NBER WORKING PAPER SERIES

THE "YOUTH PROBLEM": AGE OR GENERATIONAL CROWDING?

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Working Paper No. 1829

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
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February 1986

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ABSTRACT

This paper attempts to distinguish between two alternative views of the labor market problems faced by young workers in a number of industrialized countries in the 1970s and early 1980s. The first view is that the low relative earnings and high unemployment rates experienced by these workers were largely "age" related. Although this view carries the implication that the problems will disappear for recent youth cohorts as they grow older, it also implies that the problems will be "handed over" to successive waves of youth cohorts as they enter the labor market. The second view is that the labor market problems of recent youth cohorts are a consequence of their large size. This view has very different implications since generational crowding can permanently or temporarily depress the economic position of large cohorts but need not have an adverse effect on later waves of smaller youth cohorts.

On the basis of a multi-country empirical analysis of patterns of cohort size, earnings, unemployment, and the distribution of young workers across industries, we have four main sets of findings to report.

First, the baby-boom was not uniformly experienced across OECD economies in terms of either its timing or magnitude. While some countries, such as Canada, the U.S., and Belgium had large increases in the youth share of the population from 1965 to 1980, others, notably Japan and Switzerland, had large decreases.

Second, our empirical results indicate that large cohort size tends to have a negative effect on the "expected relative earnings" of the cohort, where expected relative earnings is defined as the product of the earnings and the employment-to-labor force ratio of a young cohort relative to the same product for an older cohort. There is, moreover, a marked trade-off between the relative earnings effect and the relative employment effect with large cohort sizes reducing relative earnings in some countries and reducing relative employment in others.

Third, at least for the U.S., the relatively low wages and high unemployment of the "unlucky cohorts" tend to converge to the patterns that would have resulted had the cohorts been more "normal" in size, with the convergence occurring within a decade or so.

Fourth, our results show that baby-boom cohorts were absorbed in the U.S. and other OECD economies quite evenly across a wide range of industries. This finding contradicts the popular belief that large youth cohorts were absorbed primarily through expansion of those industries that have been traditionally youth-intensive.

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Introduction

It is now widely accepted that the large youth cohorts that entered the labor markets of a number of countries in the 1970s have faced serious economic problems. Most discussions treat these problems as "age" or "youth" related, implying that they will disappear for current youths as they grow older and will affect new smaller cohorts simply because of their age. At the same time, recent public and professional discussion of the "baby boom" generation has focused attention on the problems from a very different perspective, which has different implications for policy; namely that the current group of youths suffer from "generational crowding" due to the size of their cohort. Generational crowding can depress the economic position of large cohorts permanently but need not adversely affect new smaller youth cohorts.

What are the facts about the demographic bulge? In which countries has it been most (least) marked? What is the evidence that it has altered the economic position of baby boom youths? To what extent have labor markets in different countries adjusted to the baby boom cohort in terms of reductions in relative wages, and to what extent in terms of worsened employment opportunities? What does the evidence suggest about the possible long term generational problems faced by the baby boom cohorts?

I. The Baby Boom Bulge: Magnitude and Economic Effect

Because fertility patterns have differed markedly across developed countries, there is a striking difference in the pattern of "baby boom" bulges in the OECD economies, producing quite different age structures of the population with potentially different effects on job markets.

Table 1 provides a general overview of the different demographic bulges in OECD countries from 1965-1980 and for historical comparison, 1950-1965, as well. It records the percentage of 15-24 year olds in the population by five year intervals. The data show a wide range of country experiences which we have crudely categorized into one of four groups, ordered by the importance of the "baby boom" in the 1965-1980 period:

(1) Those countries with a large and increasing youth percentage in the 1965-1980 period: the unweighted average mean youth percentage in this category was 18.0 in 1980, an increase of 2.5 points from its 1965 average of 15.5.

(2) Those countries with sizeable or moderately increasing youth shares: an unweighted mean youth percentage of 16.1 in 1980, up from 14.7 in 1965.

(3) Those countries with no noticeable change in the youth percentage (average 15.0 in 1980, 15.2 in 1965).

(4) Those countries with a marked decrease in the youth percentage (14.3 in 1980; 17.5 in 1965).

Observe that each group contains a fair number of countries. Observe also the wide range of changes and levels across countries. The demographic youth bulge is important in a number of countries but not in all. Indeed, there are five countries in our last category, where youth employment shares of the population fall markedly in 1965-1980, most notably Japan and Switzerland. The different patterns indicate that the baby boom and potential generational crowding is a potentially important labor market problem in some countries only, particularly the English-speaking overseas countries (U.S., Canada, New Zealand,

Table 1: The Percentage of Youths (15-24 years old) in Total Population, 1950-1980, by Country

	1950	1955	1960	1965	1970	1975	1980
Large and Increasing Youth Percentage (1965-80)							
Australia	14.6	13.1	14.0	16.2	17.5	17.4	17.6
Belgium	14.8	13.5	12.2	13.4	14.9	15.6	16.0
Canada	15.9	14.4	14.6	16.0	18.4	19.3	19.9
Ireland	15.0	14.2	13.9	15.4	15.9	16.9	17.2
New Zealand	14.5	13.4	14.1	16.4	17.4	18.0	19.0
Portugal	18.6	17.9	16.3	15.3	15.7	16.8	17.5
U.S.	14.7	13.1	13.6	15.8	17.8	18.9	18.8
Sizeable or Moderately Increasing Youth Percentage(1965-80)							
Austria	13.7	13.5	14.7	14.5	13.6	14.4	16.2
France	15.2	13.7	12.4	14.5	16.4	16.1	15.9
Germany	14.6	15.8	15.9	13.4	12.8	14.1	15.5
Luxembourg	16.2	14.1	13.1	13.3	13.9	14.6	15.1
Netherlands	15.9	14.9	15.0	17.0	17.6	16.9	17.2
Spain	18.4	16.5	15.3	15.6	15.3	15.7	16.5
No Noticeable Change in Youth Percentage(1965-80)							
Greece	19.9	19.2	16.4	15.4	14.7	14.9	15.1
Italy	17.0	16.3	15.4	15.3	14.9	14.4	15.2
Norway	13.3	12.1	13.1	15.4	15.9	15.2	15.3
UK	13.6	12.9	13.3	14.6	14.4	14.3	14.3
Decrease in Youth Percentage(1965-80)							
Denmark	13.7	13.5	14.9	16.7	16.0	14.7	15.0
Finland	15.9	14.9	15.3	18.3	19.0	17.4	16.0
Japan	19.6	19.1	18.9	20.2	19.0	15.4	13.7
Sweden	12.4	12.1	14.2	15.8	15.1	13.4	13.7
Switzerland	14.4	13.5	15.4	16.5	15.4	14.9	13.1

Source: OECD Demographic Indicators of Countries, 1979, and UN World Population Prospects, 1985.

Australia) though also in Belgium, Ireland and Portugal as shown in the table. We shall refer to the countries in the first group as "baby boom" countries, although some in the second group could also be so labelled.

In terms of understanding the "youth problem" the diverse country experiences provide valuable "experiments" for comparison, and suggest the potential of cross-country analyses to contribute to our knowledge of the economics of the problem.

II. What are the Economic Effects of a Large Entering Cohort?

That the entry of a large cohort on the job market depresses economic opportunities for that cohort has received wide acceptance among analysts. As long as workers of different ages are imperfect substitutes in production, an increase in the supply of one age cohort will, by simple supply-demand analysis, adversely affect its economic position. In general, the effect of increased cohort size can show up either in the wages and occupational position of that cohort or in their unemployment (or labor force participation) levels. The magnitude of the two effects will depend on a variety of factors including the shape of the labor supply and labor demand curves, public policy related to the labor market, and macroeconomic trends and conditions. For example, the more elastic is labor demand, the lesser the effect of a large cohort on wages. Alternatively, the existence of a minimum wage that exceeds the market wage implies that the effects of cohort size will tend to show up in the form of increased unemployment. Of course, public policy can also mitigate the adverse economic effects of large cohort size, for example, by increasing the incentives for members of a large cohort to stay in school or to join the military. Finally, conditions in the macroeconomy may be such that a large cohort of workers can be absorbed into the labor force without any negative effects on their wages or employment. Even the expansion of particular sectors of an economy, in which the demand for labor from large (youth) cohorts is high, can moderate the otherwise adverse effects of large cohort size.

It is also worth noting that the effect of large cohort size can change over time. For example, suppose the wages in some labor market tend to exceed the market clearing level for young and inexperienced workers, but not

for older experienced workers (perhaps because of a government-set minimum wage). In this situation, a large cohort will suffer relatively high unemployment with little relative wage decline when it enters the labor market, with moderation of the unemployment effect and magnification of the wage effect occurring as it ages.

As another example, the effect of large cohort size can either be aggravated or mitigated by coincidental changes in the labor force participation rates of other demographic groups. For example, in countries like the U.S., Canada, Australia, Great Britain, and Sweden, the dramatic increase in the labor force participation rates of women occurred at roughly the same time as large birth cohorts reached labor force age. By contrast, industrialized countries such as Germany and Japan have experienced little or no change in rates of female labor force participation over the past 25 years (See Table 2). If these trends are independent of the changed numbers of youths, they could have substantial independent effects on the economic position of the incoming young workers. If women are substitutes for youths in production, the position of youths will be worse in countries with rising participation, and conversely if the women are complementary inputs. Similarly, the falling labor force participation rates of older men (i.e., aged 55 and over) in a country like the U.S. could be expected to affect the prospects for the large entering cohorts.

Table 3 presents a review of the empirical studies that have been conducted on the effects of cohort size on earnings and unemployment. Most of the studies refer to the U.S. experience, although the Dooley study looks at earnings effects in Canada, the Ben-Porath study looks at earnings and unemployment effects in Israel, and the OECD study looks at unemployment effects

Table 2: Female Labor Force Participation Rates in Selected OECD Countries, 1965-1983

Country	1965	1970	1975	1980	1983
Canada	35.3	41.1	50.5	57.8	60.8
United States	45.7	50.4	54.9	61.3	63.4
Japan	55.8	55.4	51.7	54.9	57.2
Australia	34.8*	45.6	49.7	52.5	51.8
Finland	62.6	61.5	65.7	70.0	73.5
France	45.7	49.8	52.9	55.6	55.8
Germany	48.8	48.1	49.7	50.0	49.6
Italy	31.0	29.1	29.9	39.2	40.2
Netherlands	na	25.8[a]	27.0	30.3	34.3
Norway	na	51.7[a]	54.6	64.7	68.1
Portugal	na	na	50.6	54.9	55.1[c]
Spain	na	31.4[b]	33.5	33.7	35.0
Sweden	55.4	60.6	68.9	75.7	78.3
UK	50.0	52.8	57.5	59.8	59.1

Source: OECD Labor Force Statistics 1962-1982 except * from U.S. Department of Labor, Handbook of Labor Statistics, 1983.

a=1971
b=1972
c=1982

Table 3: Summary of Empirical Studies of the Effects of Cohort Size on Earnings and Unemployment

Study	Brief Description	Effect on Earnings or Earnings Growth?	Effect on Unemployment?
D.A. Ahlburg "The New Kuznets Cycle: A Test of the Easterlin-Wachter-Wachter Hypothesis" (1982)	Simple time-series analysis of the ratio of median income received by 14-24 year old American males (and 25-34 year olds) to 45-54 year olds. Regression analyses are also presented in which the ratios of the unemployment rates of 20-24 year old American males (and 25-34 year olds) to 45-54 year olds are treated as the dependent variables. In all cases, the only independent variable is the ratio of the male population aged 16-29 to the male population aged 30-64. The time periods covered are 1953-1976 in the earnings regressions and 1948-1976 in the unemployment regressions. The empirical results of this study are best interpreted as simple correlation, and not as evidence of causal relationships.	Yes. The ratio of the income received by younger and older workers is negatively associated with the ratio of the numbers of younger and older individuals in the population.	Yes. The number of unemployed younger workers rises relative to older workers as the ratio of younger to older individuals in the population rises.
J.A. Anderson "An Economic-Demographic Model of the United States Labor Market." (1982)	This study estimates a large diaggregated economic-demographic model of the U.S. labor market. Separate equations are estimated for the earnings and unemployment of males and females in different age groups. Cohort size (or some function of cohort size) is included as an independent variable in each equation, although the range of other control variables is limited. Thus, the empirical results of this study should not be interpreted as causal.	Yes. Increases in the size of a cohort tend to be associated with lower average wages received by that cohort.	Yes. The unemployment rate of young cohorts of both male and females, relative to the unemployment rate of 25-54 year old men, is positively and significantly associated with a measure of relative cohort size.

