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THE CHANGING ECONOMIC VALUE OF HIGHER EDUCATION
IN DEVELOPED ECONOMIES: A REPORT TO THE O.E.C.D.

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ABSTRACT

This paper analyses the changing economic value of higher education in the major O.E.C.D. countries. The first part of the study examines data on earnings by education or earnings in occupations composed of persons with different educational attainments. A second part looks at unemployment rates and the occupations attained by college graduates. Both the relative earnings data and the unemployment and occupational attainment data suggest that the heralded decline in the economic value of higher education in the U.S. is not a unique North American phenomenon, but rather, a general development throughout the developed world. On the basis of evidence on elasticities of substitution and the observed growth in the supply of college graduates the paper suggests that the decline in the premium to the educated reflects movement along a reasonably well-defined demand for graduates schedule due to the growth of the college and university systems of the various countries.

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One of the distinctive aspects of modern economic growth has been increased investments in higher education. During the 1950s and 1960s college and university systems expanded throughout the developed world, fueled by the belief that education offered a sizeable economic return to the individual and was an important means of societal growth. With rare exception, policymakers and analysts viewed higher education as a major road to economic well-being and in some instances as a panacea to social problems, including reduction of income inequality. Resources flowed into higher education in unprecedented amounts. In the United States, where growth was especially sizeable, colleges and universities came to employ more persons and to account for a larger share of gross national product than the steel or automobile industries.¹ Spurred by a relatively high rate of return and good job opportunities, an increasing proportion of young persons chose to enroll for higher education.

The 1970s witnessed a marked change in the economic position of the highly educated through most of the western world. The job market for graduates underwent a significant turnaround and growth of enrollments levelled off or declined relative to the relevant age group. While the timing and magnitude of the change differ among countries, there was a general reversal of the boom of previous decades.

This paper examines the quantitative dimensions of the changing economic status of the highly educated, and considers the economic forces that appear to underlie the changes. Section I analyzes several indicators of the state of the graduate market in several countries: the earnings of graduate workers relative to nongraduates, where these are not available or sparse, the earnings in occupations where graduates predominate to those where they do not, unemployment rates for graduates; and the composition of jobs obtained by graduates. It

finds noticeable declines in the earnings of graduates relative to other workers, reductions in the proportion of graduates in jobs traditionally filled by college-level workers, and noticeable increases in graduate unemployment. Section II seeks to explain the observed changes in terms of a relatively simple supply-demand model of the graduates market in which the increase in relative supply of graduates exceeding increases in relative demand reduce the economic advantage of college or university training. In addition, some consideration is given to the alternative hypothesis that the decline in the university premium is due to trade union or governmental efforts maintain the earnings of the less educated in a period of slow economic growth.

I. Quantitative Dimensions of Change

A sizeable and growing body of evidence has found that the economic position of highly educated workers, particularly recent or young graduates, underwent significant deterioration relative to that of other workers in the U.S. in the 1970s. Is this pattern of a declining premium to higher education also true of other developed countries, or is it a development distinct to the U.S.?

To answer the question, this section examines evidence on the earnings of educated workers relative to less educated workers or on the earnings of workers in occupations composed largely of graduates to those in other occupations, on graduate unemployment, and the type of jobs obtained by graduates in a large number of developed countries. While the quality of the data and the timing of changes differs from country to country, the evidence presents overwhelming support for the proposition that the economic advantages of higher education declined throughout the developed world in the period studied. In a

majority of the countries moreover, the bulk of the decline occurred in the early part of the decade, with the position of graduates more or less stabilizing toward the end of the 1970s.

Table 1 summarizes the earnings data. Where possible the information relates the earnings of college graduates to nongraduates, but in some cases, I report ratios of incomes in occupations where graduates predominate to those in occupations where they do not. This assumes that at least some inferences can be made about education premium from occupational earnings patterns. In several cases the published data show breaks or jumps due to changes in definitions or methods of computing averages. Where this occurs I report both figures and infer changes in ratios over the entire period from the sum of the two changes. The precise definition of earnings or incomes differs across countries; fringe benefits, which have become an increasingly important part of the returns to labor in recent years, are generally excluded, and all of the data relate to before-tax earnings. Exclusion of fringes undoubtedly biases the figures, though its effect on changes in ratios is equivocal. On the one hand, fringes tend to be a higher proportion of pay among the higher paid, on the other hand, the fringes of the manual workers have increased greatly in recent years, with many fringes traditionally given to the higher-level workers now given to other workers in enterprises. Overall, because the major changes found in the data are quite sizeable, I doubt that lack of data on fringes seriously distorts the pattern.

One other aspect of the data deserves attention. Sometimes the figures reported relate to workers of all ages, at other times, they refer to starting wages or the wages of young workers. While it would have been desirable to

obtain consistent figures for each country, I was limited by the published data sources. Analyses of U.S. figures show larger declines in the relative earnings of younger graduates than of older graduates, which suggests that the decline in relative earnings was concentrated among new graduates. If this is generally the case, the data for all workers in several other countries understates the dimensions of the decline among the graduates of the 1970s.

With this brief discussion of the data and calculations behind us, let us now examine the figures in Table 1, country by country, beginning with the English-speaking nations where migration might be expected to cause similar patterns of change.

English-speaking countries

For the United States, Table 1 shows declines in the income of college graduates relative to high school graduates of sizeable magnitude from 1969 to 1974, followed by rough stability in the ensuing period, with some increases and some decreases in the ratios. In all cases, however, the end of decade income ratios lie far below the ratios at the outset of the decade. The biggest declines occur for younger workers and for those with doctoral degrees. Detailed analyses of these patterns of changes suggest that they translate into declines in rates of return of 3-4 percentage points, from the 10%-11% levels of the late 1960s to perhaps 7% in the 1970s.²

The figures for Australia in Table 1 reveal a similar pattern of declining advantage to the college educated. In this case I have incomes for university degree holders and for all persons without degrees. Since the latter includes persons who have not graduated secondary school, the ratios tend to be higher than those for the U.S. With respect to the trends of

TABLE 1

The Changing Income Advantage
to Higher Education in Developed Countries

United States

(a) Ratio of Income of Full-time
Year Round Workers with Four
Years of College to Income of
Full-time Year Round Workers
with Four Years of High School

	<u>1969</u>	<u>1974</u>	<u>1978</u>	<u>Change</u> <u>1969-78</u>
1. Men, 25-34	1.39	1.16 1.20	1.22	-.21*
2. All Men	1.53	1.35 1.36	1.40	-.14*
3. Women	1.42	1.29	1.26	-.16*
4. All Women	1.36	1.35	1.28	-.08*

(b) Starting Salaries of College
Men Working in Industry to
Average Annual Earnings

	<u>1969</u>	<u>1971</u>	<u>1979/81</u>	<u>Change</u> <u>1969-79/81</u>
5. Bachelor's	1.24	1.09	1.05	-.19
6. Doctorate	2.18	1.78	1.87	-.31

Australia

Mean Income of Workers with
Degree to Mean Income of
Workers without a Degree, and left
school at 17, by age

	<u>1969</u>	<u>1974</u>	<u>1979</u>	<u>Change</u> <u>1969-79</u>
1. 25-34	1.81	1.63	1.44	-.37
2. 35-44	2.13	1.78	1.58	-.55
3. 45-54	2.46	2.10	1.65	-.81
4. All	2.29	2.01	1.90	-.39

Canada

(a) Ratio of the Income of University Degree Recipients to income of	<u>1969</u>	<u>1974</u>	<u>1975</u>	<u>1978</u>	<u>Change 1969-78</u>
1. Elementary School Graduates Those with 0-8 years	2.36	2.23	2.40	2.20	-.33*
2. High School Graduates Those with some High School	1.95	1.81	2.03	1.90	-.27*
(b) Ratio of the Income of Those with Some University Training to Income of Those with 0-8 years, by age (1969, 1974) or Ratio of the Income of Those with University Degree to Income of Those With 0-8 years, by age (1975, 1978).	<u>1969</u>	<u>1974</u>	<u>1975</u>	<u>1978</u>	<u>Change 1969-78</u>
1. Aged 24 or less	1.32	1.21	1.71	1.17	-.65*
2. 24-34	1.40	1.34	1.22	1.24	-.04*
3. 35-44	2.22	1.76	1.83	1.62	-.67*
4. 45-54	2.33	2.10	1.87	1.80	-.30*
5. All Ages	1.59	1.44	1.56	1.54	-.17*
(c) Ratio of the Income of Those With Some University to Those with Some High School (1969 and 1974) and of the Income of Those with University Degrees to Those With High School Degrees, including nonuniversity post-secondary (1975 and 1978)	<u>1969</u>	<u>1974</u>	<u>1975</u>	<u>1978</u>	<u>Change 1969-78</u>
1. Aged 24 or less	1.11	.97	1.43	1.17	-.40*
2. 24-34	1.22	1.24	1.30	1.26	-.02*
3. 35-44	1.83	1.62	1.75	1.75	-.21*
4. 45-64	1.87	1.80	2.00	1.79	-.28*
5. All Ages	1.56	1.54	1.87	1.72	-.17*

United Kingdom

(a) Ratio of Index number of graduate starting salary to earnings frequency, university sector	<u>1967</u>	<u>1974</u>	<u>1979</u>	<u>Change 1967-79</u>
	1.00	.84	.79	-.21
(b) Ratio of graduates starting salaries to average weekly earnings (x 52) of full-time workers	<u>1968</u>	<u>1974</u>	<u>1978</u>	<u>Change 1968-78</u>
1. Male Arts and Social Science /Manual	.92	.74	.77	-.15
/Nonmanual	.68	.58	.61	-.07
2. Male Arts and Social Science /Youth	2.18	1.26	1.44	-.74
3. Male Science /Manual	.88	.80	.83	-.05
/Nonmanual	.65	.62	.65	.00
(b) (cont.)	<u>1968</u>	<u>1974</u>	<u>1978</u>	<u>Change 1968-78</u>
4. Male Applied Science /Manual	.92	.82	.86	-.06
/Nonmanual	.71	.64	.67	-.04
5. Female Arts and Social Science/Female Manual	1.76	1.25	1.28	-.48
/Female Nonmanual	1.24	1.09	1.05	-.19
(c) Income of Occupation Groups	<u>1970</u>	<u>1975</u>	<u>1979</u>	<u>Change 1970-79</u>
1. Chartered Engineers /Nonmanual males	1.00	1.03	.93	-.07
(d) Index of Salaries of Scientists Aged 26-30 to Nonmanual Workers	<u>1968</u>	<u>1974</u>		<u>Change 1968-74</u>
1. Biologists	1.00	.85		-.15
2. Mathematicians	1.00	.81		-.19
3. Physicists	1.00	.92		-.08
4. Metallurgists	1.00	.94		-.06
5. Chemists	1.00	.89		-.11
6. Engineers	1.00	.82		-.18

