NO CAN DO?: A TEST OF THE TEXTBOOK MODEL OF LABOR MARKETS

MAARTEN GOOS*
FACULTY OF ECONOMICS AND APPLIED ECONOMICS
K.U.LEUVEN

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Abstract

This paper first provides a twofold test of the Card and Lemieux [2001] hypothesis that variation in college attainment growth rates can have a substantial impact on cohort specific returns to college. Most importantly, this study exploits Britain's expansion of its higher education system between 1988 and 1994 to show that the recent increase in college attainment growth rates has decreased college premiums for Britain's youngest workers. This is in line with the predictions from an adverse supply shock in a simple aggregate model of relative demand for and supply of college labor. Moreover, this paper conjectures that a simple demand-supply model can go a substantial distance towards explaining the variation in the UK economy-wide average return to college and overall wage inequality.

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I. Introduction

Figure I plots the fraction of articles published in the *Journal of Labor Economics*, the leading field journal for labor economists, in which the word "demand" or "supply" features at least once in either the abstract (left axis) or the full text (right-axis). For example, in 1983 the word "demand" or "supply" occurred at least once in 20 percent of all abstracts whereas in 2001, it only did in 10 percent of all papers. Searching the full-text documents learns that in 1983, 93 percent of all articles mentioned "demand" or "supply" at least once whereas in 2001, "demand" or "supply" was never mentioned in more than one out of five articles.

Given the downward trend in the use of "demand" and "supply", a natural question to ask is whether labor markets have become increasingly more complex such that the simple demand-supply model is no longer appropriate or whether attention has diverted away from the textbook model of labor markets for some other reason. In light of this question, this paper argues it is not the end of the textbook model as we know it and shows that a simple aggregate demand-supply model can go a substantial distance towards explaining recent changes in employment and wages.

In particular, this paper builds on existing work by Card and Lemieux [2001] (CL) who use the UK General Household Survey (GHS) between 1975 and 1996 to argue persuasively that, for cohorts born between 1955 and 1970, there was a slowdown in the growth of college attainment. In line with a simple demand-supply model, they then show that the decrease in the relative supply of college graduates for cohorts born between 1955 and 1970 lead to an increase in college premiums for these workers.

This paper first provides a twofold test of the CL hypothesis. Making use of the GHS between 1975 and 2003 (rather than 1996), it is examined whether the college premium for older workers increases as cohorts born between 1955 and 1970 move into the older age brackets in our sample. Moreover, this paper examines whether Britain's recent expansion of its higher education system between 1988 and 1994 has decreased college premiums for cohorts born after 1970. In line with the CL hypothesis, it is shown that changes in the relative supply of college workers can have a substantial impact on the cohort specific college premiums.

Finally, this paper provides some conjectures about the predictive power of the simple demand-supply framework in explaining changes in the overall college premium and overall wage inequality. It argues that a substantial part of the variation in the economy-wide average return to college and wage inequality can be captured by a simple aggregate model of relative demand for and supply of college labor.

The remainder of this paper is organized as follows. Section II contains a textbook model of aggregate labor demand and supply. Section III examines the impact of cohort specific college attainment rates on cohort specific returns to college in a number of ways. Finally, Section IV analyzes how much of the change in the overall average college premium and wage inequality can be explained by a simple demand-supply model. The final section concludes.

II. A Textbook Model of Labor Demand and Supply

Assume aggregate production in period *t* takes the following CES form:

$$(1) \qquad Y_t = \left(\theta_{ht} H_t^{\rho} + \theta_{ct} C_t^{\rho}\right)^{1/\rho}$$

where θ_{ht} and θ_{ct} are technological efficiency parameters (assumed to be time specific) and where $-\infty < \rho \leq 1$ is a function of the elasticity of substitution ($\rho = 1 - 1/\sigma_E$) between high school (H_t) and college graduates (C_t) in production.

If younger and older workers with the same education are not perfect substitutes in production, H_t and C_t represent CES aggregates given by

$$(2) \qquad H_t = \left[\sum_j \alpha_j H_{jt}^{\eta}\right]^{1/\eta} \text{ and } C_t = \left[\sum_j \beta_j C_{jt}^{\eta}\right]^{1/\eta}$$

where α_j and β_j are age-specific relative efficiency parameters and where $-\infty < \eta \leq 1$ is a function of the elasticity of substitution ($\eta = 1 - 1/\sigma_A$) between high school or college graduates of a different age.

