life Chances" (SPLC) project which aims to formulate and estimate new measures of social class appropriate for understanding life chances in modern Britain. An initial outline of the project is set out in ISER **Working Paper 2001—20**; the human capital measure used here is discussed in ISER **Working Paper 2002—2**, and the associated measure of wealth developed for the project, and its relationship to human capital through the life-course, is discussed in ISER **Working Paper 2002—16**. Regression modelling approaches to the intergenerational mobility of human capital are discussed in ISER **Working Paper 2002—17**. The SPLC project is part of the Research Programme of the ESRC Research Centre on Micro-social Change.

NON-TECHNICAL SUMMARY

Intergenerational social mobility is normally considered by British sociologists as a matter simply of transition between parents' categorical positions and those of their children. But it is now becoming clear that it may be legitimate and indeed appropriate to consider in addition, any changes that may have taken place in the conditions of life of those in each of the positions over the period. There are in effect two alternative general normative bases for the construction of indicators of social mobility. We may take the traditional view that it is sufficient just to consider the transition probabilities. Or we may consider that an adequate view of mobility requires in addition a consideration of the "rewards" attached to the positions. The first task, in this paper, is to construct a measure of intergenerational mobility that considers both transition probabilities and rewards.

A very simple solution to this problem is an "intergenerational Gini score". There are essentially two steps. First, calculate for each parental class, the appropriate "children's opportunity set", which is the sum of the products of the transition probabilities from the parental class to each of the destination classes, and the "expected reward" (eg expected annual income) of a member of each destination class. Second, calculate a categorical Gini score, ordering the parents' classes according to the size of their respective childrens' opportunity sets. The larger the resulting Gini score, the more unequal are the life chances of the children of the various categorical classes. Estimating mobility in the UK in these terms using the Goldthorpe Class categories shows little evidence of change in intergenerational mobility patterns—ie life chances—for men or women in successive birth cohorts in mid-century Britain. This analysis however suffers from the exclusion of women without recent employment experience from the class schema, and from confounding effects of historical changes in the relative sizes of the class categories.

As an alternative to the class categories, we can use a continuous *human capital* measure intended (alongside a parallel measure of individual wealth) to fulfil some of the same functions. The human capital score has been estimated for each year of the adult life of *all* members of the British Household Panel Study (using the retrospective work history data file). It is possible also (though with some reservations) to estimate the human capital of the BHPS respondents' parents when those respondents were aged about 14. If, rather than class categories, human capital quintiles are used for the mobility analysis, we avoid both of the

previously noted problems. We find, in this case, a rise in the women's intergenerational Gini coefficients for the most recent birth cohorts.

Finally we move to the more satisfactory *continuous* version of the intergenerational Gini index. Individuals' *expected* (labour) incomes (at ages 34-36) are ordered by their *fathers'* human capital scores. On this basis the women's Gini indices show a substantial increase from the 1935-44 birth cohort to the 1955-64, probably reflecting inequality of access to the labour market of women from different social backgrounds; the men's shows a small increase. Britain's intergenerational mobility patterns have, overall, been becoming more unequal over this period.

Beating the odds (2): a new index of intergenerational social mobility

1 The normative justification of mobility indices.

The starting point for this paper is a recent contribution to the economic literature on mobility measurement. "Three Meanings of Intergenerational Mobility" (van de Gaer, Schokkaert and Martinez 2001) discusses in a formal, axiomatic and quite general way the derivation of social mobility indices from alternative normative intuitions about the justifiability of particular social mobility regimes or arrangements. Their objective is to relate mobility indices (in which higher scores characterise more desirable forms of social organisation) explicitly to norms concerning socially desirable mobility patterns. My immediate purpose is to use the **Economica** discussion as a basis for the derivation of a new sort of index of intergenerational social mobility, and then to proceed to an empirical estimation of some examples of this index for Britain in the second half of the twentieth century.

Economists try to avoid pomposity by using simple-sounding terms to describe their concepts (a trick that we sociologists might sometimes usefully imitate). But the general language meanings of the terms can distract from the argument. The discussion that follows depends on the helpful distinction between two elements of a mobility process, respectively "lotteries" and "prizes"—neat, but, I discover as I discuss these ideas with friends and colleagues, nevertheless leading to confusion. There are three distinct aspects to a "lottery" in the broad sense used here by the economists:

- a probabilistic process relating origins to destinations (ie the narrow sense of a lottery)
- origin-related differentials in advantages in terms of resource or other characteristics, which influence destinations
- choices of "responsible" behaviour which improve chances of achieving preferable destinations.

The sociological processes discussed in what follows have outcomes that are only partly, and in a way that may very over historical time, dependent on chance. An alternative vocabulary—more neutral and also a little more general, though also unfortunately more pompous-sounding—has instead "transition probability distributions" which lead to different "rewards". There are "positions" in a society, which are associated with "conditions": the

lotteries, in the broad sense, are what move individuals between positions over time, and the prizes are (since we are concerned with more than just money outcomes, *particular aspects of*) the conditions associated with these positions at any given point in time.

Van de Gaer and his colleagues distinguish three different normative intuitions about mobility. A first regards mobility norms as concerning simply the ***amount of change or movement*** from origins to destinations. This is unfamiliar in its strong, maximisation-of-change, form that would require the reproduction, among those previously advantaged, of the disadvantages experienced by the previously disadvantaged, and vice versa. In a weaker form, in which the worse-off should have more chances of upwards mobility, while the better-off should have more opportunity for downwards, the authors suggest that it corresponds with a concern for compensation as in Atkinson (1981). But movement-for-the-sake-of-movement seems far from the normative concerns of sociologists contributing to this area, and it may perhaps be preferable to consider this first view as having been included for the sake of completeness of exposition. Certainly, the main ideological conflict, as well as the focus for the current paper, is between the second and the third sorts of normative expectation about mobility, relating respectively to the degree of ***equality of access to positions***, and the degree of ***equality in the expected value of rewards with respect to origins*.**

There is a cross-disciplinary conflict in terminology here. Sociologists follow political philosophers in referring to equal transition probabilities as "equality of opportunity" (Rawls 1970, Marshall Swift and Roberts 1998)—where the **Economica** authors refer to this as equality of life chances. And correspondingly the sociological usage implicit in, for example Goldthorpe and Marshall's 1991 discussion of the class mobility programme considers the term "life chances" to concern also circumstances such as income (as well as health and life-satisfactions) that certainly fall into the economists' "prizes" category. Despite the risk of confusing those who refer back to the original article, what follows uses the sociological terminology.

The origin and destination "positions" might in principle be classified at any of the possible levels of statistical measurement. The first part of the following discussion concerns just categorical measures, whether nominal (ie unordered) or ordinal, though it subsequently turns to scalar indications of position. The three normative intuitions can be specified as follows.

(1) Consider a symmetrical intergenerational transition matrix, with rows that relate to parents' positions, and columns that relate to children's, with the row and column categories listed in the same sequence. The value of an index of mobility corresponding to the ***movement*** intuition will be at a minimum where all the entries are concentrated on the major, no-change, diagonal. A necessary, but insufficient, requirement for it to reach a maximum is that the major diagonal cells are empty. In the case of an ordinal measure of position, a sufficient requirement is that all entries lie at whichever of the two extreme values, at the beginning or the end of the rows, is farthest, in terms of numbers of categories, from the major diagonal entry. Where the measure of position is nominal then the maximum movement may be represented by a "white noise" random distribution of row entries to the off-diagonal cells.

(2) An index of mobility corresponding to the objective of ***equality of access to positions*** is concerned with equalizing all the elements in each destination column of the transition matrix. (The **Economica** authors refer, only glancingly and disparagingly, to unspecified sociological measures of mobility, and suggest, surprisingly, that these depend only on the "diagonal elements of the matrix".[1]) But the general sociological approach of comparing transition matrices using measures of the disparity between equivalent pairs of cells *in each column* of the transition matrix would, on the contrary, seem to qualify unequivocally as a member of this category of mobility indices. The "odds ratios"—the relative odds of accession to a particular destination from pairs of origins—often estimated through loglinear models (Hauser 1978), have been the almost exclusive focus of the British school of mobility theorists from the early 1980s onwards (Heath 1981, Goldthorpe et al 1980). Where, for example, origin and destination positions are hierarchically ordered, odds ratios for the extreme categories provide reasonable though not comprehensive summary indices of mobility appropriate to the second sort of normative expectation.

[1] Note 15 to this useful paper reads in part: "The *exclusive* dependence of *many* sociological measures upon the diagonal elements of the matrix of transition…."—my exegetical speculation is that the word "many" in the seemingly doubled qualification emphasised by my italics, was inserted after a reviewer's comment on the limited scope of the discussion of sociological mobility indices.

(3) However, it may be considered that an appropriate normative framework for the evaluation of mobility regimes requires, in addition to evidence about the differential probabilities of acceding to particular social positions depending on origins, a consideration also of the rewards that accompany membership of those positions. An explicit expression of this view in a sociological context is found in Marshall, Swift and Roberts (1997, for example p.14), a line of argument which is developed further in Swift (2000). We might see this view as reflecting Rawls' (1971) fundamental distinction between two contrasting constructions of political "equality"[2]. While "liberal equality" requires merely equality of access to positions of advantage, "democratic equality" requires consideration both of the accessibility of positions and of the degree of equality or inequality in the advantages attached to them.

Estimating an index of ***equality in the expected value of rewards with respect to origins*** clearly needs more than just a matrix of transition probabilities. Our **Economica** colleagues suggest, on the basis of one particular element of their axiomatic system (concerning "anonymity" – compare equations 1 and 2 on p.528) that, in addition, a simple one-dimensional vector describing the rewards associated with each of the destination positions is appropriate. But (for essentially empirical reasons set out below) it appears that the extra information should ideally be in the form of a second two-dimensional matrix, having as its cell values the rewards received by children with parents from a particular social position who have arrived in a particular social position. Multiplying the equivalent elements in each row in the transition probability matrix and in this reward matrix, produces a third matrix, each row of which represents the "expected value" of rewards to be received by children of parents from each of the origin positions. The third class of mobility index measures the degree of equality in these expected values.

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[2] Rawls sets out two *principles of justice*:

1 Each person is to have an equal right to the most extensive basic liberty compatible with a similar liberty for others.