Table 3: (continued)

Study	Brief Description	Effect on Earnings or Earnings Growth?	Effect on Unemployment?
N. Alsalam, "The Effect of Cohort Size on Earnings: An Examination of Substitution Relationships" (1985)	This study researches the effect of cohort size on the shape of experience-earnings profiles. The theoretical model builds on the work of Freeman (1979) which estimates the elasticities of substitution between different types of labor in the context of an aggregate production function. However, this model also imposes the restriction that workers with similar experience are closer substitutes in production than workers with dissimilar amounts of experience. The paper estimates experience-earnings profiles separately for workers in different schooling classes in order to determine whether cohort size has a differential effect on the earnings of cohorts on the leading and trailing edges of a baby-boom. The empirical estimates presented in this paper are based on U.S. data derived from the March versions of the Current Population Survey from 1968 to 1984.	Yes. The results of this study suggest that members of large-sized cohorts earn less, both annually and weekly, than members of relatively small cohorts. This result is especially strong for college graduates. The empirical results also suggest that the cohort erodes if other large cohorts follow (i.e., if the cohort is on the leading edge of a baby-boom). On the other hand, the negative effect is aggravated if small cohorts follow (i.e., if the cohort is on the trailing edge of the baby-boom).	
Y. Ben-Porath, "Market, Government, and Israel's Muted Baby Boom" (1985)	This paper investigates the effect of cohort size on earnings and unemployment using data from Israel. This is a particularly interesting experiment since cohort size in Israel changed substantially after the late 1940's (i.e., the changes are even more dramatic than the American baby boom.) Regression models are estimated in which annual and hourly earnings for young relative to older cohorts are modeled as functions of a cyclical unemployment variable and a relative employment cohort size variable. Regression models are also fit to logged unemployment rates for young men, with employment rates for older men and a relative (labor force) cohort size variable, entered as right-hand side variables.	Yes. Young men's relative earnings are negatively associated with their relative share of employment, controlling for the business cycle. In addition, the effect seems to be larger for cohorts at the tail end of the baby-boom.	Yes. Relative cohort size has a positive effect on unemployment rates.

Table 3: (continued)

Study	Brief Description	Effect on Earnings or Earnings Growth?	Effect on Unemployment?
M.C. Berger "Cohort Size and the Earnings Growth of Young Workers" (1984)	This study argues that cohort size has a theoretically indeterminate effect on human capital investments (and not a positive effect, as argued by Welch and others). Thus, to the extent that the magnitude of individuals' human capital investments are positively related to the slopes of their age-earnings profiles, cohort size has an ambiguous effect on earnings growth. Regression models are fit to pseudo-longitudinal data on U.S. workers for a series of gender/schooling groups. The regression models control for individual labor market experience and for business cycle conditions.	Yes. Larger cohorts have less steeply sloped earnings profiles than smaller cohorts during the early part of their careers. Moreover, the flattening effect of cohort size is larger for individuals who completed college. Thus, the results of this study suggest that the effects of cohort size persist over time.	
M.C. Berger, "The Effect of Cohort Size on Earnings Growth: A Re-examination of the Evidence" (1985)	This study reestimates the model developed in Welch (1979) using three more years of data from the U.S. Current Population survey and relaxing several empirical restrictions imposed by Welch.	Yes. Cohort size depresses the earnings of white males after their entry into the labor force. However, these negative effects increase with time in the labor force (i.e., they do not decrease as reported by Welch.) Thus larger cohorts tend to have lower initial earnings and and slower earnings growth.	
M.D. Dooley "Changes in the Relationship Among Earnings, Education, and Age for Canadian Men: 1971-1981" (1985)	This study investigates the effect of cohort size on earnings levels and earnings growth using microdata for Canadian males derived from six Surveys of Conumer Finances, conducted over the period 1971-1981. The sample does not include never married adults who lived with their parents. However, the data are grouped by age and year and stratified by educational attainment levels for purposes of empirical estimation. The dependent variable in the regression model (which is structurally similar to that estimated by Welch (1979)) is the mean of log earnings of age group; in year t; the unemployment rate, a moving average of cohort size, and a time trend.	Yes. Larger cohorts tend to have lower earnings, although this effect diminishes with time. In addition, there is no evidence that earnings catchup is greater among more highly educated individuals. This finding suggests that the declining return to schooling is partly a demand-driven phenomenon.	

Table 3: (continued)

Study	Brief Description	Effect on Earnings or Earnings Growth?	Effect on Unemployment?
E.M. Falaris and H.E. Peters, "The Effect of the Demographic Cycle on Schooling and Entry Wages" (1985)	This study used panel data from the National Longitudinal Surveys of Young Men and Women and from the Panel Study of Income Dynamics to estimate regression equations in which completed education, age at completion of schooling, and hourly wages upon entry into the labor force are the dependent variables. The purpose is to estimate the direct effect of cohort size on earnings as well as its indirect effect, which is presumed to operate through the effect of cohort size on schooling decisions.	Yes. The direct effect of cohort size on entry earnings is negative. However, the educational decisions of large cohorts tend to offset the adverse earnings effects of large birth cohorts.	
R.B. Freeman "The Effect of Demographic Factors on Age-Earnings Profiles." (1979)	This study analyzes data which show that cohort size is negatively correlated with the relative earnings of young male workers (especially the college-educated) and essentially uncorrelated with the relative earnings of young female workers. Structural labor demand equations are derived and estimated using alternative production function specifications to estimate the degree of substitutability between younger and older workers. The empirical analysis controls for alternative explanations of the changes in relative earnings such as the business cycle, the increase in female labor force participation, and the growth of capital. The analysis focuses on both cross-sectional and time series data for the U.S.	Yes. Cohort size has a significant negative effect on the earnings of young workers, largely because younger workers are imperfect substitutes for older workers. No results are presented on the extent to which the cohort size effect declines with age (i.e., the extent to which the degree of substitutability between younger and older workers increases with age).	

Table 3: (continued)

Study	Brief Description	Effect on Earnings or Earnings Growth?	Effect on Unemployment?
R.B. Freeman "The Effect of Generational Crowding on the Labor Market for Young Male Workers" (1979)	This study estimates two main regression models using U.S. data. First, it regresses average weekly earnings for men computed from the 1969 and 1978 Current Population Surveys, on a vector of education/age group interaction terms. Second, it regresses teenage unemployment rates for men, over the period 1948 to 1977, on a time trend, the aggregate unemployment rate, a minimum wage variable, and a variable measuring the relative number of young male workers.	Yes. The analysis reveals a sizeable decline in the earnings of young workers relative to older workers during the same period in which the relative number of young workers increased.	No. The regression results indicate a significant positive cohort size effect only for the 16-17 year olds. The estimated effect is close to (and not significantly different from) zero for the 18-19 and 20-24 year olds. These results therefore suggest that the main effect of generational crowding is on wages and not on unemployment.
R.B. Freeman "Career Patterns of College Graduates in a Declining Job Market." (1981)	This study analyzes the effect of cohort size on the earnings growth of college graduates relative to high school graduates. Regression models are fit to both cross-sectional and longitudinal data for the U.S. Differences between the cross-sectional and longitudinal earnings profiles are analyzed.	Yes. Large size cohorts of college graduates have lower starting pay and flatter age-earnings profiles than small size cohorts.	
I. Leveson "Economic, Social, and Demographic Effects of Changes in Relative Cohort Size." (1980)	Time series regressions are fit to U.S. data over the post- World War II period. One set of regressions covers the period 1967-1977 and relates real income to relative cohort size and to a constructed variable which captures the effects of secular productivity growth and business cycle fluctuations. These regressions are fit separately to data for different race/gender groups and for both all workers and full-time workers only. A second set of regressions model teenage unemployment rates as linear functions of cohort size, adult unemployment rates, and a minimum wage variable. These regressions are fit separately to data for different race/gender groups. They cover the periods 1947-1979 and 1954-1979.	Yes. The estimated effects of cohort size on earnings for year-round, full-time workers are negative for male and female college graduates. However, the estimated effects are less uniform for high school graduates and for regressions fit to data on all workers.	Yes. The coefficient of the cohort size variable is positive and statistically significant in unemployment rate equations fit over different time periods and to different race/sex groups.

Table 3: (continued)

Study	Brief Description	Effect on Earnings or Earnings Growth?	Effect on Unemployment?
OECD, Youth Unemployment: The Causes and Consequences. (1980)	This study fits regression equations to time series data on the natural logarithm of unemployment rates of both male and female teenagers at different ages. The independent variables in these regressions are the logarithm of the adult unemployment rate a linear time trend, and the logarithm of a relative cohort size variable. Equations are estimated separately for ten countries including Australia, Canada, Finland, France, Germany, Italy, Japan, Sweden, The United Kingdom, and the United States. Time periods covered vary by country.		Mixed. The cohort size variable has a small or statistically insignificant effect in most of the regressions for Australia, Finland, France, and Sweden. On the other hand, the estimated cohort size effect tends to be positive and is often significant for youth cohorts in Canada, Germany, Italy, Japan, the United Kingdom, and the United States.
L.B. Russell, The Baby Boom Generation and the Economy (1982)	Regresses the unemployment rates of 16-17, 18-19, and 20-24 year olds on a business cycle indicator, a time trend, and the proportion of the working age population in the age group 16-24. The regressions are run separately for males and females over the time period 1947-1980.		Indeterminate. All of the regressions indicate strong positive associations between unemployment and cohort size when just the business cycle is controlled for. However, this partial correlation changes sign in every regression when a time trend variable is included. Although it is not altogether clear why a trend variable should be included in the specification, the instability of the cohort size effect with respect to the change inspecification suggests that the econometric results of Anderson (1982) and Wachter (1976) are weak.
H.W. Tan and M.P. Ward "Forecasting the Wages of Young Men: The Effects of Cohort Size" (1985)	This study estimates the effect of cohort size on the weekly wages and annual earnings of white males in the U.S. The data are drawn from the 1968 to 1981 Current Population Surveys (March). Regression models are fit to data that are stratified by completed schooling levels. Independent variables include cohort size, years of experience, real GNP, unemployment rate, and labor force size. In this study, cohorts refer to individuals who entered the labor force during the same period of time, (i.e., not to individuals who were born during the same period of time.) In addition, the cohort size measures used in the empirical work is a five year moving average of these experience cohorts.	Yes. The main findings of this study are (1) that a 1 percent increase in cohort size is associated with a .25-.35 percent reduction in the weekly wages of labor force entrants and (2) that the cohort size effect falls to .10-.15 percent as experience increases. This second finding is counter to that of Berger (1984) who reports that the wage effects of cohort size actually increase with experience.	

Table 3: (continued)

Study	Brief Description	Effect on Earnings or Earnings Growth?	Effect on Unemployment?
M.L. Wachter. "The Changing Cyclical Responsiveness of Wage Inflation." (1976)	Time-series regression of the unemployment rates of male and female teenagers in the U.S. on the unemployment rate of 25-54 year old men and the proportion of the working age population in the age group 16-24. The time period studied is 1948-1975.		Yes. Every regression reveals a strong positive association between unemployment and cohort size. Note, however, the limited number of other control variables.
M. Wachter and C. Kim "Time Series Changes in Youth Joblessness" (1982)	The central argument of this paper is that increased cohort size associated with the baby-boom led to a worsening of youth unemployment in the United States. The authors model this relationship by emphasizing the notion that increased cohort size leads downward pressure on wages which, because of institutional constraints such as the minimum wage, results in increased unemployment rates. This hypothesis is tested empirically using quarterly time-series data for white and black teenagers in different age groups. Alternative measures of unemployment rates, which presumably provide better measures of economic hardship, are constructed and analyzed. The youth unemployment rates are regressed on the adult unemployment rate, a vector of seasonal dummies, a cohort size variable, and a time trend.		Yes. The coefficients of the cohort size variables are positive and statistically significant in all of the equations estimated. In addition, the elasticities of the unemployment rates with respect to the cohort size variable tend to be larger in magnitude for the males than the females. The results of this study provide support for a supply-side/institutional view of worsening youth unemployment.
F. Welch "Effects of Cohort Size on Earnings: The Baby Boom Babies' Financial Bust." (1979)	This study develops a simple "career-phase" model according to which individual work histories are viewed as a progression of fairly rigid work phases. Because it is assumed that fundamentally different work is performed in each phase, a worker's marginal productivity, and therefore his wage, is a negative function of the number of workers at the same phase. This model is implemented empirically using data on the earnings and characteristics of men during the period 1968-1976.	Yes. Cohort size is negatively related to both annual and weekly earnings. Moreover, the cohort size effect increases with level of schooling, but decreases after a period of 6-9 years of work experience for all schooling groups. The results of this study suggest that cohort size effects diminish over time, although they do not disappear altogether.	

