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Cohort size and earnings in Great Britain

Robert E. Wright

Department of Political Economy, Adam Smith Building, University of Glasgow, Glasgow, Scotland, G12 8RT, UK

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Abstract. Numerous studies in the United States have confirmed that individuals born into large cohorts, ceteris paribus, tend to have lower earnings on entry into the labour force compared to individuals born into small cohorts. On the other hand, only limited attention has been directed towards exploring the relationship between cohort size and earnings in other nations. This paper examines empirically the relationship between cohort size and male earnings in Great Britain. The data used is a time-series of cross-sections (1973–1982) constructed from the *General Household Survey*. Some support for the hypothesis that large cohorts have depressed earnings is found. However, this effect does not persist as the cohort ages.

1. Introduction

Numerous studies in the United States have confirmed that individuals born into large cohorts, ceteris paribus, tend to have lower earnings on entry into the labour force compared to individuals born into small cohorts (Ahlburg 1982; Alsalam 1985; Anderson 1982; Berger 1983, 1984, 1985, 1988; Freeman 1976; Murphy et al. 1988; Tan and Ward 1985; Welch 1979). However, there is still considerable debate concerning whether this earnings disadvantage persists throughout the life cycle (Berger 1985). On the other hand, only limited attention has been directed towards exploring the relationship between cohort size and earnings in other nations.[1] This is somewhat surprising given that most industrialised nations, like

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[1] The exceptions to this statement are studies for Canada (Dooley 1986), France (Riboud 1987), Israel (Ben-Porath 1988) and Japan (Martin and Ogawa 1988). Also see Bloom et al. (1987) for a cross-national comparison of cohort size effects.

the United States, have experienced significant changes in age structure due primarily to fluctuations in fertility rates (Calot and Blayo 1982; Wright 1989). The purpose of this paper is to contribute to the understanding of the economic consequences of changing age structure by examining empirically the relationship between cohort size and male earnings in Great Britain.

2. Cohort size and earnings: theoretical background

There are various mechanisms by which changes in cohort size may affect earnings. As Welch (1979) points out, it is useful to divide an individual's working life into two "career phases". The first is an inexperienced or "learning phase". The second is a senior or "experienced phase". In simple terms, individuals in the learning phase tend to be younger with less work experience while individuals in the senior phase tend to older and have more work experience. Younger inexperienced workers are *complementary* to older more experienced workers – the former assists the latter thereby gaining experience. As most economic activities use a mix of inexperienced and experienced workers in production, the productivity of older workers depends on the productivity of young workers and vice-versus.

The law of diminishing returns implies that an increase in the size of one group, relative to the other, will reduce its productivity relative to the other. For example, an increase in the number of younger workers relative to older workers will lower the productivity of younger workers but raise the productivity of older workers – there will be more inexperienced workers to assist more experienced workers. On the other hand, an increase in the number of older workers relative to younger workers will increase the productivity of younger workers but lower the productivity of older workers – there will be fewer inexperienced workers to assist more experienced workers. Therefore, if earnings are a positive function of productivity, ceteris paribus, one would expect changes in the number of younger workers relative to older workers to affect their relative earnings.

3. The British background

Figure 1 shows the trend in the total fertility rate (TFR) in Great Britain for the period 1920 to 1985. Even though, the long-run trend has been downwards, there have been major short-run fluctuations. Fertility declined sharply in the depression years of 1930s. In the post-war period, fertility increased and peaked twice – in 1947 and in 1964. Therefore, Britain is somewhat unique compared to other industrialised nations in the sense that there were two post-war "baby booms". However, after the 1964 peak, fertility plummeted, reaching a low in 1977. Even though, there was a upturn in fertility in the late 1970s, it was short-lived. In recent years, fertility has stabilised, with the TFR remaining around 1.70 – a rate well below the replacement level.[2]

The changes in the fertility rate shown in Fig. 1 have had a major impact on the age distribution of the British population of working age. There are various ways of describing such changes in age structure. For example, one can construct indexes of *relative cohort size* (RCS) which are usually based on the number of

[2] A TFR of 2.1 live births per woman is usually taken as the replacement level of fertility.

