

THE PATH TO CONVERGENCE: INTERGENERATIONAL OCCUPATIONAL MOBILITY IN BRITAIN AND THE US IN THREE ERAS*

Jason Long and Joseph Ferrie

September 29, 2006

Abstract

Late nineteenth century intergenerational occupational mobility was higher in the US than in Britain. Differences between them in this type of mobility are absent today. Using data on 10,000 US and British father and son pairs followed over two intervals (the 1860s and 1870s, and the 1880s and 1890s), we examine how this convergence occurred. The US remained more mobile than Britain through 1900, but the difference fell over the last two decades of the nineteenth century (as British mobility rose) and was erased by the 1950s (as mobility fell by more in the US than in Britain).

JEL Classification: J62, N30

Page Proofs to: Joseph P. Ferrie
Department of Economics
Northwestern University
Evanston, IL 60208-2600

Email: ferrie@northwestern.edu

Pagehead title: "Path to Convergence: Mobility in Three Eras"

The belief that history was not destiny – that the careers of sons were not entirely determined by the careers of their fathers – was as pervasive in the nineteenth century US as it was absent in nineteenth century Britain. Social commentators writing from a wide range of perspectives saw the US as a place of unusually easy movement by sons out of the occupations of their fathers. They often contrasted this fluidity with the sclerotic social systems of Europe.¹ Recent research has shown that these views were indeed well-founded: the relationship between the occupations of sons in 1880-81 and those of their fathers in 1850-51 was considerably weaker in the US than in Britain after taking account of differences in the occupational structures of these two countries (Long and Ferrie, 2006).

The nineteenth century differences in mobility between Britain and the US contrast sharply with research comparing intergenerational occupational mobility among industrialized countries since the Second World War, for which there is now a voluminous literature.² Kerckhoff *et al.* (1985), like most comparisons between Britain and the US, use the Oxford Social Mobility Study (1972) for Britain and the second cohort of the OCG (1973) for the US. They conclude that there was “considerably more overall inter-generational and career mobility in the United States, but . . . the major differences between the two societies are due to shifts in the distributions of kinds of occupations.” (1985, p. 281). Examining a broader set of countries, Erikson and Goldthorpe (1992) also find the US and Britain roughly similar in intergenerational mobility, net of differences in the distributions of occupations across the two countries. Grusky and Hauser (1984) analyzed mobility in 16 countries including Britain and the US and reached similar conclusions.³ Solon (2002) and Björklund and Jäntti (2000) examined mobility in income across generations and found low rates of income mobility across generations in Britain and the US. Both countries had considerably less income mobility from fathers to sons than Canada, Finland, and Sweden.

How did we get from *there* (the second half of the nineteenth century, when the differences

between Britain and the US in mobility across generations were stark) to *here* (the second half of the twentieth century, when such differences have been largely erased)? In our previous work (Long and Ferrie, 2006), we examined only a single thirty-year interval for the nineteenth century (1850-80 for the US and 1851-81 for Britain). We have now constructed samples spanning two twenty-year intervals for the late nineteenth century (1860-80 and 1880-1900 for the US and 1861-81 and 1881-1901 for Britain), the same span as we have used for the twentieth century, making possible examination of trends in mobility in both countries, and in the differences between them, over nearly a century.

1. Data and Methods to Compare Mobility Over Time and Across Places

Though longitudinal data now exists to compare intergenerational occupational mobility across a variety of industrialized countries since the Second World War, until now there have been no comparable sources for comparing mobility in the past. We have taken advantage of two recent developments – the transcription of the entire British 1881 and US 1880 population censuses, and the indexing of the British census records for 1861 and 1901 and the US census records for 1860 and 1900 – to create such data.⁴

For example, we were able to locate in the 1861 British census the fathers of 1,454 males who were between the ages of 31 and 37 when they appeared in the 1881 British census. For 1881 to 1901, we matched 2,801 males from the 1881 British census to their sons who were between the ages of 31 and 37 when they appeared in the 1901 British census. For the US, we matched 2,632 sons age 33-39 when they appeared in the 1880 US census to their fathers in the 1860 US census, and 2,499 fathers from the 1880 US census to their sons who were age 33-39 when they appeared in the 1900 US census.⁵

With data on fathers and sons in hand, there remain two challenges to be overcome before

we can meaningfully compare intergenerational mobility over time and across places. The first is the choice of an appropriate metric: modern studies by economists tend to favor income or earnings, while several generations of work in sociology has focused instead on occupational categories. History has forced our hand here: census data on income or earnings at the individual level does not appear in the British and US censuses until the twentieth centuries. As a result, we are left with the self-reported occupations of fathers and sons as the one measure of economic status that appears in both our historical linked data and in the modern surveys to which we will compare historical mobility.