Efficient utilization of different skill groups then requires that the relative wages of college workers equal their relative marginal product within each age-year group. Writing the mean wage of high school and college workers of age *j* at time *t* as W_{jt}^h and W_{jt}^c respectively, one obtains the following estimable equation:

$$\text{(3)}\quad \log(\frac{W_{jt}^c}{W_{jt}^h}) = -\log(\frac{\beta_j}{\alpha_j}) + \log(\frac{\theta_{ct}}{\theta_{ht}}) + \left[(\frac{1}{\sigma_A}) - (\frac{1}{\sigma_E}) \right] \log(\frac{C_t}{H_t}) - (\frac{1}{\sigma_A}) \log(\frac{C_{jt}}{H_{jt}}) + \varepsilon_{jt}$$

The second term on the right-hand side of (3) reflects changes in the relative efficiency of college labor such as skill-biased technological change, globalisation or other relative demand shocks. The third term accounts for changes in the aggregate relative supply of educated labor over time whereas the fourth term reflects the importance of age-year specific variation in the relative supply of college graduates (relative to changes common across age groups) and its coefficient thus measures the imperfect substitutability between workers of a different age. The final term reflects sampling error.

Assuming that the relative supply of skilled labor is fixed at any point in time, equation (3) can be seen as analysing the importance of aggregate changes in the relative demand for and supply of college workers. For example, in the less general case of perfect substitution between workers of different age, $\eta = 1$ and the CES aggregates in(2) are just the sum of workers across age groups. In this case, σ_A is not finite and (3) simplifies to:

$$\text{(3)'}\quad \log(\frac{W_t^c}{W_t^h}) = \log(\frac{\theta_{ct}}{\theta_{ht}}) - \frac{1}{\sigma_E} \log(\frac{C_t}{H_t}) + \varepsilon_t$$

where the first term on the right-hand side of (3)' reflects changes in the relative demand for college labor and the third term accounts for changes in the relative supply of skilled labor over time. Based on equation (3)', Figure II graphically summarizes what would happen to the average college premium in case an increase in the relative demand for college labor driven by skill-biased technological change and a decrease in the relative supply of college workers.

III. The Contraction and Expansion of Higher Education in Britain

The continuous increase in the college-high school wage gap together with the relative increase in educated labor over the past twenty-five years has made many to believe that a secular increase in the relative demand for educated workers can go a substantial distance towards explaining college premiums (see Author, Katz and Kearney [2004] for the most recent overview of a very large literature). Though much less little attention has been given to the importance of changes in the relative supply of college workers, one notable exception is Card and Lemieux [2001] (CL). Based on the simple demand-supply framework captured by (3), CL use the UK General Household Survey (GHS) between 1975 and 1996 to argue that college premiums for cohorts born between 1955 and 1970 are higher due to a slowdown in the growth of educational attainment between 1973 and 1988.[1]

[1] If college attainment rates are increasing at a constant rate, the relative supply of college workers by age-year groups would increase proportionately over time. If this would be the case, all the variation in college premiums would be captured by just a time trend. Equation (3) thus provides a test for the importance of any *acceleration* or *deceleration* in educational attainment

To see this, Figure III documents the fraction of higher education graduates by birth cohort pooling all GHS samples from 1975 to 2003. The group of college graduates consists of all workers with a college degree or a diploma from a professional institution below degree level but above GCE 'A' level standard. In contrast, the group of high school graduates consists of those whose highest qualification is any number of 'A'- or 'O'-levels, apprenticeships or workers with no qualifications. Relative supply measures are constructed by summing up usual weekly hours worked by all male workers. The Data Appendix provides more detailed information on how the relative supply of college graduates is measured consistently over time.

Figure III reflects the sharp and sudden changes in educational attainment growth rates in the UK for different birth cohorts. First, as already documented by CL using the 1975-1996 GHS, there was a slowdown in the inter-cohort trend of increasing educational attainment starting with cohorts born just after 1955 and up to 1970. Second, Figure III also shows the recent expansion in Britain's higher education system between 1988 and 1994, corresponding to higher college attainment growth rates for cohorts born between 1970 and 1976. According to Walker and Zhu [2005], the recent expansion of higher education followed the removal of quotas on student numbers and the payment from central government for teaching each student, encouraging institutions to expand student numbers.

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if part of the variance in the relative supply of college workers by age-year cells is driven by differences in cohort attainment growth rates. This model thus shows that it is not just the level of educational supply that matters but also its rate of change.

The inter-cohort differences in educational attainment growth rates shown in Figure III imply that the relative supply of college graduates might differ systematically by age. To see this more clearly, Figure IV plots the residuals from a regression of the log difference between hours worked by higher education graduates and high school graduates onto a set of dummies for age group and year group fixed effects. Residual relative supply of workers aged 26-30 started to decrease in the early 1980's following the slowdown in college attainment growth rates for cohorts born just after 1955. The decrease in the relative supply of workers aged 26-30 continued up to about 1995 when cohorts born in the early 1970's enter the sampling frame. Interestingly, the relative supply series for the youngest workers increased again between 1995 and 2003 following the expansion of Britain's higher education system. Finally, also the relative supply series for other age groups shows twisting consistent with the variation shown in Figure III as the slowdown in educational attainment for cohorts born between 1955 and 1970 runs through the age bands up to the age of 46-50.

The remainder of this section provides a further test of the simple demand-supply model captured by equation (3) and differs from CL in two important ways. First, it allows cohorts born between 1955 and 1970 to grow older and therefore to relatively increase the college premium for older age groups too. Second, Britain's expansion in its higher education system between 1988 and 1994 possibly decreases college premiums for cohorts born between 1970 and 1976.