(e) Average Annual Earnings of Self-employed Professionals to Gross Weekly Earnings Manual Male	<u>1970</u>	<u>1974</u>	<u>1977</u>	<u>Change 1970-77</u>
1. Architecture	.80	.86	.62	-.18
2. Engineering	.69	.66	.56	-.13
3. Medicine	1.12	.86	.76	-.36
4. Dentistry	1.70	1.61	1.38	-.32

Japan

(a) Ratio of the Income of College Graduates to High School Graduates	<u>1954</u>	<u>1967</u>	<u>1973</u>	<u>Change 1954-73</u>
1. 20-24	1.16	.98	.95	-.21
2. 25-29	1.16	1.10	1.03	-.13
3. 30-34	1.26	1.21	1.15	-.11

(b) Ratio of Average Monthly Earnings of College Graduates to	<u>1965</u>	<u>1974</u>	<u>1978</u>	<u>Change 1965-78</u>
1. Elementary School Graduates Male	1.32	1.22	1.21	-.11
Female		1.60	1.48	-.12
2. High School Graduates Male	1.30	1.23	1.20	-.10
Female		1.37	1.27	-.10

France

(a) Ratio of Yearly Earnings of Executive and Professional Workers to Yearly Earnings of	<u>1969</u>	<u>1976</u>	<u>1979</u>	<u>Change 1969-79</u>
1. Employees	2.97	2.63	2.55	-.42
2. Manual Workers	3.30	2.80	2.72	-.58

(b) Ratio of Yearly Earnings of Technicians to Yearly Earnings of

1. Employees	1.63	1.61	1.58	-.05
2. Manual Workers	1.81	1.72	1.68	-.13

(c) Ratio of Incomes of Men Under 35 with Specialized Schooling to Office Workers

	<u>1962</u>	<u>1972</u>		<u>Change 1962-72</u>
1. Bachelor's Graduates	1.97	1.88		-.11
2. Higher Degree	2.49	2.49		.00

Italy

(a) Ratio of Average Earnings, University Graduates to

	<u>1967</u>	<u>1975</u>	<u>1979</u>	<u>Change 1967-79</u>
1. Elementary School Graduates (0-8 years)	2.63	1.96	1.54	-1.09
2. Secondary School Graduates	2.07	1.67	1.33	-.74

(b) Average Monthly Starting Wages of Executive to

	<u>1972</u>	<u>1974</u>	<u>1978</u>	<u>Change 1972-78</u>
1. Clerk (143)	2.67	2.42	1.62	-1.05
2. Administrative Assistant (120)	3.02	2.92	1.78	-1.24
3. Skilled Worker in Gas Industry	2.46	1.99	1.12	-1.34
4. Unskilled Worker in Chemical Industry	3.15 (1973)	2.90	1.54	-1.61

Denmark

(a) Relative Wages and Salaries of Central Government Employees on Collectively Bargained Contracts, Persons with Academic Degree to

	<u>1971</u>	<u>1974</u>	<u>1978</u>	<u>Change 1971-78</u>
1. Other Salaried Employees	1.94	1.76	1.67	-.27
2. Wage Earners	2.22	1.96	1.72	-.50

Germany

(a) Relative Gross Income of
Technical Employees with Higher
Qualifications (Category II)
to Others with Lower Quali-
fications (III, IV, V)

	<u>1963</u>	<u>1971</u>	<u>1978</u>	<u>Change 1963-78</u>
1. Males II/III	1.32	1.29	1.26	-.06
2. Males II/IV	1.70	1.59	1.58	-.12
3. Males II/V	2.13	1.97	1.86	-.27
4. Females II/III	1.44	1.44	1.35	-.09
5. Females II/V	2.33	2.31	2.01	-.32

*Note: The percentage point change corresponds to the difference between the figure in first row, first column and the figure in second row, third column added to the difference between the figure in second row, second column and the figure in first row, second column.

TABLE 1: Sources

United States

- (a) U.S. Bureau of the Census, Current Population Survey, Consumer Income Series P-60, various editions.

Figures on 1974 in the first row are based on old imputation procedures. Those in second row are based on new imputation procedures, as are figures for later years.

- (b) Bachelor's from Frank S. Endicott, The Endicott Report (Northwestern University), various editions, using a reported average of salaries with weights .05 accounting, .35 engineering, .40 sales, .20 general business trainees. Doctorate, unweighted average from College Placement Council, Salary Survey. Elsewhere, from U.S. Department of Commerce, Survey of Current Business, National Income Editions.

Australia

- (a) Australian Bureau of Statistics, Income Distribution 1968-69, 1973-74, 1978-79.

Table: Full year, full time workers: 'Educational Attainment Age and Mean Income'.

Figures are based on two surveys conducted in November 1969, November 1974 and November, 1979.

Canada

- (a) Dominion Bureau of Statistics, Income Distribution by Size in Canada. Table: 'Percentage Distribution of Individuals by Income Groups, Education and Sex'.

- (b) Dominion Bureau of Statistics, Income Distribution by Size in Canada. Table: 'Percentage Distribution of Individuals Whose Major Source of Income is Earned Income, by Income Groups, Age, and Education'.

Figures are based on surveys.

In 1975, the classifications by education were modified. For this reasons data by education for 1975 and later years are not directly comparable with previously published figures.

United Kingdom

- (a) A.M. Dolphin, "The Demand for Higher Education," Employment Gazette, July 1981, pp. 302-305.
- (b) G. Catto, A. Goodchild, P. Hughes, "Higher Education and the Employment of Graduates". Department of Employment, Unit for Manpower Studies.
G. Williams, "Graduates and the Labour Market," Three Banks Review, September, 1973.
Annual Abstract of Statistics. New Earnings Surveys. Great Britain.
- (c) Inland Revenue Statistics. "Professional Earnings Income Tax Assessments Under Case II, Schedule D: Net True Income".

The median starting salaries of first degree graduates were taken from the G. Williams study for figures before 1973 and from the G. Catto study for following years. In the latest case, we converted indexes numbers back to absolute figures.

United Kingdom

The average weekly salaries for manual and nonmanual workers come from New Earnings Surveys. Before 1973, the collected figures referred to gross weekly earnings that we spliced by multiplying by a coefficient to get an approximation of an average salary. We multiply by 52 to convert into annual salaries.

The weekly earnings for youth were obtained by using the indexes given by G. Williams before 1972, and the figures from the Annual Abstract of Statistics.

Japan

- (a) Umetami, "The College Labor Market and the Rate of Return to Higher Education in Post-War Japan, 1954-1973", University of Wisconsin, 1977. Ph.D. dissertation.
- (b) Japan Statistical Year Book.
Table: 'Average Age, Years of Service and Monthly Contract Cash Earnings of Regular Workers by Industry Size of Enterprise and Academic Career'.

The division corresponds to level of school completed: Elementary level corresponds to elementary schools and new system junior high schools; high school level to old system middle school and new system senior high schools; college level to old and new system colleges and universities.

France

- (a) INSEE Indicateurs du VII^{eme} plan, Revue Trimestrielle (14),
Octobre/Decembre, 1980.
Table: 'Rapports des salaires des diverses categories au salaire
ouvrier (salaires nets annuels moyens)'.

We compute the ratio of executive/employee by dividing the column 'Cadres' by the column 'employes, remunerations annuelles', and the ratio of Technician/Employee by dividing the column 'Agents de maitrise et techniciens' by 'employes, remunerations annuelles'.

- (c) Psacharopoulos, George. Earnings and Education in OECD Countries.
(1975).

Italy

- (a) Bank of Italy, Bollettino, provided by Paoli Roberti, Memorandum,
O.E.C.D., September, 1981.

- (b) Annuario di Statistiche del Lavoro.

Tables: 'Composizione delle Retribuzioni Mensile Lorde Iniziale del Personale Civile dello Stato per Carriera e Qualifica'. 'Composizione della Retribuzione e del Costo del Lavoro nei Principali Settori di Attivita Economica per Alcune Categorie di Lavoratori'.

The only statistics on highly qualified employees available referred to the public sector. Though their income probably differs from the ones in the private sector, they may be used as indicators with some restrictions. We chose to compare the gross monthly total income of a high executive (primo dirigente) with other professional positions within and outside the public sector. The rates were computed in relation to the gross monthly total income of a clerk classified as 143 (commissario cap 143) and an administrative assistant classified as 120 (coadiutore amministrativo 120). The comparison was also made to workers in the chemical industry (D, operaio 2a categoria) and in the gas industry (C1 operaio qualificato). The figures for these last two activities correspond to the gross monthly total income computed on the minimum wage of single workers on a national territory basis.

- (b) Bank of Italy, Bollettino, provided by Paoli Roberti memorandum,
September, 1981.

Denmark

(a) Statistisk Arbejds DANMARK

Table: 'Wages and Salaries of Central Government Employees'.

The different wages and salaries refer to employees on collectively bargained contracts.

Germany

(a) Statistisches Bundesamt.

Table: "Bruttomonatsverdienste der Angestellten in Industrie und Handel".

Relative gross monthly incomes were computed relating the higher qualified (categorie II) to lower qualified (categorie III, IV, and V) technicians in the industry and commerce sector (industrie Handel, Kreditinstitute und versicherungsgewerbe).

interest what stands out in the data is the sizeable percentage point decline in the advantage for the more highly educated, with greater declines in the first half of the decade for all but the 45-54 year olds. In contrast to the U.S. data, the magnitudes of the changes in Australia show possibly greater deterioration in the relative position of older graduates than of younger graduates.