Though occupation is not an ideal measure – it captures considerably more dimensions of an individual’s circumstances than income or earnings – it is what we have. We have collapsed several hundred occupation titles into four broad categories: (1) white collar (professional and technical workers, as well as retail and clerical workers); (2) farm owners; (3) skilled and semi-skilled workers (craftsmen and factory operatives); and (4) unskilled workers (including farm labourers). Experimentation with larger numbers of categories (for example, splitting white collar into “high” and “low,” or separating the skilled and the semi-skilled) altered none of the substantive findings presented below (Long and Ferrie, 2006).

Our second challenge was determining how to measure intergenerational mobility.⁶ The categories cannot be unambiguously ordered according to income or earnings, so it is not possible to calculate an intergenerational correlation. The simplest alternative approach is to compare the occupational categories of fathers and their sons in a 4×4 matrix, and calculate the fraction of the observations in the off-diagonal cells. Such a measure, however, will be influenced by both the distribution of fathers’ and sons’ occupations (the marginal frequencies in the matrix) and by the underlying chances of making particular occupational transitions.

The influence of differences in marginal frequencies can be eliminated by standardizing two

matrices so they have the same marginal frequencies, which does not alter the fundamental association between the occupations of fathers and sons (Mosteller, 1968). For example, in comparing mobility from fathers to sons in the British 1861-81 linked data to mobility from fathers to sons in the US 1860-80 linked data, we can impose the US marginal frequencies for fathers and sons on the British data. The off-diagonal elements in the British data will now reveal how much mobility we would have seen if Britain had the same occupational structure as the US. The difference between this measure and the off-diagonal mobility in the original, unadjusted British data will reveal how much British mobility was the result of the Britain's occupational structure and how much was the result of the underlying exchange of one occupation for another between fathers and sons.

This is still somewhat unsatisfactory, however, as focusing on the off-diagonal elements but treating all moves identically discards a great deal of potentially useful information. An additional calculation can be performed to provide a more comprehensive measure of the association between the occupations of fathers and sons: the Altham statistic (Altham, 1970; Altham and Ferrie, forthcoming) provides a useful summary measure of the strength of the association between rows and columns in a two-dimensional table, as well as a measure of how the strength of that association differs between two tables. The Altham statistic is defined as the sum of the squares of the differences between the logs of the cross-product ratios in tables P and Q. For two tables which each have r rows and s columns, it measures how far the association between rows and columns in table P departs from the association between rows and columns in table Q:

$$d(P,Q) = \left[\sum_{i=1}^r \sum_{j=1}^s \sum_{l=1}^r \sum_{m=1}^s \left| \log \left(\frac{P_{ij}P_{lm}P_{li}P_{mj}}{P_{im}P_{lj}Q_{ij}Q_{lm}} \right) \right|^2 \right]^{1/2} \quad (1)$$

The metric $d(P,Q)$ tells us the distance between tables P and Q.⁷ A simple likelihood-ratio χ^2 statistic

G^2 (Agresti, 2002, p. 140) with $(r-1)(s-1)$ degrees of freedom can then be used to test whether the matrix Θ with elements $\theta_{ij} = \log(p_{ij}/q_{ij})$ is independent; if we can reject the null hypothesis that Θ is independent, we essentially accept the hypothesis that $d(P,Q) \neq 0$ so the degree of association between rows and columns differs between table P and table Q. The statistic does not tell us which table has the stronger association, but that can be determined by calculating $d(P,I)$ and $d(Q,I)$, which use the same formula as $d(P,Q)$ but replace one table with a matrix of ones. If $d(P,Q) > 0$ and $d(P,I) > d(Q,I)$, we can safely conclude that mobility is greater in table Q (i.e. mobility is closer in Q than in P to what we would observe under independence of rows and columns, in which the occupation of a father provides no information in predicting the occupation of his son).⁸

This differs substantially from common practice in sociology, where the estimation of log-linear models has dominated the empirical analysis of mobility since the 1960s.⁹ Our use of the Altham statistic has one distinct advantage over the log-linear approach: it provides a single summary mobility measure for each table, and for the difference in the association between rows and columns for two tables, that can be interpreted as a *distance*, making it considerably easier to make useful comparisons over time and across places that can be visually displayed. For example, for a single table P, the Altham statistic $d(P,I)$ reveals the distance from the association between rows and columns in P to the association between rows and columns in a table I in which rows and columns are independent. A larger Altham statistic indicates a table that has less mobility.