III.A. Cohort effects in the returns to college

Table I tabulates college-high school wage gaps by age groups and year groups. The table entries are estimates of the difference in mean log weekly wages between men with a college degree versus those with any A-level or O-level qualification. Each year group contains a rolling age group and regressions for each age group within each year group include a linear age term and a dummy for which GHS sample the data are drawn from.[2] The Data Appendix contains more details about how the relative earnings measures have been constructed.

The entries in Table I provide a variety of information. First, comparisons down a column of the table show the change in the college premium for any given age group over time. Generally, relative wages for higher educated workers fell in the late 1970s and early 1980s before showing an increase from the 1980s onwards except for periods of relative stagnation in the early 1990s and early 2000s. Comparisons across the rows of Table I reveal the age profile of the college-high school wage gap at any point in time. As would be expected from the human capital literature (predicting that higher education graduates need to be on steeper earnings profiles), there seems to be evidence for a persistent concave relative age-earnings profile.

[2] By rolling age group is meant that, for example, for year group *(t-2)-(t+2)* workers aged 24 to 58 are used in *(t-2)*, workers aged 25 to 59 in *(t-1)*, workers aged 26 to 60 in *t*, workers aged 27 to 61 in *(t+1)* and workers aged 28 to 62 in *(t+2)*.

However, given the evidence presented in Figures III and IV, it is unlikely that all the variation in college premiums by age-year cells will be captured by age and year fixed effects only. One way to look for the importance of changes in inter-cohort trends in educational attainment is to directly decompose the variation in relative earnings into age group, year group and cohort fixed effects. More formally, one can use the following regression equation:

$$(4) \qquad \log(W_{jt}^{c} / W_{jt}^{h}) = A_j + B_t + D_{t-j} + e_{jt}$$

where A_j and B_t capture age group and year group fixed effects respectively and where D_{t-j} is the product of a vector of year-of-birth dummies and their coefficients. The final term reflects sampling error.

Table II presents point estimates for year group and cohort coefficients using (4). The first two columns restate the results reported in CL. The first specification only uses cohorts born before 1950 and includes nothing but age and year fixed effects. The reported year effects show a decline in the college premium in the late 1970s and relative stability thereafter. The second column fits the data for all cohorts available up to 1996 but restricts cohort effects to be the same for those born before 1950 to allow for identification. It is clear from a comparison between the first and second column that the slowdown in educational attainment growth rates for cohorts born after 1950 goes some distance towards explaining variation in college-high school wage gaps across age-year cells. The third and fourth columns aim to replicate the CL findings using the more recent 1975-2003 GHS. The reported coefficients on the cohort dummies and their standard errors are very similar indeed.

Given the expansion of higher education in Britain between 1988 and 1994, an additional test of the simple demand-supply model given by (3) is to see whether cohorts born between 1970 and 1976 have lower returns to college. To this end, the final column of Table II includes data on all available cohorts. Remarkably, relative wages for the youngest cohorts are about fifty percent lower than for cohorts born a decade earlier. Also note that the coefficients for cohorts born between 1955 and 1970 are similar to those in column four despite the fact that column five allows these cohorts to affect older age bands too through the inclusion of more recent GHS sampling years. If anything, this is evidence in support of the simple demand-supply model outlined above.

III.B Estimating the substitutability between cohorts

Equation (3) can be simplified to

$$\log(W^{c}_{jt} / W^{h}_{jt}) = E_j - F_t - (1/\sigma_A)\log(C_{jt} / H_{jt}) + \mu_{jt} \quad (5)$$

where E_j is the product of a vector of age group dummies and their coefficients and where F_t captures changes in aggregate relative demand or supply. The third term reflects the importance of age-year group specific variation in identifying a finite elasticity of substitution between workers of a different age. The final term reflects sampling error.

The first column of Table III replicates the point estimates found in CL reporting an elasticity of substitution of about 4 (1/0.233). The second column aims to reproduce this result using the 1975-2003 GHS and finds an almost identical estimate for σ_A. The final column of Table III further includes sampling years 1996 to 2003. Just as in Section *III.A*, the use of more recent sampling years provides a twofold test of the CL hypothesis. First, it allows cohorts born between 1955 and 1970 to grow older and therefore to relatively increase the college premium for older age groups too. Second, Britain's expansion in its higher education system between 1988 and 1994 possibly decreases college premiums for cohorts born between 1970 and 1976. Accounting for both, the final column of Table III finds an estimated partial elasticity of substitution between different age groups of about 5 (1/0.210) which is remarkably similar to estimates derived from the first and second column.

In sum, it is intuitive to think that young college graduates are more suited to doing certain tasks relative to older college graduates. But what is remarkable is that differences in inter-cohort trends in the relative supply of educated labor seem to go a substantial distance towards explaining college premiums by age-year groups.