2 Social and economic inequalities are to be arranged so that they are both (a) reasonably expected to be to everyone's advantage; and (b) attached to positions and offices open to all.

The phrase "to everyone's advantage" may be interpreted in two different ways (Rawls 1971 pp 64-5) implying either: (1) that societies have a responsibility merely to ensure that otherwise disadvantaged children are able to compete fairly for future positions of advantage (a position he terms "liberal equality"); or (2) that they must in addition ensure that future rewards to the advantaged are justified by benefits to the disadvantaged ("democratic equality"). A discussion of this issue in relation to the SPLC project may be found in Gershuny 2001.).

The most important point asserted by the **Economica** article for the present purpose, is the absence from the social science literature of any mobility index appropriate to this third category of normative concern with equality in the expected value of rewards[3]. Rawls' discussion of "justice as fairness", which concludes in favour of democratic equality, implies clearly that this *concern with prizes as well as lotteries* is indeed the appropriate normative basis for sociological mobility analysis. This paper proposes one such index, somewhat different to the example set out in the **Economica** article, one both simpler and more familiar in kind to sociologists: a Gini-type index of intergenerational mobility, measuring inequality of life-chances in terms of these *expected values of rewards*.

2 Motivations, methods and data

Theory

At the heart of the idea of social class is personal access to, or ownership of, resources or "capitals". There are two categories of personal resource which together determine power and advantage in any given social context (this is a longstanding view amongst sociologists, going back at least as far as Weber, and clearly set out in Scott 1997). One is the category of relatively fixed or tangible resources, closely related to financial wealth—ownership of "liquid" assets, money balances, stocks and shares, and actual or prospective rights in the form of housing wealth and pensions. The other consists of relatively intangible "embodied" resources, knowledge and skills carried within the individual giving access to various categories of human experience. These are still usefully considered "capital"—cultural, social, educational or whatever—insofar as they accumulate in much the same way as does financial capital, and can be converted, though with varying degrees of difficulty, into other forms of social positional resource. Of the embodied capitals, the relevant part for the present discussion concerns those economically salient knowledge and skills which give access to

[3] This assertion may be correct in the limited sense that the van de Gaer et al paper deals throughout with the issue of mobility between social or economic categories. However I suspect that, once the scope is widened to consider mobility between continuously-measured states (Solon 1999), we may be able to identify measures of mobility of income that correspond to the measures of intergenerational human capital mobility developed later in the present paper.

employment or other *gainful occupation, and establish the individual's long-term earning capacity – for which we use the economists' term "human capital".*

The sorts of mobility processes commonly studied by sociologists have mostly to do with positions in the labour market (or more specifically, with employment situations: Goldthorpe 2000) during the earlier part of the life-course. Most of the movement in social position necessarily comes, initially at least, in the form of human capital acquisition. After all, financial wealth can only accumulate—*real* lotteries apart—from prior financial wealth. Human capital by contrast, *can*, albeit with difficulty, be accumulated through personal effort and independent of any prior wealth or parental human capital. Financial (and similar sorts of) wealth mostly accumulates, and has most impact on life chances, somewhat later in the life-course, partly as a consequence of the savings from income gained from the deployment of human capital — and subsequently through inheritance from parents in later-middle-age. Hence, and irrespective of whether human capital is explicitly mentioned, we would expect discussion of intergenerational mobility to be *in essence* concerned with the relative extents of transmission of human capital from parents to children, and children's autonomous or independent accumulation of human capital. And hence the crucial importance accorded by sociologists to estimating the path coefficients in the so called "meritocratic triangle" (Halsey, Heath and Ridge 1980, Marshall Swift and Roberts 1997) that links parental position, education and occupational attainment.

The new human capital measure is used extensively in what follows, so a brief summary of the arguments and procedures that underlie it (developed more fully in the project papers cited previously) are in order here. Continuous measures of social position have been use in sociological discussions of mobility since at least the 1960s (most notably in Blau and Duncan 1967). But this and subsequent "status attainment" scores are in effect measures of social prestige or standing, not of class. More recent approaches such as the "Socio-economic Index of Occupational Status" (Ganzeboom, de Graaf and Treiman 1992), are, however—while their precise relation to the long-standing sociological preoccupation with social class are not entirely clear—closer to the present objective (see Gershuny 2002a pp 14-17). The motivations for the use of a continuous human capital index, rather than the conventional class categories based on the nature of employment contracts, can by contrast be simply and explicitly set out in both theoretical and practical terms.

There are various arguments, some more and some less tendentious, to the effect that a continuous human capital-type measure, rather than the traditional categorical formulations, is now the **theoretically appropriate** way to think about social class. (A more extensive reasoned catalogue of problems with various established class approaches is set out in Savage 2000).

(i) The *increasing importance, and economic value, of highly distinct and specific forms of economically salient knowledge,* must mean that the basis for class action in a traditional sense is continuously diminished. If (following the general line of Sorensen 2000) each of the multiplying categories of human capital are seeking to extract extra profit from their particular monopoly of a tiny fraction of society's productive knowledge, there is certainly a reducing likelihood that any substantial proportion of those who embody the human capital will band together to confront the owners of fixed or financial capital. (And this becomes all the more unlikely insofar as one important means that people increase their profit from their own human capital is converting it into financial capital by accepting share-ownership in the firms that employ them!)

(ii) The *increasingly wide-spread diffusion of wealth*—ownership of financial capital, housing and pension wealth—across the population, means that a majority of working-age adults now have *both* substantial human capital and some wealth. If we needed to analyse classes acting in their own interests, we would clearly require our indicator of social position to be a categorical one. But on the contrary, we are plainly, given these first two arguments, not now considering "classes-for-themselves".

(iii) The *absence of any clear or unambiguous lines of class identification* in Britain, which is Evans' (1992a) reinterpretation of Marshall, Newby, Rose and Vogler (1988), similarly suggests that we are not really able to rely on classes-*in*-themselves either (see Savage 2000 pp 37-40).

(iv) And finally, there is the contention of the previous-but-one paragraph: *human capital is the essence, or underlying cause, of the statistical regularities that mobility analysts*

study. Certainly it is possible to construct class categories that are valid in the sense of corresponding to explicit constructional criteria, (related, in the case of the most important of the traditional classifications, to the nature of the employment contract, as Evans 1992b demonstrated). And these categories may indeed show various interesting regularities both cross-sectionally and over time (Goldthorpe and Marshall 1992). The real question is, however: are those criteria the real and effective *causes* of the regularities? Do we not in fact study the human capital formation processes of the meritocratic triangle, because it is the outcome of the process through which parents reproduce their human capital in their children—and not the nature of the parents' employment contract—that *really* determines the nature of the children's employment contract?

But, such considerations aside, there are **practical reasons**, to do with the modelling and estimation of mobility processes, that make a continuous measure of this sort more useful than a categorical measure.

(i) It provides *comprehensiveness of coverage*, particularly of women out of the workforce who (if only because of rising divorce rates) can no longer be appropriately considered as attached permanently to their husbands for the purposes of longitudinal social classification (Crompton 1997). (Or, if their occupations should be "dominant" within the marriage, they cannot, for the same reason, be considered to carry their husbands as permanent class appendages). We will see in a moment, that just about half of all UK women, over the period covered by the British Household Panel Study, are outside the labour force at age 35. Of course, this is a non-random 50%, and selection effects would make it impossible to understand women's mobility in terms of a class measure based on current employment. (The coverage would be increased by including women's past employment—but the next-but-one point suggests that this is inappropriate.)

(ii) It allows straightforward *aggregation from an individual to a household level of classification*. It is clear that people act co-operatively within their households, that they are sometimes willing to some degree to pool their resources with others'. But representing the resulting collective social positions presents difficulties even where

only two individuals are involved. "Head of Household" or "dominance" procedures for aggregating individuals' positions to household indicators plainly lose a great deal of information. Establishing multi-person joint-class categories (so that, for example, three occupational groups plus a "not employed" category would produce sixteen joint-class combinations) would be cumbersome even if limited just to spouse-pairs. By contrast, the human capital approach allows straightforward summing of the scores of individual household members (since, for example, a household with two adult members each with a shadow wage rate of £10 per hour has, straightforwardly, four times the earnings capacity of a household with a single adult with a shadow wage rate of £5 per hour). There is also, in this sort of analysis, the possibility of applying standard "equivalence" adjustments to account for household economies of scale.

(iii) The nature of the human capital score makes possible the *continuous registration of effects of repeated small increments or decrements in resources*, of the sort that arise from the regular positive or negative experiences in or related to the labour market. So for example it becomes possible to consider whether the subsequent employability penalty to women leaving the labour market at the time of childbirth is proportional to the length of the absence from the labour market[t]. It may be that such small but regularly occurring changes are better representations of the reality of life-course class effects in Britain in the new century, than are the large but more infrequent shifts between the 3, 7, 11 or whatever categories of a traditional class schema.

There are of course some circumstances (examples are found immediately following this section) in which we want to use categorical measures. The continuous human capital scores can be straightforwardly grouped into, for example, quintile, decile, or whatever categories. Categorical measures, by contrast, cannot be transformed into continuous ones.

Data and estimators

The empirical procedure for calculating the human capital measure is set out in more detail in Gershuny **(**2002a). Briefly, it consists of estimates of the expected wage-earning capacity (in 1991 UK currency values) for all adult respondents in the British Household Panel Study (described below) on the basis of educational attainment, work history (numbers of months in

employment, unemployment, and non-employed in each of the previous four years), a measure of quality of present or last occupation, and various interactions among these variables, and with respondents' ages. Respondents' gender is not used directly in these estimations, which means that the index can be used to investigate gender (among other) effects on human capital in a non-circular manner. The use of a Heckman regression procedure—in which the various regression coefficients are adjusted to take account of their relationship to the probability of the respondent being in employment—means that the "shadow" (or "expected") wage rates are derived for all respondents on the basis of their various labour market and educational experiences, irrespective of whether or not they are currently employed.