The next country in the table is Canada for which the data relate the income of university graduates to the income of various groups of less educated workers, overall, and by age. Because of changes in definitions in the published figures I compare 1969 to 1974 and 1975 to 1978 separately and obtain changes over the whole period by summing the 1969-74 and 1975-78 changes. While magnitudes of change differ among age groups, with the 24-34 group showing much smaller drops in relative income than is found in the U.S. or Australia, the overall pattern is consistent. As in those countries, the relative earnings of college graduates fell in the period under study, by large amounts.

The evidence for the United Kingdom on educational groups in (a) and (b) is based on the ratios of starting salary from the Leeds University survey to the average earnings of other workers. The drop from 1968 to 1974 is uniform and large, with the institutionally-induced change in youth apprentice rates severely reducing the advantage of graduates over youths.³ The decline is particularly marked for those in the Arts and Social Sciences and for female graduates and, because of declines in the nonmanual to manual income ratios for the United Kingdom, are exceptionally large relative to the incomes of manual workers. From 1974 to 1978 there is a general but modest rise in the ratios, a pattern which is more consistent than that found in the U.S. The occupation data in lines 5-7 show comparable trends for various groups of highly qualified workers. Note that in these comparisons the base group are nonmanual workers. Contrasts with manual workers would reveal much more striking declines.

Japan

Figures for Japan in lines (a) 1-3, taken from a University of Wisconsin dissertation, show a pattern of decline in the relative earnings of graduates by age which began in the mid-1950s and proceeded through the early 1970s, of a magnitude similar to that obtained in the more recent decade for the English-speaking countries. The data also show a more pronounced drop in relative incomes for younger as opposed to older graduates, similar to that found in the U.S., U.K., and Canada.

Lines (b)1 and (b)2 carry the analysis through 1978. They give the ratios of average earnings of college graduates to elementary and high school graduates. These figures provide further evidence of a fall off in the relative pay of college graduates in Japan, with an overall drop of about 10 percentage points for both men and women.

Continental Europe

The remaining countries in Table 1 are on the continent of Europe. I had greater problems obtaining data for the continental countries than for others and have been forced to rely in several cases on earnings by occupation rather than by education. To the extent that, as seems reasonable, part of the fall in the economic advantage to the highly educated takes the form of a downgrading in occupations (this is definitely the case in the U.S. and Japan), the occupation data will understate the actual deterioration in the position of graduates.

Possible understatement notwithstanding, the evidence in Table 1 shows that for all countries there is a large drop in the income of those in jobs requiring more education relative to workers in jobs requiring less education.

The French data, in particular, show a marked fall in the advantage of executives and managers compared to nonmanual 'employees' and manual workers and a sizeable but less marked drop in the earnings of technical workers relative to manual workers. Consistent with the pattern found in the English-speaking countries, moreover, most of the decline in the ratios occurs in the first part of the 1970s, from 1969 to 1976. Lines (c) 1 and 2 for France present data on educational differentials themselves, but for an early period. They reveal a fall off in the advantage to bachelor's graduates but not to higher degree recipients in the 1960s.

Two sets of figures are given for Italy: (a) ratios of average earnings of university graduates to elementary and secondary school graduates and (b) ratios of the starting wages of public sector executives to other workers in the public sector. The college earnings data show an enormous decline in the relative earnings of graduates from advantages far exceeding those in the U.S. in 1967 to figures comparable to those in the U.S. by 1977. The public sector differentials reveal a similar pattern.

For Denmark the data are limited to part of the work force: central government employees covered by collective bargaining contracts. They have the disadvantage of providing no information on the private sector but the advantage of relating to the academic degree recipients of concern. The figures tell a clear story: in Denmark as in the other countries we have examined, the relative earnings of the more educated fell.

The final country in the table is Germany, where the data relate the pay of technical employees with higher qualifications to that of employees with

lower qualifications. The figures show a sizeable drop for the highest group relative to the lowest and more modest declines for the highest relative to other groups. As in Japan, however, the drop appears to have begun in the 1960s rather than in the 1970s.

The conclusion that in Continental Europe, as in the English-speaking countries and Japan, there was a marked fall in the relative income of the highly educated in the periods covered is inescapable.

Interpretation

The Table 1 data support the following claim: In the English-speaking countries, in Japan, and in the Western European countries, the relative earnings of highly educated workers or of those in occupations dominated by the highly educated fall sharply in the 1970s. In most of the countries, moreover, the declines appear to be greater in the early part of the 1970s than in the latter part, possibly because of the potentially larger impact of the slowdown in the world economy in the latter years on less educated workers.⁴ It is of some interest to note that evidence on nonmanual to manual differentials or on skill differentials among manual workers also have followed such a pattern. In six of the seven Common Market countries for which data are available from Eurostat, the nonmanual to manual worker earnings ratio fell, with the greatest decline in the early part of the decade.⁵ Marsden's 1981 analysis of pay differentials in Britain, West Germany, France, and Italy provides additional support for our analysis. He concludes that 'there is evidence of a similar long-term reduction in the differential for higher-paid nonmanual occupations' in all of those countries with some indication that the decline showed at the end of the 1970s (p. 309). While declines in higher paid nonmanual worker earnings to

manual worker earnings do not necessarily imply declines in the relative pay of graduates, such a pattern is consistent with the evidence in Table 1 about the rewards to higher education.

Unemployment and non-price indicators

Market adjustments to changes in the supply-demand balance involve more than simply movement of relative prices. If the economic position of the highly educated deteriorated, as indicated by the wage data in Table 1, we might also expect unemployment and nonprice indicators of economic status to show comparable declines as well.⁶

Table 2 summarizes available data regarding the types of jobs obtained by graduates and various indicators of unemployment. Measures of the proportion of graduates in 'college-level' occupations provide a statistic that is easier to interpret than unemployment rates, as declines in the proportion in jobs traditionally requiring a degree can be taken at face value as indicative of a deterioration in market conditions. Because unemployment varies cyclically, particularly for manual workers, on the other hand, comparisons of the rates for both college graduates and less educated workers are complicated: the ratio of the rates may decline, while the difference may widen for cyclical rather than reasons of structural change in the market. One way of dealing with this problem is to regress the unemployment rate of graduates on the unemployment rate for other workers and examine deviations from the regression line. I have made such calculations for the U.S. but not for other countries.

The U.S. data in lines 1 and 2 highlight one of the most important aspects of the declining market for graduates in that country: the decline in the percentage of graduates finding employment in the job areas normally held by college graduates, the one-digit professional and technical category. When one

focuses on the marginal as opposed to the average likelihood of obtaining professional, technical and kindred jobs, the story of deterioration is even stronger. From 1962 to 1968, the number of college graduates in the labor force grew by 4,017,000, whereas the number of graduates with professional jobs grew by 2,915,000 - implying that 73% of the additional college workers got professional employment. From 1969 to 1976, by contrast, when the number of graduates grew by 8,096,000, the number obtaining professional jobs grew by just 3,751,000 - a 46% rate of employment in the professions. From 1976 to 1979, the number of graduates increased by 3,706,208, while the number working as professionals increased by 1,627,000 - a 44% rate of employment in the professions.⁷

The U.S. unemployment rates show a noticeable increase in the rate for graduates, but as noted earlier this could represent either a structural change or a normal cyclic pattern. To see whether the period under study deviates from earlier periods I regressed the rate of unemployment of college graduates on the rate for high school graduates and the rate of unemployment of professional workers on the rate of unemployment for blue collar workers. Figure 1 shows the results. As can be seen by the dark areas, there does appear to be a structural change, with graduate (professional) employment worse relative to high school (blue collar) unemployment than in the past.

The Canadian data show similar patterns of change, with the graduates' unemployment rate rising sharply, from less than 2% to 4.1% in 1971 but then falling to 3.4% in 1977. As the nongraduate rate also rises substantively, it is unclear if the worsening in the position of graduates is more or less than would be expected under pre-1970s conditions. If the U.S. patterns are any indication, the graduates' situation would appear to have worsened.

TABLE 2

Unemployment and Job Attainment Indicators

United States

(a) Proportion of Workers with 4 or more years of college in professional, technical and kindred occupational category

	<u>1969</u>	<u>1975</u>	<u>1979</u>
1. Males	.61	.54	.52
2. Females	.81	.70	.65

(b) Unemployment rates, by education

	<u>1967</u>	<u>1975</u>	<u>1978</u>
3. College	.9	2.9	2.5
4. High School	3.2	9.1	6.2

Canada

(a) Unemployment rates, by education

	<u>1961</u>	<u>1971</u>	<u>1977</u>
1. Secondary school			9.3
1-3 years	3.7	8.9	
4-5 years	2.5	7.3	
2. University	1.8		
Some		7.9	6.7
Degree		4.1	3.4

United Kingdom

(a) Percentage of first degree university graduates still seeking permanent employment

	<u>1962</u>	<u>1969</u>	<u>1979</u>
	3.0	4.5	10.9

(b) Unemployment rates for entire workforce

	<u>1962</u>	<u>1969</u>	<u>1979</u>
	2.2	2.4	5.8

Japan

(a) Proportion of graduates in professional and technical jobs	<u>1960</u>	<u>1970</u>	<u>1974</u>	<u>1979</u>
	35.0	32.0	28.0	26.0

Belgium

(a) University level as percentage of total unemployed receiving unemployment compensation	<u>1971 (Oct.)</u>	<u>1975 (Dec.)</u>	<u>1979 (Dec.)</u>
1. Male	.59	1.80	1.83
2. Female	.25	1.02	.90
3. All Persons	.46	1.39	1.24

Denmark

(a) Rate of unemployment among members of unemployment insurance funds	<u>1975</u>	<u>1977</u>	<u>1979</u>
1. Academics	5.6	9.8	7.8
2. Engineers	6.5	4.3	2.3
3. Lawyers and Economists	11.6	9.8	6.1
4. Masters of Arts & Sciences	4.3	12.5	11.3
5. Total	11.1	11.4	9.2

Germany

(a) Ratio of number of unemployed engineer, chemist, physicist, mathematician to total unemployed	<u>1972</u>	<u>1974</u>	<u>1979</u>
	.60	.94	1.07

Italy

	<u>1970</u>	<u>1973</u>	<u>1979</u>
1. Ratio of graduates looking for first job to degrees granted	.35	.49	.66

Table 2 (cont.)