IV. The Average College Premium and Wage Inequality

Figure V uses the 1975-2003 GHS to illustrate the well documented decrease in wage inequality during the late 1970s and its subsequent increase during the 1980s in the UK. Figure V also shows a similar pattern for the overall average college premium. This section will therefore examine the proximate question what part of the increase in the average college premium and therefore wage inequality during the 1980s can be attributed to the simple model estimated in the previous section.

Pooling observations into age and year groups as in the previous section, Figure VI plots the average college premium across age groups over time. That is, the solid line in Figure VI is given by

$$(6) \qquad \log(W_t^c / W_t^h) = \sum_j s_{jt} \log(W_{jt}^c / W_{jt}^h)$$

where s_{jt} is the fraction of all workers aged j at time t. In line with the estimated college premiums in Figure V, also this approach shows a sharp increase in the college premium after 1978-1982.

The dashed line in Figure VI consists of the predicted college premium in any given year using (5) and the full sample. More specifically, the plotted predicted wage gap for any year group t is given by:

$$(7) \qquad \hat{\log}(W_t^c / W_t^h) = \sum_j s_{jt} \hat{\log}(W_{jt}^c / W_{jt}^h)$$

with

$$(8) \qquad \hat{\log}(W_{jt}^c / W_{jt}^h) = \hat{E}_j - \hat{F}_t - (1/\hat{\sigma}_A)\log(C_{jt} / H_{jt})$$

where a hat reflects the use of coefficient estimates. As would be expected from the high R-squared found in the last column of Table III, predicted and actual college premiums move closely together, indicating the accuracy of the simple relative supply-demand model presented above.

An interesting question also is how much of the overall change in the average college premium and therefore wage inequality can be explained by secular shifts in the demand and supply for college workers (captured by the time fixed effects in (8)) on the one hand and the slowdown in educational attainment growth rates after 1978-1982 (captured by the final term in (8)) on the other. A simple way to distinguish between secular relative demand or supply shifts and age group specific relative supply shocks is to construct a counterfactual series of the average college premium assuming there was no fall in educational attainment growth rates.

Looking back at Figure III, it is clear that educational attainment grew at pretty much a constant rate for cohorts born before 1955. This implies that all (C_{jt} / H_{jt}) were increasing proportionately (say, at rate η) as more educated cohorts gradually entered older age brackets. If this is the case and if an increase in the relative demand for college workers is also best described by a linear time trend (say, with slope γ), equation (5) rewrites as:

(9) $$\log(W_{jt}^{c} / W_{jt}^{h}) = E_j - F_t - (1/\sigma_A)\log(C_{jt} / H_{jt}) + \mu_{jt}$$

where (10) $$F_t = \log(C_{1975} / H_{1975}) + \gamma_{1975} + (\eta + \gamma)t$$

and (11) $$\log(C_{jt} / H_{jt}) = \log(C_{j1975} / H_{j1975}) + \eta t$$

Using only cohorts born before 1955 and corresponding estimated fixed time effects from (9), parameter estimates of all coefficients in (10) and

(11) can be obtained. After having obtained an estimate for the left-hand side of (9), equation (6) then shows how to calculate the counterfactual average college premium for each year. Note that one can also predict the counterfactual college premium for years after the 1955-cohort entered the sample since the time variation on the right-hand side of (9) only depends on the initial distribution of college attainment in 1975 and time *t*. Plotting (6) for each year then gives the counterfactual series given by the dashed-dotted line in Figure IV.

Figure VI shows that between 1978-1982 and 1997-2000 the actual college premium increased with 16 log points from 0.28 to 0.44. Counterfactual wage gaps show that the college wage premium would have increased by 8 log points if only the relative demand and supply of college workers would have grown proportionately over time as they did before 1983-87. This suggests that the slowdown in educational attainment growth rates for cohorts born after 1955 could have increased the average college premium by as much as 8 log points or about half of its total increase. Similarly, Figure III showed a 40 log point increase in the log(90/10) wage differential from 0.92 in 1980 to 1.32 in 2000. Assuming that an 8 percentage point increase in the college premium leads to about a 16 log points increase in the log(90/10) wage differential, the fall in educational attainment growth rates for cohorts born after 1955 can explain as much as forty percent of the total increase in wage inequality.

The estimated impact of inter-cohort differences in educational attainment growth rates on the average college premium and wage inequality is derived from what is merely more than back-on-the-envelope computations. Their relevance should therefore be judged with some caution. Nevertheless, the analysis so far leaves little doubt that a simple model accounting for the relative demand and supply of college labor goes a substantial distance towards explaining changes in the average college wage premium and wage inequality over time.

Conclusions

This paper has argued that a simple aggregate model of labor demand and supply can go a substantial distance towards explaining the recent changes in employment and wages. In doing so, it has exploited the acceleration in college graduates entering the UK labor market in recent years. In line with a textbook demand-supply model, it was shown that the recent increase in college attainment growth rates has lead to a decrease in the college premium for Britain's youngest workers.

Moreover, the economy-wide average college premium and therefore overall wage inequality are expected to decrease as younger cohorts will come of age. "Education, education, education" therefore seems to be an effective policy to save wage inequality from rising ever further.