The British Household Panel Study (BHPS) is a self-reproducing panel of individuals in their household contexts, starting with a random sample of 5000 British households (initially located south of the Caledonian Canal), with annual interviews with all household members aged 16 and above (and from Wave 3 with members aged 11-15). The permanent sample consists of all those in the 1991 (Wave 1) sample plus all of their natural descendants. However, the annual interviews are conducted with all current household co-residents of each permanent sample member, irrespective of sample status, so as to establish the full household circumstances of the permanent sample members. The non-permanent sample respondents are not re-interviewed once they cease to be co-resident with permanent sample members. The study therefore continues to be representative of that (large) part of the current British population consisting of, or descended from, 1991 residents in mainland Britain. Extra samples (of low income households, and for Scotland, Wales and Northern Ireland) have been added, substantially increasing the overall size of the study (these have not however been used in the research reported here). The BHPS wave-on-wave response rate is regularly above 95%. (Full details of the BHPS are found in Taylor et al 2002.)

The SPLC project uses the first ten waves of the study (covering the years 1991-2000). The data set analysed in this project is a subset of the sample, a reasonably standard "balanced panel" design (ie a sample with values for all ten waves, with no new entrants, and which therefore ages by exactly ten years over the period it covers). It does however have one unusual feature which reflects the "class and life-chances" research aims of the overall project. While sample "attritors" (respondents who cease to respond during the course of the

study for reasons other than death or incapacity) are excluded (and the remaining sample is reweighted to adjust for the demographic and socioeconomic makeup of the attrittors), nevertheless the dead (including attritors who subsequently died) remain members of this balanced panel—to ensure *inter alia* that we are able to take adequate account of class differences in mortality rates.

In addition to the collection of data on respondents' current circumstances, and on economic and other changes since the previous interview, the BHPS contains substantial amounts of retrospective "recall" data on live events prior to the start of the panel study. There is a detailed marital (and cohabitation) history, and a fertility history covering the whole of the respondents' lives. And in BHPS Waves 2 and 3 there are detailed paid work and occupational histories, covering all changes in work and employment circumstances (related to respondents' "main jobs") since leaving school. These, in combination with BHPS data on schooling and educational attainment, are sufficiently comprehensive to allow us to calculate (using 1990s coefficients) human capital scores for each year of adult life (though in practise from age 20) of all the respondents in the balanced panel, The procedure is quite distinct from the "time warp" approach used by Joshi and Davis (2002) which gives a synthetic life-course earnings account simulated on the basis of cross-sectional evidence; in the present case, evidence from the actual life-course work and employment accounts spanning the twentieth century is combined with the 1990s human capital coefficients. The resulting annual vector of human capital scores for each age of the adult life of the members of the balanced panel is the main dataset discussed in what follows.

One important shortcoming of the BHPS for current purposes, is that it does not contain sufficient information to allow us to establish human capital scores for the sample members' parents by the same means. There is of course a (mostly young) subset of the BHPS sample, consisting of adults who were co-resident with their parents in 1991, for whom this information is available. This group will become of increasing interest to mobility researchers as the BHPS progresses (Francesconi and Ermisch have already used this sort of cross-generation panel data to good effect; 1999, 2000). But for the more general purposes of social mobility research, and particularly for the comparison of successive birth cohorts, this strategy is for the moment plainly inappropriate.

The BHPS collected, in wave 1, a limited amount of information from all sample members about their parents' employment circumstances at or around the time of respondents' 14th birthday. Parents' employment status, occupation, and supervisory responsibilities were established at this point—information just sufficient to establish the standard British administrative and academic socio-economic classifications for the parents. This limited amount of data provides the basis of an imputation exercise. Taking a "pooled sample", of all BHPS respondents with children aged 13 and 14 at any point in the ten years of the study, employment status and occupational level (2-digit SOC) were regressed on human capital (separately for men and women), and the resulting coefficients were used to provide an imputed value for all respondents' *parents'* human capital.

This means that both the respondents' whole-life human capital vector and the imputed estimate of their parents' human capital, use the 1990s values of the various aspects of work experience and educational attainment in the labour market (in 1991 prices). This is plainly not historically correct. It would in principle be possible to develop historically correct coefficients for converting the BHPS work history data to the human capital measure, using historical data sets such as the New Earnings Survey from 1970. But this is a separate major project, not undertaken here. The problems caused by the 1990s valuation are not fatal. The various characteristics—highest educational attainment, occupational level, unemployment experience and so on—all have unchanged (positive or negative) directions of effect on expected earnings (eg recent unemployment experience reducing them) throughout the period, even if the relative size of the effects may have changed somewhat. Besides, there are advantages to set against the disadvantages. In particular, the procedure provides a degree of constancy of meaning for the mobility analysis. After all, the human capital scores are no more than complex weighted averages of a mixture of employment and educational characteristics: The use of constant 1990s values means that, when we compare successive birth cohorts' human capital values, we are in fact comparing similarly weighted mixtures of characteristics.

The "reward" values used in the calculation could in principle be any indicator pf conditions or outcomes; a life satisfaction or a "happiness" score for example. In the following analysis, more conventionally, however, the respondents' expected annual labour income, derived as a linear transformation of the lifetime human capital score vectors are used. The coefficients for

this transformation are again derived from regressions using pooled 1990s panel data. The destinations, in the mobility analysis discussed here, are the are the positions of the members of the balanced panel sample (both their Goldthorpe class, and their human capital scores together with the expected rewards from these) at ages 34, 35 and 36.

3 An introductory example: mobility using the three-category class scheme

It should be emphasized here that the new mobility index is not essentially linked to the use of the human capita measure of social position. Indeed, the first of the four estimations presented in this paper uses the simplest form of the Goldthorpe class scheme to classify both origins and destinations. Table 1 sets out the two matrices required if we are to measure inequality of life-chances in terms of expected values of rewards; we will use this women's mobility data as the source material for the explanation of the mobility index.

Table 1: Class Mobility Matrices: women

(father's class when daughter aged 14: daughter at ages 34, 35 and 36)

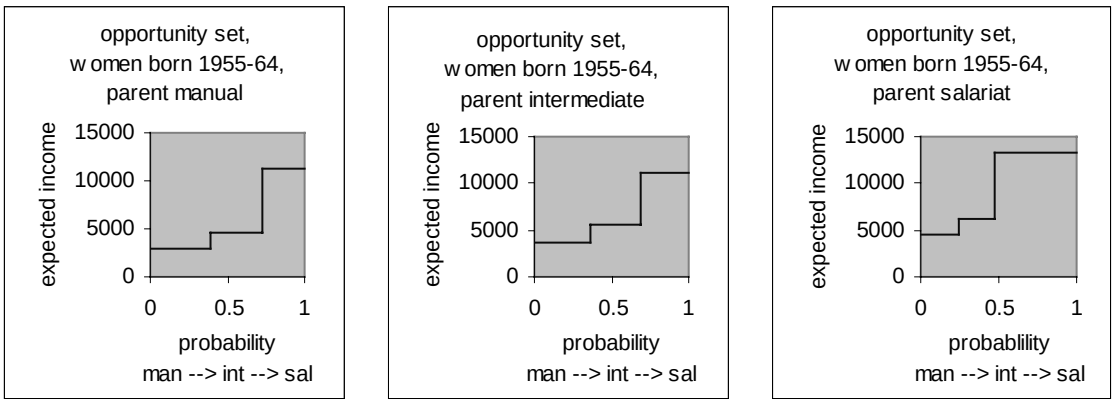
	Transition matrix: row percentages of class entry				Reward matrix: daughter's pred. annual labour income (£'000s)			
father's class ↓	child s	child int	child m	*N*	child s	child int	child m	mean
born 1925-34								
parent salariat	49.1	36.8	14.0	*57*	13.0	4.6	3.6	8.5
parent intermediate	24.1	50.6	25.3	*87*	8.9	4.3	1.0	4.7
parent manual	12.1	22.3	65.6	*404*	8.7	4.4	2.6	3.7
	98	*155*	*295*	*548*	10.0	4.4	2.5	4.4
born 1935-44								
parent salariat	44.3	41.8	13.9	*79*	10.1	4.1	1.6	6.4
parent intermediate	19.8	39.5	40.7	*81*	11.9	5.1	3.3	5.9
parent manual	13.6	25.7	60.8	*339*	8.7	4.9	2.3	3.8
	97	*152*	*250*	*499*	9.7	4.7	2.4	4.7
born 1945-54								
parent salariat	46.5	32.3	21.3	*155*	14.2	5.4	2.6	8.9
parent intermediate	31.4	34.7	33.9	*118*	9.8	5.0	2.9	5.8
parent manual	17.1	33.1	49.9	*375*	11.1	5.5	2.7	5.1
	173	*215*	*260*	*648*	12.1	5.4	2.7	6.1
born 1955-64								
parent salariat	52.6	22.8	24.7	*215*	13.4	6.1	4.4	9.6
parent intermediate	31.7	32.4	35.9	*145*	11.1	5.7	3.7	6.8
parent manual	27.5	34	38.5	*371*	11.3	4.7	3.0	5.8
	261	*222*	*248*	*731*	12.1	5.2	3.4	7.1

The first of the two sets of matrices is the familiar transition matrix, with row percentages showing proportion of children from each of the fathers' origins in the each of the destination columns around the age of 35 (which represents the point of maximum differentiation of children's social position by their parental origins). So, for example, about 37% of daughters born from 1925-1935 with fathers in the salariat, who were in employment around the age of 35, were in the intermediate classes. Notice that the number of cases here is severely limited by the selection of those in employment (compare, for example, with the numbers in Table 5), and this substantial downwards mobility is likely to reflect some systematic aspect of this selection process. Thus, for example, there is likely to be considerable marital endogamy, daughters seeking, through their choice of marital partner, both to emulate their father's class and to match that attached to the own prospective occupation (Ermisch and Francesconi 2002). In the 1960s (when these daughters were in their mid-30s), wives of members of the salariat were still relatively unlikely to take paid employment. However daughters of members of the salariat married to members of the intermediate class are both more likely to be themselves qualified for intermediate rather than salariat jobs than their sisters married to salariat members (because of homogamy) and more likely to be in employment than those sisters (because of a desire to maintain the economic level or the parental home). Or, at the least, some such similar process operates, implying without question that the selection of the subset of cases from the sample as a whole included in Table 1 is a non-random one. (Note also that to increase the variability of the data, each respondent has been represented three times, at ages 34,35 and 36.)

