Economic Policy Institute

1660 L STREET, NW • SUITE 1200 • WASHINGTON, DC 20036 • 202/775-8810 • FAX 202/775-0819

Earnings of recent college graduates in the 1980s and 1990s: evidence from the Current Population Survey, the National Association of Colleges and Employers "Salary Survey," and the Recent College Graduate/Baccalaureate and Beyond Surveys

John Schmitt
jschmitt@epinet.org

February 28, 2001

The author would like to thank the Russell Sage Foundation for generous financial support and Abe Cambier, Danielle Gao, and Yvon Pho for assistance with the data.

1. Introduction

This paper examines the earnings of recent college graduates over the last three decades. The primary purpose is to summarize the major trends in earnings of recent college graduates from three independent data sources: the Current Population Survey (CPS); the National Association of Colleges and Employers (NACE) "Salary Survey"; and the combined National Center for Education Statistics' (NCES) Recent College Graduates (RCG) and Baccalaureate and Beyond (B&B) surveys. A secondary purpose of the paper is to identify earnings patterns for recent college graduates that appear, at least at face value, to be inconsistent with the prevailing "skills-biased technological change" (SBTC) explanation for the rise in overall wage inequality in the 1980s and 1990s.

The economic prospects of recent graduates with four-year college degrees are interesting for several reasons. First, recent college graduates comprise an increasingly large share of the young workforce. In 1998, over one-third (36.5%) of all 18-to-24 year olds were enrolled in college; among high-school graduates of the same age, almost half (45.2%) were enrolled.[1] While many of those who attend college do not complete a four-year degree, over 30% of men and women born between 1965 and 1969 had obtained a four-year college degree before the age of 30.[2]

A second reason for interest in the economic experience of recent college graduates is that, as new entrants to the labor market, recent college graduates are much more exposed to raw market forces than older workers with similar skills. How recent graduates fare potentially tells us more about supply and demand factors than the wage and employment outcomes for older workers, who may be shielded from the full brunt of market changes by social norms, union contracts, and other legal protections.

Finally, the recent college graduates would seem to be particularly well-placed to have taken advantage of the acceleration in the demand for "skills" that is widely believed to explain much of the rise in economic inequality in the 1980s and 1990s.[3] Young people making decisions about post-secondary education in the 1980s and 1990s had important advantages over older cohorts. The more recent cohorts made their decisions about whether –and what– to study after the apparent rise in skill premiums was already underway. These younger cohorts also benefited from secondary and post-secondary educational experiences where access to and use of computer technology was widespread, even outside of traditionally technical courses of study.

These last features of the educational experience of recent college graduates make the group particularly appropriate for testing explanations of rising wage and income inequality based on technology, an important secondary concern of this paper. The standard SBTC story makes several predictions about trends in real and relative wages of recent college graduates that can be put to crude tests here. Some of the basic predictions most relevant here are: first, that the smooth rise in technological change, particularly the diffusion of personal computers and other information technology, should, all else constant, generate a smooth growth in the earnings of recent college graduates relative to groups with fewer years of schooling or less familiarity with computer technology; second, that productivity-enhancing skills-biased technological growth, all else constant, should have raised the inflation-adjusted wages of recent college graduates, especially of those graduates who majored in disciplines such as engineering and computer science; and third, that the smooth diffusion of information technology combined with the unequal distribution of computing skills *within* the group of recent college graduates should have

led to a smooth increase over time in the "within-group" earnings inequality of recent college graduates. While many of the possible inconsistencies between these simple predictions of the SBTC story and the data examined here may be reconciled by appealing to more sophisticated models of SBTC, in most cases the remedial work remains to be done. An alternative possibility is that the minor and major inconsistencies between the standard SBTC story and the earnings experience for recent college graduates, in fact, point to fundamental problems with prevailing technology-based explanations for rising inequality.

The analysis here draws on three complementary data sets: the Census's CPS for the years 1973-99; private surveys by NACE of employers' annual salary offers to graduating seniors at a sample of U.S. colleges and universities for the years 1962-2000; and the combined RCG and B&B surveys fielded periodically between the late 1970s and the mid-1990s for the Department of Education's NCES. The CPS is the standard reference point for almost any discussion of recent wage trends and provides a sample large enough to look at fairly fine groups of workers. The NACE data are unique in that they look at annual salary offers to graduating seniors by sex (for women from 1974 on). One advantage of the NACE over the CPS is that the NACE collects data by undergraduate major. The RCG/B&B surveys provide information on the economic circumstances of recent college graduates about one year after graduation. As with the NACE data, the RCG/B&B surveys include information on graduates' majors.

The paper has several key findings. First, relative and especially real earnings of recent college graduates are highly cyclical. Neither relative nor real earnings show the smooth growth that would reflect, all else constant, smooth, technology-driven growth in

labor demand. Even if SBTC does lie behind the erratic, long-term gains in relative and real earnings of recent college graduates, the cyclical swings in earnings –which presumably respond to changes in aggregate demand, labor supply, and institutional changes– suggest that the size of SBTC effects have been small relative to these other factors.

Second, relative and real earnings appeared to have been far more responsive to the mild recession of the early 1990s than they were to the deep recession of the early 1980s.

Third, in all three data sources, real earnings growth since the mid-1970s –even for technologically oriented majors such as engineering and computer science– has been small. Between 1973 and 1999, real earnings of recent college graduates failed to keep pace with one reasonable benchmark for real wage gains, average productivity, which grew almost 50% over the period. According to the CPS data, between 1973 and 1999, the average hourly wage of recent college graduates increased only 6.5% for men and 9.9% for women. Even the real earnings of recent graduates with technical degrees fell far short of matching average productivity gains. According to the NACE data, between 1973-74 and 1999, real salary offers to graduating seniors with engineering degrees increased about 16% for men and 21% for women; over the same period, offers to seniors with computer science degrees grew about 34% for men and 30% for women. For the fastest growing group –computer science majors– these real increases are only a little more than 1% per year over the full period.

Fourth, some of the trends in the hourly wages of recent college graduates relative to groups with different levels of formal education and potential labor market experience

run counter to predictions implicit in the standard SBTC story. The wages of recent college graduates relative to recent high school graduates (ages 19-22), for example, were flat for both men and women in the 1990s. The relative wages of recent female college graduates with respect to older high-school graduates (ages 43-46) also changed very little over the period.