2. Intergenerational Mobility in Britain and the US Since the 1860s

Table 1 presents the raw data in the form of simple 4×4 matrices, with fathers' occupations across the columns and sons' occupations down the rows. Table 2 provides several summary measures of mobility, as well as tests of the null hypothesis that mobility does not differ across two tables. For the earliest data from both countries (Panel 1), the US displays somewhat more mobility

than Britain when measured as the percent off the main diagonal, a difference that persists even when the British occupational distribution is imposed on the US association between fathers' and sons' occupations and when the US distribution is imposed on Britain.

The Altham statistic for Britain in the 1861-81 data exceeds that for the US in the 1860-80 data, and we can reject the null hypothesis that the association between fathers' and sons' occupations does not differ. We cannot, however, reject the null hypothesis that this association is the same once we eliminate the diagonal elements. On this basis, it seems safe to conclude that nineteenth century commentators were justified in claiming that the US was a place of exceptional mobility across generations, at least compared to the world's other major industrial economy at the time. Furthermore, this difference remains (though diminished in magnitude) through the end of the nineteenth century: for the British 1881-1901 and US 1880-1900 samples (Panel 2), the Altham statistic is again lower (mobility is greater) in the US and the difference between British and US mobility is statistically significant. Though the raw mobility measures (M) diverge by more than they did in the earlier twenty year period, the difference is nearly eliminated if the British occupation structure is imposed on the US (M').

By the twentieth century (Panel 3), mobility differences between Britain and the US have narrowed in all respects: if either country's marginal frequencies are imposed on the other, the off-diagonal mobility measures lie within three percentage points of each other. More strikingly, the Altham measures are now closer in magnitude, and it is no longer possible to reject the null hypothesis that the association between father's and son's occupation differs between Britain and the US. This is consistent with much of the recent research by sociologists employing log-linear models of occupational categories, and by economists employing intergenerational income correlations.

The last two comparisons in Table 2 show the change over time within each country. In

Britain, mobility actually increases from the 1861-81 period to the post-Second World War period (Panel 4), while in the US it falls dramatically (Panel 5). For both countries, it is possible to reject the null hypothesis that the association between fathers' and sons' occupations did not change, though this is possible only at the 10% level in the British case.¹⁰ The path leading to this convergence is shown in Figure 1, which takes all of the possible pair-wise comparisons among the six datasets and exploits the interpretation of the Altham statistic as a distance measure: with the distances between the row-column associations in each pair of tables in hand, it is possible to provide a two-dimensional representation of the positions of each table relative to an arbitrarily-placed origin representing the row-column association for a table in which fathers' and sons' occupations are independent.¹¹ The picture painted in Figure 1 is one of modest net improvement in British mobility from the mid-nineteenth century, coupled with a substantial decline in US mobility over the same time.

3. Explaining the Convergence

In attempting to understand how mobility differs across places and over time, ideally, we seek explanations that are consistent with five facts we have established:

1. $\text{Mobility}^{19\text{th c. US}} > \text{Mobility}^{19\text{th c. Britain}}$
2. $\text{Mobility}^{19\text{th c. US}} > \text{Mobility}^{\text{late } 20\text{th c. US}}$
3. $\text{Mobility}^{\text{late } 20\text{th c. Britain}} > \text{Mobility}^{19\text{th c. Britain}}$
4. $\text{Mobility}^{\text{late } 19\text{th c. Britain}} > \text{Mobility}^{\text{early } 19\text{th c. Britain}}$
5. $\text{Mobility}^{\text{late } 20\text{th c. Britain}} \approx \text{Mobility}^{\text{late } 20\text{th c. US}}$

Economic theory provides some guidance in our search for causes. In a simple economic model of intergenerational mobility (Becker and Tomes, 1979, 1986), parents maximize an altruistic utility function subject to: their own income, the heritability of endowed characteristics, the technology transforming investment in their child into the child's human capital, the relationship between human capital and income for the child, and public investment (schooling) in the child. Solon (2004)

shows that the elasticity of child's income with respect to parent's income is

$$\beta = \frac{(1-\gamma)\theta\rho + \lambda}{1 + (1-\lambda)\theta\rho\lambda} \quad (2)$$

where γ is progressivity of public spending, θ is $\partial(\text{Human Capital})/\partial(\text{Investment})$, ρ is the earnings return to human capital, and λ is the heritability of characteristics. Mobility is lower (β is higher) when heritability of characteristics is greater, human capital investment is more productive, the earnings return to human capital is greater, and public investment in children is less progressive. Grawe and Mulligan (2002) and Han and Mulligan (2001) also show that mobility is lower where capital markets function poorly, and mobility is lower with more variance in ability.