Figure 2A: Unemployment of Youths Relative to Adults, Males, 1965-1983, Baby-Boom Countries (Ratios)

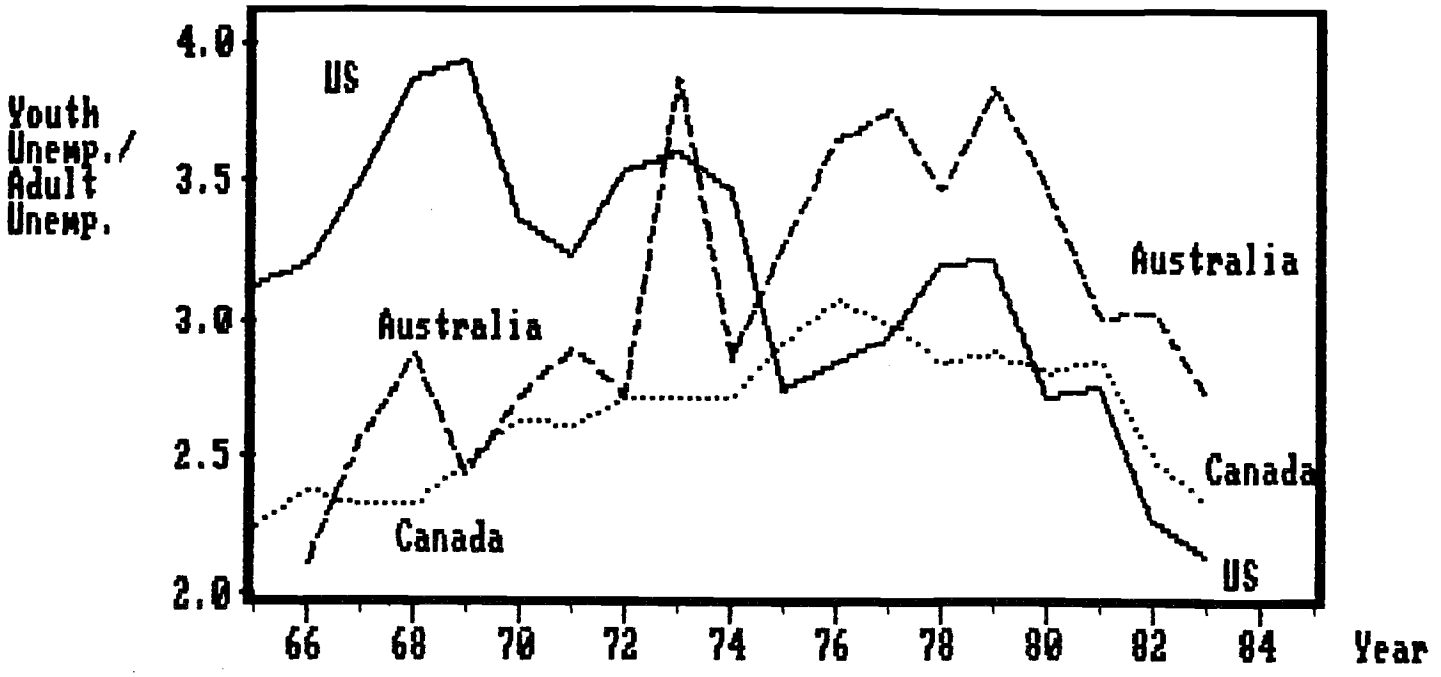
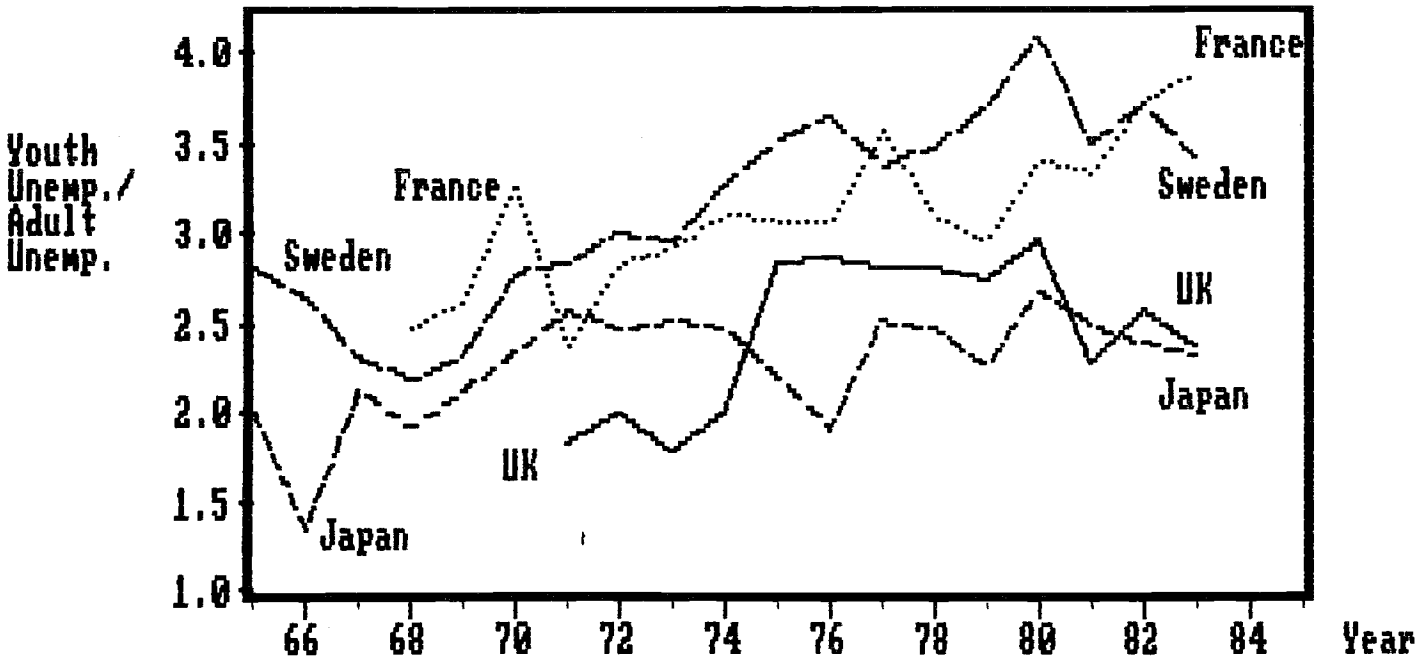


Figure 2B: Unemployment of Youths Relative to Adults, Males, 1965-1983, Countries Without Baby Booms (Ratios)



Source: OECD Labour Force Statistics, 1962-1982

in ten industrialized countries. In many respects these studies are difficult to compare. They use widely varying data (e.g., aggregate time-series data vs. microdata); they define key variables in significantly different ways (e.g., cohorts are defined in terms of year of birth in some studies and year of entry into the labor force in other studies; they are defined relative to a varying set of other cohorts; and sometimes the cohort size measure is smoothed by defining it as a moving average of adjacent cohort sizes); and they use different empirical specifications and estimation techniques (e.g., sometimes trend variables are included and sometimes they are not; some studies stratify their data by education while others do not; some studies involve simple least squares regressions while others use highly structured and restrictive factor analytic models). In addition, since few studies report results of estimating alternative models, it is difficult to gauge their robustness with respect to the conclusions they reach.

Despite these differences across studies, two clear areas of agreement do emerge. First, in the U.S., Canada, and Israel, the labor market entry of relatively large cohorts did result in a decline in the earnings of those cohorts relative to the earnings of older and smaller cohorts. Second, the labor market entry of large cohorts tended to result in increased relative unemployment in most countries.

Figures 1A and 1B plot the average earnings of young males relative to adult males over the years 1966-84 for seven OECD countries for which data are available (although the number of years of data varies somewhat by country). Figure 1A plots these data for the U.S., Australia, and Canada---all countries which fall into our first category of countries: those with large and rising

Figure 1A: Earnings of Youths Relative to Adults, Males, 1966-1984, Baby-Boom Countries (Ratios)

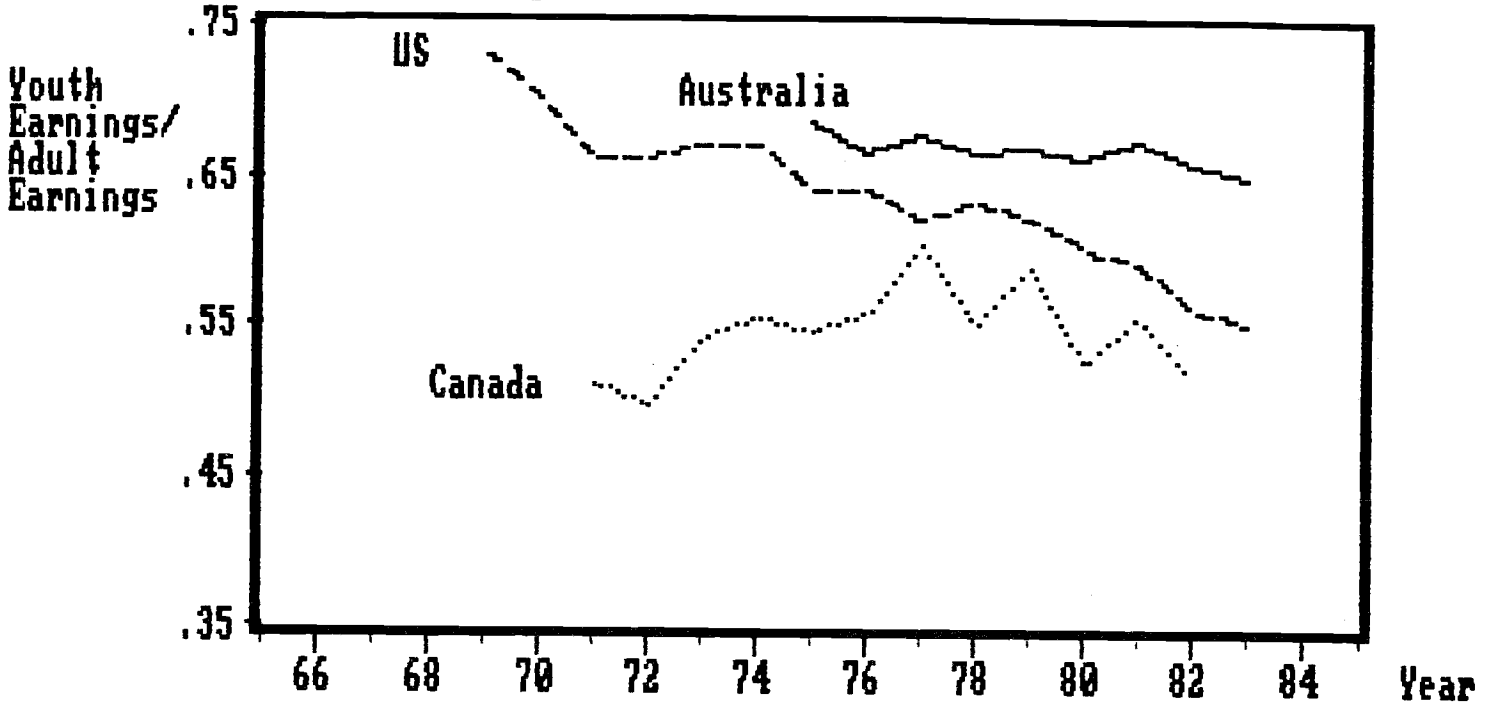
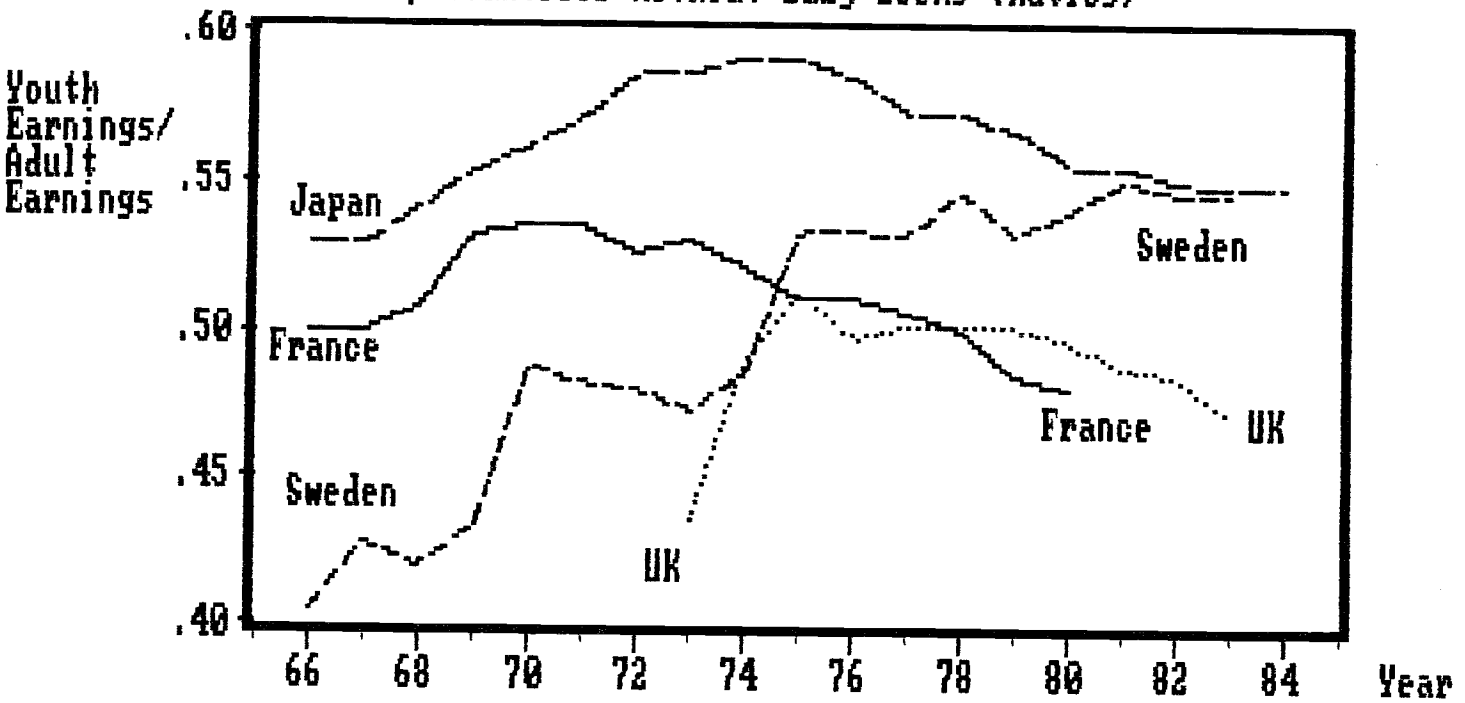


Figure 1B: Earnings of Youths Relative to Adults, Males, 1966-1984, Countries Without Baby-Booms (Ratios)



Sources: See Table A.3, Appendix II.

youth percentages of the population. Figure 1B plots these data for countries which did not experience such dramatic baby booms. It includes France, which fits into our second category, the U.K. (our third category), and Sweden and Japan, which had declines in the youth percentage.