Fifth, gender differentials among recent high-school graduates fell substantially between the mid-1970s and the late 1980s, but men retained a relatively constant 10% earnings premium over women throughout the 1990s. While the SBTC story is hardly unique in this respect, this prevailing explanation of recent earnings development does not offer an explanation for why the relative wages of recent female college graduates rose so substantially even as the supply of recent female college graduates also grew dramatically.

Finally, wage inequality among recent college graduates did grow between the mid-1970s and the end of the 1990s, but the pattern of growth does not sit well with the standard representation of SBTC. For men, within-group inequality grew fastest in the 1970s (when overall inequality fell) and slowest in the 1980s (when overall inequality increased at its fastest pace). For women, within-group inequality fell in the 1990s, even as overall wage inequality rose (albeit more slowly than it had in the 1980s).

The paper is divided into six sections. The second section, which follows, describes the three data sets in greater detail. The third section analyzes trends in the average earnings of young college graduates. The fourth section examines trends in the relative earnings of recent college graduates along several dimensions: relative to recent high school graduates, older college graduates, and older high school graduates; by

undergraduate major; and by gender. The fifth section looks more broadly at developing patterns of "within-group" wage inequality among recent college graduates. The final section describes plans for related future research.

2. The data

The paper uses three principal sources of data: the CPS; the NACE "Salary Survey"; and the combined RCG and B&B surveys. This section provides a brief summary of data issues for each survey relevant to the present analysis.

Before examining the specifics of each survey, two points apply to all data analyzed. First, whenever tables or figures report earnings in real terms, the paper uses the Bureau of Labor Statistics' Consumer Price Index "Research Series" (CPI-U-RS) as a deflator. Using the CPI-U-RS, which applies recent methodological changes in the official CPI to earlier years, has the effect of lowering real wages in earlier years and thus raising the rate of real wage growth relative to calculations based on the CPI-U.[4] Second, the paper, wherever possible, seeks to make comparisons over time across comparable points in the business cycle. I have defined business cycle peaks as local low points in the national unemployment rate, which were 1973, 1979, 1989, and 2000 (where wage data for 2000 are not yet available, I use 1999).

CPS

The paper uses several components of the Current Population Survey (CPS). All wage analyses rely on the May CPS and the CPS merged Outgoing Rotation Group (ORG); a brief examination of health-care coverage rates uses data from the annual March files of the CPS.

The May CPS surveys, which supply wage data for 1973-78, and the ORG files, which supply wage data for 1979-99, provide information on hourly wages of college graduates who are 23 to 26 years of age.[5] Despite some differences in sample structure, the May CPS uses questions on workers earnings that are almost identical to those asked of respondents in the CPS ORG. Mishel, Bernstein, and Schmitt (2001) reports on the particulars of creating consistent wage data from the May CPS and the ORG.[6]

For this paper, the most difficult problem presented by the CPS wage data is the change in education coding in the CPS in 1992. Prior to 1992, the CPS asked respondents about the number of years they had attended school and whether or not they completed the final year that they attended. Beginning in 1992, the CPS asked respondents for their highest educational qualification (high school degree, two-year college degree, four-year college degree, etc.). While the new survey format has clear advantages over the earlier approach, the methodological change complicates efforts to compare wage patterns by education across the survey change. The solution employed here is to attempt to convert the data collected in the earlier version of the survey into a form that is as close as possible to the new, improved survey. Specifically, I have defined as a college graduate anyone in the earlier version of the survey that said that they had completed 16 years of schooling or had studied –but not completed– 17 years of schooling. This approach is not entirely satisfactory because some individuals will have finished a four-year college degree in less than 16 years; others will not be finished their degree, even after they have completed 16 or attended 17 years of schooling. Jaeger (1997) contains a complete discussion of the issues surrounding the education coding change. Experience suggests that, while some caution is necessary in interpreting changes over time, application of an

approach similar to the one used here allows for meaningful earnings comparisons across both versions of the education coding.[7]

NACE

In the late 1950s, the College Placement Council (CPC), a private, nonprofit organization that later became the National Association of Colleges and Employers (NACE), began surveying college and university career offices about job offers made to graduating seniors. Initially, the CPC surveyed about 80 colleges; by the end of the 1990s, the number of colleges participating in the survey exceeded 150. Through 1973, the CPC collected information on offers to male undergraduates by their major and by their prospective employers' industry; in 1974, the CPC survey also began to track offers to women.

CPC/NACE (hereafter NACE) analyzes the survey results several times each year and makes their analysis available for a small fee to subscribing college placement offices, employers, and others. Each year, for each undergraduate major and employer industry, NACE reports the total number of offers and the average value of those offers.[8] For this paper, I have used these published results to construct a time series of average offers by major for men from 1962 to 2000 and for women from 1974 to 2000.[9]

The NACE data have several features worth mentioning. First, the survey is of offers to students, not actual salaries of recent graduates. Second, a comparison of the distribution of job offers by major with the distribution of degrees granted by undergraduate major in any given year suggests that the NACE survey is heavily weighted toward technical degrees, particularly in engineering. Third, while the CPC/NACE data do not report any information on participating employers, the

distribution of offers by major and by industry, as well as the nature of on-campus recruitment suggests that the offers tracked here are typically from large employers. Taken together, these features of the NACE survey mean that the data are not likely to be representative of the earnings experience of typical recent college graduates. While the list of colleges and universities is geographically and academically diverse, the data reported here, on average, probably reflect the experience of those students with more technical backgrounds or who are headed for employment in the largest firms and who, therefore, face the best economic circumstances in any given year.

RCG/B&B

The RCG surveys were a series of cross-sectional surveys of several thousand recent college graduates conducted periodically between 1976 and 1991 for the Department of Education. In 1993, the B&B survey, which was similar to the RCG surveys but also included a longitudinal component, replaced the RCG.[10] When used with accompanying weights, the surveys were designed to be nationally representative of all recent college graduates.

The RCG/B&B surveys gathered detailed information on the college experience and employment situation about one year after graduation of graduates with bachelor's degrees. Information collected included the age, sex, race, undergraduate major, as well as the industry and occupation, full-time or part-time status, and annual salary of post-college employment. The restricted-use versions of these surveys also reports the name of the undergraduate institution, grade-point average, and, in the case of the B&B survey, the student's SAT scores. All RCG/B&B data presented here come from published analyses of the data sets conducted by the NCES.