<u>Italy</u>	<u>1970</u>	<u>1973</u>	<u>1977</u>
2. Percentage of experienced unemployed who are graduates	.7	1.2	2.6
3. Rate of unemployment, (including persons seeking first job as unemployed)			
Graduates	3.5	4.8	5.9
Total Labor Force	3.1	3.4	5.0

France

(a) Unemployment rates	<u>1970</u>	<u>1975</u>		<u>1977</u>	<u>1980</u>
1. Professionals & executives	.8	1.6	1.6	1.9	2.2
2. Middle level executives	.8	1.9	1.9	2.6	3.2
3. Employees	1.4	3.6	4.0	5.4	7.2
4. Manual workers	1.7	3.8	3.9	4.7	6.4

TABLE 2 (Sources)

UNITED STATES:

- (a) U.S. Department of Labor, Educational Attainment of Workers, March, 1969, Special Labor Force Report 125, Table 1, p. A-28, Special Labor Force Report 186, Table 1, p. A-19, Special Labor Force Report 240, Table 5, p. A-19.
- (b) U.S. Department of Labor, Educational Attainment of Workers, March, 1976 and March, 1979, Special Labor Force Report 92, Table 1, p. A-15, Special Labor Force Report 193, Table 3, p. 6, Special Labor Force Report 225, Table 2, p. A-19.

Figures for 1967 correspond to total 18 years and over, figures for 1975 and 1978 correspond to total 16 years and over.

CANADA:

- (a) S. Ostry, M. Zaide, Labour Economics in Canada. Toronto, 1979.
Table: 'Unemployment Rates by Level of Education 1961, 1971'.

Statistics Canada - Labour Force Surveys.

Table: 'Estimates by Educational Attainment'. Figures referred to are annual averages.

UNITED KINGDOM:

- (a) Department of Employment Unit for Manpower Studies - "Employment of the Highly Qualified, 1971-1986".
Table: 'First Degree Graduates "Still Seeking Employment"; Unemployment Rates and Unemployment Among School Leavers", with 1979 from G. Catto, A. Goodchild, P. Hughes, "Higher Education and the Employment of Graduates". Department of Employment - Unit for Manpower Studies.
Table: F-1, p. 78 ('First Degree University Graduates Unemployed or in Temporary or in Overseas Employment 1972-1979') by adding the graduates 'believed unemployed' to the graduates 'in temporary home employment' and dividing by the total graduates 'of known destination'.
- (b) The Employment Gazette.

TABLE 2 (Sources - cont.)

JAPAN:

- (a) 1960-1974, Umetami, "The College Labor Market and the Rate of Return to Higher Education in Post-War Japan, 1954-1973", University of Wisconsin, 1977, with 1979 from Japan Statistical Year Book, 1980. Table: 'Population 15 years old and over by age, group employment status and level of education'.

BELGIUM:

- (a) ONEM - Office National de L'Emploi, bulletins mensuels. Table: "Chomeurs Complets indemnisés inscrits en fin de mois".

Unemployment figures for the university level correspond to the numbers of college graduates, civil engineers and other persons with some college education.

DENMARK:

- (a) Statistisk Arbog - DANMARK. Table: 'Unemployment Among Members of Unemployment Insurance Funds'.

Most of the professions corresponding to post-secondary education are introduced in the table in 1975. For former years no indicators of unemployment could be found at this level.

FRANCE:

- (a) Indicateurs du VII^{eme} plan - Revue Trimestrielle (14) Octobre/Decembre, 1980. Table: 21.2.2b; 'Rapport Demandeurs d'emploi salarie
Population active de la categorie
selon la categorie socio-professionnelle de l'activite perdue'.

The two columns for 1975 represent the values of the rates before and after some changes were introduced in the statistics computation.

GERMANY:

- (a) Statistische Bundesamt. Table: 'Arbeitslose und Offene Stellen Nach Berufsgruppen'.

TABLE 2 (Sources - cont.)

ITALY:

- 1) Annuario di statistiche del lavoro.
Table: 'Persone in Busca di Prima Occupazione per Titolo di Studio'.
Annuario statistico italiano.
Table: 'Laureati per Sesso e Corso di Laurea'.
- 2) Annuario di statistiche del lavoro.
Table: 'Disoccupati per Titolo di Studio'. The rate corresponds to
unemployed graduates divided by total unemployment.
- 3) Annuario di statistiche del lavoro.
Table: 'Disoccupati per Titolo di Studio'; 'Persone in Busca di Prima
Occupazione'; 'Occupati per Titolo di Studio'.

Unemployment rates (for lines 3 and 4) were computed by dividing the sum (unemployed persons and persons looking for first job) by the total of (unemployed persons and persons looking for first job and employed persons).

The ratio in line 3 refers to graduates. The ratio in line 4 refers to total labor force.

The story for the United Kingdom is similar, with the evidence in line 1 showing a definite worsening in the ease with which first degree recipients find jobs: the proportion still seeking employment in December of the year was 3% in 1962, in 1979 it was still 11%, whereas the rate of total unemployment rose more modestly. In 1962 the ratio of the percentage of first degree university graduates still seeking permanent employment to the total unemployment rate was 1.4; the figure rose to 1.9 by 1969 and was still at that level in 1979. However, our data do not extend to the recent doubling of total unemployment in the British economy.

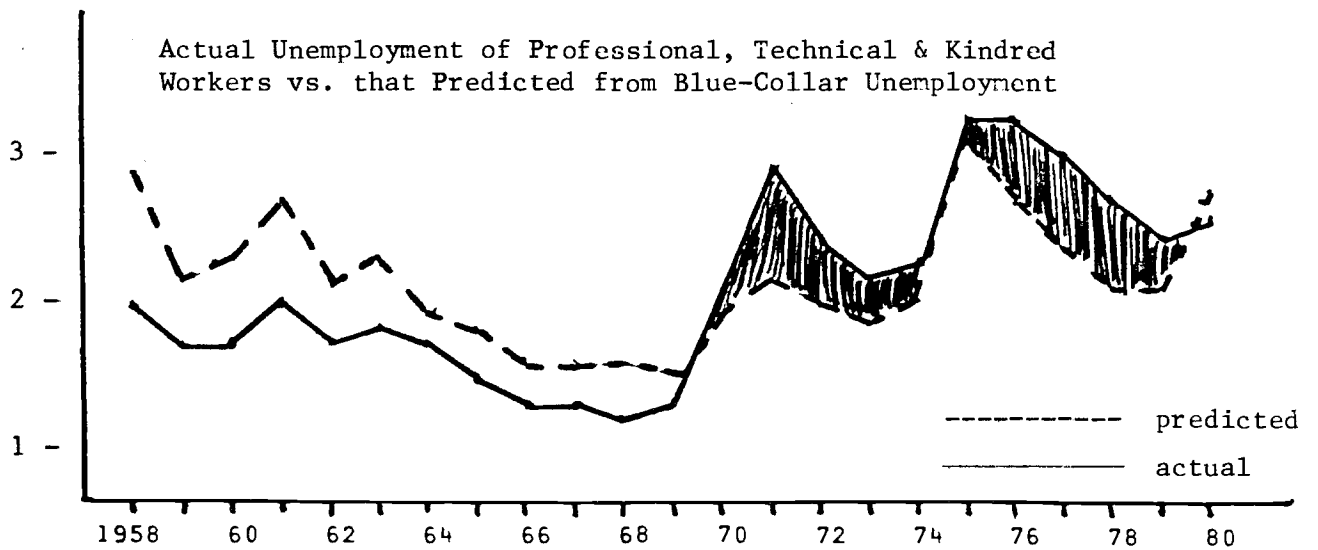
The limited figures I have obtained for Japan show a drop in the proportion of graduates in professional and technical jobs, though in Japan, unlike the U.S., the majority of graduates are employed in managerial and clerical rather than professional jobs.

Turning to the European continent, the Belgium data are perhaps the most striking as they show a tripling in the proportion of the unemployed persons receiving unemployment compensation accounted for by those with university education, an increase that has to far exceed the increase in the university share of the work force over the period.

The figures for Denmark show sizeable rates of unemployment for selected groups of highly qualified workers, except engineers. Compared to the average rate in the country, the figures reveal higher rates for graduates of arts and sciences and academics, a pattern consistent with data for the U.S. which suggest a greater worsening in the market for academic fields.⁸

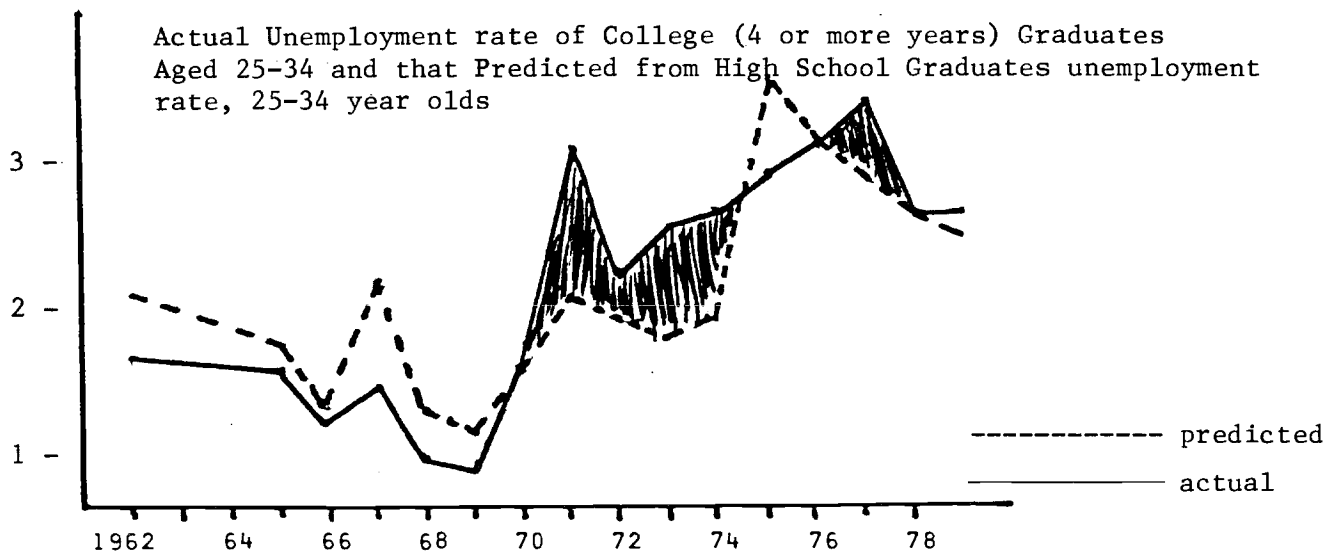
The Italian data by education which I have obtained do not give normal rates of unemployment. They distinguish between graduates looking for their first job, the experienced unemployed, and the employed. I use the figures to calculate three types of statistics. The ratio of graduates looking for first jobs to degrees granted in line 1 for Italy is an indicator of the difficulties new graduates may have in obtaining work. As the data compared are different

FIGURE 1



$$\text{Professional unemployment rate} = .63 + .21 \text{ Blue Collar unemployment rate} (.05)$$

$$R^2 = .47$$



$$\text{College unemployment rate} = .42 + .34 \text{ High School unemployment rate} (.07)$$

$$R^2 = .64$$

Source: U.S. Department of Labor, Bureau of Labor Statistics; Special Labor Force Reports; Educational Attainment of Workers, various editions. U.S. Department of Labor, Bureau of Labor Statistics; Handbook of Labor Statistics, Bulletin 2070, December, 1980.