The striking feature of Figures 1A and 1B is that the U.S. is the only country in which there is a dramatic decline in relative earnings. Indeed, Australia is the only other country which shows even some evidence of relative earnings decline. In contrast, relative earnings of youth in all of the other countries are either quite stable or increasing over time. These patterns suggest that the effect of cohort size on relative earnings may vary by country or may be "overpowered" by other factors (union wage policy, minimum wages, and so on).

As an example of the diversity of different countries' experiences, consider the patterns of change in the U.S. and Australia versus that in Canada. The U.S. and Canada had a larger increase in the size of their youth cohorts than Australia. Whereas the declines in relative earnings in the U.S. and Australia are consistent with the sizeable baby boom bulge in the U.S. and the moderate bulge in Australia, the absence of a decline is suprising in the case of Canada.

In Japan and Sweden, the increases in relative youth earnings are consistent with the evidence of proportionate declines in the number of young workers reported in Table 1. In addition, there is little change in relative earnings in France, which is consistent with the small change in the proportion of young workers. Finally, the U.K.'s growth in relative earnings is curious given the lack of change in the relative proportion of young workers.

Here, the relative earnings growth can apparently be explained by the institutionally determined increase in youth apprentice rates.

One problem with interpreting Figures 1A and 1B in terms of the gross correlation between relative cohort size and relative earnings is that it fails to consider the second key dimension of adjustment: unemployment. Thus, in Figures 2A and 2B we have plotted relative youth unemployment rates (i.e., the ratio of unemployment rates of males aged 15 (or 16)- 24 to males aged 25-54) over time for the same countries as in Figures 1A and 1B. The most interesting pattern in these Figures is the decline in relative unemployment rates in the U.S. The decline for the U.S. is consistent with the decline in relative earnings shown in Figure 1A and suggests that the effect of the baby boom was felt mainly on earnings in the U.S. and not on unemployment.

One other feature of Figures 2A and 2B worth noting is that relative unemployment rates do not decrease for any country except the U.S. For example, it is interesting to note that relative youth unemployment was higher in the U.S. than in any of the other countries in 1967. By 1983, however, relative youth unemployment was lower in the U.S. than in any of the other countries. On the other hand, in Japan, Sweden, and France, where simple economic theory would lead one to expect that the large decline in the proportion of young males would result in increased relative earnings or decreased relative unemployment, the relative unemployment rate increases only slightly. Overall, the Figures indicate that the magnitude of the wage adjustment in the U.S. has been substantial whereas the evidence for the other countries suggests a greater impact on relative youth joblessness. However, the experience depicted is rich enough to make it clear that responses to population changes are not uniform,

but rather depend upon economic institutions and circumstances.[1]

To summarize the unemployment and wage patterns shown in the Figures and to relate them to cohort size, we have estimated a two equation model.

In the first equation the dependent variable is the log of expected relative wages-- the product of the wages paid youths and one minus the youth unemployment rate divided by the product of the wages paid adults and one minus the adult unemployment rate. Cohort size effects that operate on either unemployment or wages will be captured by this dependent variable. For the sample of countries shown in Figures 1 and 2, we regress this dependent variable on five independent variables: the log of the ratio of young to older men in the relevant age groups--our measure of relative cohort size; a linear trend, to capture any trend factors such as technological change that might affect youth unemployment or wages; the log of the male adult unemployment rate, to capture cyclical factors; the log of female labor participation to capture the increased female work activism independent of demographic factors; and country dummy variables (omitting the U.S.); and a constant term. The results of the calculations, shown in column (1) of Table 4 reveal significant cohort, cycle, trend, and country effects. The elasticity of expected relative wages to our relative cohort measure is a sizeable -.22, a magnitude comparable to those obtained in individual country studies of the effect of cohort size on relative wages or unemployment, analysed separately.

Our second equation explores the tradeoff between relative wages and relative unemployment by regressing the log of youth to adult unemployment on the

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[1]For a discussion of youth unemployment in France, United Kingdom, Germany, Canada, and the U.S. which addresses circumstances particular to each country, see The Nature of Youth Unemployment, An Analysis for Policy-Makers, OECD, 1984

Table 4: Coefficients and Standard Errors of the Effect of Relative Cohort Size on "Expected Relative Wages" and of the Tradeoff Between Relative Wages and Relative Unemployment, Male Workers

The Dependent Variable:	log relative expected wage,(youth/adults)	Log relative unemployment rate (youth/adults)
Independent Variables:	(1)	(2)
log relative cohort size	-.22 (.11)	-
log adult male unemployment rate	-.16 (.02)	-.08 (.05)
Time	.004 (.004)	.018 (.006)
log relative wage, (youth/adult)		1.39 (.20)
log female labor participation rate	.04 (.15)	-.37 (.22)
Constant	3.68 (.39)	-4.43 (1.00)
Dummy Variables for Countries:		
Australia	-.02 (.03)	-.07 (.06)
Canada	-.13 (.02)	.09 (.05)
France	-.34 (.03)	.20 (.09)
Japan	-.29 (.04)	-.20 (.08)
Sweden	-.44 (.05)	.38 (.09)
UK	-.30 (.03)	.18 (.07)
R-squared	.83	.73

Note: The dependent variable in (1) is defined as log of youth wage x(1 - youth unemployment rate) divided by adult wage x(1-adult unemployment rate). The deleted country in the set of dummy variables is the U.S. See the appendix for exact data and definitions.

log of relative wages, time, and the log of the adult male unemployment rate and the log of the female participation rate. As can be seen in column (2), we obtain a highly significant and sizeable positive coefficient on relative wages. Thus, a country in which relative youth wages increased tended to "pay" for this increase with higher relative youth unemployment. In short, our data show that cohort effects alter the relative economic position of youths and reveal a tradeoff between unemployment and wages. However, without detailed analysis of institutions, policies, and perhaps industrial developments in individual countries we are unable to explain why countries have arrived at different points on the "tradeoff" demand curve.

In order to probe more deeply into the responses of different economies to variations in cohort size, we have calculated the change in the proportion of young workers by industry over recent time periods. These statistics are reported in Table 5 for males and females separately in the U.S., Japan, Germany, and Sweden, and for both sexes in France and Norway. In connection with this table, the first interesting question to ask is whether or not the wage and unemployment declines in the U.S. can be attributed to the sizeable growth of low-wage service jobs. For example, from 1970 to 1980, 87 percent of the growth of private sector jobs in the U.S. occurred in the service-producing industries, defined broadly to include all sectors but mining, manufacturing, and construction.[2] (By contrast, growth of employment in services in Europe has been rather modest.)

For young male workers in the U.S., what stands out in the first

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[2]Calculated by taking the change in service employment divided by the change in total employment in the private sector, U.S. Department of Labor, Employment and Training Report of the President 1982, p. 239.

Table 5: The Change in the Proportion of Young Workers by Industry*

Sector	United States 1970-1980 M	United States 1970-1980 F	Japan 70-83 M	Japan 70-83 F	Germany 75-83 M	Germany 75-83 F	Sweden 70-84 M	Sweden 70-84 F	Finland 76-83 Both Sexes	Norway 72-83 Both Sexes
Agriculture, Forestry, Fishing and Hunting	.06	.04	-.06	-.04	.04	.03	.04	.05	0	.03
Construction	.07	.02	-.10	-.10	.05	-0	-.02	-.08	-.02	.06
Manufacturing	.02	.01	-.12	-.20	.02	-.01	0	-.04	-.04	-.02
Mining	.08	.01	-.05	0	.03	.08				
Transportation and Communication	0	-.14	-.08	-.22	-.01	-.01	-.04	-.06	-.06	-.03
Wholesale Trade	.04	0	-.08	-.14	-.02	-.02	0	-.01	-.03	.02
Retail Trade	.07	.11								
F.,I.,R.,E.	0	-.05	-.06	-.17	-.02	-.08	-.04	-.11	-.06	-.04
Business and Repair Services	.04	-.02								
Professional Services	-.02	-.03	-.06	-.10	-.01	-.03				
Entertainment and Recreational Services	.03	.05								
Personal Services	.06	.01			.06	.02	-.03	-.07	-.01	-.03
Public Administration	.01	-.01	-.08	-.11	-.04	-.05				
TOTAL	.03	.01	-.08	-.10	.01	-.02	-.01	-.05	-.03	.00
Change in the Actual Number of Youths Employed (millions)	4.98	5.31	-2.17	-1.73	.14	-.04	-.04	.01	-.02	.04

*For sources, sector definitions, and definitions of "Young," see Appendix Table A.4.
NOTE: Proportions are relative to workers of the same sex in a given sector.

column of Table 5 is the extraordinary increase in the proportions of youths in each industry. Whereas many have argued that much of the absorption of youths into the U.S. work force occurred via expansion of "traditional" youth intensive industries, with the proportions of youths in the industries changing only modestly, the opposite turns out to be the case: the U.S. employed its increased male youth population in a wide variety of sectors, with youth employment coefficients rising substantially everywhere.

To quantify this finding we decompose the growth of youth employment into three components using the following simple identity

$$(1) \quad \Delta Y = \Sigma\, a_j\, \Delta I_j + \Sigma I_j \Delta a_j + \Sigma \Delta I_j \Delta a_j$$

where ΔY = change in youth employment, 1970 - 1980.

a_j = share of workers in industry j who were young in 1970

I_j = employment in industry j in 1970

Δ = change from 1970 to 1980

This decomposition breaks the growth of youth employment into:

(1) Growth due to expansion of youth employment industries;

(2) Growth due to changes in youth intensity of employment within industries; and

(3) Interaction effects.

As can be seen in the first row of Table 6, the decomposition shows that increased youth intensity coefficients, rather than changes in industry distribution, are the main factors underlying the overall changes in the youth share of jobs in the U.S. In particular, the decomposition for the U.S. attributes all of the growth of male youth employment to changes in youth intensity within industries; the bulk of the growth of female youth employment

is also due to the changes in youth intensity within industries. The negative interaction terms show that the proportionate increase of youths (both men and women) in expanding industries was smaller than in declining industries, even though the absolute increase was greater in the expanding industries.

Table 6 also decomposes the growth of youth unemployment for five other countries. The key result is that, as in the U.S., changes in youth intensity across industries, rather than the change in the size of youth intensive industries, is responsible for the overall change in youth employment shares in each economy. This is true in cases where the youth share of employment has fallen sharply, as in Japan, as well as in cases where changes are more moderate.

In sum, evidence on employment of persons by age across industries tends to support the view that the bulk of adjustment to changes in cohort size occurs within industries rather than across industries.

Table 6: The Decomposition of the Changing Share of Youth Employment

Country	Period	Sex	Initial Youth Share	Actual Change in Youth Share	Predicted Change in Youth Share, Fixing Youth Intensity Coefficients, Varying Industry Distribution	Predicted Change in Youth Share, Varying Youth Intensity Coefficients, Fixing Industry Distribution	Interaction
Japan	70-83	M	18.4%	-8.3%	0.3%	-8.6%	0.0%
	70-83	F	25.8	-10.6	2.8	-12.7	-0.8
Finland	76-83	M	17.6	-2.8	-0.1	-3.0	0.3
	76-83	F					
Sweden	70-84	M	15.8	-1.4	0	-1.1	-0.3
	70-84	F	20.5	-4.8	0.3	-4.3	0.8
Norway	72-83	M	15.7	-0.3	0.4	-0.3	-0.4
	72-83	F					
Germany	75-83	M	17.1	0.9	0.1	0.8	0
	75-83	F	24.2	-1.6	0.5	-2.0	-0.1
U.S.	70-80	M	16.7	3.0	0.0	3.0	-0.1
	70-80	F	23.0	0.6	0.4	0.5	-0.3

1. "Share of Youth Employment" is the ratio of youth employment to total employment. See Appendix Table A.4 for sources and for definitions of the terms "youth" and "employment."