Two of these stand out as plausible sources of differences across places and over time: (1) the progressivity of public investment; and (2) the productivity of investment by parents in their children. These factors seem to fit the observed pattern, in which mobility in nineteenth century Britain was substantially below that in the US, while the gap between them declined dramatically in the twentieth century as US mobility diminished dramatically and British mobility rose somewhat.

The scale of public investment in education in Britain and the US can be seen in Table 3. In the middle of the nineteenth century, the US was already enrolling nearly half of its school-age children in schools, compared to just over a sixth in England. Over the last quarter of the nineteenth century and the first decade of the twentieth, Britain closed this gap. Three institutional changes underlie British progress through the start of the twentieth century: (1) the Education Act of 1870 established school boards and mandatory, government-funded primary education; (2) the Education Act of 1880 set the minimum school leaving age to 10, and restricted school leaving up to age 13; and (3) the school leaving age was periodically raised thereafter, to age 14 by 1900. In the US, by

contrast, though public education was widely available by the start of the twentieth century, it remained a locally-controlled and locally-funded enterprise, resulting in fewer opportunities for progressive redistribution through the provision of greater educational resources to those whose parents could least afford to directly invest in their children.

Another noteworthy difference between the US and Britain is internal migration. Both Schultz (1961) and Becker (1964) suggested viewing migration as an investment. In the Becker and Tomes (1986) framework, changes in location undertaken by the family can produce occupational mobility just as investment by the family in the child's human capital. After childhood, the individual himself may undertake such investment to compensate for under-investment by a credit-constrained family or to take advantage of investment opportunities that were unavailable to the family because they did not yet exist or were overlooked by them.

Geographic mobility in the late nineteenth century was much higher in the US than in Britain (Long and Ferrie, 2006). In the British 1851-81 sample, 27 percent of sons crossed a county boundary over these three decades, while in the US 1850-80 sample, 62 percent did so.¹² In fact, in the US, men changed states over thirty years as often as men in Britain changed counties. Though the US experienced substantial improvements in transportation and flows of information from the third quarter of the nineteenth century to the third quarter of the twentieth, residential mobility rates actually fell. (Ferrie, 2005) This suggests that the return to mobility in the 1850-80 period must have been substantial – greater than in late nineteenth century Britain and greater than in the modern US.¹³

Residential mobility may have provided an alternative to direct investment in human capital. Kim (1998) has shown that regional specialization in the US increased through 1880, fell slightly through 1910, and then fell dramatically throughout the rest of the twentieth century. This raises the possibility that throughout the second half of the nineteenth century, differences in the economic

activities undertaken in different places left open another route to advancement: migration to places that were growing more rapidly than others. Some of these places of unusual opportunity were cities that sprang up initially to provide services demanded as the frontier expanded. For example, Chicago's population grew ten-fold in just the twenty years after 1850, then nearly tripled over the next two decades, providing a site of substantial opportunity. (Galenson, 1991) Though US labour markets were well-integrated at the regional level by the middle of the nineteenth century, at least within the North (Margo, 2000; Rosenbloom, 1996), differences across smaller units of geography may have continued to present opportunities for "locational arbitrage" that provided a route to occupational change through the start of the twentieth century.

4. Conclusions

Despite their superficial similarities in the late nineteenth century, Britain and the US were very different from one another in one important respect: once account is taken of differences in occupational structure, the US exhibited considerably more intergenerational mobility than Britain, as social commentators at the time noted. These differences, however, were largely erased by the second half of the twentieth century. Though our explanation remains speculative at this point, the timing of the convergence is broadly consistent with declines in two factors that should have favored greater US mobility in the nineteenth century: its more widely-available public education and its high rates of geographic mobility as settlement moved west and new cities and towns sprang up at a rapid rate. By the late twentieth century, the US no longer led Britain in educational availability, and the benefits of internal migration within the US in providing opportunity had substantially diminished.

Colby College

Northwestern University and NBER

References

Agresti, A. (2002). *Categorical Data Analysis*, New York: Wiley.