(graduates seeking first job will include those from previous years' classes), the magnitude should not be taken as an unemployment rate, as normally defined. The trend, however, is sufficiently striking to suggest a distinct worsening in the position of graduates, consistent with reports of major problems in the Italian marketplace. Line 2 records the percentage of the experienced unemployed who are graduates. It shows that university graduates have more than tripled their share of unemployment in the period 1970-1979 from 0.7% to 2.6%; since the graduate share of the work force has not come close to tripling (from 1970 to 1979 the graduate share of employment rose from 3.1% to 4.6%), this implies a distinct trend in relative unemployment rates. Finally, lines 3 and 4 record the relevant unemployment rates, where the number of persons seeking first jobs are included in both the numerator and denominator of the statistic. These data show a rate for graduates in excess of that for the entire work force in the decade.

In France the data for unemployment rates by occupation show noticeable increases in the rates for professionals and executives and for middle level executives. Whether these increases are more/less/about what would be expected on the basis of past patterns of cyclic change we have not determined. In Germany the proportion of the unemployed in scientific and technical occupations rose by nearly 80% in the space of just seven years.

Overall, while the data in Table 2 suffer from various problems of non-comparability across countries, the preponderance of the evidence suggests that the unemployment of graduates and their employment prospects worsened in the 1970s, probably though not definitely, to a greater than normal extent during an economic slowdown. Since the 1970s were a period of sluggish economic growth, however, it is important to recognize that the unemployment of the nongraduate labor force tended to increase more in percentage points than did the graduate unemployment rate.

II. Economic Determinants of Change

What factors explain the observed declines in the economic position of highly educated workers in the O.E.C.D. countries shown in tables 1 and 2?

In this section I seek to explain the observed patterns in terms of changes in the relative supply and demand for graduates, with the principal moving force being the rapid expansion of higher education of the 1960s. I develop a small supply-demand model designed to pin down the key forces at work and examine empirical evidence regarding the magnitude of the relevant parameters of change. Finally, I consider one possible alternative explanation of change: that the decline in the relative position of graduates stems not from the increased supply of graduates but rather from trade union and governmental policies which maintained the position of less educated workers in the face of an overall drop in the market for labor of various types.

The supply-demand framework

Let \dot{X} = rate of change in the location of the demand curve for university graduates relative to the demand for other workers; \dot{S} = rate of change in the position of the supply of university graduates relative to other workers; σ = the elasticity of demand for university graduates relative to other workers which in the current context can be represented by the elasticity of substitution, ϵ = the elasticity of supply of university graduates defined "relative" to the number of potential students.

Then the change in relative demand for graduates will be:

$$(1) \quad \dot{E} = \dot{X} - \sigma \dot{W}$$

where \dot{E} = rate of change in relative employment of graduates and \dot{W} = rate of change in relative pay of graduates. The change in the relative supply of gra-

duates will be:

$$(2) \quad \dot{E}_s = \dot{S} + \epsilon \dot{W}$$

where \dot{E}_s = relative supply.

Assume, for simplicity, that the labor market clears, so that $\dot{E} = \dot{E}_s$. Then the economic advantage received by college graduates will depend on the shift (\dot{S}, \dot{X}) and slope (ϵ, σ) parameters as follows:

$$(3) \quad \dot{W} = (\dot{X} - \dot{S}) / (\epsilon + \sigma)$$

Equation (3) shows, that when shifts in supply for educated labor exceed shifts in demand, relative wages will fall. The extent of the fall is conditioned by the elasticity of substitution between more and less qualified labor and the elasticity of supply. Figure 2 shows graphically how the effect of changes in supply and demand depends critically on the relevant elasticities. Taking the demand side first, panel A distinguishes between the extreme case in which the elasticity of substitution between more/less educated workers is infinite and the case in which it has a more modest value. In the infinite elastic case, changes in the demand for and supply of educated labor have no effect on relative wages. Turning to supply, panel B shows a similar situation with an infinite and noninfinite elasticity of supply. It makes the point that if investments in human capital are perfectly elastic at a going rate of return, as is often implicitly assumed in human capital models, then relative wages are fixed at a level solely supply determined.

What has happened to the four determinants in the period studied?

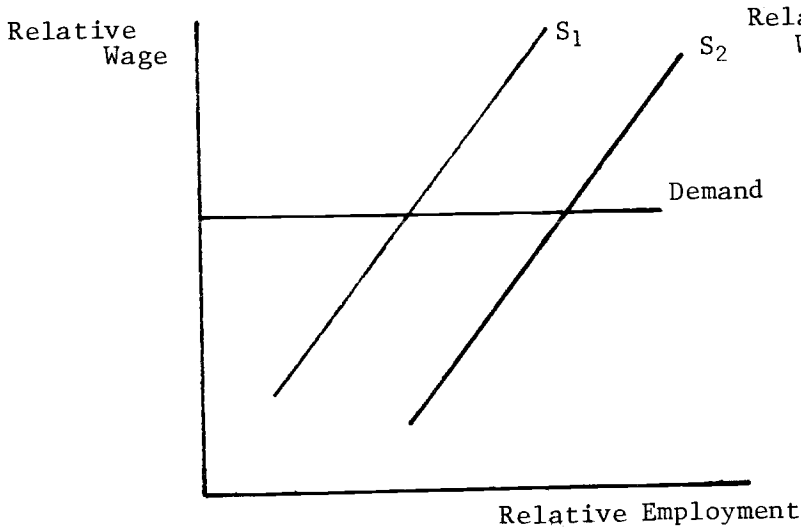
Shifts in supply (\dot{S})

Two factors caused a significant increase in the supply of highly educated workers in the 1970s: the entry of the 'baby boom' generation into the

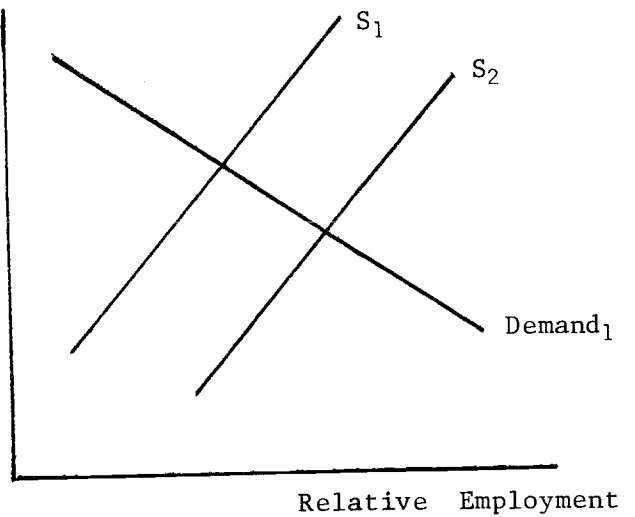
FIGURE 2

Role of Demand and Supply Elasticities in Explaining Changing Economic Values of College Education

A.

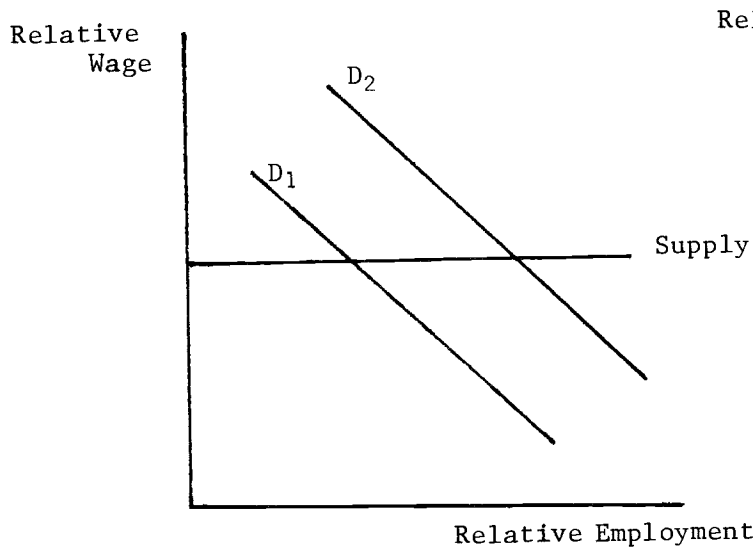


Infinite elastic demand: shifts in supply/demand have no effect

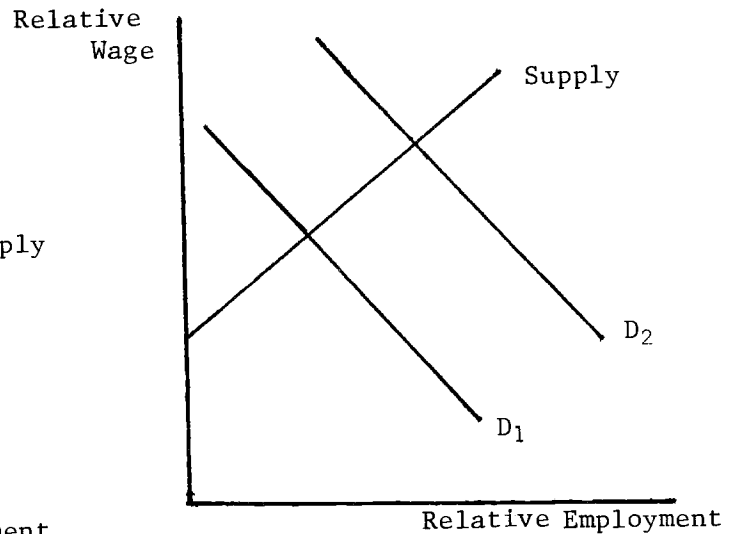


Finite elastic demand: increases in supply reduce education premium

B.