The RCG/B&B surveys provide detailed, nationally representative information on the economic circumstances of recent college graduates and are, in principal, ideal for the analysis presented here. In practice, however, the data have several limitations. First, the surveys were conducted only periodically (about every three years) between 1976 and 1994. As a result, no data exist for the 1995-2000 period, when recent college graduate wages grew dramatically in the CPS and NACE data sets. Second, the RCG/B&B surveys cover only recent college graduates and therefore contain no comparable information on individuals of the same age that did not attend, or attended but did not finish, a four-year college.

3. Average earnings

Wages, offers, and salaries

All three data sources provide estimates of the average earnings of recent college graduates that cover at last some portion of the last three decades (see Table 1 and Figures 1, 2, and 3). The most striking feature of average real earnings, regardless of the source, is their clear cyclical nature. Over the last four decades, average earnings for men and women rose and fell repeatedly in a range that is between about 10% above and 10% below the value of average real earnings in 1979. While average real earnings in the CPS and NACE data sets were indeed higher at the end of the 1990s (the RCG/B&B data end in 1994) than they were at the middle of the 1970s, none of the real earnings series shows a tendency to rise smoothly over the period.

While the three data sets demonstrate broadly consistent patterns, important differences are still apparent. The first three columns of Table 1 (and Figure 1) show the

average real hourly wage from the CPS for 23-to-26-year olds with exactly a four-year college degree. Between 1973 and 1979, average wages fell for male and female graduates, with the largest declines among females. Between 1979 and 1989, average real wages rose for both men and women, this time with the largest increases for women. The rise in the 1980s in real wages for men was small (1.5%, though the increase through 1988 was about 6.0%); the increase for women over the same period was larger (12.0%). As a point of comparison, between 1979 and 1989, average hourly productivity in the nonfarm business sector rose 14.5%.[11] Between 1989 and 1999, average real wages for both men and women increased about 6.5%, compared to a rise over the same period in average productivity of 20.4%. Over the 1990s wages grew, but unevenly. Average real wages fell between 1989 and 1995 (about 7.8% for men and 4.6% for women) and then rose even more steeply between 1995 and 1999 (up 15.5% for men and 11.7% for women). Over the 1995-99 period, real wage growth among recent college graduates did manage to exceed average productivity growth, which was up 10.3%.

Several features of that cyclicality of the CPS wage data warrant special attention. The first is the decline in real wages between the business cycle peaks in 1973 and 1979. The standard explanation for falling real wages over this period is the sharp rise in the supply of college graduates, especially female graduates, in the 1970s. The decline in average real wages in response to rising supply may provide important clues about the magnitude of long-term shifts in demand for recent college graduates. A second important feature of the CPS wage data is the stark difference in average wage responses to the recessions of the early 1980s and the early 1990s. The recession in the early 1980s was much more severe than that of the early 1990s, but real wages of recent college

graduates barely reacted to the first, deep recession and declined dramatically in response to the second, milder recession. These disparate responses to macroeconomic developments suggest that underlying (that is noncyclical) shifts in demand or supply for recent college graduates may have differed substantially between the early 1980s and the early 1990s.

The third and fourth columns of Table 1 (and Figure 2) present the average annual salary offers to graduating seniors from the NACE data. As with the CPS, the NACE data show a clear cyclical pattern with some modest long-term growth in real wages. The timing of the NACE cycles, except in the 1990s, however, differs substantially from those in the CPS. Between 1973 and 1979, average salary offers in the NACE data increased for both men (5.6%) and women (13.9%, between 1974 and 1979), a pattern that diverges markedly from the CPS data, which saw men's average wages falling slightly (down 1.5%) and women's average wages dropping more (down 7.8%). Between 1979 and 1989, as average hourly wages rose for both men and women in the CPS, the NACE data show declines in real salary offers to graduating seniors (down 2.2% for men and down 5.6% for women). In the 1990s, however, the NACE data do show a pattern that closely resembles the one found in the CPS data. In the NACE data, average salary offers increased about 7.4% for men and 10.8% for women (not far from the 6.5% rate for both men and women in the CPS data). As was true in the CPS, the average value of offers in the NACE data fell sharply in the first half of the 1990s and then rose even more steeply in the second half of the 1990s.

On the whole, the NACE estimates of average salary offers move more smoothly than the CPS estimates of average wages. The NACE data rise almost continuously

between 1973-74 and 1982; fall almost continuously (despite the economic recovery of the late 1980s) through 1994; and then rise rapidly through 2000. For purposes of this analysis, three common features of the NACE and CPS data appear to be most important. The first is the strong cyclicality of wages. While the cycles do not overlap exactly, both data sets show wide cyclical swings in real wages; neither shows anything approaching a steady rise in average real wages for recent college graduates, even among what are probably the relatively "high-end" graduates captured in the NACE data. A second key feature of both the NACE and CPS data is a long decline in the real earnings of recent college graduates –from the early 1980s in the case of the NACE data and the mid-1980s in the case of the CPS data– through the mid-1990s in both data sets. A final common feature of the CPS and NACE data sets is the strong rise in real earnings for recent college graduates at the end of the 1990s. No period in the CPS data shows sustained wage increases of the magnitude experienced at the end of the 1990s. In the NACE data, however, the 1962-68 and 1973-82 periods demonstrated roughly comparable increases in the inflation-adjusted value of offers.

The last two columns of Table 1 (and Figure 3) show data from the RCG/B&B surveys on the average annual salaries of full-time recent college graduates at about one year after graduation. The irregular periodicity of the RCG/B&B surveys makes it impossible to compare earnings growth over the periods 1973-79, 1979-89, and 1989-99. The graph of the average salary data in Figure 3, however, demonstrates that average salaries fell between 1976 and 1981 (as was the case with hourly wages in the CPS, but not with annual salary offers in the NACE data); then rose continuously through 1987 (as was the case with the CPS data, though in the NACE data the value of offers increased

only through 1982); and, finally, fell continuously through 1994 (as in both the CPS and NACE data sets).