Altham, P.M. (1970). 'The measurement of association of rows and columns for an $r \times s$ contingency table', *Journal of the Royal Statistical Society, Series B*, vol. 32, pp. 63-73.

Altham, P.M., and Ferrie, J.P. (forthcoming). 'Tools for comparing tables of data cross-classified by two characteristics', *Historical Methods*.

Becker, G. (1964). *Human Capital*, New York: National Bureau of Economic Research.

Becker, G., and Tomes, N. (1979). 'An equilibrium theory of the distribution of income and intergenerational mobility' *Journal of Political Economy*, vol. 87(6) (December), pp. 1153-1189.

Becker, G., and Tomes, N. (1986). 'Human capital and the rise and fall of families', *Journal of Labor Economics*, vol. 4(3), pp. S1-S39.

Björklund, A., and Jäntti, M. (2000). 'Intergenerational mobility of socio-economic status in a comparative perspective', *Nordic Journal of Political Economy*, vol. 26(1), pp. 3-33.

Crafts, N.F.R. (1984). 'Economic growth in France and Britain, 1830-1910: a review of the evidence', *Journal of Economic History*, vol. 44 (March), pp. 49-67.

Erikson, R., and Goldthorpe, J.H. (1992). *The Constant Flux : A Study of Class Mobility in Industrial Societies*, Oxford: Clarendon Press.

Ferrie, J.P. (2005). 'The end of American exceptionalism? mobility in the US since 1850', *Journal of Economic Perspectives*, vol. 19 (Sept.), pp. 199-215.

Galenson, D.W. (1991). 'Economic opportunity on the urban frontier: nativity, work, and wealth in early Chicago', *Journal of Economic History*, vol. 51, pp. 581-603.

Grawe, N.D., and Mulligan, C.B. (2002). 'Economic interpretations of intergenerational correlations', *Journal of Economic Perspectives*, vol. 16 (Summer), pp. 45-58.

Grusky; D.B., and Hauser, R.M. (1984). 'Comparative Social mobility revisited: models of convergence and divergence in 16 countries', *American Sociological Review*, vol. 49 (Feb.), pp. 19-38.

Han, S., and Mulligan, C.B. (2001). 'Human capital, heterogeneity, and estimated degrees of intergenerational mobility', *ECONOMIC JOURNAL*, vol. 111 (April), pp. 207-243.

Hauser, R.M. (1980). 'Some Exploratory methods for modeling mobility tables and other cross-classified data', *Sociological Methodology*, vol. 11, pp. 413-458.

Historical Statistics of the United States (2006), New York: Cambridge University Press.

Kerkhoff, A.C., Campbell, R.T., and Winfield-Laird, I. (1985). 'Social mobility in Great Britain and the United States', *American Journal of Sociology*, vol. 91 (September), pp. 281-308.

Kim, S. (1998). 'Economic integration and convergence: US regions, 1840-1987', *Journal of Economic History*, 58(3) (September), pp. 659-683.

Long, J., and Ferrie, J.P. (2006). ‘“Everything in Common . . . But the Language”? Mobility in Britain and the US Since 1850’, mimeo, Northwestern University.

Margo, R.A. (2000). *Wages and Labor Markets in the United States, 1820-1860*, Chicago : University of Chicago Press.

Marx, K. (1852 [1978]). ‘The eighteenth brumaire of Louis Bonaparte’, in *The Marx-Engels Reader*, R. Tucker, ed., pp. 594-617, New York: Norton.

Marx, K. (1865 [1975]). ‘Value, price, and profit’, in K. Marx and F. Engels, *Works 1864–68*, vol. 20 of *The Collected Works of Karl Marx and Frederick Engels*, New York: International Publishers, New York.

Mill, J.S. (1848 [1909]). *Principles of Political Economy*, London and New York: Longmans, Green and Co.

Mosteller, F. (1968). ‘Association and estimation in contingency tables’, *Journal of the American Statistical Association*, vol. 63, pp. 1-28.

Rosenbloom, J. (1996). ‘Was there a national labor market at the end of the nineteenth century? new evidence on earnings in manufacturing’, *Journal of Economic History*, vol. 56, pp. 626-656.

Schultz, T.W. (1961). ‘Investment in human capital’, *American Economic Review*, vol. 51, pp. 1-17.

Solon, G. (2002). ‘Cross-country differences in intergenerational earnings mobility’, *Journal of Economic Perspectives*, vol. 16 (Summer), pp. 59-66.

Solon, G. (2004). ‘A model of intergenerational mobility variation over time and place’, in M. Corak, ed.,

Generational Income Mobility in North America and Europe, pp. 38-47, Cambridge: Cambridge University Press.