Infinite elastic supply: shifts in demand/supply have no effect



Finite elastic supply increases in demand raise premium

labor market (which, of course, differed somewhat in timing across countries) and the increased propensity of young persons to enroll in higher educational programs over the period. Because of the time lag between decisions to enroll in university and graduation and entry into the job market, we take the increase in the supply of graduates due to the enrollment expansion of the 1960s as a shift in supply (S) in the 1970s.

Table 3 presents comparable international data which document this well-known phenomenon and provide some magnitude of the changes. It shows that between 1960 and 1970 the absolute and relative number of persons entering universities (and thus graduating in the 1970s) doubled or even tripled in many countries. Data for a limited number of countries for which I have figures on graduates confirm that the tremendous increase in enrollments showed up in graduates in the 1970s. Between 1970 and 1976 in the U.S. the ratio of 25-34 year old college to high school graduates rose from .38 to .57 -- a 50% rise.⁹ In the U.K., the number of degrees granted 20-24 year olds rose from .116 to .144 from 1970 to 1975,¹⁰ while in Japan the number of new college graduates relative to new high school graduates increased by over 50%, from .24 in 1970 to .37 in 1975.¹¹ Any economic explanation of the declining economic value of higher education will rest heavily on the striking increase in supply in the period.

Shifts in Demand

In the absence of detailed country studies of the employment of graduates by sectors and of sectoral rates of growth, along the lines of the fixed coefficient model often used by governmental forecasters, it is difficult to say much about the demand side for the bulk of the countries. On the basis of detailed analyses of the U.S. and general knowledge of development elsewhere,

TABLE 3

New Entrants to University-Type Higher Education as Percentage of Relevant Population
and Percentage Changes in New Entrants and in the Ratio of
New Entrants to the Relevant Population

	New Entrants to University-Type Higher Education/ Relevant Population		Compound Annual Percentage Change in New Entrants		Compound Annual Percentage Changes in New Entrants/Relevant Population			
	1960-1970	1976-79	1960-70	1970-77	1960-70	1970-76/79		
Australia	.075	.118	.162	8.0%	6.4	4.6	5.4	4.4
Belgium	.131	.130		8.9	0.6		0.0	
Canada	.192	.201			3.4		0.8	
Denmark	.053	.130	.135	11.2	3.9	9.4	0.4	6.0
France	.123	.199	.187	10.1	-0.8	4.9	-0.7	2.2
Germany	.104	.136			4.8		3.4	
Italy	.236	.295		12.8	3.6		3.8	
Japan	.085	.171	.260	7.2	3.7	7.2	4.8	6.1
Netherlands	.041	.083	.087	9.9	2.7	7.3	0.8	4.8
Norway	.139	.162			1.6		2.6	
Sweden	.079	.290	.333	13.0	0.8	13.9	2.3	9.4
U.K.	.048	.107	.133	8.0	5.6	8.3	2.8	5.8
U.S.	.254	.292	.252	4.7	-0.2	1.4	-2.4	0.0

Source:

TABLE 3 - Source

* 1978 for Australia, Germany, and U.K.; 1979 for Denmark, France and Japan.

** For Belgium the final year is 1974, for Canada, 1971-1976; for Denmark, the final year is 1976, for Sweden, 1976, for U.K., 1975, for U.S., the final year is 1976.

Column 1: O.E.C.D., Working Papers of the Education Committee, 25/11/77

Columns 2, 3: O.E.C.D., Educational Statistics of the O.E.C.D. Countries, 1981, Table 54, with updates from unpublished O.E.C.D. data.

Column 4: Calculated from O.E.C.D., Educational Statistics Yearbook, 1974, Table 21.

Column 5: Calculated from O.E.C.D., Educational Statistics of the O.E.C.D. Countries, Table 45.

Columns 6, 7: Calculated from columns 1, 2, and 3.

however, it is possible to rule out an explanation of the decline in the economic premium to high levels of education in terms of a decline in relative demand for graduates. Relative demand for graduates appears to have increased in the period, though at declining rates over time, as the technologically intensive industries and education and the government sectors--all of which employ large proportions of graduates--grew, often rapidly. That demand increased does not, of course, imply that the pattern of demand shifts did not contribute to observed changes in the relative incomes of graduates, for had it increased more rapidly, the observed decline would have been more modest.

Elasticity of Substitution

As shown in (3), one of the key parameters in determining the extent to which increases in supply of graduates relative to demand reduce relative wages is the elasticity of substitution between more and less educated workers. What do we know about the magnitude of this parameter?

In the 1960s, several analysts concluded that the key elasticity was quite high, sufficiently large to yield a roughly horizontal demand curve. The basic mode of analysis was to regress the relevant income ratios on relative quantities, and certain control variables, assuming that relative quantities are predetermined by past supply decisions. The first three studies listed in Table 4 summarize the results of this work. Using a small sample of countries, Bowles obtained a value of σ of over 200. With a sample of 28 states from the United States, Dougherty obtained a more moderate but still very high estimate of over 8. Since the impact of changes in the relative supplies on relative wages depends inversely on the elasticity of substitution, the value of 8 implies only modest impacts of changes in relative supply on wages: an increase of, say,

100% in the relative supply of graduates would reduce relative earnings by just 9%.¹³ Psacharopoulos and Hinchliffe divided the country sample by degree of development, finding an essentially infinite elasticity in the developed countries of concern. Since the relative income of graduates remained constant or increased in the 1950s and 1960s, despite the increased supply of graduates, these estimates were accepted as being roughly in accord with reality and taken, by some, as refuting the "fixed coefficient" model of demand used by the O.E.C.D., among others, to analyse the graduate and skilled worker market.

In the 1970s, concurrent with the observed decline in the relative position of graduates, new estimates based on better data and models provided a very different picture of the relevant elasticity. Tinbergen amplified the country and state models to deal with the likely interaction of supply and demand in determining relative wages and quantities, and obtained quite different results from Bowles and Dougherty. His elasticities ranged from about 1/2 to 2.00. I used time series data for the United States to determine the impact of growth in the relative number of graduates on relative earnings and obtained estimates of a similar magnitude, ranging from 1 to 2.6. Relatively moderate results were also obtained between more and less educated workers by Layard and Fallon. By the mid-1970s the value of the substitution elasticity parameter appeared to be on the order of 1 to 2, which is of a magnitude that permits sizeable increases in supply relative to demand to reduce the premium to highly educated workers.

Elasticity of supply

The second key parameter in equation (3) is the elasticity of the supply of students to universities. While research on this topic did not begin in earnest until the mid-1970s, we have at this point several studies, which though

TABLE 5

Estimates of the Elasticity of Substitution Between
Highly Educated and Less Educated Workers

Study	Sample	σ
Bowles (1969)	12 countries	2.02
Dougherty (1972)	28 states, U.S.A.	8.2
Psacharopoulos & Hinchliffe (1972)	18 countries	developed 1.000 less developed 2.1-2.5
Tinbergen (1974)	12 countries 28 states	0.6-1.2 0.4-2.1
Freeman (1975)	24 years, U.S.A.	1.0-2.6
Layard and Fallon (1975)	23 countries	0.6-3.5

Note: Definitions of highly educated to less educated vary somewhat between samples. All except Layard and Fallon treat college relative to some other group. Layard and Fallon relate groups with 8 or more years to less than 8.

Sources: Bowles, S., Planning Educational Systems for Economic Growth, Harvard University Press, 1969.
 Dougherty, C.R.S., 'Estimates of Labour Aggregation Functions', J.P.E., 80, No. 6, 1101-1119.
 Psacharopoulos, G. and Hinchliffe, K., 'Further Evidence on the Elasticity of Substitution Among Different Types of Educated Labour', J.P.E., 80, No. 4, 786-791.
 Tinbergen, J., 'Substitution of Graduates by other Labour', Kyklos Vol. 27, No. 2, 217-226.
 Freeman, R., 'Overinvestment in College Training?', J.H.R., Summer 1975.
 Layard, P.R.G. and Fallon, P.R., 'Capital-Skill Complementarity, Income Distribution and Output Accounting', J.P.E., 83, No. 2, 279-302.

using different data and methodologies, all suggest that the elasticity is on the order of perhaps 1.5.

Table 5 summarizes these studies in a format comparable to that used in Table 4. What is impressive about the studies is that although they treat very different forms of data, they obtain comparable magnitudes. Time series estimates for the U.S. and U.K. range from 0.7 to 1.7, cross-country comparisons yield estimates of 0.5 to 2.6; analyses using individual data and a more structural model yield a figure of about 2.0.

For the U.S., moreover, there is survey evidence which suggests that, contrary to the traditional views of educators, students are highly aware of, and responsive to economic rewards. Nearly 80 percent of freshmen surveyed by the American Council of Education in 1977 agreed, for example, that a major reason for going to college was that it would enable them to get a better job.¹² Nearly one-third cited "able to make more money" as a very important reason for going to college. Similar results are obtained with questions relating to choice of career. My 1969 survey of college students showed that their expectations of salaries and of lifetime income profiles over fields mirrored actual market circumstances.¹³

If there is indeed a non-negligible supply response to economic opportunities, one would expect, at the least a slowdown in the growth of enrollments relative to the relevant population in the 1970s. Columns 3-4 and 5-6 of Table 3 and figures 3 and 4 examine this expectation. The columns in the table contrast percentage changes in the enrollments and in ratios in the 1960-1970 period to the 1970-76 period. In each country the rate of increase enrollments decelerates; in all but one the ratio of enrollments declines becoming negative in the U.S. and France and dropping to below 1.0% in the

Netherlands, Belgium and Canada.

The figures give more detailed time series information for the U.S. and U.K. It shows the drop off in enrollments in the U.S. in the 1970s, concentrated among men, and reveals a similar fall in the U.K. toward the end of the period, concentrated among women. Note that the figures for the U.K. show a decline in the proportion enrolled in the period covered, in contrast to the O.E.C.D. figures. One reason for this divergence is that the O.E.C.D. figures refer to university-type higher education whereas the participation rates in Figure 4 refer to all higher education, including teacher training where enrollments have been dropping especially rapidly.