The RCG/B&B data reinforce several of the trends in the CPS and NACE data. First, estimates of the average annual salary of recent college graduates in the RCG/B&B data are strongly cyclical. The exact cyclical pattern in the RCG/B&B data appears to follow the CPS data more closely than it does the NACE data. In the RCG/B&B and CPS data, average real earnings fell in the late 1970s; then rose through about 1987; then fell again through 1994. Second, as is the case with the CPS and NACE data, the RCG/B&B data suggest that the average real wages of recent college graduates fell sharply between about 1987 and 1994. Finally, the RCG/B&B data suggest that the earnings of recent college graduates did not respond in a strong or long-lasting way to the deep recession of the early 1980s, but did react negatively to the shallower recession of the early 1990s.

Health insurance coverage

So far, the analysis has ignored nonwage compensation. Table 2 reports data on the most important nonwage component of compensation, employer-provided health insurance coverage. The table shows the share of 23-to-26 year olds with coverage in 1979, 1989, and 1998. Between 1979 and 1989, the share of recent male graduates with employer-provided health insurance fell almost 9 percentage points, from about 75% to about 66%. Over the same period, the share of women with health insurance remained roughly constant at 67%. In the 1990s, health-care coverage fell for both men (down 5.5 percentage points) and women (down 11.5 percentage points). These movements in health-care coverage rates suggest that the earnings data in Table 1 may overstate improvements in real compensation in the 1980s and 1990s for men and in the 1990s for

women, since the observed changes in earnings do not take into consideration stagnant and declining rates of health coverage.

4. Relative earnings

This section shifts attention from absolute earnings to the relative earnings of recent graduates. The first subsection looks at the average earnings and health-care coverage rates of recent college graduates relative to workers with different levels of education and potential work experience. The second subsection examines the relative earnings of recent college graduates by their undergraduate major. The third subsection analyzes the relative earnings of recent graduates by gender.

Education and experience differentials

Only the CPS data allow an analysis of the earnings of recent college graduates relative to other workers with different levels of education or potential work experience. Table 3 uses the CPS data to compare the average wage of workers age 23-to-26 that have exactly a four-year college degree to two groups of high-school educated workers. The first high-school comparison group (columns 1, 2, and 3 and Figure 4) is age 19-22 in each survey year. This group, which has in principle gone straight from high school to work, should have roughly the same level of labor-market experience as the slightly older recent college graduates group. The second high-school group (columns 4, 5, and 6 and Figure 5) is the same age as the recent college graduate group (23-26), but because the high-school graduates have not finished a four-year college degree they should have more labor-market experience than the recent college graduates group.

The wage premium enjoyed by recent college graduates over both groups of young high-school graduates varies considerably over the period. Compared to the 19-22 year-old high-school graduates, the average wages of recent college graduates fell sharply from the mid- through the late-1970s. Relative college wages then rose sharply until about 1985 and then less sharply through about 1990. From 1990 through 1993-94, relative wages of college-educated workers fell again. After 1994, the relative wages recovered somewhat. Over the full decade of the 1990s, the wages of recent college graduates changed little relative to the 19-22 year-old high-school graduates.

The wages of recent college graduates relative to slightly older high-school graduates (ages 23-26) show a similar, though muted, pattern (see Figure 5). The relative wages of recent college graduates fell in the 1970s; rose through about 1990; then stagnated or fell through the mid-1990s; finally recovering through the end of the decade. The main difference between relative wages across the two high-school reference groups is that recent college graduates were flat with respect to 19-22 year-old high school graduates, but rose with respect to 23-26 year-old high school graduates.

Table 4 compares the average wages of recent college graduates with two older reference groups. The first group (see columns 1, 2, and 3 and Figure 6) is college graduates that are exactly 20 years older than the recent college graduate group; the second (see columns 4, 5, and 6 and Figure 7) is high school graduates that are also 20 years older than the recent college graduates. The pattern of relative wages differs markedly across the two groups of older workers.

Relative to older male college-educated workers, the wages of recent male college graduates changed little between 1973 and 1999. The wages of recent female graduates,

however, fell almost continuously over the entire period, from close to 90% of the earnings of older college graduates in 1974 to only about 70% of the earnings of older graduates in 1998-99.

Relative to older high-school-educated workers, recent male college graduates' wages rose between 1973 and 1999. Throughout most of the 1970s, recent male college graduates made only about 80% of what older high-school graduates earned. Between the late 1970s and the late 1980s, recent college graduates raised their relative to earnings to about 90% of those of older high-school graduates. During the recession of the early 1990s, the earnings of recent male graduates fell relative to older male high-school graduates, but from about 1993 on, recent college graduates closed the gap, reaching near parity (99%) with older high-school graduates by 1999.

The relative wages of recent female college graduates followed a different trajectory. The wages of recent female college graduates fell from about 125% of older female high-school graduates in 1973 to just 110% of older high-school graduates in 1979. Between 1979 and 1990, however, recent female graduates recovered almost all of the ground lost in the 1970s. In the first half of the 1990s, relative wages of recent female graduates fell again, to about the same level reached in 1979. In the second half of the 1990s, recent women college graduates' relative wages grew again, ending up at almost the same level at which they started in 1973.

Several aspects of these relative wage movements merit particular emphasis. First, while the cyclical movements were less pronounced for relative wages than was they were for average real wages, all of the series in Figures 4, 5, and 6 show some cyclical

variation. In several cases, the cyclical movements were large relative to any relative gains over the full period.

Second, for both men and women, the wages of recent college graduates relative to recent high-school graduates (ages 19-22) were essentially flat from the end of the 1980s through the end of the 1990s, while the wages of recent college graduates rose somewhat relative to slightly older (ages 23-26) high-school graduates. This odd discrepancy –which implies that over the 1990s the wages of more-experienced high-school graduates fell slightly compared to less-experienced high-school graduates– suggests that the timing of labor-market entry may have a persistent impact on wages over time. The better performance of younger high-school graduates relative to their slightly older counterparts also suggests that this group of new entrants may have somehow been better positioned to take advantage of whatever economic forces drove up wages at the end of the 1990s.

Third, despite their likely greater familiarity with information technology (a product of the timing of the high-school and college-experience and the distribution of women across undergraduate majors), younger college-educated women saw a substantial decline in their earnings relative to their older counterparts.