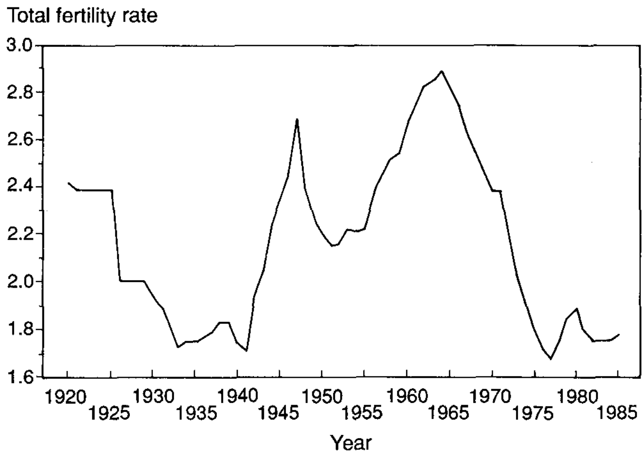

Fig. 1. Total fertility rate, Great Britain, 1920–1985

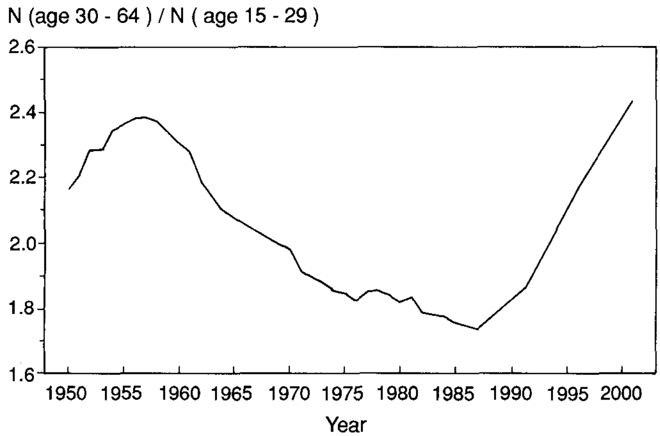

Fig. 2. Relative cohort size, Great Britain, 1950–2001

males of working age in the population. One such index is the ratio of the number of males age 30–64 to the number of males age 15–29 (i.e. N_{30-64}/N_{15-29}). This index is particularly useful for our purposes here, since it can be thought of as summarising changes in ratio of "older workers" to "younger workers".

This RCS index for the 1950 to 1985 period, and for a forecast for the 1985 to 2001 period (OPCS, 1989), is shown in Fig. 2. The trend confirms that there have been major changes in the age structure of the British population. More specifically, between 1960 and 1985, the trend in RCS was downwards. This suggests that throughout this period, there was a increase in the number of younger workers relative to older workers. However, in the 1990s this trend will reverse itself. In the immediate future, there will be a decrease in the number of young workers relative to older workers.

Ermisch (1988a, b) presents time-series evidence for Great Britain consistent with the hypothesis that cohort size depresses earnings. He constructs a measure of relative earnings defined as the ratio of the hourly wage rate of manual workers less than age 20 to workers over the age of 20. Cohort size is measured as the number of men of working age less than age 20 to the total number of men of working age. Based on time-series regression models and co-integration methods (1952–1979), Ermisch (1988a) estimates "long-run" cohort-size/relative wage rate elasticities in the area of −0.20. This suggests that a 10% increase in the number of young workers (less than age 20) would lower their relative wage rate by about 2%, supporting the hypothesis that cohort size depresses earnings. However, these estimates are based on a highly aggregate measure of relative earnings and refer only to manual occupations. It is not clear that age 20 is the relevant cutoff for defining inexperienced and experienced workers. Likewise, it is not clear that results based on manual occupations (which have declined in importance in Britain) are generalisable to other occupation groups. What is required is an examination of the relationship between cohort size and earnings using data at much lower levels of aggregation across a range of occupation classes, before more confident conclusions can be drawn.

4. Econometric evidence from earnings equations

In this section, age-aggregated earnings equations are estimated across homogeneous educational groups in order to examine empirically the impact that cohort size has on the earnings of British males. In these earnings equations a measure of cohort size is included as a "predictor", allowing one to see how differences in cohort size affects the "shape" of age-earnings profiles (see Pestieau 1989, pp 11–13).[3]