III. Permanent or Transitory Economic Effects of Generational Crowding?

Consider the economic situation of a large cohort that enters the job market and suffers poor wages or employment prospects as a consequence of "generational crowding." As the cohort ages will it "catch-up" to the position it would have held had it been smaller, or will it fall further behind?

The question of the transitory or permanent nature of the economic problems faced by the baby-boom generation is a difficult one that has just begun to receive theoretical and empirical attention.

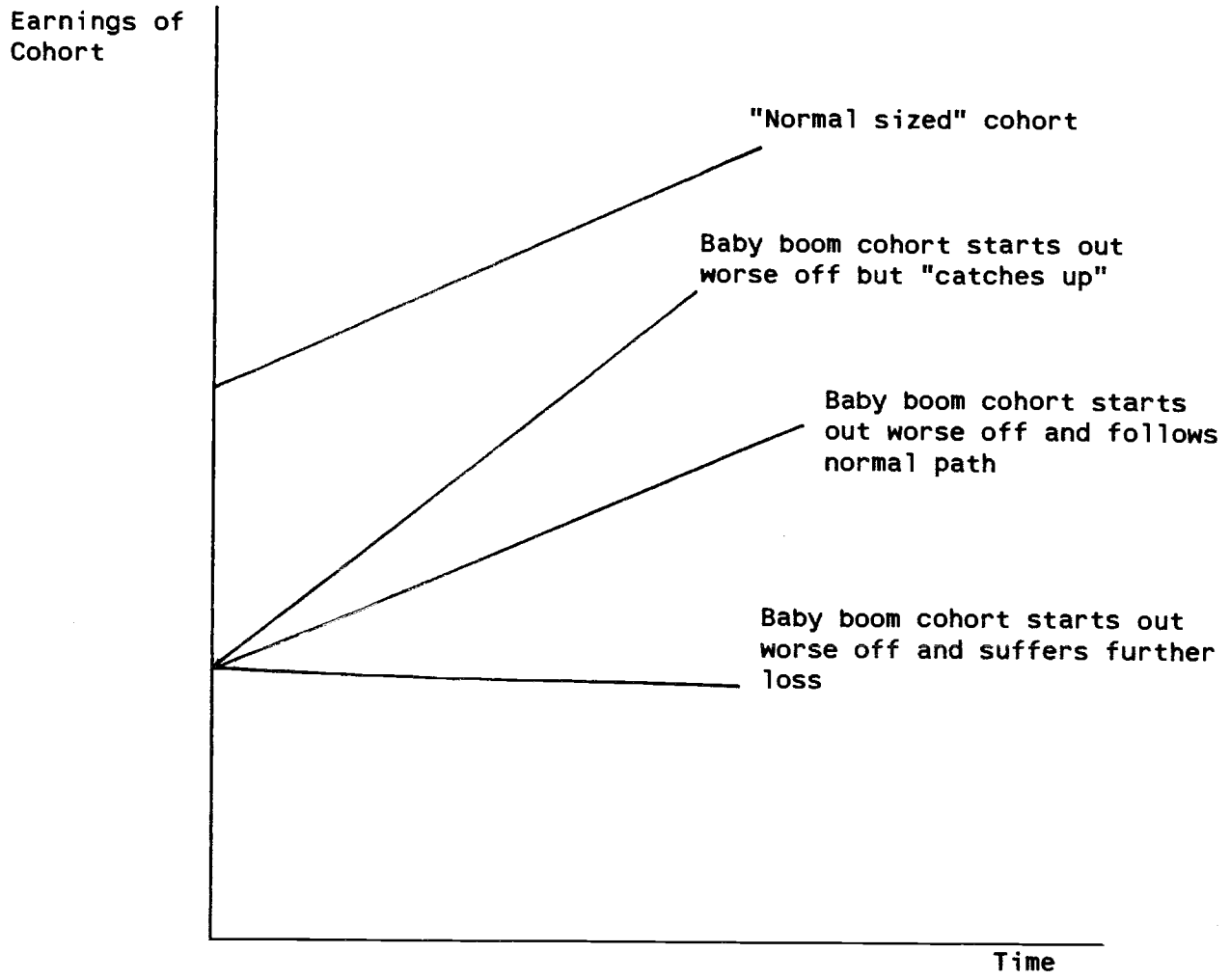
The problem is difficult for three reasons. First, the baby-boom generation has been in the job market in the U.S. and some other countries for only a decade or so. Twenty or thirty years from now economic historians will have full life-cycle cohort income profiles to study. We do not. Second, there is an inherent confounding of cohort effects and macroeconomic (or period) effects. In other words, the "baby-boomers" moved into the job market in the 1970s, a period of exceptionally low productivity and real wage growth in the U.S. and of low productivity and employment growth in Europe as well. It is by no means easy to factor out the differential effect of cohort size and sluggish macro-economic development on cohort progress in the job market. Third, we lack sufficient knowledge of the degree of substitutability of workers by age to make definite statements about how the demand for workers of different ages changes as they age. One possibility is that as workers specialize, they become less substitutable. Another possibility is that persons with work experience are less distinguishable and thus better substitutes for persons in different cohorts than are new entrants. Welch, in particular, has argued that the depressing effects of large cohort size on wages are diminished as members

of the large cohort "optimize" around the crowding problem they face (e.g., via different human capital decisions, increased migration, etc.)

These considerations suggest three dramatically different possible scenarios for "baby-boom generation" cohorts as they age (See Figure 3). First, the "baby-boom" cohort can make "normal" progress as it ages, neither catching up with its position had it been a smaller cohort nor losing further ground. Standard human capital investment considerations would, for example, suggest that such profiles might be "normal" for baby boomers, to the extent that opportunities are depressed in both learning and earning situations by generation size. In this sense, being a member of a large cohort depresses the level but does not tilt the shape of a "longitudinal" cohort age-earnings profile. Second, it is possible that the large supply of persons of the given age will "clog" up promotion possibilities, leading to earlier "plateauing" of persons along their career paths and further losses in earnings relative to where the cohort otherwise would have been. In particular, standard job ladder models suggest slower promotions and earnings growth as the large generation competes for a relatively fixed number of higher level jobs in company hierarchies. Third, the cohort may enjoy rapid progress as it ages, as persons move out of low-level jobs into more "normal" jobs, leading to at least some "catch-up." In other words, catch-up may take place because the cohort makes schooling and labor market decisions which help to dampen the adverse effects of its size. In addressing the extent to which substitution among age groups rises with age, one anticipates smaller effects of generational crowding as the cohort ages.

The position of a particular group in the age structure of the work force -- whether they are preceded by a relatively large (small) cohort or

Figure 3: Possible Effects of Cohort Size on Cohort Earnings Profiles



followed by a relatively large (small) cohort -- is also likely to affect their progress. The tail end of the baby boom might, for instance, be expected to face longer term and more serious difficulties than cohorts born at the beginning of the baby boom. Tailenders run the dual danger of facing a job market with clogged promotion possibilities and only a small number of new entrants that they could be expected to supervise.

The basic fact about the progress of the U.S. baby boom in the 1970s is simple: they have experienced much lower percentage wage increases as they have aged than have previous cohorts (see Figure 4), producing lower relative wages for the groups as they mature.[3] This fact is revealed by considering the difference between real median income growth of young workers and that of older workers in the post World War Two period. Figure 4 shows that this difference was fairly constant before the baby-boom cohorts began to enter the labor market (the ratio of 25-34 year olds to 25+ year olds was 23.7% in 1950, 23.4% in 1960, and 23.9% in 1970), then dropped sharply in the mid 1970s (when the ratio of 25 to 34 year olds to 25+ year olds jumped to 27.4% by 1975, indicating the entry of baby-boom children into the labor market).

Population projections indicate that the ratio of 25-34 year olds to 25+ year olds has risen to about 30% as of 1985 and will remain almost at that level until 1990. Thus, 25-34 year olds will continue to face labor market crowding in the near future.

However, in light of the difficulties alluded to earlier it is perhaps not surprising that there is considerable disagreement among analysts

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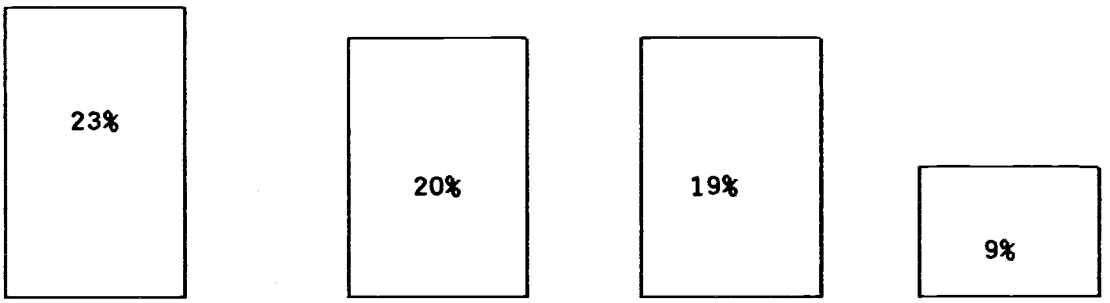
[3]We have reported differences in percentage changes in wages because these are the relevant differences for analysing changes in relative wages -- i.e. percentage change in wages of 25-34/wages of all men 25+ is approximately equal to the difference in the percentage change in the two wages.

Figure 4: Difference in Percentage Increases in Real Median Incomes of Male Workers Aged 25 - 34 and 25+ Over Three Decades*



1949 - 1959	1959 - 1969	1969 - 1979	1973 - 1983
Workers aged 25 - 34 in 1949 and 35 - 44 in 1959	Workers aged 25 - 34 in 1959 and 35 - 44 in 1969	Workers aged 25 - 34 in 1969 and 35 - 44 in 1979	Workers aged 25 - 34 in 1973 and 35 - 44 in 1983

Source: 1949, 1959, 1969, U.S. Census of Population 1950, 1960, 1970, Educational Attainment Volumes. 1973, 1979, 1983 from U.S. Bureau of Census, Current Population Reports Series P-60.

* The actual increases in real median incomes for the groups are given below:

	1949-59	1959-69	1969-79	1973-83
25-34	63%	51%	16%	0%
25+	40%	32%	-4%	-9%

regarding the permanence of generational crowding effects. The studies by Welch, Tan and Ward, and Dooley estimate similar empirical models using data for the U.S. and Canada and report results which show some "catch-up." In contrast to these studies, Berger presents theoretical arguments which suggest that optimal human capital decisions will not necessarily result in the reduction of cohort size effects on earnings, and presents an empirical analysis which suggests that the negative effect of cohort size on earnings increases with experience, contrary to the findings of Welch and others.[4]

Freeman has presented evidence that "catch-up" is not complete while in an earlier study, Ruggles and Ruggles found that the "depression" generation suffered some permanent economic losses compared to workers who entered the market in World War II in the U.S., but that those effects were modest. However, the depression generation carried with it the effects of poor starting jobs, but not of generational crowding.

As our contribution to the debate over which of the three scenarios outlined in Figure 3 best fits the experience of U.S. baby boom cohorts, we traced the earnings progress of several age cohorts in the period 1969-1984 using Current Population Survey tapes. These data permit comparisons of persons in their late twenties and early thirties at the outset of the baby boom bulge in the labor market with similarly aged persons who entered the labor market during the 1970s; they also permit comparisons of persons in their early and mid twenties who were part of the first wave of baby boomers with that of similarly aged persons later in the wave. There are diverse ways to contrast these

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[4]Since Berger's data and empirical model are identical to those of Welch, except for the relaxation of certain restrictive assumptions in Welch's study, Berger's results indicate that studies of the "catch-up hypothesis" may be quite sensitive to their assumptions and empirical design.

various groups; we have chosen to compare the progress of individuals in "young" cohorts with that of individuals in cohorts twelve years older in the period covered.

Empirical Findings: Earnings

Tables 7A and 7B report the percent wage gaps between selected youth cohorts (i.e., 17-20, 21-24, 25-28, 29-32, 33-36, and 37-40) and cohorts that are twelve years older than them (i.e., 29-32, 33-36, 37-40, 41-44, 45-48, and 49-52). These gaps are reported in Table 7A for U.S. males (white and nonwhite) for the years 1969, 1973, 1977, 1981, and 1984 (although the statistics for 1984 actually refer to cohorts one year younger, in order to preserve the cohort, as opposed to the age, comparisons). Table 7B reports a similar set of statistics for females. The data used to compute the statistics in these tables are drawn from the May versions of the Current Population Survey in the corresponding years. All individuals with positive earnings are included in the sample.