Finally, the earnings of recent male college graduates relative to older male college graduates and of recent female graduates relative to older high-school graduates changed little over the full 1973-99 period. As with the decline in the earnings of recent female graduates relative to older female college graduates, at face value, the relatively constant relative wages along these two dimensions appear to be at odds with explanations of inequality that rely on rising returns to familiarity with information

technology. That the wage of recent female college graduates relative to older female high-school graduates was essentially identical in 1973 and 1999 is particularly troubling in this respect.

Health-care coverage

The data on employer-provided health insurance rates in Table 2 complement the preceding analysis of relative wages. Panel (b) shows health-care coverage rates for male college and high-school graduates with different levels of potential labor-market experience in 1979, 1989, and 1998. Over the 1980s, coverage rates fell by the same margin, in percentage-point terms, for recent college graduates and older college graduates. Since recent college graduates started from a lower base of coverage, the relative decline in coverage was slightly larger for the younger college graduates. Younger high-school graduates (ages 19-22 and 23-26) experienced larger absolute and relative declines in health-care coverage (20-24 percentage points, from initial coverage rates below those of college graduates). Older high-school graduates, however, saw smaller absolute and relative declines in coverage than did recent college graduates; older high-school graduates began and ended the 1980s with higher rates of employer-provided health insurance than did recent college graduates. In the 1990s, health-coverage rates for recent college graduates deteriorated (down 5.5 percentage points) with respect to older college graduates (up 0.3 percentage points) and older high-school graduates (down 5.0 percentage points, from a higher base). Health-insurance coverage, however, fell less in the 1990s for recent college graduates than it did for younger high-school graduates ages 19-22 (down 8.3 percentage points) and 23-26 (down 6.0 percentage points).

Panel (c) reports the same data for women. Between 1979 and 1989, absolute coverage rates for recent college graduates rose 0.6 percentage points, less than the increase experienced by older college graduates (up 2.7 percentage points) and older high-school graduates (up 4.8 percentage points). Relative coverage rates for recent college graduates, however, increased dramatically with respect to younger high-school graduates, who experienced large declines in coverage rates (down 14.8 percentage points for 19-22 year olds and 7.2 percentage points for 23-26 year olds). Over the 1990s, relative health-care coverage rates for recent college graduates declined with respect to older college graduates, older high-school graduates, and even high-school graduates ages 23-26. The only group that did worse than recent female college graduates in the 1990s was recent high-school graduates ages 19-22.

The pattern of changing health-care coverage rates in the 1980s and 1990s complicates the simple skills-biased technical change explanation for rising wage inequality (see Appendix Table 2 for a schematic summary of relative wage and health care coverage rates). A straightforward acceleration in the skills-bias of technology should have increased the relative health-care coverage rates for recent college graduates with respect to younger high-school graduates and older high-school graduates –and arguably– even with respect to older college graduates, who typically have less familiarity with information technology. In several cases, however, relative coverage rates for recent college graduates fell: for males, with respect to older high-school graduates in the 1990s (there was no significant change with respect to this group in the 1980s); and, for females, with respect to older high-school graduates in the 1980s and 1990s and high-school graduates ages 23-26 in the 1990s. Over both decades, for both

men and women, relative coverage rates for recent college graduates fell with respect to older college graduates.

Earnings by major

The relative earnings of recent college graduates by undergraduate major may also shed important light on the forces shaping the economic prospects of recent college graduates. This subsection looks at earnings data from the NACE and the RCG/B&B surveys, paying particular attention to the relative earnings of individuals with technical degrees.

Figure 8 (see also Table 5) graphs the relative average salary offers to graduating seniors in technical and nontechnical majors from the NACE data (for 1962-2000 for men and 1974-2000 for women). Technical majors include engineering, agriculture and natural resource sciences, computer sciences, health sciences, and natural sciences; nontechnical majors include business, communications, education, home economics, humanities, and social sciences.

The data for men show that the ratio of technical to nontechnical offers gradually declined in the 1960s and early 1970s. The relative value of technical offers to both men and women, however, rose steeply between 1974 and 1982. After 1982 and until about 1987-88, offers to technical majors fell again relative to nontechnical majors. Technical offers recovered at the end of the 1980s expansion through about 1992 and then fell almost consistently through 2000. Overall, relative offers to technical majors show significant cyclical variation over the period examined here. While technical offers in 2000 were higher relative to nontechnical offers than they had been in the mid-1970s,

technical offers in 2000 were below where they had been in relative terms at the end of the 1970s and at the end of the 1980s.

Tables 6 and 7 and Figures 8 and 9 examine trends from the NACE data for more disaggregated groups of undergraduate majors. Three features of these disaggregated series appear to be inconsistent with the view that an acceleration in skills-biased technological change was responsible for the rise in wage inequality in the 1980s and 1990s. First, real salary offers for men and women across all groups of majors show a clear cyclical pattern. Offers were higher for all categories of majors in 2000 than they had been in the mid-1970s, but recent college graduates got to those higher real salary offers after a series of ups and downs that seem, at face value, inconsistent with a smooth rise in demand for more-skilled workers. At the very least, the cyclical movements suggest that the magnitude of SBTC-driven changes in the relative demand for college-educated workers may have been smaller than is generally assumed. Over much of the last three decades, the size of underlying SBTC effects appeared to be small relative to cyclical changes in aggregate demand (except possibly in the early 1980s), relative supply, and the combined effects of labor-market institutions.

Second, while real offers to all majors, especially computer science and engineering, rose rapidly in the second half of the 1990s, real offers to computer science, natural science, and engineering majors fell steadily from the mid-1980s to the mid-1990s. As the aggregate data for technical and nontechnical majors in Figure 6 demonstrate, these real earnings declines also represented relative declines with respect to undergraduates with nontechnical degrees.

Finally, the real increases in salary offers over the period 1973-2000 failed to keep pace with average productivity gains over the same period, even for young workers with engineering and computer science degrees.

Independent data from the RCG/B&B surveys corroborate the basic trends in the NACE data. Table 8 and Figure 11 displays information on annual salaries of recent college graduates by their undergraduate major for various years from 1976 through 1994. Computer science and engineering majors earned the highest salaries in every year, but their real earnings declined almost continuously throughout the whole period. The earnings of computer science and engineering majors relative to humanities majors also fell sharply over the period 1981-94.