The second set of matrices is not familiar: the "reward matrix" shows the predicted annual labour income for each of the transition groups. Note here the disparity in the earnings of women in each occupational category according to their paternal class origins. Women from salariat origins in the 1930s birth cohort who were themselves employed in the salariat have £13K expected annual labour income, while those otherwise similar from manual backgrounds have only £9K of expected earnings. In this case the very large difference is probably a reflection of a selection process. But irrespective of its explanation, this disparity is the basis for insisting on the use of a reward matrix differentiated by parental origin, rather than of a single-dimensional reward vector giving the undifferentiated mean expected income for each destination class as suggested by van de Gaer et al.

Figure 1: Women's opportunity sets, by fathers' Goldthorpe class

(pictures from mobtab1.xls)



The first step, in the calculation of the mobility index, is to estimate, separately for each paternal origin class (and birth cohort), the total volume of expected income received by the daughters of each class origin. This volume (termed by van de Gaer et al, slightly contrary to the sociological usage, the "opportunity set") is simply the product of the reward to each destination class, and the number or proportion of the daughters in each destination—this product is represented by the area under the plotted line in each of the three charts in Figure 1. Clearly the (age 34-36) opportunity set for the 1955-64 birth cohort salariat daughters is several times as large as that for daughters of manual workers.

The second step is to compare the distributions of these opportunity sets, with some counterfactual distribution that might be considered "fair". The starting point for a "fair" counterfactual is reasonably self-evidently that each parental class's children should have the same opportunity set[4] —remember, this does not in any way imply equality in the rewards received by each of the daughters' classes, but only that the mix of daughters' classes should be the same for all fathers irrespective of their own classes. Clearly, if we simply summed the difference between each of the origin classes' actual share and their "fair" share, we would always arrive at a total of zero. But, for example, simply summing the squared differences would produce an indicator of inequality, or in this defined sense, "unfairness". There are many different ways of constructing such indices of "unfairness", which vary both in the nature of the counterfactual criterion of fairness, and in the different ways in which the gaps between the counterfactual and the actual values are aggregated. Further thought and

[4] See comments on alternative counterfactuals in the concluding section. But the bottom line is, we stick with the fairness=equality position for the moment.

discussion may suggest that there is an optimal way of constructing an index specifically suited to measuring inequality among children's opportunity sets. But the aim of the present paper is simply to introduce and illustrate the use of this class of index for sociological models of intergenerational mobility. The familiar Gini index of inequality, which compares the actual distribution with a straightforward counterfactual equal distribution, will serve as an example for this purpose.

The three category version of the Goldthorpe class schema has been used here because it is intended to be hierarchical, in the sense that manual workers can be considered in some sense less advantaged than members of the intermediate class, who are in turn less advantaged than the salariat. This ordinal relation between the classes makes estimating the Gini index straightforward. We order each of the groups in the society from the least advantaged to the most advantaged. We then progressively cumulate the proportion of the total advantages received by each successive group. If there is any inequality, having cumulated in the order of advantage, all except the most advantaged group will have a cumulated total which is less than the cumulated total it would have received from the hypothetical "fair" distribution.

Figure 2 plots such actual and counterfactual distributions using the information in Table 1. The Gini coefficient is calculated as the ratio between the area underneath the 45^{o} line which represents the counterfactual fair distribution, and the area between the counterfactual and the actual distribution. Those familiar with Gini coefficients for national income distributions will see immediately that the values here—0.13 for the 1925-34 cohort of women, 0.11 for the 1946-44—are considerably smaller. The degrees of inequality among intergeneration opportunity sets are indeed necessarily much smaller than for cross-sectional income distributions. Consider: say for a moment that there were no change in the sizes of and rewards to classes over two generations—then any class mobility between parent and child, would mean that the intergenerational Gini would be smaller than the cross-sectional. Any intergenerational mobility in effect reduces inequality in children's life chances from the perspective of the class position of the parents' generation.

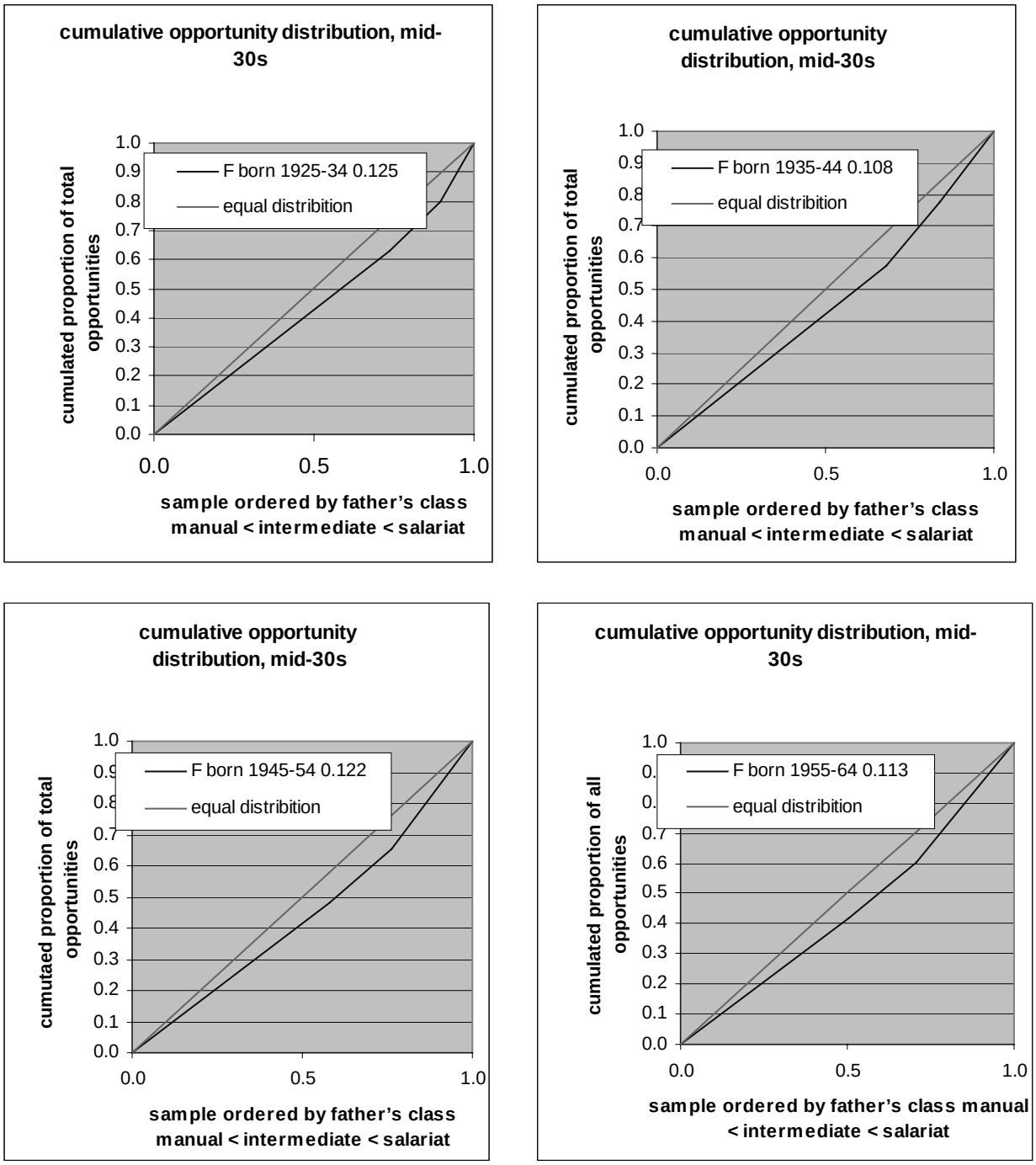


Figure 2: Gini mobility diagrams for women

In fact, the intergenerational mobility Ginis for men calculated from the Table 2 data are even smaller than the women's (these small values are one reason for suspecting that the Gini-type approach will in the end turn out not to be the most appropriate way of calculating this index).

Table 2: Class Mobility Matrices: Men

(father's class when son aged 14: son at age 34-36)

	Transition matrix: row probabilities of class entry				Reward matrix: son's pred. annual labour income (£'000s)			
father's class ↓	child s	child int	child m	*N*	child s	child int	child m	mean
M born 1925-34								
parent salariat	44.4	20.4	35.2	*108*	19.4	11.7	13.0	15.6
parent intermediate	26.8	22.9	50.3	*157*	17.6	10.8	11.0	12.7
parent manual	17.6	11.4	71	*658*	15.7	9.5	10.3	11.1
	206	*133*	*584*	*923*	17.0	10.2	10.5	11.9
M born 1935-44								
parent salariat	69.6	17	13.3	*135*	18.9	11.6	15.7	17.2
parent intermediate	23.3	32.7	44	*150*	17.0	13.4	11.0	13.2
parent manual	23.3	17	59.8	*666*	17.6	10.6	11.4	12.7
	284	*185*	*482*	*951*	17.9	11.5	11.5	13.4
M born 1945-54								
parent salariat	55.1	19.9	25	*216*	21.1	13.7	12.6	17.5
parent intermediate	44.7	20.1	35.2	*179*	20.0	11.7	12.2	15.6
parent manual	23	17.3	59.7	*635*	18.2	12.1	10.9	12.8
	345	*189*	*496*	*1030*	19.6	12.4	11.2	14.2
M born 1955-64								
parent salariat	68.7	11.3	19.9	*291*	20.3	12.5	13.4	18.0
parent intermediate	28.5	34.6	36.9	*179*	20.2	13.1	11.7	14.5
parent manual	30.9	17.2	51.9	*559*	18.8	11.8	11.8	14.0
	424	*191*	*414*	*1029*	19.7	12.4	12.0	15.2

Nevertheless we can explore the sources of the cohort differences as in Table 3. The "actual" column shows a variation in the daughters' life-chances Gini from 0.13 for the 1925-34 birth cohort, to 0.11 for the 1935-44 cohort, and so on. In fact, (apart from change in the overall dispersion of predicted incomes which we discuss in the next section), there are three independent "dimensions of freedom" in the underlying data: (1) the distribution of fathers among the classes varies across the cohorts; (2) the transition probabilities from each paternal class to the children's classes vary; and (3) the reward matrix may change. The fourth possibility, change in the distribution among the children's classes is of course not independent, but fixed by (1) and (2)[5] For the moment we shall merely consider each of these dimensions separately; consideration of the general problem of partitioning change in the mobility index will be undertaken elsewhere.