The method is based around a very simple model of earnings:

$$\ln \mathrm{E} = \alpha_0 + \alpha_1 \mathrm{Age} + \alpha_2 \mathrm{Age}^2 + \alpha_3\,\mathrm{CS} + \alpha_4\,\mathrm{CS}\cdot\mathrm{Age} + \beta X \ , \tag{1}$$

where E is earnings; Age is age; CS is a cohort size; and X is a vector of other (exogenous) factors thought to determine earnings. The signs and magnitudes of the parameters of Eq. (1) (particularly α_1, α_2, α_3 and α_4) provide information on how cohort size affects the shape of age-earnings profiles. Various possibilities are summarised in Fig. 3. Because earnings grow with age, but at a diminishing rate, we expect that $\hat{\alpha}_1 > 0$ and $\hat{\alpha}_2 < 0$. If follows that if cohort size does *not* have an effect on earnings then we would expect $\hat{\alpha}_3 = 0$ and $\hat{\alpha}_4 = 0$. That is, cohort size does not affect the shape of age-earnings profiles. This outcome is represented

[3] One could also examine how cohort size affects the shape of experience-earnings profiles. This is essentially the approach pioneered by Welch (1979). However, it is important to stress that Welch used imputed measures of work experience in his earnings equations, since estimates of actual work experience are *not* available in the *Current Population Survey* (i.e. work history data are not collected in this survey). It is well known that there are serious problems associated with using imputed estimates of work experience in earnings equations (see Wright and Ermisch 1991 for a detailed discussion). Since work history data are also not collected in the *General Household Survey*, the decision was made to focus on age-earnings profiles in order to avoid the problems of using imputed measures of work experience.

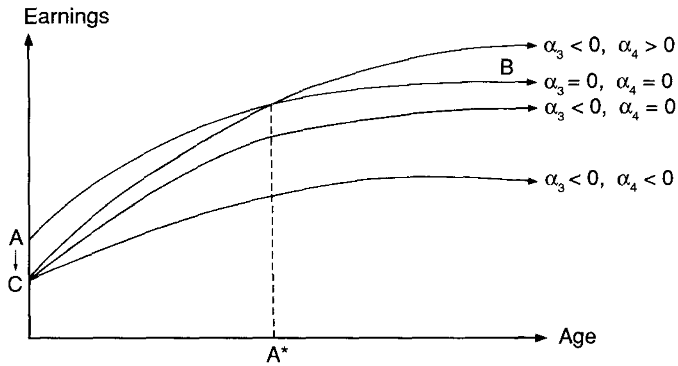

Fig. 3. Cohort size and age-earnings profiles

by the profile *AB* in Fig. 3. (It is also convenient to think of *AB* as representing the age-earnings profile of individuals born into "normal" size cohorts).

As discussed above, the expectation is that individuals born into large cohorts have lower earnings, ceteris paribus, on entry into the labour market. Since our model is in terms of age, this lower earnings on entry is analogous to lower earnings for young workers of large birth cohorts. If this is true then we would expect to find $\hat{\alpha}_3 < 0$. This depressed level of earnings is shown by the distance *AC* in Fig. 3. Information on how cohorts size affects earnings growth is given by $\hat{\alpha}_4$ – the parameter describing the interaction between cohort size and age. Three possibilities are shown in Fig. 3. If $\hat{\alpha}_4 = 0$ then cohort size has no affect on earnings growth. On the other hand, if $\hat{\alpha}_4 > 0$, then individuals born into larger cohorts have "faster" earnings growth. Therefore, their earnings actually overtakes the earnings of "normal" cohorts at some age. This overtaking or catch-up point is denoted by A^* in Fig. 3 – the point were the age-earnings profiles cross. Finally, if $\hat{\alpha}_4 < 0$ then individuals born into larger cohorts have slower earnings growth and the gap between their earnings and the earnings of "normal" size cohorts increases as the cohort ages.

4.1 Data

The data used in the analysis are from the *General Household Survey* (GHS), which is a yearly random sample of households in Great Britain carried out by the *Office of Population Censuses and Surveys* (for details see OPCS 1981). More specifically, a pooled cross-section of ten GHSs, covering the period 1973 to 1982 was used. This dataset was constructed by Bamford and Dale (1988).

The analysis is restricted to males in order to circumvent the problems that emerge when one is examining the determinants of female earnings due to the intermittent nature of female labour force participation (see Ermisch and Wright 1989; Wright and Ermisch 1991). As recently pointed out by Gustafsson (1990), the effect of cohort size on female earnings (and labour force participation) is an important topic that has not received much attention in economic research. Individuals below the age of 20 are excluded due to the likelihood that such households heads are not representative of all individuals in these young age groups. Likewise, due to potential selection bias resulting from the non-randomness of retirement decisions, individuals beyond the age of 50 are not included in the analysis (see Berger 1985). However, the effect of cohort size on retirement is another neglected area that needs to be considered. The self-employed were also excluded from the sample. Therefore, the sample consists of male household heads between the ages of 20 and 50 (inclusive) who are employed for salaries or wages.[4] The earnings variable is a weekly measure of earnings (see below).