Sombart, W.(1906 [1976]). *Why Is There No Socialism in America*, translated by P. Hocking and C.T. Husbands, New York: M.E. Sharpe.

de Tocqueville, A. (1835 [1945]). *Democracy in America*, vol. 2, pp. 98-99, New York: Alfred A. Knopf, 1945.

Treiman, D.J., and Ganzeboom, H.B.G. (2000). 'The fourth generation of comparative stratification research', in S.R. Quah and A. Sales, eds., *The International Handbook of Sociology*, pp. 123-150, London: Sage.

Wong, R. (1990). 'Understanding cross-national variation in occupational mobility', *American Sociological Review*, vol. 55 (Aug.), pp. 560-573.

Xie, Y. (1992). 'The log-multiplicative layer effect model for comparing mobility tables', *American Sociological Review*, vol. 57 (June), pp. 380-395.

Yamaguchi, K. (1987). 'Models for comparing mobility tables: toward parsimony and substance', *American Sociological Review*, vol. 52 (Aug.), pp. 482-494.

Footnotes:

* We are grateful to the organizers and participants at the session on “What can we learn from comparisons of intergenerational mobility?” at the Royal Economic Society’s 2006 conference. Helpful comments were also provided by two anonymous referees.

1. French aristocrat Alexis de Tocqueville, in *Democracy in America* (1835 [1945], pp. 98-99), observed in the 1830s that “Among aristocratic peoples, families remain for centuries in the same condition and often in the same place. . . . Among democratic peoples [e.g. in the US], new families continually spring from nowhere while others disappear to nowhere and all the rest change their complexion.” John Stuart Mill, in *Principles of Political Economy* (1848 [1909], p. 393), painted a picture of mobility in Britain that was almost the mirror-image of de Tocqueville’s in its bleakness: “So complete, indeed, has hitherto been the separation, so strongly marked the line of demarcation, between the different grades of labourers, as to be almost equivalent to an hereditary distinction of caste; each employment being chiefly recruited from the children of those already employed in it, or in employments of the same rank with it in social estimation.” More radical observers, such as Karl Marx (1852 [1978], 1865 [1975]) and Werner Sombart (1906 [1976]), recognized similar differences between Britain and the US, and attributed at least part of the lack of acute class consciousness in the US to the ease with which sons could escape their father’s station in life.

2. Treiman and Ganzeboom (2000) survey research on comparative occupational mobility across generations.

3. Wong (1990), by contrast, finds greater mobility in Britain than in the US, and Yamaguchi (1987) finds the reverse.

4. A detailed description of the linkage process is provided in Long and Ferrie (2006). Though urban dwellers and those who were literate and higher in socioeconomic status, and those who were younger in the initial

year for the forward linkages (e.g. from 1881 to 1901 for Britain and from 1880 to 1900 for the US) were slightly more likely to be successfully linked, we have constructed weights that allow the linked data to mimic the marginal frequencies in the general population of all characteristics observable in the general population. None of the results that follow are altered by the imposition of these weights.

5. The age ranges were chosen to enhance comparability with the modern intergenerational mobility data for each country. The US census manuscripts with information on occupation exist for every tenth year in the span 1850-80 and 1900-30, while the British census manuscripts with information on occupation are available for every tenth year in the span 1841-1901. The only two long intervals over which fathers and sons can be matched for both countries, then, are 1860 or 1861 to 1880 or 1881 and 1880 or 1881 to 1900 or 1901. For comparability over time, we desired a similar span (twenty years) between fathers' and sons' occupations in the modern data. The Oxford Mobility Study reports the respondent's age in 1972 and the occupation of the respondent's father when the respondent was age 14. In order to produce a span between the report of the father's occupation and the report of the respondent's occupation that was on average twenty years, respondents who were age 31-37 in 1972 were selected. This, in turn, dictated the choice of ages in the terminal year (1881 or 1901) for the historical British data. The question on the occupation of the respondent's father in the 1973 US Occupational Changes in a Generation survey pertained to when the respondent was age 16. A twenty-year span on average between these observations was produced by selecting respondents who were 33-39 in 1973, which dictated the choice of ages in the terminal year (1880 or 1900) for the historical US data.

6. These issues are addressed in greater detail in Altham and Ferrie (forthcoming).

7. See Altham and Ferrie (forthcoming) for a discussion of the distance measure and test statistic, and for algorithms for their computation.