[5] If the rewards under discussion here were actual earnings rather than earnings predicted from human capital estimated with constant 1990s coefficients, it would also be necessary to correct for changes in income dispersion between the birth cohorts.

Table 3 Partial decomposition of change in the intergenerational class mobility Gini Index (father's class when child aged 14: child aged 34-36)

	daughters				sons			
Model	1	2	3	Actual	1	2	3	Actual
fathers distributions change	✔			✔	✔			✔
transition rates change		✔		✔		✔		✔
reward rates change			✔	✔			✔	✔
born 1925-34	0.13	0.13	0.13	0.13	0.05	0.05	0.05	0.05
born 1935-44	0.16	0.13	0.12	0.11	0.06	0.07	0.04	0.04
born 1945-54	0.19	0.11	0.10	0.12	0.07	0.07	0.05	0.07
born 1955-64	0.20	0.06	0.13	0.11	0.08	0.05	0.03	0.06

Columns 1 show the Gini scores that result if we allow the fathers' distribution to change as in the real data, but maintain the transition and reward matrices as they were for the 1925-34 cohort. In this case we see, for the daughters, an apparent regular and substantial increase in inequality (probably due to the progressively increasing differential selection of the daughters of salariat fathers into regular employment). The sons show a much smaller (since there is much less selection here) but still regular rise through the period. Columns 2, in which the transition matrices are allowed to change, but the fathers' distributions and the reward matrices are held as they were in 1925-34, show for the daughters' case an initial rise small rise, and then a substantial decline in inequality. The sons' Ginis show little change from this source.

The conventional way of looking at change in transition rates involves odds ratios. Table 4 shows the complete set of relevant odds ratios for the simple symmetrical three-class analysis we have been considering. With m origin classes and n destination classes, there are (m-1)*n odds ratios necessary to describe a mobility process completely. Just comparing the extreme values, as in the first panel of Table 4, can give a misleading impression—as the salariat-vs-manual-origin coefficients for women suggest an entirely smooth increase in equality, while the intermediate-vs-manual panel shows more irregularity of change. The relevant columns of Table 3 provide an appropriate and intuitively appealing means for summarising tables of odds ratios (which, as m and n rise, quickly become difficult to comprehend).

Table 4: relative odds of class entry, age 34-36

	women			men		
	salariat	intermediate	manual	salariat	intermediate	manual
father in salariat vs father in manual						
born 1925-34	7.01	2.03	0.09	3.74	1.99	0.22
born 1935-44	5.05	2.08	0.10	7.54	1.00	0.10
born 1945-54	4.21	0.96	0.27	4.11	1.19	0.23
born 1955-64	2.93	0.57	0.52	4.91	0.61	0.23
father in intermediate vs father in manual						
born 1925-34	2.31	3.57	0.18	1.71	2.31	0.41
born 1935-44	1.57	1.89	0.44	1.00	2.37	0.53
born 1945-54	2.22	1.07	0.51	2.71	1.20	0.37
born 1955-64	1.22	0.93	0.89	2.31	3.57	0.18

Column 3 in Table 3 shows that allowing the reward rates to vary while holding the other parameters constant produces a U-shaped pattern for women, and an oscillating pattern for men, followed by approximate constancy. The component processes vary independently (as Swift 2000 surmised), and the resulting small and irregular changes in the actual mobility index can reflect, as the women's Gini scores do here, a residual from summation of larger and more regular contrary changes in its components. Complex pictures are emerging, difficult to interpret, and made more so by the fact that we only see that part of the picture that includes that specially selected subset of people in their mid-30s who are in employment.

4 Mobility estimates using hybrid and categorical human capital measures.

Having established the principles of the intergenerational mobility index using the conventional class categories, we can both greatly simplify the analysis and remove the "selecting only the employed" problem. Using the human capital score divided into quantile categories to indicate the origin and destination categories means that we can include all the children, not just those in employment. And the use of the quantiles means that change related to the fathers' (or the children's) distributions drops away, and we can concentrate just on change in the transition and reward matrices.

However, readers may have some doubt about the efficacy of the procedure, described briefly in Section 2, for imputing human capital scores to parents. So we first estimate a hybrid mobility model, with categorical parental class origins, and human capital quintile

destinations for the children. This—as we can clearly see from the increase in the number of cases when we compare Table 5 with Table 1, and (though less dramatic) Table 6 with Table 2—deals at least with the problem of selection-by-employment. This second group of analyses also moves from the Goldthorpe three class categorisation, to the much more detailed seven class schema.

Now, one major difference between the more aggregated three-category schema, and the disaggregated seven-category schema, is that while the former is intended as a hierarchical classification, the latter is unequivocally non-hierarchical. Who could say unequivocally on *a priori* grounds, whether the petite bourgoisie are more or less advantaged than the routine non-manual, the foremen than the petite bourgoisie? Does the requirement for ordinality mean that we cannot estimate a Gini index for these tables?

Table 5: Hybrid Class/Human Capital Mobility Matrices: women at age 35

(father's class when daughter aged 14: daughter aged 34-36)

	Transition matrices (row percentages) Daughter's human capital quintiles →						reward matrices (1991 £'000s) Daughter's human capital quintiles →					
father's class ↓	1	2	3	4	5	Total	1	2	3	4	5	Total
born 1925-34												
higher salariat	9.6	16.9	7.2	13.3	53.0	*83*	-0.1	1.0	2.1	3.9	10.2	6.3
lower salariat	13.2	20.6	13.2	27.9	25.0	*68*	0.0	1.0	2.3	4.2	7.8	3.7
routine non-man,	13.8	40.0	18.5	15.4	12.3	*65*	0.0	1.1	2.1	4.0	6.7	2.3
petite bourgoisi	25.6	15.9	14.6	20.1	23.8	*164*	-0.2	1.0	2.3	4.0	7.3	3.0
foremen, technic	16.5	21.7	23.1	24.5	14.2	*212*	0.0	1.0	2.2	3.9	8.1	2.8
skilled manual w	21.2	18.9	22.0	20.1	17.8	*259*	-0.3	1.1	2.2	3.9	7.2	2.7
semi-,unskilled,	23.3	19.0	22.8	19.0	15.8	*373*	-0.4	1.0	2.3	3.9	6.8	2.4
Column	*245*	*246*	*242*	*248*	*243*	*1224*	-0.3	1.0	2.2	3.9	7.8	3.0
born 1935-44												
higher salariat	13.3	12.2	16.7	16.7	41.1	*90*	-0.3	1.6	3.1	4.7	11.0	6.0
lower salariat	12.5	12.5	29.7	12.5	32.8	*64*	0.2	1.7	3.0	4.8	9.7	4.9
routine non-man,	13.3	13.3	22.2	31.1	20.0	*45*	0.4	1.9	2.8	4.9	11.4	4.8
petite bourgoisi	12.1	12.1	22.4	26.7	26.7	*116*	0.3	1.8	2.8	4.8	9.1	4.6
foremen, technic	20.4	21.0	19.8	17.4	21.6	*167*	0.0	1.5	3.0	4.6	9.4	3.7
skilled manual w	21.0	23.3	15.1	22.8	17.8	*219*	0.1	1.7	3.0	4.6	8.3	3.4
semi-,unskilled,	27.1	24.3	22.5	17.9	8.2	*280*	0.1	1.6	2.8	4.7	9.2	2.6
Column	*196*	*193*	*199*	*197*	*196*	*981*	0.1	1.6	2.9	4.7	9.6	3.8
born 1955-64												
higher salariat	6.6	14.3	15.9	20.9	42.3	*182*	0.5	2.3	3.8	5.5	13.6	7.9
lower salariat	17.1	14.4	15.8	21.9	30.8	*146*	0.7	2.2	3.9	5.8	12.2	6.0
routine non-man,	20.9	16.3	23.3	15.1	24.4	*86*	0.6	2.3	3.8	6.2	11.3	5.1
petite bourgoisi	22.3	21.8	23.5	21.8	10.6	*179*	0.6	2.1	3.7	5.7	10.3	3.8
foremen, technic	21.4	17.3	30.4	14.3	16.7	*168*	0.5	2.2	3.8	6.0	11.7	4.4
skilled manual w	26.4	24.4	15.7	17.7	15.7	*254*	0.6	2.1	3.7	5.8	10.5	4.0
semi-,unskilled,	21.3	23.6	19.2	23.9	12.0	*343*	0.6	2.1	3.9	5.6	11.1	4.0
Column	*271*	*272*	*271*	*273*	*271*	*1358*	0.6	2.2	3.8	5.7	11.9	4.8
born 1955-64												
higher salariat	5.7	14.8	17.7	21.5	40.2	*209*	1.2	3.0	4.8	7.5	14.4	8.8
lower salariat	18.6	16.9	12.7	21.2	30.5	*118*	0.8	2.7	4.3	7.0	13.7	6.8
routine non-man,	23.3	13.3	35.0	16.7	11.7	*60*	1.2	2.7	4.7	7.2	14.8	5.2
petite bourgoisi	21.8	19.0	19.0	24.1	16.1	*174*	0.3	2.8	4.7	7.1	12.9	5.3
foremen, technic	20.5	16.4	21.1	19.9	22.2	*171*	0.7	2.7	4.4	7.1	14.9	6.2
skilled manual w	21.6	23.1	23.6	20.1	11.6	*199*	0.9	2.8	4.5	7.2	11.6	4.7
semi-,unskilled,	28.3	27.2	19.1	16.5	8.8	*272*	0.7	2.7	4.7	6.8	13.0	4.3
Column	*241*	*240*	*241*	*241*	*240*	*1203*	0.7	2.8	4.7	7.5	14.3	6.0

Table 6: Hybrid Class/Human Capital Mobility Matrices:

(father's class when son aged 14: son at age 35)