The effect of cohort size on earnings likely differs by education level. It seems reasonable to assume that the gap between inexperienced and experienced workers is larger in occupations that are characterized by higher skill levels. Put another way, there is less scope for the substitution of younger workers for older workers in more skilled occupations. This suggests that the hypothesized negative effect that cohort size has on earnings should be larger in occupations that require more formal education due to this lower degree of substitutability. Therefore, three broad education levels based on formal qualifications received are defined and the sample is divided into each of these levels. The education levels are: (1) *None* – no qualifications beyond basic school leaving; (2) *Intermediate* – *O*-level(s), CSEs (i.e. *Certificate[s] of Secondary Education*), clerical and commercial qualifications, apprenticeships, foreign qualifications and other qualifications; and (3) *Higher* – *A*-level(s), nursing qualifications, technical certificates, teaching diplomas and university degree(s). It was felt that a more detailed breakdown of education levels would have too few cases in some of the age groups for reliable analysis. Furthermore, it is believed that these three groupings adequately capture the main differences in the British education system.

The individual-level observations are aggregated into means based on single-year age groups, the survey year and education group. For each of the three education levels, there are 31 age groups (i.e. age 20, 21, ..., 50) and 10 years of data (i.e. 1973, 1974, ..., 1982). Therefore, the "sample" across which the earnings equations are estimated is composed of 310 observations (i.e. 31 age groups X 10 years).

4.2 Econometric specification

The earnings equation estimated with the GHS data is of the form,

$$\begin{aligned}\ln \mathrm{E}_{it} = {} & \alpha_0 + \alpha_1 \mathrm{AGE}_i + \alpha_2 \mathrm{AGE}_i^2 + \alpha_3 \mathrm{CS}_{it} + \alpha_4 \mathrm{CS}_{it} \mathrm{AGE}_i \\ & + \alpha_5 \mathrm{PT}_{it} + \alpha_6 \bar{U}_t + \alpha_7 t + \alpha_8 t^2 + e_{it} \ , \end{aligned} \tag{2}$$

where AGE_i = age group i where $i = 0$ = age 20, 1 = age 21, ..., 29 = age 50; $\ln \mathrm{E}_{it}$ = mean of logarithmic weekly earnings of age group i in year t (1982 pounds sterling); CS_{it} = is the measure of cohort size of age group i in year t (see below); PT_{it} = percentage of age group i in year t that is employed part-time;[5] $\bar{U}_t$ = total male unemployment rate in year t (per cent); t = time trend where

[4] Since no imputation of earnings takes place in the GHS (unlike the American *Current Population Survey*), all individuals with missing earnings information were excluded from the sample.

[5] Part-time refers to working less than 30 hours per week or in the case of teachers less than 25 hours per week.

$1 = 1973$, $2 = 1974$, ..., $10 = 1982$; and e_{it} = error term assumed $N(0, \sigma^2/n_{it})$ where n_{it} is the number of observations in age group i in year t.

As earnings tend to increase with age, but at a diminishing rate, a quadratic age term is present in the equation. The inclusion of the interaction between age and cohort size allows for the possibility that the impact of cohort size on earnings varies over the life cycle. In the GHS dataset hours worked are not given so average hourly wage rates could not be calculated. Therefore, the percentage working part-time is included as a crude control for hours worked. The total unemployment rate is included as an indicator of the business cycle along with a time trend.[6] In an attempt to correct for the problem of heteroscedasticity, which usually accompanies grouped data, the regressions were weighted by the number of earners in each age-education-year cell (see Welch 1979).[7] The means and standard deviations for the regression variables are given in Appendix Table 1.