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Table I
College-high school wage gaps by age groups and year groups

	Age groups						
Year groups	26-30	31-35	36-40	41-45	46-50	51-55	56-60
1975-1977	0.159	0.256	0.356	0.356	0.378	0.412	0.460
	(0.026)	(0.031)	(0.038)	(0.038)	(0.051)	(0.058)	(0.070)
1978-1982	0.110	0.240	0.291	0.367	0.360	0.361	0.426
	(0.018)	(0.020)	(0.025)	(0.029)	(0.035)	(0.044)	(0.057)
1983-1987	0.194	0.241	0.335	0.364	0.385	0.402	0.499
	(0.022)	(0.024)	(0.026)	(0.034)	(0.039)	(0.043)	(0.053)
1988-1992	0.274	0.375	0.388	0.325	0.465	0.439	0.369
	(0.027)	(0.028)	(0.029)	(0.030)	(0.039)	(0.047)	(0.070)
1993-1996	0.262	0.405	0.436	0.335	0.406	0.352	0.307
	(0.033)	(0.033)	(0.035)	(0.036)	(0.042)	(0.063)	(0.097)
1997-2000	0.325	0.485	0.568	0.483	0.499	0.472	0.315
	(0.040)	(0.042)	(0.053)	(0.052)	(0.060)	(0.071)	(0.103)
2001-2003	0.310	0.419	0.433	0.440	0.416	0.520	0.490
	(0.034)	(0.033)	(0.035)	(0.036)	(0.040)	(0.045)	(0.077)

Notes: The table entries are estimates of the difference in mean log weekly wages between men with a higher education degree versus those with A-level or O-level qualifications. Each year group contains a rolling age group and regressions for each age group within each year group include a linear age term and a dummy for which GHS sample the data are drawn from. See the Data Appendix for more details about the construction of higher education wage gaps by age groups and year groups.

Table II
Decompositions of college-high School wage differentials by age and year into cohort, age and time fixed effects

	C-L		1975-1995		1975-2003
	oldest cohorts only	oldest cohorts same	oldest cohorts only	oldest cohorts same	oldest cohorts same
Year effects					
1975-1977	0.000	0.000	0.000	0.000	0.000
1978-1982	-0.086	-0.076	-0.026	-0.035	-0.034
	(0.021)	(0.018)	(0.019)	(0.017)	(0.018)
1983-1987	-0.057	-0.069	0.003	-0.021	-0.015
	(0.025)	(0.021)	(0.022)	(0.019)	(0.021)
1988-1992	-0.041	-0.037	-0.001	0.005	0.016
	(0.028)	(0.025)	(0.026)	(0.023)	(0.024)
1993-1996	-0.060	-0.039	-0.033	-0.021	-0.013
	(0.038)	(0.031)	(0.036)	(0.029)	(0.029)
1997-2000	-	-	-	-	0.044
					(0.033)
2001-2003	-	-	-	-	-0.021
					(0.044)
Cohort effects					
1950-1954	-	-0.009	-	0.006	-0.001
		(0.019)		(0.018)	(0.018)
1955-1959	-	0.075	-	0.089	0.074
		(0.025)		(0.024)	(0.024)
1960-1964	-	0.134	-	0.140	0.113
		(0.032)		(0.032)	(0.030)
1965-1969	-	0.162	-	0.146	0.160
		(0.046)		(0.047)	(0.037)
1970-1974	-	-	-	-	0.113
					(0.047)
1975-1979	-	-	-	-	0.103
					(0.073)
Degrees of freedom	14	20	14	20	30
R-squared	0.85	0.92	0.84	0.91	0.89

Notes: Standard errors are in parentheses. Models are fit by weighted least squares to the age group by year group wage gaps shown in Table I. Weights are the inverse sampling variances of the estimated wage gaps. All models include age group fixed effects.

Table III
Estimated models for the college-high school wage gap by age and year

	C-L	1975-1995	1975-2003
Age-group specific relative supply	-0.233	-0.240	-0.210
	(0.058)	(0.065)	(0.050)
Year effects			
1975-1977	0.000	0.000	0.000
1978-1982	-0.032	0.068	0.056
	(0.023)	(0.034)	(0.029)
1983-1987	0.060	0.143	0.162
	(0.034)	(0.067)	(0.054)
1988-1992	0.149	0.203	0.231
	(0.039)	(0.079)	(0.063)
1993-1996	0.199	0.266	0.285
	(0.044)	(0.093)	(0.074)
1997-2000	-	-	0.356
			(0.090)
2001-2003	-	-	0.384
			(0.086)
Degrees of freedom	23	23	35
R-squared	0.86	0.87	0.87

Notes: Standard errors are in parentheses. Models are fit by weighted least squares to the age group by year group wage gaps shown in Table I. Weights are the inverse sampling variances of the estimated wage gaps. All models include age group fixed effects.