	Transition matrices (row percentages) Son's human capital quintiles →						reward matrices (1991 £'000s) Son's human capital quintiles →					
Father's class ↓	1	2	3	4	5	Total	1	2	3	4	5	Total
born 1925-34												
higher salariat	3.9		37.3	17.6	41.2	*51*	7.3		11.0	12.9	20.8	15.2
lower salariat	20.6		12.7	19.0	47.6	*63*	6.6		11.1	12.5	20.7	15.1
routine non-man,	7.3	9.8	34.1	7.3	41.5	*41*	5.2	9.0	9.8	12.5	20.9	14.2
petite bourgoisi	9.9	17.0	32.6	14.9	25.5	*141*	7.1	9.0	10.7	12.7	18.2	12.3
foremen, technic	17.6	18.2	15.0	31.0	18.2	*187*	6.8	8.8	11.1	12.6	16.9	11.4
skilled manual w	25.4	22.0	16.8	18.5	17.2	*232*	6.7	8.8	10.9	12.7	17.9	10.9
semi-,unskilled,	26.0	25.1	20.8	19.0	9.2	*327*	6.8	8.7	10.7	12.6	19.3	10.3
Column	*209*	*195*	*222*	*208*	*208*	*1042*	6.7	8.8	10.8	12.6	18.9	11.6
born 1935-44												
higher salariat	6.8	23.3	5.5	11.0	53.4	*73*	5.7	10.7	12.3	15.0	22.0	16.9
lower salariat	17.8	5.6	7.8	24.4	44.4	*90*	7.3	10.5	12.4	14.7	21.6	16.0
routine non-man,	20.7	34.5	6.9	37.9		*29*	7.9	9.7	11.9	16.0	0.0	11.9
petite bourgoisi	16.3	23.4	10.6	31.2	18.4	*141*	8.3	10.2	11.9	15.3	20.7	13.6
foremen, technic	23.5	16.8	21.9	23.5	14.3	*196*	6.0	10.3	12.2	14.8	22.1	12.5
skilled manual w	21.1	16.4	27.0	16.8	18.8	*256*	7.5	10.2	12.2	16.0	20.1	13.0
semi-,unskilled,	22.6	25.8	25.8	15.0	10.8	*287*	7.1	10.1	12.2	15.4	19.9	11.8
Column	*215*	*214*	*214*	*217*	*212*	*1072*	7.1	10.2	12.2	15.3	21.0	13.2
born 1945-54												
higher salariat	6.5	18.1	16.7	22.5	36.2	*138*	7.1	9.8	13.2	16.9	24.2	16.9
lower salariat	9.7	11.1	20.1	22.9	36.1	*144*	5.9	10.2	12.9	17.1	22.0	16.2
routine non-man,	15.2	15.2	21.2	24.2	24.2	*66*	7.5	9.8	12.4	16.9	22.6	14.8
petite bourgoisi	23.4	13.7	16.0	17.7	29.1	*175*	5.7	9.7	13.0	16.6	22.0	14.1
foremen, technic	26.2	16.9	16.4	22.4	18.0	*183*	6.5	9.8	12.9	16.6	21.6	13.1
skilled manual w	16.8	23.6	24.3	21.4	13.9	*280*	6.4	9.5	12.7	16.6	22.9	13.1
semi-,unskilled,	27.6	28.2	22.0	15.2	7.0	*341*	6.5	9.6	12.6	16.4	22.1	11.3
Column	*263*	*268*	*267*	*264*	*265*	*1327*	6.4	9.7	12.8	16.7	22.5	13.6
born 1955-64												
higher salariat	10.6	10.1	19.7	23.9	35.8	*218*	6.5	10.6	13.8	17.4	23.4	17.0
lower salariat	10.7	15.6	26.2	13.9	33.6	*122*	6.7	10.6	13.6	16.7	24.1	16.3
routine non-man,	19.1	20.6	14.7	25.0	20.6	*68*	4.1	10.9	12.5	16.9	23.4	13.9
petite bourgoisi	21.5	23.2	18.2	19.9	17.1	*181*	6.2	10.6	13.8	16.5	22.4	13.4
foremen, technic	25.9	14.3	23.8	26.5	9.5	*189*	7.1	10.9	13.7	16.7	22.9	13.3
skilled manual w	23.8	21.2	17.5	18.5	19.0	*189*	7.9	10.9	13.7	17.0	21.9	13.9
semi-,unskilled,	24.4	29.5	19.3	15.3	11.5	*295*	7.2	11.0	13.6	17.5	22.6	12.9
Column	*254*	*251*	*253*	*252*	*252*	*1262*	6.9	10.8	13.6	17.0	23.0	14.3

Fortunately this is not the case. The hierarchy that is designed into the three category schema, is an *a priori*, *ex ante* sort of hierarchy. We know without really needing any evidence that the manual worker categories will come out worst, in terms of life chances, that the intermediate will be in the middle and the salariat will be best-off. But with the seven category schema we have an alternative option: to construct an ordering on an *ex post* basis,

according to a measured extrinsic scalar characteristic—the size of the children's opportunity sets. What emerges (Table 7) is not wholly consistent across the eight lists (ie four age cohorts for each sex). We see that three occupational categories—petite bourgoisie, routine non-manual, and foremen and technicians (emphasized by the different fonts)—move around in the ordering, both relative to each other and in relation to the other four categories. The routine non-manual parents are a numerically very small group, but there may well be some real sociological interest in the changing positions of the children of the petite bourgoisie and the foremen and technician groups, both across the successive birth cohorts and between the sexes—though this remains obscure in the present analysis. The other four occupational groups however remain in an almost entirely regular mutual relation for all eight cohort-gender combinations (the so-far-unexplained exception being that the daughters of semi- or unskilled fathers born 1945-54 have a higher opportunity set than those of the otherwise similar skilled workers).

Table 7 Orderings of fathers' occupation by value of children's opportunity sets aged 34-36

	born 1925-34	born 1935-44	born 1945-54	Born 1955-64
daughters				
rank				
7	**routine non-man,**	semi-,unskilled,	petite bourgoisie	semi-,unskilled,
6	semi-,unskilled,	skilled manual w	skilled manual w	skilled manual w
5	skilled manual w	*foremen, technician*	semi-,unskilled,	**routine non-man,**
4	*foremen, technician*	petite bourgoisi	foremen, technician	petite bourgoisie
3	petite bourgoisie	**routine non-man,**	**routine non-man,**	*foremen, technic*
2	lower salariat	lower salariat	lower salariat	lower salariat
1	higher salariat	higher salariat	higher salariat	higher salariat
sons				
rank				
7	semi-,unskilled,	semi-,unskilled,	semi-,unskilled,	semi-,unskilled,
6	skilled manual w	**routine non-man,**	*foremen, technician*	*foremen, technician*
5	*foremen, technician*	*foremen, technician*	skilled manual w	petite bourgoisie
4	petite bourgoisie	skilled manual w	petite bourgoisie	skilled manual w
3	**routine non-man,**	petite bourgoisie	**routine non-man,**	**routine non-man,**
2	lower salariat	lower salariat	lower salariat	lower salariat
1	higher salariat	higher salariat	higher salariat	higher salariat

If we take the orderings exactly as they present themselves in each of the eight cohort-gender combinations (ie as they are set out in Table 7) we can then straightforwardly calculate Gini indices for the hybrid mobility tables. The partial decompositions as in Table 3 present a problem, because of the cohort differences in the orderings; these are not attempted here, and

so Table 8 presents just the actual Gini scores. In fact, little changes from Table 3 (though the scores are slightly higher, an effect of the larger number of origin categories); we may reasonably suspect that the "no change" result here again reflects the growth, for successive birth cohorts, in the proportions of fathers in the salariat classes – a problem we can only deal with by moving from the hybrid mobility analysis to a symmetrical analysis with human capital scores for both origins and destinations.

Table 8: Gini scores for the hybrid analysis

	women	men
born 30s	0.14	0.07
born 40s	0.15	0.06
born 50s	0.14	0.08
born 60s	0.14	0.06

Table 9: Human Capital Mobility Matrices: Women

(father's humcap when daughter aged 14; daughter at age 35)

	transition matrices (row percentages) Daughters' quintiles →						reward matrices (1991 £'000s) Daughters' quintiles →					
Father q ↓	1	2	3	4	5	**Total**	1	2	3	4	5	Total
born 1925-34												
bottom	27.5	20.5	15.6	23.4	13.1	*244*	-0.2	1.1	2.3	4.0	6.6	2.3
2	21.2	22.5	25.2	18.9	12.2	*222*	-0.4	1.1	2.1	4.0	6.7	2.3
3	22.3	24.3	26.7	12.0	14.7	*251*	-0.3	1.0	2.3	4.0	7.2	2.3
4	15.2	16.0	20.8	23.4	24.5	*269*	-0.2	0.9	2.2	3.9	8.0	3.4
top	12.9	16.8	11.4	21.8	37.1	*202*	0.1	1.0	2.2	3.9	9.0	4.6
Column	*237*	*238*	*240*	*236*	*237*	*1188*	-0.3	1.0	2.2	3.9	7.9	3.0
born 1935-44												
bottom	21.7	23.4	23.4	19.0	12.5	*184*	0.2	1.6	2.9	4.7	8.3	3.0
2	24.2	21.3	19.1	24.2	11.2	*178*	0.0	1.6	2.9	4.8	10.9	3.3
3	22.1	18.8	16.3	17.8	25.0	*208*	0.1	1.6	2.9	4.6	9.4	4.0
4	18.7	21.8	22.3	18.7	18.7	*193*	0.1	1.7	3.0	4.7	8.5	3.5
top	13.8	15.8	19.4	20.4	30.6	*196*	0.2	1.6	2.9	4.8	10.5	5.0
Column	*192*	*193*	*192*	*191*	*191*	*959*	0.1	1.6	2.9	4.7	9.6	3.8
born 1945-54												
bottom	23.6	17.4	20.0	25.9	13.1	*305*	0.5	2.2	3.8	5.6	11.1	4.1
2	21.1	27.8	18.1	15.4	17.6	*227*	0.7	2.1	3.7	5.7	11.5	4.3
3	20.5	23.4	20.9	17.2	17.9	*273*	0.5	2.2	3.8	6.0	10.7	4.4
4	21.3	20.1	24.3	17.5	16.8	*268*	0.7	2.2	3.8	5.8	11.5	4.4
top	12.8	13.2	16.8	22.3	34.8	*273*	0.7	2.3	3.8	5.6	13.3	6.9
col	*268*	*270*	*270*	*269*	*269*	*1346*	0.6	2.2	3.8	5.7	11.9	4.8
born 1955-64												
bottom	30.2	23.8	18.3	21.8	5.9	*202*	0.7	2.7	4.4	6.7	15.0	4.0
2	27.1	23.1	22.7	16.2	10.8	*277*	0.6	2.7	4.5	7.2	12.3	4.3
3	16.7	21.4	20.2	21.8	19.8	*252*	0.5	2.7	4.6	7.1	12.7	5.7
4	20.3	14.5	23.3	20.7	21.1	*227*	0.9	2.8	4.5	7.2	14.6	6.2

	top	6.7	17.1	14.6	20.4	41.3	*240*	1.0	2.9	4.8	7.5	14.6	8.8
col		*240*	*240*	*239*	*240*	*239*	*1198*	0.7	2.8	4.6	7.1	13.9	5.8