Gender differentials

A final measure of relative earnings is the earnings gap between otherwise similar men and women. Figure 12 graphs the ratio of male-to-female earnings for recent college graduate earning data from the CPS, NACE, and RCG/B&B data originally presented in Table 1. Men have higher earnings in all years in all three series. The CPS data show relative male wages among recent college graduates rising in the 1970s; then falling continuously through the late 1980s; and finally leveling out in the 1990s at a point where men were earning, on average, about 10% more than women. The RCG/B&B data on annual earnings follows the CPS data closely with respect to both the level of the estimated premium for men and the changes over time, at least until 1994, when the RCG/B&B data show an increase in the gender gap while the CPS shows a slight decline. The NACE data show a remarkably constant gender gap, with average offers to

graduating men about 10% higher than offers to women throughout almost the entire 1974-2000 period.

The strong rise in the relative earnings of recent college graduate women over the last two decades –despite a large rise in the relative supply of recent college graduate women– points to an important hole in the standard SBTC explanation. Has SBTC also been gender biased?

5. Within-group wage inequality

This section analyzes the level of wage inequality within the narrow group of recent college graduates. The CPS data for recent college graduates show a complicated pattern of within-group inequality for both men and women. The pattern of inequality also appears to be sensitive to the specific inequality measure employed.

Table 9 and Figure 13 present the first measure of wage inequality: the variance of log real wages for workers age 23-26 with a four-year college degree. For men (see column 2), the variance of log real wages rises across every cyclical peak from 1973 through 1999. On an annualized basis, the most rapid rise in the variance of wages occurred between 1973 and 1979, before inequality began to rise in the overall wage distribution. The peak-to-peak increase in wage variance was slowest between 1979 and 1989, when overall wage inequality was growing fastest. The variance of log wages grew in the 1990s, but much more rapidly in the first half of the decade than it did in the second. For women (see column 3), the variance of log wages followed a different pattern. The variance of wages declined in the 1970s; rose in the 1980s; and was flat in the 1990s. The small change in the variance of wages over the full decade of the 1990s

was the result of a rise in wage inequality between 1989 and 1995 and an almost equal decline in inequality from 1995 through 1999.

One interesting feature of the variance of log wages was the tendency in the 1970s and 1980s for the variance to rise continuously from the trough through almost the peak of each business cycle, only to fall precipitously in the peak year of each cycle. Cyclical expansions may initially lead to widening inequality among recent college graduates, but the low unemployment rates characteristic of the peak years examined here may disproportionately boost the wages of less well-paid recent college graduates.

Tables 10, 11, and 12 and Figures 14, 15, and 16 display data on a second set of measures of within-group inequality: the 90-10, 90-50, and 50-10 log wage differentials for the same group recent college graduates. For men (see Table 11), the 90-10 differential (column 4) follows a pattern roughly similar to that of the variance of log wages. On an annualized basis, the 90-10 differential grew fastest between 1973 and 1979 and slowest between 1979 and 1989. The 90-10 differential rose in the 1990s, but faster at the beginning of the decade than it did at the end.

The same table also presents information on the 90-50 (column 5) and 50-10 (column 6) differentials. The data on these two components of the 90-10 differential demonstrate that the change in inequality after 1973 was not symmetric around the median. In the 1970s, inequality grew faster at the top, that is, the gap between 90th percentile workers and 50th percentile workers grew more quickly than the gap between 50th percentile and 10th percentile workers. In the 1980s, while the 90-10 differential expanded, the 90-50 differential actually fell slightly; the entire rise in the 90-10 differential in the 1980s, then, was due to the widening gap between workers at the

middle and those at the bottom. In the 1990s, by contrast, the 50-10 differential was basically unchanged, while the 90-50 differential grew sharply.

For women (see Table 12), changes in the 90-10 differential over time bear little resemblance to changes in the variance of log wages. In the 1970s, the 90-10 differential rose, while the variance of log wages declined. In the 1990s, the 90-10 differential fell, while the variance of log wages was basically unchanged. For women, movements in the 90-10 differential and the variance of log wages only coincided during the 1980s, when both increased, and in the second half of the 1990s, when both decreased. As with men, decomposing the 90-10 differential into the 90-50 and 50-10 differentials illustrates that the changes in inequality were generally not symmetric around the median. Between 1973 and 1979, as the 90-10 differential rose 0.040 log points, the 50-10 differential fell 0.026 log points; all of the increase in within-group inequality in the 1970s was therefore concentrated in the top half of the wage distribution. Between 1979 and 1989, all three differentials expanded, but three-quarters of the rise in the 90-10 differential occurred in bottom half of the distribution. In the 1990s, the 90-10 differential decreased 0.074 log points, but the gap between workers at the top and the middle actually grew 0.023 log points.

The SBTC explanation of rising inequality typically argues that one side-effect of SBTC is a rise in within-group wage inequality. Even among workers with the same level of formal education and same potential work experience, those that work best with new technology should see their wages rise relative to those who are not as comfortable with new technologies. The pattern of within-group technology observed here, at first blush, presents several challenges to the SBTC story. Among male recent college graduates, the

variance of log wages and the 90-10 differential rose faster in the 1970s (when overall inequality was declining) and in the 1990s (when overall inequality was growing more slowly) than they did in the 1980s, when overall inequality expanded at its fastest pace. The variance of log wages and the 90-10 differential for women did grow fastest in the 1980s, but the variance of log wages was flat and the 90-10 differential for women fell in the 1990s, as overall inequality continued to grow.

6. Conclusions

In two companion papers, I will seek to use the data sets reviewed here to analyze two questions. First, to what extent are some of the developments in the real and relative wage changes and the within-group inequality documented here the result of changes in the composition of recent college graduates? The RCG/B&B surveys are well-suited to examining these questions because these surveys include detailed information on recent college graduates employment circumstances and undergraduate experience, including (in the restricted-use version of the survey) the name of the undergraduate institution and the students grade-point average. This kind of information on both the student and the institution should allow at least a limited examination of changes in composition that reflect what Hoxby and Terry (1999) refer to as the "extensive" and "intensive" margins.

The second question that I hope to examine with these data is: to what extent can a simple supply-and-demand framework explain the complex movements in relative wages presented here? The CPS data (combined with independent NCES data on enrollment rates) should provide sufficient information to construct and test the limits of such a simple supply-and-demand model.