The cohort size measure CS_{it} is the (natural) logarithm of a weighted moving average of age group i's relative share of the potential labour force (i.e. age 16 to 64) in year t. More specifically,

$$CS_{it} = \ln\left(\sum_{k=-2}^{2} \omega_k N_{i-k,t} / \sum_{i=16}^{64} N_{it}\right), \tag{3}$$

where N_i denotes the number of individuals age i in year t. ω_k are a set of five inverted *V-weights* equal to 1/9, 2/9, 3/9, 2/9 and 1/9, respectively (see Welch 1979). The moving average implies that the earnings of a particular age group is affected by both the size of its own cohort and by the size of surrounding cohorts. The *V*-weights imply the degree of substitutability between workers of different ages declines the farther away, in terms of age, the surrounding cohorts are. Although the use of *V*-weights may seem arbitrary, they are a logical first-choice when one remembers that we have no a priori information that would help us pick a theoretically "correct" set of weights. Furthermore, they do ensure that the degree of substitutability between workers of different ages declines, which is a central theoretical feature that must be incorporated in any measure of cohort size.

It is important to note that this measure of cohort size is somewhat different to the one used by Berger (1985, 1988), Dooley (1986) and Welch (1979). In these studies, the cohort size variable is defined in terms of number of individuals with a certain level of education (e.g. high school graduates). That is, the terms $N_{i-k,t}$ and N_{it} in Eq. [2] are education-level specific. There are problems with such a measure. If education attainment is a function of cohort size, which seems likely (see Connelly 1986; Easterlin 1978, 1980), then a cohort size measure defined in terms of education attainment is not an exogenous variable. The bias that can result from estimating earnings equations with endogenous variables is well known. The measure of cohort size used here has the desirable property of being demographically determined, and therefore is exogenous (see Ermisch 1988a).

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6 In estimates not reported here t, t^2 and $\bar{U}$ where replaced by a dummy variable for each year. This more "flexible" specification of period effects led to a similar set of parameters for the included variables, suggesting that the results are not dependent on the specification of the time trend or on the inclusion/exclusion of the unemployment rate.

7 Despite the "crudeness" of this heteroscedasticity correction it appears to be effective. The results were found to be robust when other weighted-squares-like corrections were carried out. This suggests that the results are not dependent on the specifics of the estimator used.

4.3 Estimates

Table 1 reports the estimates of Eq. (1) for the three education levels. Turning first to the cohort size variables in the no qualifications equation, both the main effect (CS) and the cohort size-age interaction (CS·AGE) are not statistically significant at conventional levels. An *F*-test reveals that they can be excluded from the equation without significant loss of fit. It appears that changes in cohort size does *not* affect the earnings of British males with no qualifications beyond basic school leaving. This finding suggests two possible conclusions. The first is that individuals with no qualifications of different age are "perfect" substitutes. The second is that any labour market adjustment due to cohort size change has been through a change in the unemployment rate of this group of workers. The time-series studies of Ermisch (1988b) and Wells (1983) are consistent with this view.

In the two other equations, the cohort size and the cohort size-age variables are jointly significant. In both cases, the parameter of the cohort size variable is negative and the parameter of cohort size-age variable is positive. This indicates

Table 1. Parameter estimates of earnings equations, British males: 1973 – 1982

Education group	No qualifications	Intermediate qualifications	Higher qualifications
AGE	0.027 [1.16]	0.127 [2.76]	0.157 [3.15]
$AGE^2/1000$	−0.422 [4.68]	−0.541 [4.55]	−0.918 [6.82]
CS	0.181 [1.16]	−0.153 [1.83]	−0.351 [1.73]
CS·AGE	0.00251 [0.26]	0.0262 [2.04]	0.0284 [2.002]
PT	−0.00179 [0.90]	−0.00142 [0.67]	−0.00227 [1.56]
$\bar{U}$	−0.0182 [6.97]	−0.0143 [4.35]	−0.00681 [2.00]
t	−0.0119 [2.14]	−0.0367 [4.90]	−0.0456 [5.66]
t^2	0.00370 [6.19]	0.00534 [6.72]	0.00456 [6.06]
α_0	5.377 [9.49]	4.236 [5.99]	3.457 [4.66]
R^2	0.358	0.526	0.831
F	21.0	41.8	185.6
$\overline{\ln E}$	4.778	4.947	5.133
$\bar{E}$	119.22	141.63	173.40
N	310	310	310

Notes: Absolute value of *t*-statistics given in parentheses. The dependent variable is the logarithm of weekly earnings that larger cohort size does appear to depress earnings of "younger workers". Furthermore, this depressing effect is larger among individuals with higher-level qualifications compared to individuals with intermediate-level qualifications. The elasticity of earnings with respect to cohort size is: $\partial \ln E/\partial \ln CS = \alpha_3 + \alpha_4 AGE$. At age 20, the elasticity of earnings with respect to cohort size (α_4) is -0.15 for the intermediate qualifications group and -0.35 for the higher qualifications group (see Table 1). This finding is consistent with the view that in higher skill occupations there is less scope for the substitution of younger workers for older workers.