8. Contingency tables are often dominated by elements along the main diagonal (which in the case of mobility captures immobility or occupational inheritance), so we will calculate an additional version of $d(P,Q)$ to examine only the off-diagonal cells and see whether, conditional on occupational mobility occurring between fathers and sons, the resulting patterns of mobility are similar in P and Q. This new statistic will test whether P and Q differ in their proximity to “quasi-independence.” (Agresti, 2002, p. 426) For square contingency tables with r rows and columns, this additional statistic $d^i(P,Q)$ will have the same properties as $d(P,Q)$, but the likelihood ratio χ^2 statistic G^2 will have $[(r-1)^2-r]$ degrees of freedom.

9. See Hauser (1980).

10. Long and Ferrie (2006) provide additional comparisons (using thirty year intervals between fathers' and sons' occupations), and also conduct a variety of sensitivity analyses (for example, taking account of the fact that the US farm sector was still growing in absolute size through the end of the nineteenth century). They also perform a conventional log-linear analysis, calculating what Xie (1992) terms the “log multiplicative layer effect” and finding that this procedure, too, reveals substantially greater mobility in the US than in Britain in the nineteenth century.

11. In the same way, if we know the distances between each pair of cities in a country, it is possible to generate a reasonably accurate two-dimensional map even without knowing the absolute positions of cities in latitude and longitude.

12. British counties were roughly the same size on average as US counties.

13. It would be a mistake to attribute this high return directly to the presence of an open frontier in the nineteenth century US, however, for two reasons: (1) both residential and occupational mobility remained

high through 1910, fully two decades after the closing of the frontier; and (2) the frontier was never the destination for more than a small fraction of US internal migrants after 1850.

Table 1.
*Intergenerational Occupational Mobility in Britain and the US in Three Eras,
Males 31-37 (Britain) and 33-39 (US) in Terminal Year (frequencies)*

Terminal Year and Son's Occupation	Britain				US			
	Initial Year and Father's Occupation				Initial Year and Father's Occupation			
	White Collar	Skilled & Semi-			White Collar	Skilled & Semi-		
Farmer		Skilled	Unskilled	Farmer		Skilled	Unskilled	
A. 1881 (Britain) or 1880 (US)	1861				1860			
White Collar	86	13	116	37	115	233	115	39
Farmer	2	46	4	7	43	949	103	60
Skilled/Semiskilled	84	30	459	198	59	286	173	75
Unskilled	32	19	118	203	33	220	66	63
B. 1901 (Britain) or 1900 (US)	1881				1880			
White Collar	161	22	261	67	161	234	143	51
Farmer	5	48	14	16	27	658	58	43
Skilled/Semiskilled	135	72	1,020	440	61	276	252	95
Unskilled	45	26	223	246	34	243	84	79
C. 1972 (Britain) or 1973 (US)	1949-55				1950-56			
White Collar	174	11	206	38	595	144	539	164
Farmer	2	9	3	1	3	61	7	5
Skilled/Semiskilled	71	19	417	102	186	193	576	236
Unskilled	8	4	44	14	49	53	115	62

Table 2.
Summary Measures of Mobility in Britain and the US

Comparison and Terminal Year	M (1)	M' (2)	d(P,I) (3)	G ² (4)	d(Q,I) (5)	G ² (6)	d(P,Q) (7)	G ² (8)	d ⁱ (P,Q) (9)	G ² (10)
1. Britain 1881 (P) vs. US 1880 (Q)	45.4	38.2	28.31	401.29***	12.09	385.40***	17.62	92.02***	6.52	3.52
2. Britain 1901 (P) vs. US 1900 (Q)	47.3	48.5	23.05	456.04***	14.58	535.38***	10.00	41.67***	3.73	4.28
3. Britain 1972 (P) vs. US 1973 (Q)	45.3	53.7	24.03	168.39***	20.76	420.39***	7.88	7.51	7.44	2.36
4. Britain 1881 (P) vs. Britain 1972 (Q)	45.4	44.3	28.31	401.29***	24.03	168.39***	9.45	14.86*	8.05	1.96
5. US 1880 (P) vs. US 1973 (Q)	50.6	57.7	12.09	385.40***	20.76	420.39***	10.66	46.70***	3.54	3.19

Notes: M is total mobility (percent off the main diagonal), M' is total mobility using the marginal frequencies from the other table, G² is the likelihood ratio χ^2 statistic with significance levels *** < 0.01 ** < 0.05 * < 0.10. Degrees of freedom: 9 for columns (4), (6), and (8); 5 for column (10).