Table 10: Human Capital Mobility Matrices: Men

(father's humcap when son aged 14; son at age 35)

Transition matrices (row percentages) reward matrices (1991 £'000s)

	Sons' quintiles →						Sons' quintiles →					
Father q ↓	1	2	3	4	5	**Total**	1	2	3	4	5	Total
born 1925-34												
bottom	26.1	22.9	21.1	19.3	10.6	*218*	7.1	8.8	10.6	12.6	17.9	10.4
2	18.9	25.4	16.8	21.1	17.8	*185*	6.2	8.9	10.7	12.8	17.3	11.0
3	21.9	21.9	20.4	10.4	25.4	*201*	6.9	8.8	10.6	12.4	19.6	11.8
4	11.4	14.4	28.2	17.8	28.2	*202*	7.4	8.8	10.9	12.6	18.1	12.5
top	21.1	10.6	17.9	31.2	19.3	*218*	6.1	8.8	10.9	12.7	21.2	12.2
Column	*205*	*193*	*214*	*206*	*206*	*1024*	6.7	8.8	10.7	12.6	19.0	11.6
born 1935-44												
bottom	26.3	24.4	21.2	21.2	6.9	*217*	6.8	10.0	12.2	15.4	20.1	11.4
2	27.6	21.4	17.7	16.7	16.7	*192*	7.6	9.9	12.1	15.6	20.7	12.4
3	17.1	21.1	22.8	19.7	19.3	*228*	7.4	10.2	12.3	15.5	21.1	13.3
4	15.0	15.4	19.6	26.2	23.8	*214*	7.2	10.6	12.1	15.2	21.0	14.1
top	15.7	16.2	18.2	15.7	34.3	*198*	6.4	10.3	12.4	15.4	21.5	14.7
Column	*210*	*207*	*210*	*210*	*210*	*1049*	7.1	10.2	12.2	15.4	21.1	13.2
born 1945-54												
bottom	30.3	24.7	15.9	18.3	10.8	*251*	6.6	9.7	12.7	16.6	21.5	11.8
2	20.9	20.9	26.0	18.8	13.4	*277*	5.9	9.5	12.7	16.7	22.6	12.7
3	24.3	14.1	15.8	22.2	23.6	*284*	6.2	9.7	12.7	16.6	22.2	13.8
4	12.6	23.4	27.6	18.0	18.4	*239*	6.5	9.7	12.9	16.7	22.4	13.8
top	10.6	18.2	15.9	22.3	33.0	*264*	7.0	9.9	13.0	16.8	23.0	16.0
Column	*260*	*264*	*265*	*263*	*262*	*1315*	6.4	9.7	12.8	16.7	22.5	13.6
born 1955-64												
bottom	25.3	22.9	20.9	18.9	12.0	*249*	7.6	10.7	13.6	16.9	22.5	13.1
2	26.0	31.2	16.7	13.4	12.6	*269*	6.7	10.8	13.6	17.5	22.6	12.6
3	17.2	21.9	16.7	22.3	21.9	*233*	5.9	10.9	13.6	16.9	23.2	14.5
4	20.0	12.3	25.0	23.1	19.6	*260*	7.2	10.8	13.7	16.7	22.6	14.5
top	10.1	11.3	21.1	22.7	34.8	*247*	6.3	10.6	13.7	17.3	23.6	16.8
Column	*250*	*252*	*253*	*251*	*252*	*1258*	6.9	10.8	13.6	17.0	23.1	14.3

Tables 9 and 10 now replace the paternal origin class categories with the paternal human capital quintiles, to give a symmetrical 5*5 origins/destinations analysis. There are now equal proportions of cases in each of the row and column categories (only *approximately* equal, however, because of difficulties in handling the case-weights in the SPSS ranking procedure).

Now we have, as a result of the use of human capital quintile (ie fixed-proportion) categories, not three, but just two dimensions of independent change, in the transition matrix, and in the reward matrix. So the decomposition set out in Table 11 is simpler to interpret. For the

daughters we see through the successive birth cohorts a U-shaped pattern of reduction and then increase in inequality due to the changes in the transition matrices; contrast this with the two corresponding effects (fathers distributions and transitions) for women in Table 3—continuously increasing inequality due to change in the distribution of fathers' origins, combined with continuously decreasing inequality due to change in the transition rates. The U-shaped pattern here is (together with the additional evidence from the non-employed daughters) the result of the combination of columns 1 and 2 from table 3.

The Table ll women's transition rate effect (column 1) is slightly moderated by the small decline in inequality attributable to changes in the distribution of rewards (column 2), to produce overall a small decline in inequality from the 1925-34 to the 1935-44 birth cohorts, and a rapid increase in inequality from the 1945-54 to the 1955-64 cohorts. This last effect may perhaps be in part an artifact of the data set, to which we will return in a moment—though the lack of an equivalent break in the sons' indices, which continue to show relatively small and historically inconsistent changes, may be reassuring.

Table 11: Decomposing change in the human capital mobility Gini Index
(father's humcap when child age 14; child aged 34-6)

	daughters			**sons**		
Model	1	2	**Actual**	1	2	**Actual**
transition rates change	✔		✔	✔		✔
reward rates change		✔	✔		✔	✔
born 1925-34	0.17	0.17	0.17	0.05	0.05	0.05
born 1935-44	0.13	0.13	0.11	0.07	0.05	0.06
born 1945-54	0.12	0.14	0.10	0.07	0.05	0.07
born 1955-64	0.23	0.12	0.18	0.07	0.04	0.06

5 Mobility using continuous positional measures

The final step takes us from the categorical transformation of human capital to its use as a continuous indicator of position. The Gini can be, and indeed is normally, estimated from continuous data. And there is no real reason, other than the expositional convenience for demonstrating the relationship of the new approach to intergenerational mobility to the traditional categorical transition approach, for not doing so now. We simply assemble the

cases in ascending order according to the fathers' human capital score, and then proceed as with a normal Gini calculation on the children's expected labour income. Having removed the human capital categories from the analysis, there is no longer any meaning to the decompositions reported in Table 10, since the transition rates and reward rates merge to become simply mobility rates. If we were using actual earnings for successive cohorts as the reward matrix, then we would certainly wish to decompose the change so as to discover what part derives from changing dispersion of rewards to human capital, and what from mobility in the underlying distribution of personal attainments. But since the reward matrix we are using is expected earnings derived as a linear transformation of the children's 1990s-valued human capital scores, any change in the dispersion of rewards is a direct result of change in the personal characteristics (though clearly the distinction between mobility constituted by change in individuals rank ordering among the members of the society, and mobility due to change in the overall dispersion of human capital, is still of substantial sociological interest).

Table 12:
Gini index of inter-generational mobility using continuous human capital measures (father's human capital when child age 14; child now aged 34-36)

	women		**men**		**both**	
	Gini	*N*	**Gini**	*N*	**Gini**	*N*
born 1925-34	0.19	*1190*	0.08	*1022*	0.09	*2212*
born 1935-44	0.12	*958*	0.08	*1049*	0.07	*2008*
born 1945-54	0.15	*1347*	0.08	*1315*	0.09	*2662*
born 1955-64	0.24	*1199*	0.09	*1255*	0.15	*2455*

So Table 12 sets out the intergenerational Gini scores for the continuous human capital case. The scores here are generally larger, as we might expect as we move away from the categorical approach, since more extreme values are included. The sequence of Gini scores for the women still shows an inverted-U shape, though now with a quite substantial increase in inequality—the score more than doubles between the 1935-44 birth cohort and the 1955-64. And the men's trend now shows a small but regular increase in inequality across the four cohorts.

Here we must enter a caveat about the data. The 34-36-year-olds in the 1955-64 birth cohort reached their mid-30s in the 1990s, so the source of much of the employment data from which their human capital score is estimated, is respondents descriptions of their employment

situations given in successive annual waves of BHPS data collection. This data has an average recall period of 12 months, and much of the evidence applies to the current employment state. For each of the earlier birth cohorts, by contrast, the source of the information about their mid-30s employment circumstances is the work and employment history retrospective data collected in BHPS waves 2 and 3. So the earlier birth cohorts will have mean recall periods of anything from 7 to 27 years. Some parts of the recalled employment data are unproblematical. The recall of occupations, which accounts for the largest part of the variation in the human capital score, is believed to be reasonably reliable and unbiased. But we know, in particular, that unemployment events are very severely censored in the recall data (Dex and McCulloch 1997). And we suspect that in the case of women's recall data, actual periods of unemployment become transformed in memory into periods of "family care"—which have less negative impacts on human capital than do unemployment. So part of the apparent increase in inequality among women over the two most recent birth cohorts, may reflect an apparent growth of proportions with low human capital, that in fact results from a difference in the mode of data collection. We will have to bear this possibility in mind when interpreting the results related to the final birth cohort. However the stability in the corresponding men's results suggests that this problem is not too serious

To complete the discussion of the full range of applications of these techniques, we should remind ourselves that the discussion throughout has been of mobility from *paternal* positions. We do have some information abut mothers' human capital as well as fathers'. We could provide Gini estimates based on *parental*, as opposed to merely paternal human capital, calculated simply by summing mothers' and fathers' human capital scores. The number of respondents would be boosted by around 10%, reflecting additional cases where the respondent's father was not employed—or where information on the father's employment position was not provided, or respondents had no father at this period in their lives—but did have a mother in employment. This analysis however would have a very serious shortcoming: all the respondents' parents have some human capital, as defined in this paper, irrespective of their employment status. But here, the current approach to estimating mothers' human capital from the Wave 1 BHPS recall data means that only mothers who were employed around the time of their children's 14th birthdays are contributing any evidence. This constitutes a serious selection bias, which would serve to suppress the

contributions to children's human capital made by the human capital of mothers who are out of employment. Indeed, though this "parental" approach is perhaps in principle the correct way to study intergenerational mobility, the bias resulting is sufficiently severe to lead us to set the analysis aside for the moment[6].