Notes

[1] See NCES (2000), Table 186.

[2] See Card and Lemieux (2000), Figures 6a and 6b.

[3] For a discussion of the important distinction between increasing and accelerating demand for skills, see Mishel and Bernstein (1994, 1998). I put "skills" in quotation marks here because the term is used broadly and sometimes loosely in the general discussion of rising demand for skills. It sometimes means that a worker is a supervisor or nonproduction worker; sometimes, that a worker has a four-year college degree or more; sometimes, that a worker uses a computer on the job.

[4] To compare the CPI-U and CPI-U-RS, see Council of Economic Advisors, *Economic Report of the President*, January 2001, Table B-62, p. 346. (Since the BLS has not calculated the CPI-U-RS prior to 1977, I have spliced the CPI-U-X1 (which corrects the CPI-U for the treatment of housing costs) to the CPI-U-RS prior to 1977. Note also that the BLS has not calculated the CPI-U-X1 for years prior to 1967; following the BLS, I have spliced the CPI-U to the CPI-U-X1 prior to 1967.)

[5] For relevant sample sizes for each year, see Appendix Table 1.

[6] See Appendix B, pp. 413-19.

[7] The BLS and the NCES, for example, both report data on college-graduates (and other education categories) across the coding change. The impact of the coding change appears to be bigger on the share of the population categorized as having a college degree than it is on the absolute or relative earnings of those groups. See, for example, Card and Lemieux (1999), Table A-2.

[8] In later years, for some undergraduate majors and employer industries, NACE also reports the 10th, 50th, and 90th percentile of offers.

[9] I also attempted to obtain access to the microdata used to create the published tables. NACE representatives, however, indicated that some of the earlier survey results were not available in electronic form and that some were no longer available in any but the published format. A spreadsheet with all data used in this report is available from the author on request; back issues of the relevant CPC and NACE publications is available directly from NACE (see <http://www.naceweb.org/>).

[10] For a more detailed look at the RCG/B&B surveys see the National Center for Education Statistics web pages: < http://nces.ed.gov/surveys/rcg/> and <http://nces.ed.gov/surveys/b&b/>.

[11] All estimates of productivity use CEA (2001), Table B-49.

References

Card, David and Thomas Lemieux. (1999). "Can Falling Supply Explain the Rising Return to College for Younger Men? A Cohort-Based Analysis." Center for Labor Economics Working Paper No. 13. University of California, Berkeley, California.

Card, David and Thomas Lemieux. (2000). "Dropout and Enrollment Rates in the Post-war Period: What Went Wrong in the 1970s?" National Bureau of Economic Research Working Paper No. 7658. Cambridge, Mass.: National Bureau of Economic Research, (April).

Council of Economic Advisors. (2001). *Economic Report of the President*. Washington, DC: Government Printing Office, (January).

Howell, David. (1995). "Collapsing Wages and Rising Inequality: Has Computerization Shifted the Demand for Skills?" *Challenge*, January-February, pp. 27-35.

Howell David. (1997). "Institutional Failure and the American Worker: The Collapse of Low-Skill Wages." Public Policy Brief No. 29. Annandale-on-Hudson, New York: The Jerome Levy Economics Institute of Bard College.

Hoxby, Caroline M. and Bridget Terry. (1999). "Explaining Rising Income and Wage Inequality Among the College-Educated." National Bureau of Economic Research Working Paper No. 6873. Cambridge, Mass.: National Bureau of Economic Research, (January).

Jaeger, David A. (1997). “Reconciling the Old and New Census Bureau Education Questions: Recommendations for Researchers.” Journal of Business and Economic Statistics, vol. 15, no. 3., pp. 300-10.

Mishel, Lawrence and Jared Bernstein. (1994). "Is the Technology Black Box Empty? An Empirical Examination of the Impact of Technology on Wage Inequality and the Employment Structure." Unpublished paper. Economic Policy Institute, Washington, DC.

Mishel, Lawrence and Jared Bernstein. (1998). "Technology and the Wage Structure: Has Technology's Impact Accelerated Since the 1970s?" *Research in Labor Economics*, vol. 17, pp. 305-55.

Mishel, Lawrence, Jared Bernstein, and John Schmitt. (2001). *The State of Working America 2001-2001*. Ithaca, New York: Cornell University Press.

National Center for Education Statistics. (2000). *Digest of Education Statistics, 1999.* <http://nces.ed.gov/pubs2000/digest99/>.

Appendix TABLE 1
Sample sizes for wage data on individuals age 23-26 with a four-year college degree, Current Population Survey

	All	Men	Women
May CPS			
1973	758	397	361
1974	764	401	363
1975	847	444	403
1976	794	383	411
1977	1,043	518	525
1978	960	453	507
ORG			
1979	3,474	1,697	1,777
1980	4,024	1,895	2,129
1981	3,659	1,697	1,962
1982	3,575	1,650	1,925
1983	3,679	1,727	1,952
1984	3,778	1,762	2,016
1985	4,017	1,862	2,155
1986	3,921	1,777	2,144
1987	3,944	1,779	2,165
1988	3,694	1,667	2,027
1989	3,484	1,590	1,894
1990	3,675	1,670	2,005
1991	3,547	1,609	1,938
1992	3,954	1,798	2,156
1993	3,920	1,732	2,188
1994	3,956	1,727	2,229
1995	3,875	1,738	2,137
1996	3,532	1,531	2,001
1997	3,405	1,498	1,907
1998	3,188	1,411	1,777
1999	3,007	1,314	1,693

Source: Author's analysis of CPS.

Appendix TABLE 2
Change in relative wages and relative health-care coverage of recent college graduates, CPS

Change with respect to:	Men				Women			
	1980s		1990s		1980s		1990s	
	Wage	Health	Wage	Health	Wage	Health	Wage	Health
College, 43-46	?	?	?	?	?	?	?	?
High School								
19-22	?	?	?	?	?	?	?	?
23-26	?	?	?	?	?	?	?	?
43-46	?	?	?	?	?	?	?	?

Source: Tables 2, 3, and 4.

Appendix TABLE 3
Changes in within-group wage inequality among recent college graduates, CPS

	Men		Women	
	1980s	1990s	1980s	1990s
Variance log wages	?	?	?	?
Log wage differentials				
90-10	?	?	?	?
90-50	?	?	?	?
50-10	?	?	?	?