In both the intermediate and higher qualifications equations, the sign of the cohort size-age interaction is positive. This indicates that the negative effect that cohort size has on earnings diminishes as one gets older (gains more experience). In other words, the earnings disadvantage of being a member of a large cohort does not appear to persist over the life-cycle. Put another way, earnings tend to grow at a faster rate for individuals born into larger cohorts and at some point overtake the earnings of individuals born into smaller cohort. The "takeover point" (i.e. $-\alpha_3/\alpha_4$) is about age 26 for the intermediate qualifications group and age 33 for the higher qualifications group. Likewise, the earnings-cohort size elasticity evaluated at age 40 are all very positive: for the intermediate qualifications group the elasticity is $+0.37$ and $+0.22$ for the higher qualifications group.

This finding is in agreement with what Welch (1979) found for the United States and Dooley (1986) found for Canada. However, it needs to be qualified. As Alsalam (1985) points out, the impact that cohort size has on earnings over the life cycle depends on the size of cohorts preceding and following. Individuals born in the late 1950s, the "start" of the second British baby boom (see Fig. 1), entered the labour force in the mid-1970s. They are likely to find that the negative earnings effect of cohort size diminishes as they age because the large cohorts that follow increase their productivity and earnings. As the data used in this paper cover the 1973–1982 period, and therefore refer to individuals entering the labour force in the 1970s, our findings are consistent with the view. However, individuals born in the mid-1960s, the peak of the baby boom, started entering the labour force in the mid-1980s. It is not unreasonable to assume that the negative effect of cohort size on earnings may actual *increase* as this cohort ages. They are followed by small cohorts which is likely to decrease their productivity and earnings.

Turning to the remaining variables, across all three education levels, concave age-earnings profiles are observed. At the cohort size mean (see Appendix Table 1), the estimates indicate that the earnings peak at around age 32, 48 and 49 for individuals with no qualifications, intermediate qualifications and higher qualifications, respectively. As expected, the part-time hours variable (PT) has a negative sign. However, it is only significant in the higher qualifications equation. The unemployment rate variable ($\bar{U}$) is highly significant in all three equations with the expected negative sign. However, the negative effect that unemployment exerts on earnings is smaller at higher levels of education. This suggests that the earnings of individuals with lower qualifications (lower skilled occupations) are more responsive to short-run labour market conditions, such as swings in the business cycle. Finally, the time trend (t and t^2), indicates a U-shaped pattern. The parameters of these terms indicate that earnings were depressed in the early period over which our data refer to. It is unclear why this is the case, but it could be associated with the recession brought about by the "oil price shocks" of early

1970s – a short-run wage depressant perhaps not picked up by changes in the total unemployment rate.

5. Concluding comments

This paper has examined the relationship between cohort size and male earnings in Great Britain. Age-aggregated earnings equations were estimated across three education levels using data from the *General Household Survey* covering the period 1973 to 1982. Evidence in support of the hypothesis that large cohorts have depressed earnings was found among individuals with educational qualifications beyond basic school leaving. This earnings disadvantage was found to be larger for individuals with more education but does not appear to persist over the life cycle. These findings are broadly consistent with what Welch (1979) found for the United States and with what Ermisch (1988a, b) found in his time-series analysis of British data.

Appendix Table 1. Means [and standard deviations] of variables included in earnings equations, British males, 1973–1982

Education group	No qualifications	Intermediate qualifications	Higher qualifications
AGE	17.913 [8.024]	16.655 [8.180]	14.252 [7.783]
AGE^2	385.0 [279.2]	311.8 [267.3]	263.5 [248.7]
CS	−3.792 [0.109]	−3.767 [0.114]	−3.746 [0.114]
CS·AGE	−68.63 [31.71]	−59.75 [32.30]	−54.10 [30.75]
PT	1.671 [1.817]	1.656 [2.165]	3.460 [3.494]
$\bar{U}$	6.833 [3.396]	7.150 [3.419]	7.648 [3.646]
t	5.076 [2.829]	5.409 [2.774]	5.867 [2.782]
t^2	33.746 [30.911]	36.929 [31.059]	42.136 [32.110]