To facilitate the interpretation of the statistics in Tables 8A and 8B, we have marked cohorts that were born at various stages of the baby boom (e.g., the superscript "e" refers to the early baby- boom cohorts, "m" to middle baby-boom cohorts, and "l" to late baby-boom cohorts). Unmarked figures refer to non-baby-boom cohorts that were born prior to 1945 or after 1963. These will be taken as our reference cases (i.e., normal-sized cohorts). Comparisons are made between cohorts twelve years apart in order to make efficient use of the Current Population Survey data given available sample sizes, the range of years covered by the May version of the Survey, and our interest in analyzing wage gaps between baby-boom youth cohorts and non-baby-boom older cohorts.

Table 7A: Percent Hourly Earnings* Gap Between Youth Cohorts and Older Cohorts, Males

Young Cohort	Old Cohort	Year				
		1969	1973	1977	1981	1984**
17-20	29-32	-34.8[m]	-47.4[m]	-50.5[l]	-46.8[l]	-51.6
21-24	33-36	-16.4[e]	-26.8[m]	-34.9[m]	-35.4[l]	-43.4[l]
25-28	37-40	- 1.8	-11.0[e]	-25.4[m]	-20.5[m]	-29.6[l]
29-32	41-44	2.5	- 1.4	-11.3[e]	-16.5[m]	-12.2[m]
33-36	45-48	3.0	- 4.6	- 2.1	- 5.8[e]	- 7.9[m]
37-40	49-52	1.7	2.3	1.1	- 0.1	0.5[e]

*Calculated as usual weekly earnings divided by usual hours per week; includes only individuals with positive usual weekly earnings.

**All calculations for 1984 are made using cohorts one year younger (e.g. 20-23 instead of 21-24) so as to preserve cross-time comparisons within cohorts.

[e]Early baby boom cohort (youth cohort born 1945-1946).

[m]Middle baby boom cohort (youth cohort born 1949-1952 or 1953-1956).

[l]Late baby boom cohort (youth cohort born 1957-1963).

Table 7B: Percent Hourly Earnings* Gap Between Youth Cohorts and Older Cohorts, Females

Young Cohort	Old Cohort	Year				
		1969	1973	1977	1981	1984**
17-20	29-32	-14.3[m]	-34.4[m]	-32.8[l]	-39.9[l]	-44.9
21-24	33-36	- 8.8[e]	- 6.3[m]	-31.9[m]	-19.6[l]	-34.9[l]
25-28	37-40	-11.1	2.9[e]	- 2.1[m]	- 5.8[m]	-16.8[l]
29-32	41-44	0.4	7.5	4.7[e]	4.3[m]	4.5[m]
33-36	45-48	- 6.7	2.5	35.6	9.7[e]	13.2[m]
37-40	49-52	- 0.8	4.2	4.5	8.2	7.3[e]

*Calculated as usual weekly earnings divided by usual hours per week; includes only individuals with positive usual weekly earnings.

**All calculations for 1984 are made using cohorts one year younger (e.g. 20-23 instead of 21-24) so as to preserve cross-time comparisons within cohorts.

[e]Early baby boom cohort (youth cohort born 1945-1946).

[m]Middle baby boom cohort (youth cohort born 1949-1952 or 1953-1956).

[l]Late baby boom cohort (youth cohort born 1957-1963).

The results for U.S. males in Table 7A show, first, a substantially larger hourly earnings gap for baby-boom cohorts than for pre-baby-boom cohorts. (It is a bit difficult to make comparisons with post-baby-boom youth cohorts since the older cohorts in these cases are not always normal-sized (e.g., the 33-36 year olds in 1981 and the 32-35 year olds in 1984 were baby-boom cohorts)). In 1969, for example, 21-24 year olds (who were born during the years 1945-48) had hourly earnings that were 16.4 percent less, on average, than 33-36 year olds (who were born during the years 1933-1936). This gap is much larger than the 1.8 percent gap, also in 1969, between 25-28 year olds and 37-40 year olds (the former cohort being born during the years 1941-44, prior to the baby boom). Of course, this type of finding is not by itself sufficient to demonstrate that cohort size has an adverse effect on wages. For example, it might simply reflect the fact that wage differences between age groups that are a fixed number of years apart typically decline as the base age increases (i.e., that the most rapid growth of wages occurs at the relatively young ages). However, our second major finding suggests that there is indeed a cohort size effect. In particular, Table 7A reveals larger wage gaps for the middle and late baby-boom cohorts than for the early baby-boom cohorts, controlling for age. For example, the earnings gap of 16.4 percent between 21-24 and 33-36 year olds in 1969 increased to 26.8 percent and 34.9 percent in 1973 and 1977. Indeed, since the 21-24 year olds in these years were born further into the baby boom, during the years when the number of births climbed almost to the peak of the baby boom, these patterns tend to provide relatively strong evidence of a cohort size effect on hourly earnings. Observe that, with few exceptions, the wage gap is larger for cohorts born further into the baby boom than for the

early baby-boom cohorts. This observation also holds for the 17-20 year olds in Table 7A, although we are hesitant to place much weight on this evidence since it relates to individuals whose labor force attachment is not characterized by a great deal of permanence.

Finally, the wage gaps in Table 7A all tend to decline as age increases, for both synthetic cohorts (i.e., the columns of Table 7A) and actual cohorts (i.e., the downward sloping diagonals of Table 7A). Observe also that the wage gaps narrow more (both proportionately and absolutely) for the baby-boom cohorts than for the non-baby-boom cohorts, providing evidence that the wages received by the baby-boom cohorts are catching up with those they would have received if their cohort size had been smaller. Nevertheless, the hourly earnings gaps for the baby-boom cohorts were not eliminated by the time they reached ages 29-32 in 1977 and 1981, suggesting that they had only partly compensated for the effects of their large sizes.

Table 7B provides estimates of the corresponding wage gaps for females. In general, the results show a similar pattern to those in Table 7A, with the hourly earnings gaps tending to be larger for the baby-boom cohorts than for the non-baby-boom cohorts. In addition, the figures also show some evidence of catchup in relative earnings. However, these results are substantially less clearcut than the results for the males. We suspect that these differences are associated with the fact that cohort size was not the most important supply-side change in the labor market for women during the years 1969-1984. Rather, changing labor force participation rates were far more significant. For example, the labor force participation rate of 25-28 year old women increased from 34.9 percent in 1969 to 58.7 percent in 1981. In contrast,

a reasonable measure of the magnitude of the cohort size variation associated with the baby boom -- the change in the ratio of 25-28 year olds to 17-40 year olds between 1969 and 1981 -- amounted to only 1.3 percentage points (i.e., the ratio increased from 16.4 percent to 17.7 percent). Underlying this dramatic increase in female labor force participation are complex economic and social forces which determine female labor supply. These forces include (1) changing tastes and preferences of women viz-a-viz labor and leisure, (2) the advent and increasingly widespread use of effective contraception, (3) changes in women's relative wages, (4) changes in the earnings of male family members, (5) changing government policies such as those involving affirmative action, child care, etc., and (6) structural shifts in the demand for labor associated with the shift from a manufacturing-based economy to a service-based economy and the growth of part-time and otherwise flexible employment.

Empirical Findings: Unemployment

To analyze the extent to which unemployment is a consequence of generational crowding, and the degree to which this type of unemployment persists over time, we have prepared Tables 8A and 8B. These tables report differences in unemployment rates for males (8A) and females (8B) for the same youth and older cohorts as in Tables 7A and 7B. The figures for the males in Table 8A reveal a number of interesting patterns. First, the unemployment gaps are especially large for the younger cohorts in all five years. This reflects the fact that unemployment profiles tend to fall sharply early in the life cycle and then gradually level off. Second, and of greater importance to us, the unemployment gaps tend to be higher for the middle and late baby-boom cohorts

Table 8A: Differences in Unemployment Rates* Between Youth Cohorts and Older Cohorts, Males

Young Cohort	Old Cohort	Year				
		1969	1973	1977	1981	1984**
17-20	29-32	5.80[m]	7.27[m]	7.57[l]	9.85[l]	7.38
21-24	33-36	2.98[e]	5.34[m]	6.97[m]	7.07[l]	5.37[l]
25-28	37-40	1.24	1.37[e]	1.84[m]	1.62[m]	2.59[l]
29-32	41-44	- .39	.31	.81[e]	2.68[m]	- .09[m]
33-36	45-48	- .28	- .03	.19	.87[e]	.52[m]
37-40	49-52	- 2.5	.22	- .15	.71	1.15[e]

*Calculated as the unemployment rate of the young cohort minus the unemployment rate of the old cohort.

**All calculations for 1984 are made using cohorts one year younger (e.g. 20-23 instead of 21-24) so as to preserve cross-time comparisons within cohorts.

[e]Early baby boom cohort (youth cohort born 1945-1946).

[m]Middle baby boom cohort (youth cohort born 1949-1952 or 1953-1956).

[l]Late baby boom cohort (youth cohort born 1957-1963).

Table 8B: Differences in Unemployment Rates* Between Youth Cohorts and Older Cohorts, Females

Young Cohort	Old Cohort	Year				
		1969	1973	1977	1981	1984**
17-20	29-32	5.11[m]	4.98[m]	5.46[l]	6.09[l]	3.62
21-24	33-36	1.29[e]	2.86[m]	1.67[m]	3.97[l]	3.83[l]
25-28	37-40	- .32	1.46[e]	.52[m]	2.67[m]	1.32[l]
29-32	41-44	- .19	- .83	- .69[e]	1.76[m]	.03[m]
33-36	45-48	- .41	- .29	1.26	1.79[e]	.42[m]
37-40	49-52	.43	- .05	- .02	.31	- .54[e]

*Calculated as the unemployment rate of the young cohort minus the unemployment rate of the old cohort.

**All calculations for 1984 are made using cohorts one year younger (e.g. 20-23 instead of 21-24) so as to preserve cross-time comparisons within cohorts.

[e]Early baby boom cohort (youth cohort born 1945-1946).

[m]Middle baby boom cohort (youth cohort born 1949-1952 or 1953-1956).

[l]Late baby boom cohort (youth cohort born 1957-1963).

than for the pre- and early baby-boom cohorts. To illustrate, consider the differences in the unemployment rates of 21-24 year olds and 33-36 year olds. In 1969 this difference was 2.98 percent, whereas it was 5.34 percent in 1973, 6.97 percent in 1977, and 7.07 percent in 1973. This pattern of worsening relative unemployment as the baby-boom proceeds is shown in the figures for the youth cohorts aged 17-20 and 25-28 as well. Thus, the figures in Table 8A suggest that unemployment is positively associated with cohort size.

The estimates in Table 8A also suggest that the increased unemployment associated with large cohort size is not a permanent phenomenon. For example, by the time the cohorts aged 21-24 and 33-33 in 1969 reached ages 29-32 and 41-44 in 1977, the 2.98 percentage point difference in their unemployment rates had declined to less than one percentage point. Similarly, by the time the cohorts aged 21-24 and 33-36 in 1973 had reached ages 32-35 and 44-47 in 1984, the difference in their unemployment rates had declined from 5.34 percentage points to just .52 percentage points. Thus, it appears that catch-up in terms of the unemployment associated with large cohort size is complete within roughly a decade of entry into the labor force.

The results for females in Table 8B are qualitatively similar to those for the men, although not as consistent with the notion that large cohort size is associated with high unemployment. As with the men, the cross-sectional results indicate that unemployment gaps between young and older workers tend to decline with age, reflecting the concavity of age-unemployment profiles. In addition, the unemployment gaps involving baby-boom cohorts also tend to be larger than those involving pre-baby-boom cohorts. In contrast to the results for men, there is no clear pattern of catch-up over time in Table 8B. Rather,

the statistics reveal strong patterns of cyclicality (e.g., 1973 was a high point of the U.S. business cycle whereas 1981 was a relative low point). Thus, the unemployment patterns of female cohorts are similar to the earnings patterns for female cohorts insofar as they both seem to be less strongly influenced by cohort size than by other economic factors.

IV. Implications for the Future

There have been diverse speculations and predictions about the economic effects of generational crowding for the future. For obvious reasons, business concerns have focused on marketing issues, while demographers have focused on implications for fertility and, to a lesser extent, labor force participation. The "Easterlin hypothesis" regarding the effect of cohort size on economic and demographic behavior has, in particular, generated considerable academic interest. In this section we consider potential effects of continued generational crowding on the labor market, fertility, and the relatively neglected area of provision of social services. Wherever possible, we ground our speculations on relevant empirical studies.

Labor Market

Generational crowding is likely to have some effects on the demand and supply for workers of different types.