Figure I
The number of articles using "demand" or "supply" as a % of the total number of articles in the *Journal of Labor Economics* for each year between 1983 and 2001

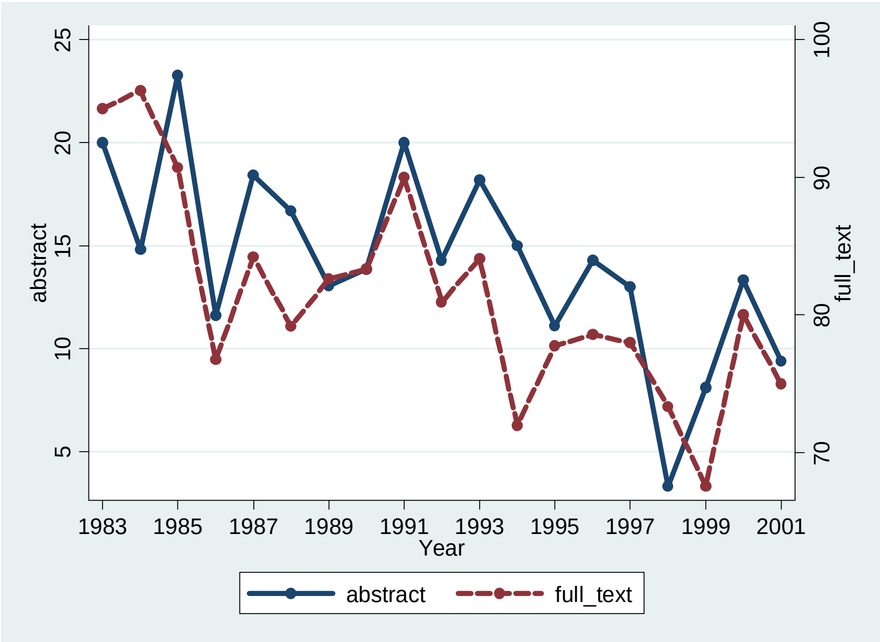


Figure II
A textbook model of labor demand and supply

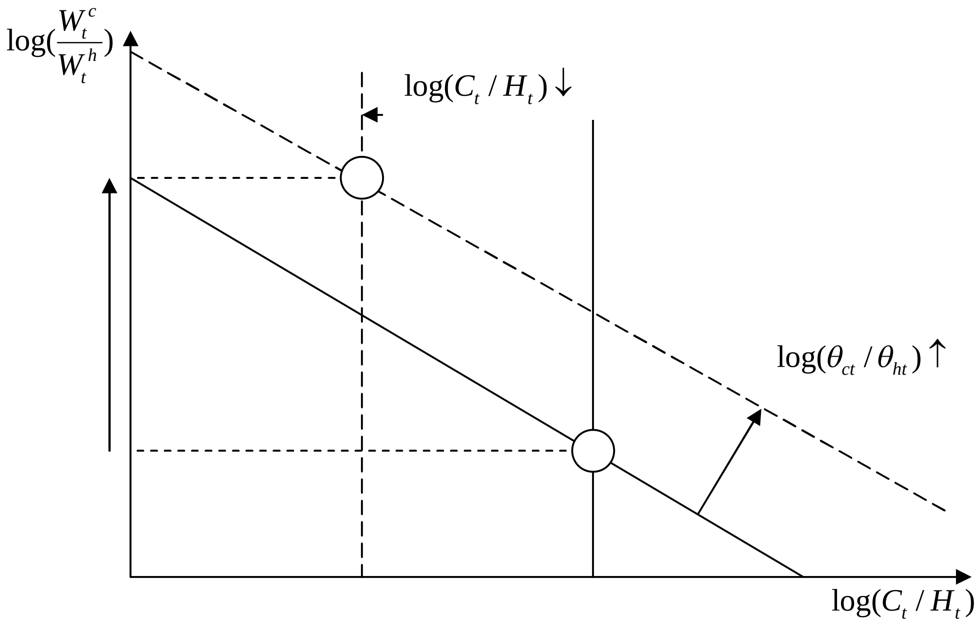
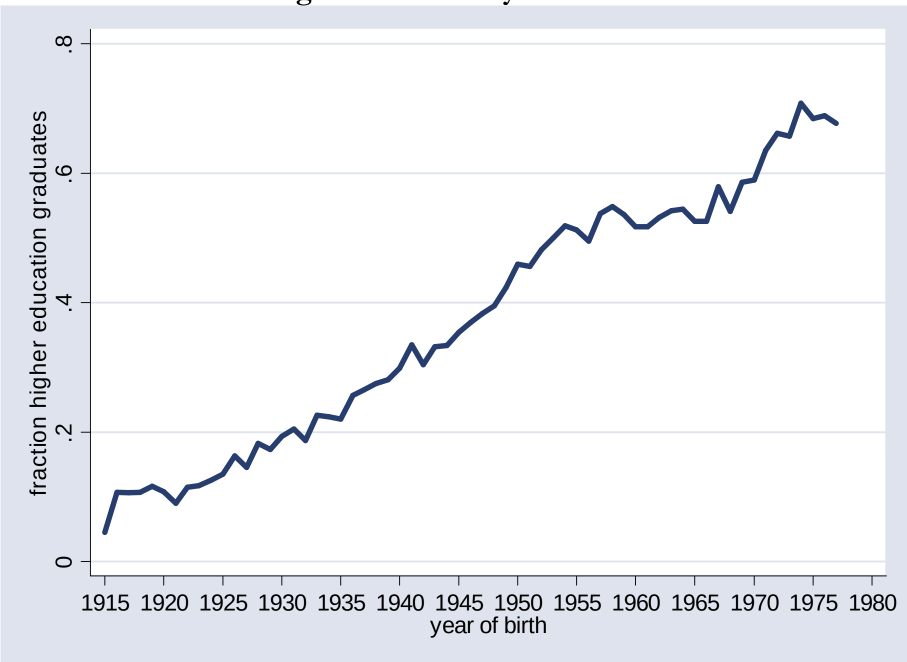
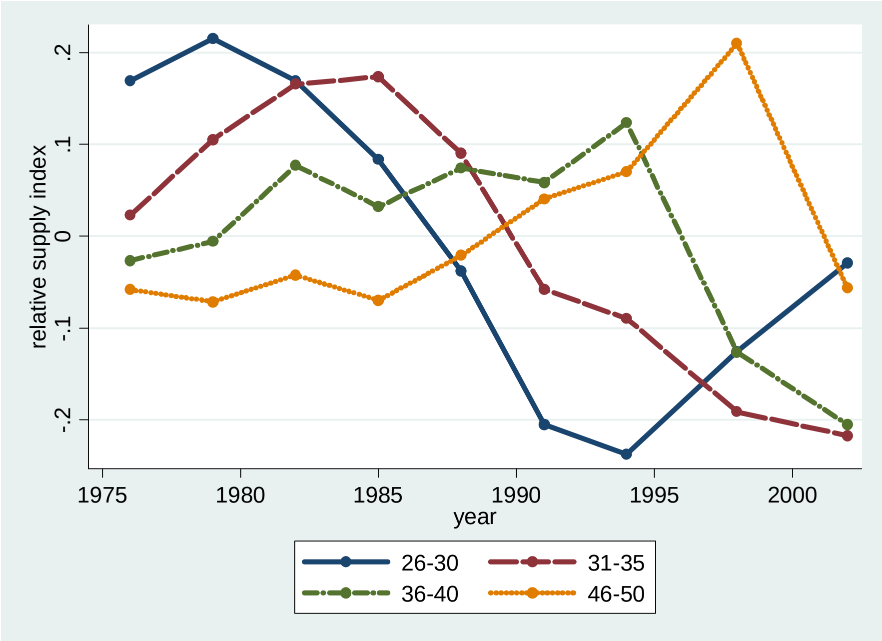