We conclude that there is a substantial elasticity of supply with respect to salaries but that the elasticity is far from the infinite value which would rule out a supply-demand explanation of observed changes.

TABLE 5

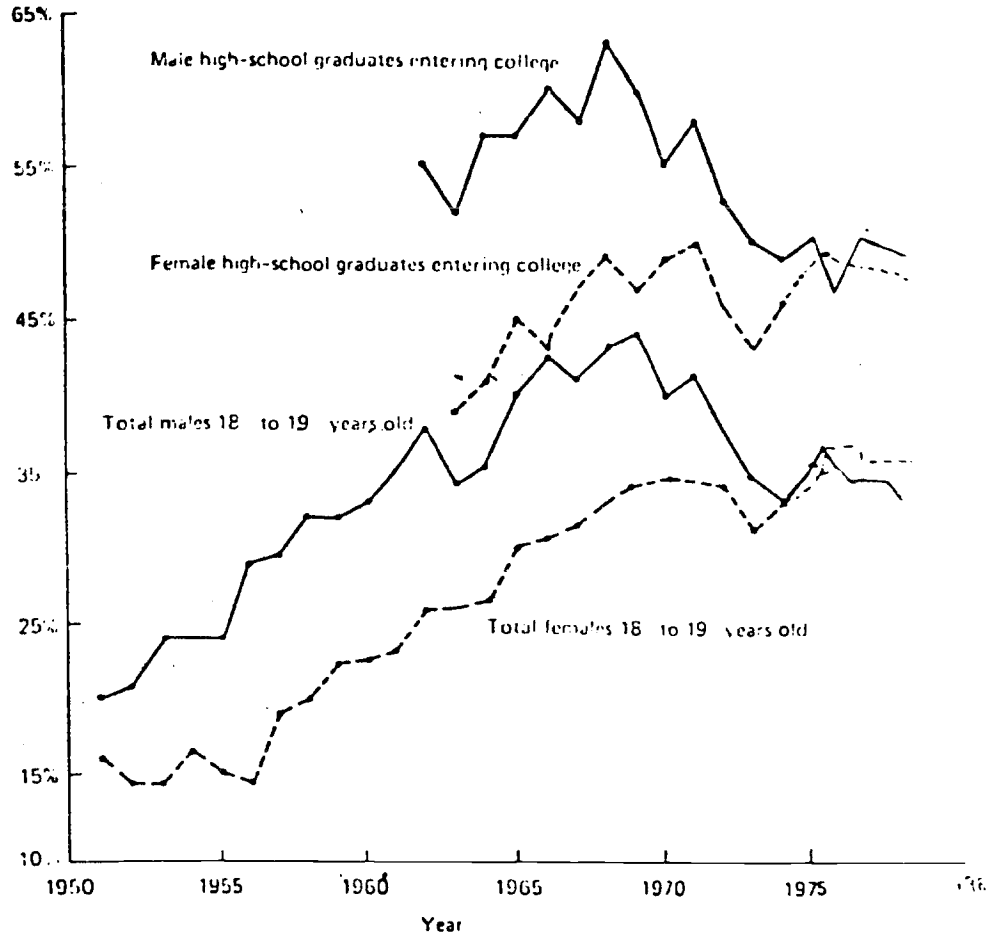
Estimates of the Elasticity of Supply of Persons to Higher Education

<u>Study</u>	<u>Sample</u>	<u>ϵ</u>
Freeman (1975)	24 years, U.S.A.	1.3 to 1.7
Tinbergen (1974)	12 countries	0.54 to 2.64
Rosen & Willis (1978)	Individuals in NBER-Thorndike sample, U.S.A.	\approx 2.00
Pissarides (1979)	20 years, U.K.	1.12 to 1.31
Dolphin (1981)	13 years, U.K.	0.7

- Source: Freeman, R., 'Overinvestment in College Training?', Journal of Human Resources, Summer, 1975.
- Pissarides, R.A., 'Staying on at School in England and Wales - and Why 9% of the 1976 Age Group Did Not', London School of Economics Discussion Paper No. 63 (November, 1979).
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FIGURE 3

Proportion of Young Men and Women Enrolled in College
in the U.S., 1951-1979



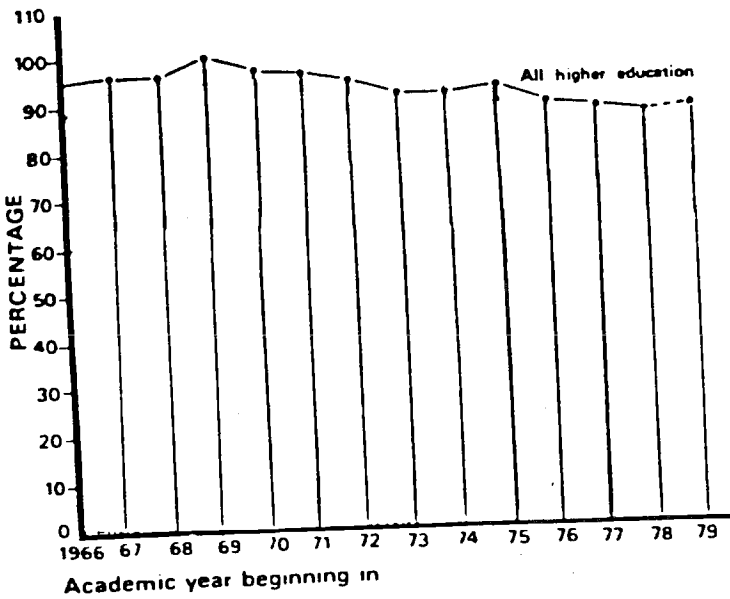
Source: U.S. Bureau of the Census, "School Enrollment", Current Population Reports, Series P-20; various editions, 1950-1979; U.S. Bureau of Labor Statistics, Employment of High School Graduates and Dropouts, Special Labor Force Reports.

FIGURE 4

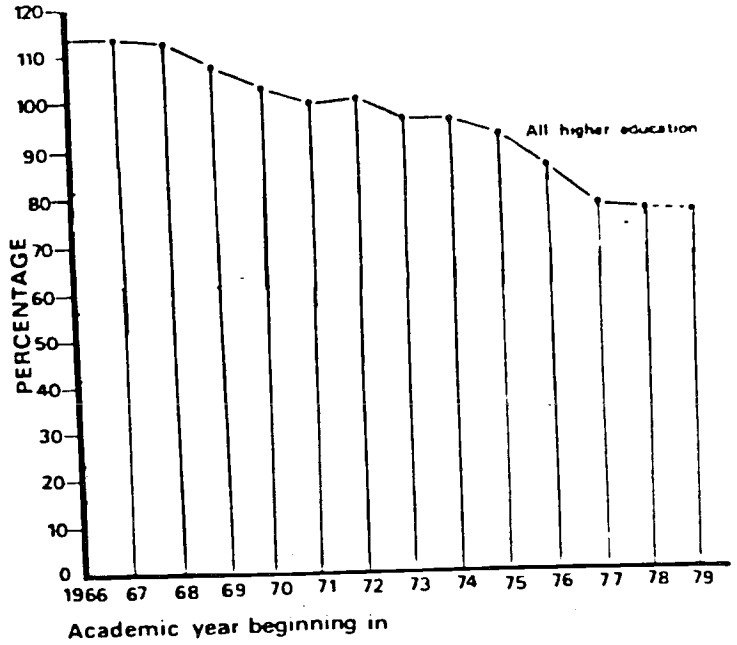
Proportion of Young Men and Women Enrolled in College in the U.K., 1966-1979

Qualified participation rates¹ (U.K.)

Men



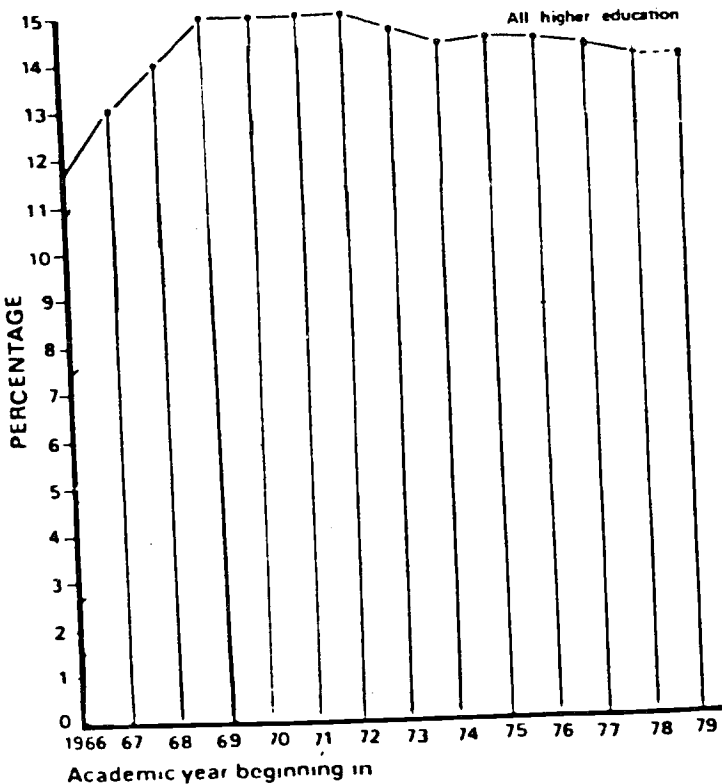
Women



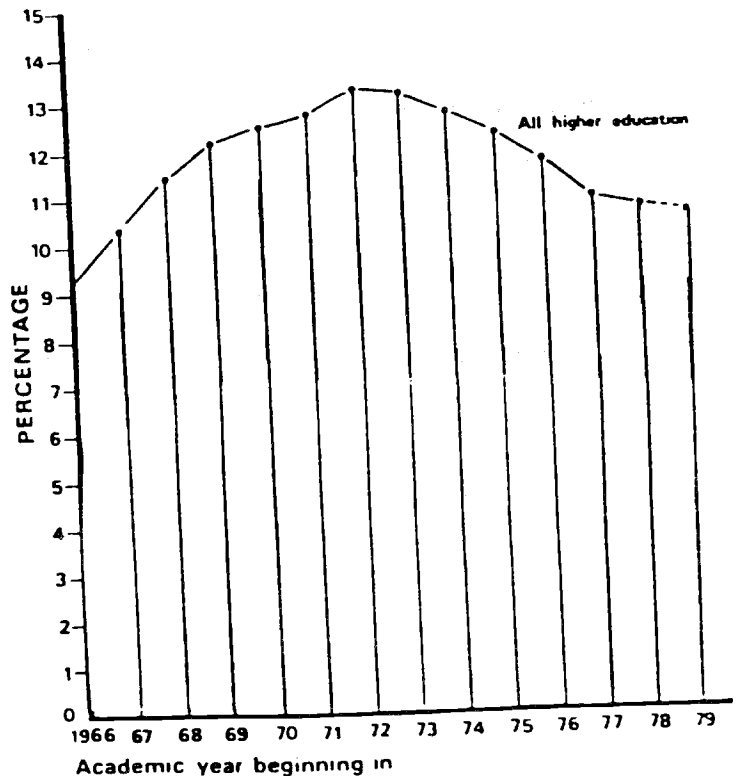
¹ The rates for all higher education exceeded 100 per cent in the earlier years because they included a large number of entrants to teacher-training with less than two A levels, who are not included amongst the qualified leavers.