Notes: Weighted by the number of earners in each age-education cell (see text)
Source. General Household Survey Timeseries Database

References

Alburg D (1982) The new Kuznets cycle: a test of the Easterlin-Wachter-Wachter hypothesis. Res Popul Econ 4:93–115

Alsalam N (1985) The effect of cohort size on earnings: an examination of substitution relationships. University of Rochester Center for Economic Research Working Paper No. 21, Rochester, New York

Anderson J (1982) An economic-demographic model of the US labor market. Res Popul Econ 3:117–153

Bamford C, Dale A (1988) General household survey time series 1973–1982. Department of Sociology, University of Surrey, Guildford, UK

Ben-Porath Y (1988) Market, government, and Israel's muted baby boom. In: Lee R, Arthur W, Rodgers G (eds) Economics of changing age distributions in developed countries. Oxford University Press, Oxford, pp 12–38

Berger M (1988) Black-white earnings ratios: The role of cohort size. Econ Lett 26:285–290

Berger M (1985) The effect of cohort size on earnings: A reconsideration of the evidence. J Polit Econ 93:561–573

Berger M (1984) Cohort size and the earnings of young workers. Indust Labor Relat Rev 37:582–591

Berger M (1983) Changes in labor force composition and male earnings: A production function approach. J Hum Resources 18:177–196

Bloom D, Freeman R, Korenam S (1987) The labour-market consequences of generational crowding. Eur J Popul 3:131–176

Calot G, Blayo C (1982) Recent course of fertility in Western Europe. Popul Stud 36:349–372

Connelly R (1986) A framework for analyzing the impact of cohort size on education and labor earnings. J Hum Resources 21:543–562

Dooley M (1986) The overeducated Canadian? Changes in the relationship among earnings, education, and age for Canadian men: 1971–1981. Can J Econ 14:142–159

Easterlin R (1980) Birth and fortune: The impact of numbers on personal welfare. Basic Books, New York

Easterlin R (1978) What will 1984 be like? The socioeconomic implications of recent twists in age structure. Demography 15:397–432

Ermisch J (1988a) Fortunes of birth: The impact of generation size on the relative earnings of young men. Scott J Polit Econ 35:266–282

Ermisch J (1988b) British labour market responses to age distribution changes. In: Lee R, Arthur W, Rodgers G (eds) Economics of changing age distributions in developed countries. Oxford University Press, Oxford, pp 76–86

Ermisch J, Wright R (1989) Differential returns to human capital in full-time and part-time employment: the case of British women. Discussion Paper 88-14. Department of Economics, Birkbeck College, London

Freeman R (1976) The effects of demographic factors on age-earnings profiles. J Hum Resources 14:289–318

Gustafsson S (1990) Cohort size and female labor supply. Centre for Economic Policy Research Discussion Paper No. 384, London

Martin L, Ogawa N (1988) The effect of cohort size on relative wages in Japan. In: Lee R, Arthur W, Rodgers G (eds) Economics of changing age distributions in developed countries. Oxford University Press, Oxford, pp 59–75

Murphy K, Plant M, Welch F (1988) Cohort size and earnings in the United States. In: Lee R, Arthur W, Rodgers G (eds) Economics of changing age distributions in developed countries. Oxford University Press, Oxford, pp 39–58

Office of Population Censuses and Surveys (1989) OPCS Monitor. PP2 89 No. 1. HMSO, London

Office of Population Censuses and Surveys (1981) The General Household Survey. HMSO, London

Pestieau P (1989) The demographics of inequality. J Popul Econ 2:3–24

Riboud M (1987) Labour market response to changes in cohort size: the case of France. Eur J Popul 3:359–382

Tan H, Ward M (1985) Forecasting the wages of young men: the effects of cohort size. Report No. R.3115-Army, RAND Corporation, Santa Monica CA

Welch F (1979) Effects of cohort size on earnings: The baby boom babies financial bust. J Polit Econ (Suppl) 87:S65–S97

Wells W (1983) The relative pay and employment of young people. Research Paper No. 42. Department of Employment, London

Wright R (1989) The Easterlin hypothesis and European fertility rates. Popul Dev Rev 15:107–122

Wright R, Ermisch J (1991) Gender discrimination in the British labour market: a reassessment. Econ J 101:508–522