Table 3.
Public School Enrollment
as a Percentage of School-Age Population (percent)

	1850	1870	1890	1910
England	n.a.	16.8	38.5	54.2
US	47.2	48.4	54.3	59.2

Note: "School-Age" is 5-19 for England, and 5-20 for the US.
Sources: England: Crafts (1984, Tables 2 and 3); US: *Historical Statistics of the US* (Series Bc438).

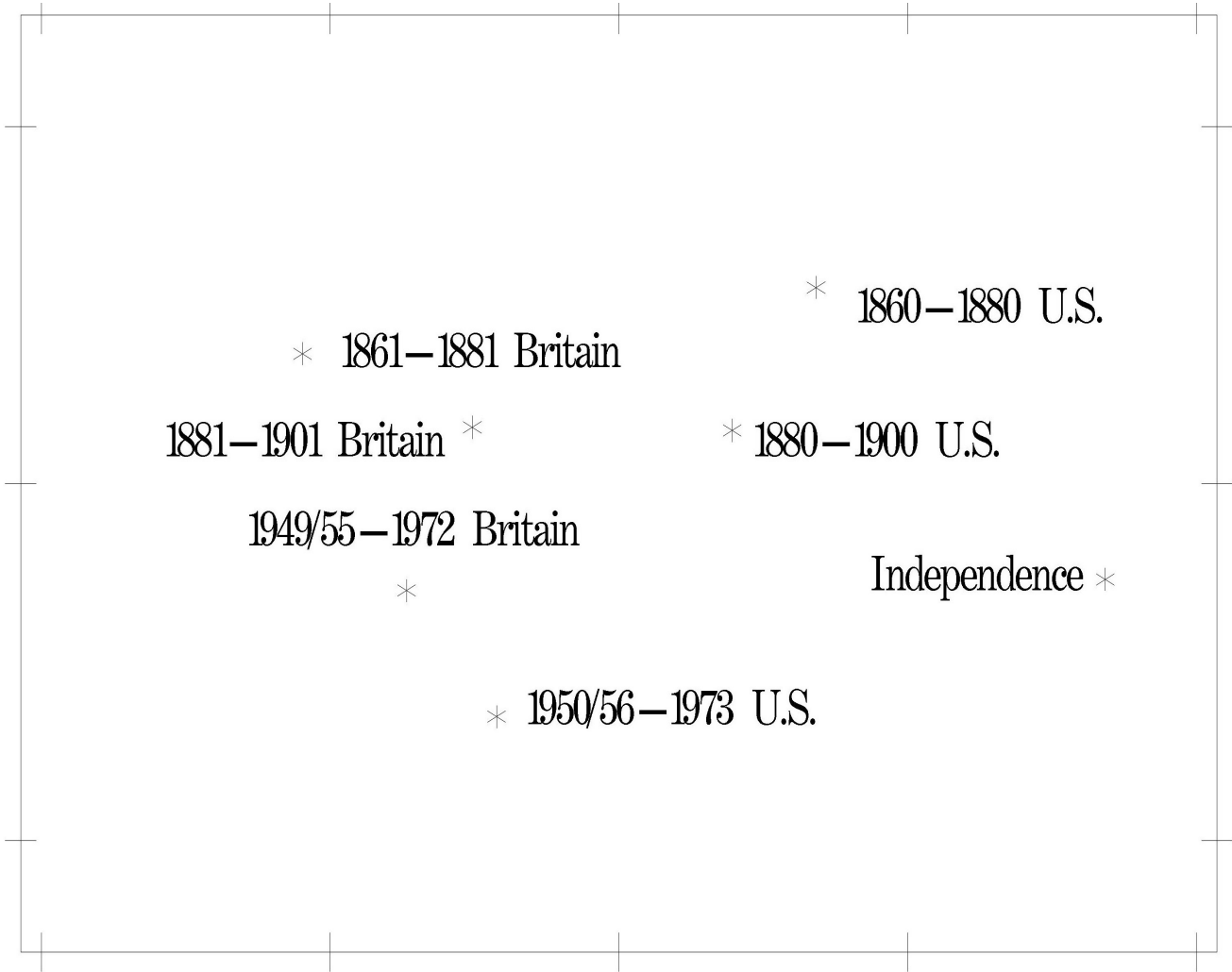


Fig. 1
*Two-Dimensional Representation of Intergenerational Occupational Mobility
in Britain and the US Since 1860 (Multidimensional Scaling Scores)*