6 Discussion and Conclusions

Theoretical

The distinction between equality of access to positions and equality of distribution of rewards, seems, as a result of the sequence of arguments we have followed, less useful than it did at the outset. Political philosophers use it, but it may be that they do so really as an expositional device. Certainly it may be helpful at an early stage in the discussion, to say, as did the economists with whom we started this paper, "consider lotteries and prizes…." as a means of introducing the concept of the opportunity set. But as the argument develops, it becomes clear (if it had not been clear before) that, at least from the "democratic equality" perspective, the opportunity distribution itself is the essence of the intergenerational (or any other sort of) mobility issue.

The third of the normative intuitions introduced at the start of this paper implies that the subject of social mobility is the difference in the expected values of the opportunity sets for children with different parental origins. If there are just so many discrete parental origins, then there are just so many expected values that must be compared. But if there is a continuous gradation of positions, acquired through the continual daily accumulation of economically salient competencies and qualifications—in short, human capital—then the subject of intergenerational mobility becomes, on this normative basis at least, the degree of

[6] We are currently considering whether it will be possible to collect this information from parents of BHPS sample members. However, two of the British Birth Cohort Studies (NCDS and BCS70) certainly contain sufficient data on parental background to allow the estimation these sorts of models.

variation of the expected value of children's opportunity distributions, across the range of parental positions

There is certainly room for the alternative normative starting point. "Take care of the lotteries, and the prizes will take care of themselves" one might say. But once we recognise that there are *no essentially distinct categories* to run the lotteries between, the position becomes harder (though still not impossible) to justify. Social mobility is the degree of change between parents' abilities to acquire rewards, and their children's. If social position is indeed scalar, mobility between positions is, simply, the distance moved, and understanding intergenerational mobility is simplified to a matter of modeling the distribution of the differences between parents' and children's human capital. But without question, accepting *either* of these views involves a commitment to a particular political position, a particular view of the nature of social justice.

An intergenerational mobility *index*, of the sort discussed here, sets the actual, observed, pattern of intergenerational differences against a hypothetical, counterfactual pattern that might be considered *fair*. Certainly equality of opportunity sets is one candidate for this, and this is implicit in all the previous estimations. But, on the other hand, Rawls' difference principle, for example, might justify some limited degree of inequality in favour of children of high human capital parents. Specially well-qualified parents might thereby be motivated to devote extra resources to their children's socialisation, on the grounds that this makes the society better-off, and hence benefits the worst-off indirectly. (Following this line of argument we might identify an optimum level of intergenerational inequality, and simply subtract a Gini value representing this from the value calcualted as above, to arrive at a final normatively sanctioned intergenerational mobility index.) However, it is difficult to escape the suspicion that a stronger case might be made for inequality which disproportionately benefits worse-off parents, to enable their children to develop their full potentials. (This might indeed indirectly benefit the children of better-off parents.) These sorts of considerations raise some empirical questions (eg can "headstart-type" compensatory programmes be made to work?). But overall the issue comes down again to political choices, now concerning the detail of implementing the third view.

Methodological

We have discussed in sequence four distinct approaches to the measurement of intergenerational mobility based on the third "democratic equality" approach to mobility:

1. A simple combination of the reward matrix with the transition matrix in an otherwise traditional symmetrical class-mobility approach, allows us for example to pursue the Swift (2000) question about the relationship of change in transition probabilities to change in social conditions. However: (a) the fact of the changing proportions in the various class categories introduces problematical variations that have then to be somehow removed again before useful results emerge; and (b) there is the problem of exclusion or misrepresentation of the positions of those outside labour force—affecting estimates of women's positions in particular.

2. Non-symmetrical hybrid models deal with (b) but not with (a), so we move on straightforwardly to….

3. ….symmetrical quantile-grouped human capital models, with constant marginal distributions, which thus allow change to be disaggregated into just the transition and reward components. But the smaller the n of the ntiles, the less good the analysis, which means in turn we move to….

4. ….the continuous Gini approach, which emerge accordingly as the preferred form for intergenerational mobility analysis.

Nevertheless we are still at an intermediate stage in the development of the intergenerational mobility index. Two particular issues remain for discussion in the construction of the index—the choice of an appropriate counterfactual test of fairness, and an appropriate means of aggregating the arithmetic differences between the counterfactual and the actual expected values.

We also need to consider some familiar statistical issues, Do the differences in the indices really reflect differences in the population? A full treatment must await further development

of the indices – but a prior requirement will be establishing the strength and significance of the association between parents' and children's positions. An approach to regression modeling of intergenerational human capital mobility is set out in a parallel paper (ISER Working Paper 2002—xx).

Substantive

We have encountered two data problems. The under-measurement of unemployment in the earlier three birth cohorts probably leads to an underestimation of the very bottom of the human capital distribution. This means that differences between these and the fourth cohort should be treated with caution; however, the under-measurement applies both to men and to women, so to the extent that men's and women's patterns of inter-cohort change *differ*, the problem may be judged accordingly as less severe. And the absence of most of the evidence on maternal human capital means that the "parental endowment" approach must, though plainly correct in principle, be excluded from analysis of BHPS retrospective data (though the BHPS panel materials themselves will eventually be ideal for this purpose).

Nevertheless, even the preliminary Gini version of the index produces some important results. The first of the potential advantages of a human-capital-based positional indicator listed in Section 2, its comprehensiveness of coverage, does allow us for the first time[7] to make sensible statements about class-type social mobility for Britain—men *and* women—as a whole.

[7] This statement might be disputed by proponents of the Cambridge Scale on the grounds that it too may be considered a continuous indicator of social class (eg Blackburn and Prandy 1997). However, the two sub-scales for men and women cannot be combined, which would, in the absence of a joint ranking across the sexes, seem to imply in turn that a single index of inequality in intergenerational mobility combining both sexes is not possible through this means.

Table 13: Summary: Gini Indices of inter-generational mobility

(father's class/human capital when child age 14; child at ages 34-36)

Model	class categories	hybrid class / human capital	Human capital quintiles	human capital continuous
Women				
born 1925-34	0.13	0.14	0.17	0.19
born 1935-44	0.11	0.15	0.11	0.12
born 1945-54	0.12	0.14	0.10	0.15
born 1955-64	0.11	0.14	0.18	0.24
Men				
born 1925-34	0.05	0.07	0.05	0.08
born 1935-44	0.04	0.06	0.06	0.08
born 1945-54	0.07	0.08	0.07	0.08
born 1955-64	0.06	0.06	0.06	0.09

A summary of the various analyses is presented in Table 13. Three clear substantive conclusions emerge:

1. Women experience more inequality in intergenerational mobility than men do. Without exception, for all four birth cohorts and in all four different versions of the calculation, the women's Gini coefficient is comfortably larger than the men's.

2. The two symmetrical human capital versions of the intergenerational Gini index show women's mobility chances as become more unequal over the recent birth cohorts; this effect is masked in the two class-based indices, as a result of the growth in the size of the more advantaged classes

3. The two human capital-based indices show men's Ginis either changing irregularly or with small increases. As we saw in Table 12, the continuous human capital Gini score for both sexes combined increased from .07 for the 1935-44 birth cohort, to .09 for the 1945-54, and .15 for the 1955-64 cohort. Overall we conclude that intergenerational mobility in Britain is becoming less equal.

The first finding is an unremarkable, though easily forgotten, reflection of the central importance of work experience to the accumulation of human capital. If there are substantial class differences in the degree of women's labour force attachment, but not in men's, then

necessarily any measure that involves rewards from the labour market will show father-daughter mobility as producing more inequality than that from father to son.

The second finding (which in effect also drives the third) may be somewhat more surprising. This period has seen the growth of women's participation in the educational system to equal men's, and even a suspicion that women's overall educational attainment may now be higher than men's, as well as the growth of legislation supporting gender equality of opportunity. We might speculate that the reasons for finding 2 have to do with processes outside the workforce which influence the accumulation of human capita differentially for men and women, within partnerships, within marriages, and particularly after the birth of children. There is still an unequal gender division of domestic labour in households, even where partners are nominally in the same employment status (which is claimed to intensify as a result of marriage: Bittman and Pixey 2000); this reduces women's ability to accumulate human capital relative to men's. The continuing assumption of maternal responsibility for care of young children, coupled with the lack of services to support working mothers, and inappropriate temporal organisation of jobs, has a similar effect.

These factors, to continue the speculation, mean that in previous historical eras, with women mostly outside workforce, women had a low degree of inequality of intergenerational mobility chances, insofar as *most* women suffered downward mobility in human capital terms and as compared to their fathers. Now women with parents with high levels of human capital, are themselves differentially likely to acquire high initial levels of human capital derived from educational system. They can build on this by "buying in" domestic and childcare services that could not be afforded by women with lower levels of human capital, and hence accumulate further capital much faster than less well-endowed women who can only view their attachment to the labour market as secondary to their domestic role (for an empirical demonstration of this process see Joshi and Davis 2002). It is in the analysis of these processes that another previously-claimed practical advantages of the human capital approach comes into play. It allows us to examine how the succession of incremental life-course decisions cumulates into human capital change (see the Allerednic analysis in Gershuny 2000) and hence affects intergenerational mobility .

Note however that all of the foregoing discussion concerns calculations of opportunity distributions on the bases of individual-level financial rewards or expectations. But it may be rational for women to some degree to "trade" these individual expectations for a larger share of a *household's* financial rewards (eg by "marrying up", or by trading a diminution of their individual prospects as a result of household/domestic processes mentioned above, for larger share in husband's expected earnings). These can be investigated by replacing the individual-level rewards used in this paper, with individual share of household level resources – thus making use of the third practical advantage of the human capital measure, its aggregability from an individual to a household level

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