Figure III
College attainment by birth cohort



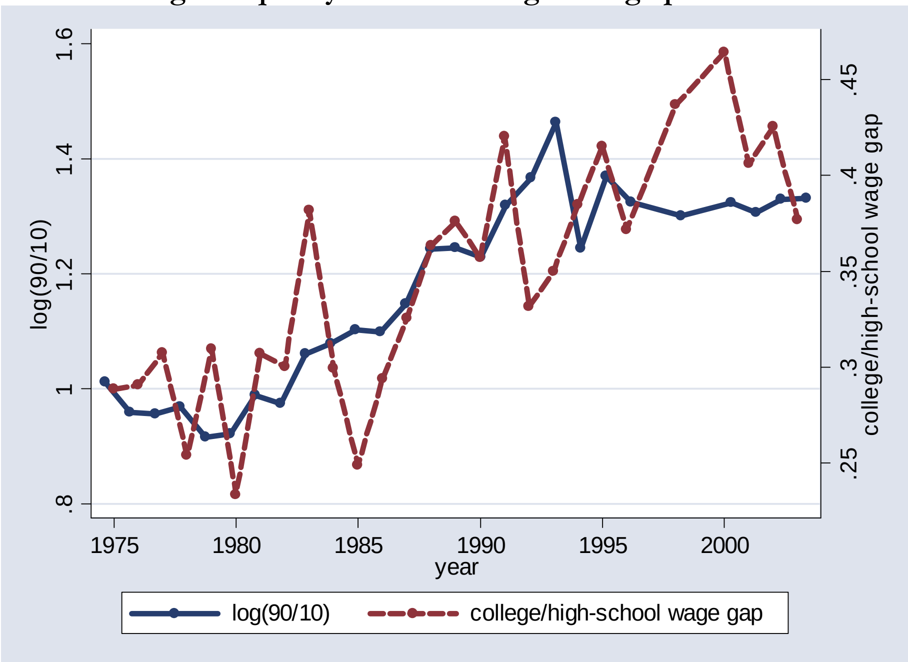
Notes: See the Data Appendix for more details about the construction of relative supply measures.