Age participation rates (U.K.)

Men



Women



The supply-demand explanation of change

The preceding analysis suggests that the decline in the premium to higher education found in Section I can potentially be explained as the result of a sizeable shift in supply of graduates, which exceeded the increase in demand, in conjunction with elasticities of substitution on the order of 2.0 and elasticities of supply on the order of 1.5. Using (3) and those values of σ and ϵ , we would expect increases in relative number of graduates to reduce the educational premium with an elasticity of about 0.3. If we take the increases in relative enrollment from 1960 to 1976/79 shown in Table 3 as indicative of the change in relative supply of young graduates over the period, and assume moderate increases in relative demand for graduates, e.g. 1% per year, which is about the estimate I obtained for the U.S. (Freeman, 1976, table 5, p. 4), the resultant figures suggest that the supply-demand explanation will fit the observed experience to a reasonable extent: on average, the growth rate of relative enrollments in the final column of Table 3 is nearly 4.0% per annum; taking $\dot{S} = 4.0\%$; $\dot{X} = 1.0\%$ and $1/(\sigma + \epsilon) = .30$ in equation (3), these figures yield a decline in the university premium of about 1% per annum, which is roughly in accord with the general magnitude of declines in most countries. Since, of course, the timing and magnitude of changes differs considerably among countries, this exercise is meant solely to show that the proposed explanation is not grotesquely out of line. In the one case where I have tested the explanation using a regression model, (see Freeman, R. in Griliches, Z., W. Krelle, H. Krupp, and O. Kyn, 1978), all of the 1969-74 change in the U.S. was attributed to the rapid growth of the relative supply of graduates. Note that the reversal in growth of supply in the late 1970s in the U.S. is crudely consistent with the observed slackened decline/ modest improvement in relative earnings

ratios at that time; cyclical factors, however, were also at work.

What about alternative explanations of the changes?

One potential hypothesis is that in a period of slow/declining growth of real earnings, as characterized the 1970s, trade union/governmental activities to maintain the real position of manual workers rather than the supply-demand market figures stressed here underlie the observed patterns. In the one case in which I have examined this hypothesis, the data suggest that while union activities have operated in the predicted direction, they have not been sufficiently sizeable to explain the observed patterns. Specifically in the U.S., where about 20% of the labor force is organized, trade unions have raised their wages relative to those of nonunion manual workers by perhaps 5 percentage points in the period studied; if we assume, at an extreme, that half of nongraduates were organized, this implies at most a 2 1/2 percentage point increase in manual worker earnings and thus a 2 1/2 point decrease in the college premium, compared to observed changes of 14-20 percentage points.

The future

Are the developments of the 1970s a permanent or a transitory phenomenon? Will the premia to higher education continue to decline, stabilize, or rise in the future? In terms of the analysis given, the answer depends on what Tinbergen has called the 'race' between the growth of supply and the growth of demand.¹⁴ On the supply side, demographic forces and the reduced propensity to enroll in higher education shown in Table 3 suggest that the principal cause of the falling premia--rapid expansion of supply--will be arrested in the next decade. In some countries, notably the United States, demographic factors are likely to lead to an actual improvement in the economic status of young gra-

TABLE 6

Cross-section Relation Between Economic Development
and Private Returns to College Training

Grouping of countries by per capita income class (from high to low)	Mean income per capita (\$ U.S.) (about 1960) and number of countries	Private rate of return (%)
1	\$86 (3)	25.2
2	223 (4)	25.4
3	389 (3)	17.8
4	828 (5)	15.4
5	1670 (5)	14.2
6	2224 (5)	10.8

Source: G. Psacharopoulos, 'Rates of Return to Investment in Education Around the World', Comparative Education Review, Vol. 16, No. 1, February 1972, p. 64. Tables with mean incomes calculated from Appendix Table, p. 67. The number for the fifth group has been corrected.

duates as the number of young persons falls in the 1980s, decreasing the number of young graduates and raising their wages. In other O.E.C.D. countries the demographic patterns will produce declines in the number of young persons at the end of the 1980s, suggesting that any improvement in the position of graduates will not begin until then. The demographic change is likely to have less impact on nongraduate workers because they tend to be more ready substitutes for older workers than are new university-trained personnel. In other countries, the demographic swings are less dramatic, suggesting more modest changes in the market in ensuing periods. On the demand side, it is difficult to forecast how technology and related factors will shift relative demand schedules. Diverse forecasts, based on varying assumptions about future economic developments, suggest no extraordinary change in relative demands, which leaves the shifts in supply as the main moving force in the market.

While there may be some upswing and while there is unlikely to be any further deterioration in the relative economic position of graduates, at least in the 1980s, I do not believe the market will rebound in general to such an extent as to restore pre-1970s graduate/nongraduate differentials.

In this regard, it is of some value to contrast the position of highly educated workers across countries. All else the same, if the relative earnings on return to college declined with level of development, one could be more likely to expect the reduced premium to persist than if development were unrelated to premium. Table 6 summarizes data gathered by G. Psacharopoulos which shows a sizeable drop in private returns to college training with development, which lends support to the notion that the diminished premium of the 1970s will be more than a transient phenomenon.

Another clue to the future may be found in the evidence given by Scitovsky in his 1966 paper on the trend in professional earnings. Scitovsky examined data from 1870-1900 to the 1950s, finding a downward trend in most western countries in the ratio of professional earnings to the earnings of other workers, though his data revealed diverse patterns of change for different professions in different periods. That the development of the 1970s are at least consistent with some long-run changes also suggests they will not be entirely reversed in ensuing decades.

Conclusion

This paper has examined diverse data on the changing economic position of graduate workers in the major developed countries. It has found

- 1) An overall trend in the 1970s and in some cases earlier toward a lower graduate to nongraduate income ratio.
- 2) A distinct time pattern to the decline, which was most severe in most countries in the early part of the decade.
- 3) A worsening in the unemployment position of graduates, in some cases relative to the unemployment position of other workers.
- 4) A reduction in the upward trend and in some cases a reversal of the trend in enrollments as a proportion of the relevant age group.
- 5) Estimates of substitution between more and less educated workers and elasticities of the supply of students on the order of 1-2, magnitudes which permit shifts in supply and demand to have a sizeable effect on wages.

The paper has advanced the hypothesis that the decline in the college premium is in fact due to the increase in supply during the period in conjunction with the elasticity values given above. It has speculated that the 1980s will see a better market for graduates but not a return of the pre-1970s economic advantage.

Footnotes

- 1/ For a discussion of the changing economic value of education in the U.S. see R. Freeman (1976); for the U.K. see C. Pissarides and A.M. Dolphin.
- 2/ See R. Freeman (1977) for a detailed evaluation of rates of return.
- 3/ See C. Pissarides for an effort to translate these figures into present values of earnings.
- 4/ Countries for which the decline in earnings ratios was greater in the early part of the decade are: U.S. (all but one group), Australia, U.K., Japan, France, Denmark, countries with a mixed pattern are: Canada and Germany. Italy is the major exception to the generalization.
- 5/ Ratios of Indices of the Average Earnings of Nonmanual to Manual Workers in Common Market Countries, 1972-1979

	<u>1972</u>	<u>1976</u>	<u>1979</u>	<u>Δ</u>
1. Denmark	1.00	.90	.87	-.13
2. Italy	1.00	.87	.78	-.22
3. Netherlands	1.00	.96	.95	-.05
4. Belgium	1.00	.95	.95	-.05
5. Germany	1.00	1.03	1.03	.03
6. France	1.00	.82	.85	-.15
7. United Kingdom (males)	1.00	.95	.94	-.06

Note: Average earnings of nonmanual workers refer to average gross monthly earnings. Average earnings of manual workers refer to average gross hourly earnings.

Source: Eurostat. "Hourly Earnings--Hours of Work".
Tables: "Trends of Average Gross Monthly Earnings of Nonmanual Workers by Industrial Groups"; "Trends of Average Gross Hourly Earnings of Manual Workers by Industrial Groups".

- 6/ Since price and quantity adjustments can under some conditions substitute for one another this is not a necessary condition for a market to be declining.

- 7/ The 1962-1968 data are reported by the National Center for Educational Statistics, line 3, Condition of Education 1979, table 1.11, updated. I have updated them using data from U.S. Bureau of Labor Statistics Educational Attainment, 1976 and 1979.
- 8/ See R. Freeman, The Overeducated American (Academic Press, 1976).
- 9/ The U.S. data are from Current Population Reprints, Consumer Income Series P-60.
- 10/ The U.K. data are from University Grants Committee, Abstract of Statistics.
- 11/ The Japanese data are from Umetami, "The College and the Rate of Return to Higher Education in Post-War Japan, 1954-1973". University of Wisconsin, 1977. Ph.D. dissertation.
- 12/ American Council on Education, National Norms for Fall 1977.
- 13/ See R. Freeman, The Labor Market for College-Trained Workers (Harvard University Press, 1979).
- 14/ See Tinbergen, p. 224.

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