Our reading of evidence suggests that the effects of generational crowding on the industrial and occupational composition of labor demand will be modest. While there are definite differences in demand for goods by age groups, the general result of most studies is that changes in consumption have relatively modest effects on the industrial and occupational composition of labor demand, save in a few sectors -- such as education and construction. One reason for this is that interindustry linkages translate particular final goods demands into demand for goods and labor in many sectors. In the case of the baby boom cohort, their lower relative income has further reduced their potential impact on the demand for final goods. Finally, enough other factors ranging from

technology to trade influence composition of output and demands for labor that we forsee no dramatic effects of the baby-boom bulge on the composition of demand for labor.

We anticipate larger labor market effects on post-baby boom cohorts, with the change from a relative surplus to a relative shortage of entry-level workers likely to cause a sizeable upswing in the fortunes of young workers. To be sure, the first of the post-baby boom cohorts will face some competition from the baby-boomers. However, extant analyses of the impact of the number of persons of different ages on the wages of others suggests either positive or modest negative spillover effects, so that the dominant factor will be the shortfall of entry level workers. Indeed, in view of the importance of young workers in interindustry mobility, as cohort size diminishes we believe there will be a need for additional job training of the larger older cohorts to facilitate adjustment to changing technology and demands.

Fertility

One of the most striking features of post-World War II fertility patterns in Western Europe and the United States is their tendency to decline. These patterns have become the focus of considerable debate among economists. At issue is the question of whether the decline is temporary or permanent. For example, Easterlin has developed a cohort size theory of fertility behavior. According to this theory, when cohort size is large, employment opportunities are relatively poor, incomes are low relative to aspirations (which are formed by childhood "standards of living" in one's parents' household), and couples substantially curtail childbearing because the demand for children is highly

elastic with respect to the difference between income and aspirations. In contrast to this theory, which predicts that fertility will increase once the small size youth cohorts (i.e., the children of the baby-boom generation) enter the labor market, Butz and Ward have developed a traditional microeconomic model which suggests that fertility declines are the result of permanent increases in the demand for female labor (i.e., the increased demand leads to higher wages paid to women, thereby increasing the opportunity cost of childbearing and childrearing, which results in lower fertility). Butz and Ward also suggest, however, that women will tend to time their childbearing to coincide with periods during which their incentive to work (i.e., their wage) is low. Thus, to the extent that generational crowding depresses earnings (as our earlier results imply), the Butz and Ward model suggests that increased fertility (albeit around a downward sloping trend line) is likely to result. Thus, the two main economic models of fertility have quite different implications for the effect of generational crowding, with the Easterlin theory emphasizing income effects and predicting a rise in fertility and the Butz and Ward theory emphasizing substitution effects and predicting further declines in the fertility of children of the baby boom generation. To date, empirical economists have not been able to convincingly argue that either model is superior. Nonetheless, is is true that fertility rates have increased in several countries (including the U.S.) since the late 1970s, providing some support for the Easterlin model. However, as Bloom and Trussell have argued, the increase may well be due to changes in the time of fertility (i.e., delayed childbearers are now reaching their desired ages of childbearing) so that a longer time series of data will be necessary before any firm conclusions can be drawn.

Psychological Well-Being, Suicide, and Crime

There has been some speculation about the effects on individual behavior of a large cohort of persons who are not making "historical" progress in their careers. Levy and Michel have argued that the economic effects of cohort size will generate increasing "selfishness." Others argue that large cohort size is a cause of conservativism among youth while still others worry that it will have the opposite political effect as persons who have "plateaued" in their career seek political redress. The only empirical evidence on the psychological effects of cohort size is the Ahlburg and Schapiro study that attributes much of the rising suicide rate among young Americans to cohort size. It predicts a "generational" suicide problem with suicide rates for males above age 45 rising as the baby boom generation ages and declining for youths as cohort size falls. Whether cohort size has effects on less dramatic forms of social and psychological behavior has not been extensviely addressed. A recent study by Maxim does, however, provide some empirical evidence that juvenile delinquency rates in Canada were positively associated with cohort size, controlling for age and period effects.

Social Services

Where we anticipate a major impact of generational crowding is in the provision of social services. A large cohort is a large voting bloc, with the potential for enacting social legislation that benefits themselves rather than other age groups. Already, Preston has provided evidence in the U.S. that as the ratio of older persons to children has changed, so too have public expenditures for older persons relative to children. In the political sphere,

unlike the market sphere, being a member of a large group is an advantage, not a disadvantage. Thus, it is quite likely that large cohorts will attempt to compensate for their adverse experience in the labor market by supporting legislation that benefits them, even though it may be at the expense of smaller cohorts. For example, the U.S. baby boom is now aged 21 - 39 and comprises roughly one-third of the U.S. population. It would not be at all surprising to see it exert considerable political influence in the direction of social security and medicare cost containment, policies promoting earlier mandatory retirement, policies against teenage sub-minimum wages, policies favoring the development of flexible mortgage instruments, and tax reforms including the provision of increased day-care tax credits and increased tax deductions for dependents.

Summary and Conclusion

This paper has attempted to distinguish between two alternative views of the labor market problems faced by young workers in a number of industrialized countries in the 1970s and early 1980s. The first view is that the low relative earnings and high unemployment rates experienced by these workers were largely "age" related. Although this view carries the implication that the problems will disappear for recent youth cohorts as they grow older, it also implies that the problems will be "handed over" to successive waves of youth cohorts as they enter the labor market. The second view is that the labor market problems of recent youth cohorts are a consequence of their large size. This view has very different implications since generational crowding can permanently or temporarily depress the economic position of large cohorts but

need not have an adverse effect on later waves of smaller youth cohorts.

On the basis of a multi-country empirical analysis of patterns of cohort size, earnings, unemployment, and the distribution of young workers across industries, we have four main sets of findings to report.

First, the baby-boom was not uniformly experienced across OECD economies in terms of either its timing or magnitude. While some countries, such as Canada, the U.S., and Belgium had large increases in the youth share of the population from 1965 to 1980, others, notably Japan and Switzerland, had large decreases.

Second, our empirical results indicate that large cohort size tends to have a negative effect on the "expected relative earnings" of the cohort, where expected relative earnings is defined as the product of the earnings and the employment-to-labor force ratio of a young cohort relative to the same product for an older cohort. There is, moreover, a marked trade-off between the relative earnings effect and the relative employment effect with large cohort sizes reducing relative earnings in some countries and reducing relative employment in others.

Third, at least for the U.S., the relatively low wages and high unemployment of the "unlucky cohorts" tend to converge to the patterns that would have resulted had the cohorts been more "normal" in size, with the convergence occurring within a decade or so.

Fourth, our results show that baby-boom cohorts were absorbed in the U.S. and other OECD economies quite evenly across a wide range of industries. This finding contradicts the popular belief that large youth cohorts were absorbed primarily through expansion of those industries that have been traditionally youth-intensive.

Overall, then, our analysis suggests that the heralded "youth" problem is more than that. It is also a generational problem compounded by the

weak labor market into which the baby boom generation entered. While it is difficult to separate the effects of cohort size from the effects of a weak economy on the progress of the generation, the combination has produced exceedingly slow progress, with only moderate catch-up from an initially low earnings or high unemployment position.

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Appendix I: Regression Results for the U.S.

Tables 7 in the main text reports percent earnings gaps between selected youth cohorts that are a fixed number of years older than them. As we indicated in the text, we also performed a more complex regression analysis, using the same data, aimed at measuring (1) the extent to which baby boom cohorts in the U.S. started out their working careers relatively worse off than older cohorts in terms of their earnings experience and (2) the extent to which the earnings of baby boom cohorts caught-up with the older cohorts over time. The key advantage of regression analysis over the simpler analysis of raw percent differences presented in Tables 7 is that the regression framework permits one to control for a variety of other factors which might vary across cohorts and affect earnings. To the extent that these other factors -- such as schooling, urban/rural residence, and geographic location -- are correlated with both earnings and cohort, their omission could be potentially misleading in terms of the interpretation of Tables 7. On the other hand, to the extent that other factors change in response to large cohort size (e.g., schooling increases because people decide to wait longer before entering the job market), their inclusion in the model could be a case of "over controlling."

The regressions differ from the simple tables by focusing on usual weekly earnings for white males rather than on hourly earnings for all males. These differences have little effect on the results as the alternative earnings measures move together closely in the CPS data.

The data used in the estimation are drawn from all of the May

versions of the Current Population Surveys conducted between 1969 and 1981. From each of these successive cross-sectional surveys, a one-in-five sample was drawn of white males who were aged 21-44 in 1969 and who had positive earnings. Thus, the sample follows that same population of individuals through time (i.e., individuals aged 21-44 in 1969, 22-45 in 1970, 23-46 in 1971, ..., and 33-56 in 1981). For each individual in the sample, the following variables were defined: log of average weekly earnings (in nominal terms), completed years of schooling, urban or rural residence (i.e., SMSA or non-SMSA), region of residence (North, South, East, or West), and year inlcuded in the survey.

The thirteen individual cross-sectional files are organized into one large pseudo-longitudinal file. This large file is divided into strata according to whether individuals were members of young cohorts in 1969 (i.e., 21-24, 25-28, or 29-32 years old) or old cohorts in 1969 (i.e., 33-36, 37-40, or 41-44 years old). We also separated out individuals aged 21-24 in 1973 and aged 33-36 in 1973. It should be noted that all individuals in the 13 cross-sectional data sets were divided into these strata. In other words, an observation on a 41 year old in the 1981 Current Population Survey would be grouped with the observations on the 29-32 year olds in 1969. It should also be noted that the 29-32 year olds in 1969 served double-duty in the empirical work: they served as both a young cohort in the division of cohorts as of 1969 and as an old cohort in the division of cohorts as of 1973.

After classifying all observations from the 13 Current Population Surveys in this manner, we then formed them into four sets of data. We did this by grouping observations involving the three young cohorts in 1969 with observations on individuals in each of the three older cohorts in that same

year. This yielded three data sets. A fourth data set was formed by grouping the 21-24 year old individuals in 1973 with the 33-36 year old individuals in 1973.

The main purpose of the empirical exercise we conducted was to compare the earnings experience of cohorts born at different points in the baby boom with cohorts born before the baby boom. In particular, the cohort that was 21-24 years old in 1969 was born at the beginning of the baby boom whereas the cohort that was 21-24 years old in 1973 was born in the middle of the baby boom; all of the other cohorts we have defined were born before the baby boom and will serve as benchmarks for our analysis.

The basic model we estimated involved a regression of logged weekly earnings on years of schooling, an urban residence dummy, a vector of three region of residence dummies (one is omitted because the regression includes an intercept), a vector of year dummies, a young cohort dummy for some base year (either 1969 or 1973), and an interaction term defined as the product of the young cohort dummy and a time trend. In algebra:

$$\text{Log } (W_{it}) = \sum_{it} a_i X_{it} + bC_i + \sum_t d_t I_t + e \text{ Year } C_i$$

where

W_{it} = weekly earnings of person in ith cohort in year t

X_{it} = vector of control variables

C_i = dummy variable for cohort (=1, if "youth cohort"; 0, if companion group)

I_t = vector of year dummies

Year = trend variable (1, 2, ...)

The regressions cover the years 1969-1981. Each regression follows the two specified cohorts (one younger, one older) through the entire 13 year

period.

The schooling and residence variables are included to control for standard effects of human capital on earnings. The year dummies are included to pick up time trends in the movements of nominal earnings. Part of these movements will be due to inflation while other parts will be due to the influence of business cycle fluctuations and trends in capital formation and productivity growth. One could try to control for all of these effects by including some sort of a time trend (e.g., linear, quadratic, or exponential) but that would impose a smoothness constraint on the combination of different effects. Although there is no reason to believe that either inflation or the business cycle or other effects on earnings are smooth over time, we first tried to estimate the models reported in this Appendix with a simple linear time trend and without the time dummies. By comparing the results to those we report, we were able to statistically reject the hypothesis of a smooth linear trend. Thus, we report results which essentially account for a time trend in the most flexible way possible (i.e., by allowing different intercepts for each year). It is, of course, true that we could have accounted for some trend movements in earnings by using a standard price index like the CPI to deflate our nominal earnings data, but that would implicitly make an assumption that we had a perfect indicator of inflation. Moreover, it would still not necessarily leave a trend that could be satisfactorily captured by a smooth trend variable. That is why we adopt a regression specification which explicitly deflates the nominal earnings data (because they are expressed in units of natural logarithms) and picks up other trend influences as well. It is a completely standard practive in empirical models that use quasi-longitudinal

data.

The young cohort dummy is included so that the regression provides an estimate of the proportionate wage difference between the young and the old cohorts in the base year. For example, for the regressions in which the young cohorts were 21-24 years old in either 1969 (the first column of estimates in Table A.1) or 1973 (the last column of estimates), the coefficient of the young cohort dummy represents the proportionate difference in the weekly earnings of the young and old cohorts at roughly the time the young cohort entered the labor market (and holding constant the other variables in the regression). For the regressions in which the young cohort was older than 21-24 in 1969, this coefficient represents the proportionate earnings difference at some later point in the cohorts' experience (i.e., ages 25-28 or 29-32). Finally, the coefficient of the interaction term represents an estimate of the tendency for the young cohort's earnings to catch up over time (signified by a positive coefficient) or to fall further behind (signified by a negative coefficient) the earnings of the older cohort.