Figure IV
Age group specific relative supplies of college graduates



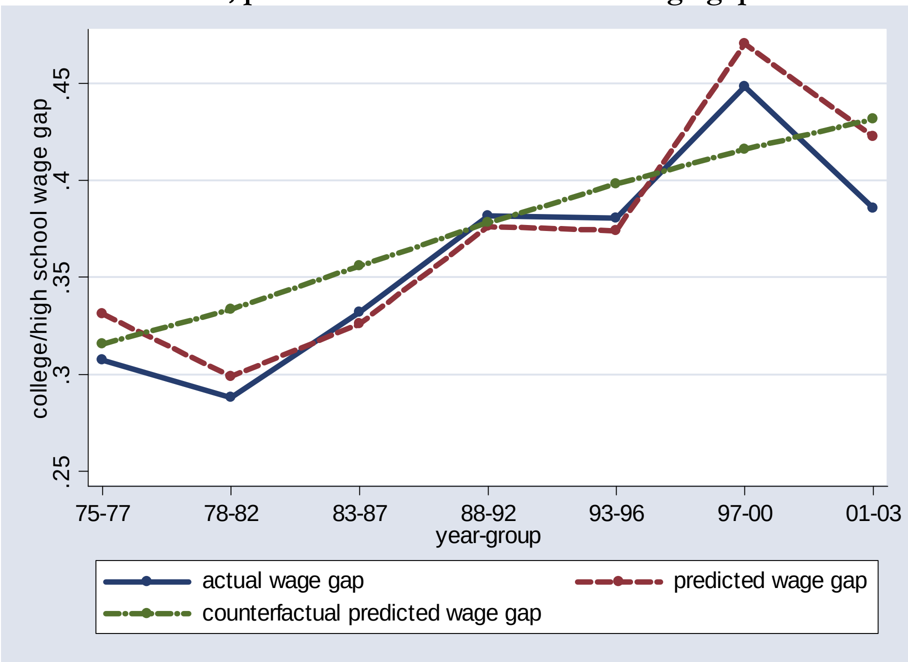
Notes: The relative supply indices are the residuals from a regression of the log difference between hours worked by higher education graduates and high school graduates by age group and year group onto age group fixed effects and year group fixed effects.

Figure V
Wage inequality and the average college premium



Notes: The college/high-school wage gap is the weighted mean across age groups of the estimated difference in mean log weekly wages between men with a higher education degree versus those with A-level or O-level qualifications for each two-year period. Each period contains a rolling age group and regressions for each age group within period include a linear age term and a dummy for which GHS sample year the data are drawn from.

Figure VI
Actual, predicted and counterfactual wage gaps



Notes: The predicted wage gap is the weighted mean across age groups of the predicted difference in mean log weekly wages between men with a higher education degree versus those with A-level or O-level qualifications for each year group using equation (5). The counterfactual predicted wage gap uses cohorts born before 1955 to provide estimates of the predicted counterfactual impact of the secular increase in the relative demand for and supply of college workers and therefore does not account for the impact of inter-cohort differences in educational attainment growth rates.

Data Appendix

A. Relative Supply Measures

U.K. workers are divided into five education groups for the purpose of constructing supply measures of higher education graduates relative to high school graduates using the 1975-2003 GHS. The group of higher education graduates consists of all workers with a higher degree (Census Level A); a first degree/university diploma or certificate/qualifications obtained from colleges of further education or from professional institutions of degree standard (Census Level B); HNC/HND/BEC/TEC Higher/City & Guilds Full Technological Certificate/university diploma or certificate/Qualifications obtained from colleges of further education or from professional institutions below degree level but above GCE 'A' level standard (Census Level C). The group of high school graduates consists of those whose highest qualification is any number of A-levels or O-levels with or without commercial qualifications; clerical and commercial qualifications without GCE 'O' level; GCE 'O' level in grades D or E; apprenticeships; no qualifications.

Relative supply measures are constructed by summing up usual weekly hours of work of all male workers (self-employed and wage and salary workers) by age and year. Because of the relative small size of the GHS samples, working hours are summed over age groups and year groups. For example, years 1978 to 1982 pool workers aged 24 to 58 in 1978, aged 25 to 59 in 1979, aged 26 to 60 in 1980, aged 27 to 61 in 1981 and workers aged 28 to 62 in 1982. Similar rolling age bands are used to construct other year groups and relative supply measures by age group within each year group.

B. Relative Wage Measures

Wage gaps in Table I are based on samples of weekly wages for men with a higher education degree and an A- or O-level degree. For years 1983 to 1987, reported wages are divided by pay period to construct average weekly wages.

The wage gaps are estimated in separate regression models for each age group/year group combination. These regressions all include a dummy for having a higher education degree, a linear age term and dummies for which GHS sample the observation was drawn from. A similar procedure is used to compute wage gaps by experience groups, except that the regression models for each experience group include a linear experience term instead of a linear age term. The inverse of the estimated variance of the coefficient on the dummy for having a higher education degree is used as weight in the models reported in the paper.