As noted in the main body of text, the estimates presented in Table A.1 tend to confirm the conclusions suggested by Table 7A in the text. First, the coefficient of the young cohort dummy is negative in all regressions. This is merely a reflection of the fact that the earnings profiles of synthetic cohorts slope upward. Second, the magnitude of the young cohort dummy is roughly two and one half times greater (in absolute value) in the comparision of 21-24 and 33-36 year olds in 1973 than it is in the comparison of these same-aged cohorts in 1969. Since 21-24 year olds in 1969 were born at the very start of the U.S. baby boom (i.e., 1945-1948), whereas the 21-24 year olds in 1973

were born well into the baby boom (and just a few years before the baby boom hit its peak), the relative magnitudes of these coefficients suggest that the baby boom had a substantial negative effect on entry-level earnings.

Third, the coefficients on the interaction terms are all positive, suggesting that there is some catch-up in relative earnings as young cohorts age. Although these estimates tend not to be statistically significant (with the exception of the estimate contained in the fourth column of results) they are not totally insignificant in magnitude. For example, the coefficient estimates in the first column of results suggests an average catch-up of .26 percent per year, or roughly 2.1 percent after 8 years. Thus, by the time the 21-24 year old cohort reaches ages 29-32, its earnings deficiency relative to the 33-36 year old cohort (which would then be 41-44 years old) would have declined from 17.1 percent ot 15 percent. If we take the relative earnings deficiency of 4.7 percent for non-baby boom cohorts aged 29-32 and 41-44 (in the third column of estimates) as our benchmark, we see that the catch-up amounts to roughly one-sixth of the total baby-boom effect, after 8 years. However, according the these estimates there will be no further catch-up after the 8 years since the estimated interaction coefficient is roughly the same for the cohorts in columns one and three. In other words, young cohorts' earnings tend to catch up to older cohorts' earnings, whether they are baby-boom cohorts or not. (We are, however, somewhat hesitant to place substantial emphasis on this literal implication or our results since it represents an out-of-sample projection.)

In contrast to the comparison of results in columns one and three, a comparison of results in columns four and three paints a somewhat different pic-

ture. The interaction term in column four indicates that the estimated catch-up is statistically significant for the 21-24 year old cohort in 1973 (relative to the cohort aged 33-36 year) in 1973. It is also economically significant, taking on a value of nearly 3.6 percent of the 42.4 percent initial difference in relative earnings. This implies that roughly three-fourths of the earnings difference between the cohorts would be eliminated after 8 years. Put another way, it implies that five-sixths of the relative earnings difference we would otherwise expect (based on the estimate of 4.7 percent on column three), would disappear after 8 years. These results therefore indicate that the baby-boom cohort whose earnings started out the lowest was also the cohort which experienced the greatest degree of catch-up.

In order to gauge the robustness of the results in Table A.1, we have estimated an alternative specification of a similar model in which the schooling, urban/rural residence, and region dummy variables are excluded from the regression. [These estimates, which are presented in Table A.2, may also be interpreted as a test of the specification underlying the comparison of cohort earnings patterns in Table 7A of the text (i.e., the main difference is essentially that the cohort size effects are assumed to have different functional forms in Table A.2 and 7A.)] As one can clearly see from Table A.2, dropping the control variables significantly reduces the explanatory power of the regressions. However, the estimated effects of the baby-boom on entry-level earnings and the estimated catch-up parameters are very similar in size and statistical significance across models. The stability of results across model specifications increases our confidence in these results. Moreover, the finding that statistical controls do not alter the basic pattern of results also

explains the consistency of the conclusions drawn from Table 7A in the text and Tables A.1 and A.2 in the Appendix.

Overall, then, the estimates in Tables A.1 and A.2 suggest that baby-boom cohorts did have a less favorable earnings experience than "comparable" cohorts born before the baby boom. However, the estimates also provide evidence that baby-boom cohorts' relative earnings improve over time. But whether the improvement completely or only partially eliminates the negative effect of large cohort size is not clearly revealed by our data.

Table A.1: Least Squares Estimates of Relative Earnings Patterns for Selected Pairs of U.S. Cohorts, White Males, Using Data from the May Current Population Surveys, 1969-1981.*

Dependent Variable: Log of Average Weekly Earnings				
Sample Definition:				
Youth Cohort Aged and Older Cohort Aged	21-24 in 1969 33-36 in 1969	25-28 in 1969 37-40 in 1969	29-32 in 1969 41-44 in 1969	21-24 in 1973 33-36 in 1973
Intercept	4.393 (0.025)	4.323 (0.024)	4.326 (0.024)	4.751 (0.033)
Years of Schooling	0.040 (0.001)	0.049 (0.001)	0.050 (0.001)	0.049 (0.002)
Urban Dummy	0.101 (0.009)	0.109 (.009)	0.104 (0.009)	0.090 (0.012)
Young Cohort Dummy (at start of period)	-0.171 (0.015)	-0.091 (.014)	-0.047 (0.014)	-0.424 (0.019)
Young Cohort Dummy x Time Trend (interaction)	0.0026 (0.0024)	0.0035 (0.0024)	0.0031 (0.0024)	0.0357 (0.0049)
Region Dummies Included **	Yes	Yes	Yes	Yes
Year Dummies Included **	Yes	Yes	Yes	Yes
R-squared	.49	.49	.51	.36
Number of Observations	8427	8132	7475	5354

*Standard errors are reported in parentheses below estimated coefficients.
**The region dummies (3) and the year dummies (12 for the 1969 regressions and 8 for the 1973 regression) are jointly statistically significant in all regressions.

Table A.2: Estimates of Model Presented in Table A.1 with Year Dummies but No Other Control Variables*

Dependent Variable: Log of average weekly earnings				
Sample Definition				
Youth Cohort Aged and Older Cohort Aged	21-24 in 1969 33-36 in 1969	25-28 in 1969 37-40 in 1969	29-32 in 1969 41-44 in 1969	21-24 in 1973 33-36 in 1973
Intercept	4.894 (0.017)	4.910 (0.017)	4.900 (0.017)	5.379 (0.019)
Young Cohort Dummy (at start of period.)	-0.142 (0.016)	-0.044 (0.015)	-0.006 (0.015)	-0.418 (0.021)
Young Cohort Dummy X Time Trend (interaction)	0.004 (0.003)	0.003 (0.003)	0.004 (0.003)	0.038 (0.005)
Year dummies included	Yes	Yes	Yes	Yes
R^2	.42	.39	.39	.26

*Standard errors are reported in parentheses below coefficient estimates.

Table A.3: Relative Earnings of Youths: Explanations and Sources

Country	Youth Ages	Adult Ages	Earnings Definition	Source
Australia	15-19 20-24	20+	Average weekly earnings full time workers.	Bureau of Stats., Weekly Earnings of employees
Canada	15-19 20-24	25-64	Average annual wages and salaries, full year full time workers.	Unpublished data from Statistics Canada
France	20 & Under 21-25	26-64	Avg. annual net earnings: full time workers in industry, commerce and services	Unpublished data from INSEE: Institut National de la Stats. et des Economiques.
Japan	19 & Under 20-24	25+	Avg. monthly contractual cash earnings in manufacturing	Ministry of Labour, Yearbook of Labour Statistics.
Sweden	16-19 20-24	25-64	Avg. monthly salaries: full time employees in mining, quarrying and manufacturing	National Central Bureau of Stats. "Statistika Meddelanden," unpublished data.
United Kingdom	17 & Under 18-20	21+	Avg. gross weekly earnings, full time employees.	Dept. of Employment Gazette.
United States	16-24	25+	Median weekly earnings; wage and salary workers	Current Population Survey Labor Force Statistics, Dept. of Labor, Bureau of abor Statistics.

Note: Data for countries other than the U.S. were provided by OECD.

Table A.4 Youth Employment Data: Explanations and Sources

Country	Youth Age Group	Source	Sectors
U.S.	15-24	Census of Population	
Japan	15-24	Annual Report on the Labor Force Survey	1.Trans. and Comm. includes Electricity, Gas, Water, Steam, and Hot water supply. 2.F.I.R.E. includes Insurance and Real Estate only
Germany	15-24	Belvolkerung und Erwerb-statigkeit	1.Mining includes electricity, gas, and water. 2.Trans. and Commm. includes storage. 3.F.I.R.E. includes Banking and Insurance only. 4.Personal Services are workers in Private households and non-profit industry only.
Sweden	16-24	Arbetskrafts-undersokningen (Statistika Centrubyran)	1.Mining and Manf. includes electricity, gas, and water 2.Wholesale & Retail Trade includes restaurants & hotels. 3.Transportation and Commun. includes storage. 4.Business & Repair services include Business Services only 5.Public Administration and Personal Services include Community, Social and Personal Service workers only.
Finland	15-24	Labor Force Survey, Central Statistical Office of Finland	
Norway	16-24	Labor Market Statistics	

Table A.5: Earnings of Youths[1] Relative to Adults, Males, 1966-1984[2] (percent)

Year	Australia	Canada	France	Japan	Sweden	UK	USA
1966	NA	NA	50.00	52.88	40.46	NA	NA
1967	NA	55.76	49.99	52.71	42.70	NA	74.00
1968	NA	NA	50.63	54.00	41.94	NA	NA
1969	NA	52.10	53.09	55.27	43.19	NA	73.00
1970	NA	NA	53.47	56.00	48.68	NA	70.00
1971	NA	51.05	53.47	57.01	48.08	NA	66.00
1972	NA	49.65	52.48	58.49	47.85	NA	66.00
1973	NA	53.89	52.99	58.50	47.16	43.46	67.00
1974	NA	55.47	52.00	58.98	48.44	48.79	67.00
1975	68.48	54.51	51.02	58.99	53.18	51.13	64.00
1976	66.53	55.63	50.98	58.35	53.14	49.57	64.00
1977	67.59	60.31	50.46	57.23	53.10	50.05	62.00
1978	66.59	54.95	49.93	57.10	54.55	50.01	63.00
1979	66.65	58.57	48.41	56.49	53.01	49.97	62.00
1980	66.27	52.25	47.88	55.38	53.93	49.40	60.00
1981	67.25	55.43	NA	55.35	54.92	48.61	59.00
1982	65.83	51.26	NA	54.84	54.39	48.26	56.00
1983	64.92	NA	NA	54.74	54.38	46.89	55.00
1984	NA	NA	NA	54.71	NA	NA	NA

Source: See Table A.3.

NA means not available.

1. Youth earnings are weighted averages of earnings of the two youth groups described in Table A.3, where populations of males 15-19 and 20-24 years old are used as weights (except for the U.S. where earnings data are reported for 20-24 year olds and hence do not require weighting).

2. This chart corresponds to Figures 1A and 1B.

Table A.6: Unemployment of Youths Relative to Adults[1], Males, 1965-1983[2]

Year	Australia	Canada	France	Japan	Sweden	UK	USA
1965	NA	2.23	NA	2.00	2.80	NA	3.12
1966	2.11	2.37	NA	1.33	2.63	NA	3.20
1967	2.56	2.31	NA	2.11	2.29	NA	3.50
1968	2.86	2.31	2.45	1.90	2.18	NA	3.88
1969	2.43	2.47	2.60	2.11	2.31	NA	3.94
1970	2.71	2.63	3.25	2.33	2.78	NA	3.37
1971	2.88	2.60	2.36	2.56	2.82	1.84	3.23
1972	2.71	2.69	2.82	2.45	3.00	2.00	3.53
1973	3.88	2.69	2.90	2.50	2.94	1.77	3.60
1974	2.85	2.70	3.10	2.45	3.27	2.00	3.47
1975	3.26	2.91	3.05	2.19	3.50	2.83	2.74
1976	3.64	3.07	3.05	1.89	3.63	2.85	2.83
1977	3.76	2.98	3.55	2.50	3.36	2.81	2.93
1978	3.46	2.83	3.08	2.44	3.47	2.80	3.21
1979	3.83	2.87	2.93	2.25	3.69	2.72	3.21
1980	3.47	2.80	3.39	2.67	4.09	2.96	2.72
1981	3.00	2.84	3.31	2.47	3.47	2.27	2.76
1982	3.02	2.48	3.71	2.37	3.70	2.57	2.27
1983	2.71	2.33	3.86	2.30	3.39	2.37	2.14

Source: OECD Labour Force Statistics 1962-1982, Part III, 1984.

NA means not available.

1. Figures are ratios of unemployment rates of 15-24 year olds (16-24 year olds to those in the U.S., UK and Sweden) of 25-54 year olds.
2. This chart corresponds to Figures 2A and 2B.