Source: Tables 9, 10, 11, and 12.

TABLE 1
Average real earnings of recent college graduates, 1962-2000
(1999 dollars)

	CPS-ORG			NACE		RCG/B&B		
	(Avg per hour)			(Avg offer per year)		(Avg per year)		
Year	All	Men	Women	Men	Women	All	Men	Women
1962	--	--	--	31,097	--	--	--	--
1963	--	--	--	31,976	--	--	--	--
1964	--	--	--	32,382	--	--	--	--
1965	--	--	--	32,869	--	--	--	--
1966	--	--	--	34,185	--	--	--	--
1967	--	--	--	35,467	--	--	--	--
1968	--	--	--	36,446	--	--	--	--
1969	--	--	--	37,366	--	--	--	--
1970	--	--	--	37,424	--	--	--	--
1971	--	--	--	35,529	--	--	--	--
1972	--	--	--	34,889	--	--	--	--
1973	13.38	14.24	12.42	34,601	--	--	--	--
1974	13.16	14.02	12.20	33,717	29,020	--	--	--
1975	12.55	13.49	11.47	33,975	29,291	--	--	--
1976	12.91	14.19	11.66	33,903	30,265	--	--	--
1977	12.43	13.43	11.39	34,436	30,812	--	--	--
1978	12.71	14.02	11.49	36,149	32,234	26,068	29,428	22,666
1979	12.73	14.03	11.44	36,554	33,054	--	--	--
1980	12.62	14.12	11.24	36,596	33,025	--	--	--
1981	12.75	14.03	11.57	37,766	34,073	23,540	26,991	20,825
1982	13.02	14.25	11.89	38,411	34,363	--	--	--
1983	12.91	13.88	12.01	36,541	32,790	--	--	--
1984	13.03	14.39	11.77	36,891	33,055	--	--	--
1985	13.34	14.62	12.18	37,194	33,633	25,841	28,572	23,526
1986	13.55	14.88	12.35	37,298	33,720	--	--	--
1987	13.78	14.72	12.94	34,865	32,891	27,596	29,925	25,407
1988	13.72	14.87	12.71	35,958	32,637	--	--	--
1989	13.48	14.24	12.82	35,747	31,191	--	--	--
1990	13.65	14.44	12.98	35,726	32,093	--	--	--
1991	13.11	13.94	12.40	35,504	31,574	26,475	28,827	24,941
1992	12.72	13.22	12.29	34,869	31,161	--	--	--
1993	12.78	13.42	12.25	33,780	30,769	--	--	--
1994	12.63	13.41	11.99	33,326	30,362	24,822	27,475	23,128
1995	12.64	13.13	12.22	33,833	30,189	--	--	--
1996	12.48	13.11	11.96	34,595	31,126	--	--	--
1997	12.83	13.68	12.14	35,341	31,677	--	--	--
1998	13.78	14.67	13.05	38,176	33,134	--	--	--
1999	14.33	15.16	13.65	38,375	34,555	--	--	--
2000	--	--	--	39,646	35,090	--	--	--

(continued)

TABLE 1 (continued)
Average real earnings of recent college graduates, 1962-2000
(1999 dollars)

	CPS-ORG			NACE		RCG/B&B		
	(Avg per hour)			(Avg offer per year)		(Avg per year)		
Year	All	Men	Women	Men	Women	All	Men	Women
Percentage change								
1973-79	-4.9	-1.5	-7.8	5.6	13.9	--	--	--
1979-89	5.9	1.5	12.0	-2.2	-5.6	--	--	--
1989-99	6.3	6.5	6.5	7.4	10.8	--	--	--
1989-95	-6.2	-7.8	-4.6	-5.4	-3.2	--	--	--
1995-99	13.3	15.5	11.7	13.4	14.5	--	--	--
1978-87	8.5	5.0	12.6	-3.6	2.0	5.9	1.7	12.1
1987-94	-8.4	-8.9	-7.3	-4.4	-7.7	-10.0	-8.2	-9.0

Notes:
CPS-ORG: Author's analyis of the May CPS (1973-78) and CPS merged outgoing rotation group (1979-99). Average hourly earnings of 23-26 year olds who have completed exactly 16 or started but not completed 17 years of schooling (1973-91) or who report a four-year college degree only (1992-99).
NACE: Offer-weighted average of annual salary offers to graduating seniors. Change for women from 1973-79 refers to 1974-79.
RCG/B&B: Average annual salary of bachelor's degree recipients employed full-time one year after graduation, taken from NCES (1997) analysis of RCG and B&B data.

TABLE 2
Employer-provided Health-Care Coverage
(Percent with coverage)

				Percentage-point change	
	1979	1989	1998	1979-89	1989-98
(a) All					
College					
Age 23-26	70.5	66.7	57.9	-3.8	-8.8
Age 43-46	70.9	68.2	71.4	-2.7	3.2
High school					
Age 19-22	52.9	35.6	25.4	-17.3	-10.2
Age 23-26	63.6	51.5	42.4	-12.1	-9.1
Age 43-46	65.5	63.9	60.2	-1.6	-3.7
(b) Men					
College					
Age 23-26	75.0	66.3	60.8	-8.7	-5.5
Age 43-46	88.2	79.5	79.8	-8.7	0.3
High school					
Age 19-22	55.4	35.6	27.4	-19.8	-8.3
Age 23-26	71.7	48.1	42.1	-23.6	-6.0
Age 43-46	84.3	76.2	71.2	-8.1	-5.0
(c) Women					
College					
Age 23-26	66.5	67.1	55.6	0.6	-11.5
Age 43-46	50.5	53.2	63.2	2.7	10.0
High school					
Age 19-22	50.4	35.6	22.9	-14.8	-12.7
Age 23-26	55.3	48.1	42.9	-7.2	-5.2
Age 43-46	48.7	53.5	49.0	4.8	-4.5

Source: Author's analysis of March CPS data.

Notes: Data are for private sector, wage and salary workers, who worked at least one week in the year.

TABLE 3
Relative wages of recent college graduates, CPS, 1973-1999:
(Ratio of recent-college-graduate to recent high-school-graduate average wages)

	Relative to high school graduates, ages 19-22			Relative to high school graduates, 23-26		
Year	All	Men	Women	All	Men	Women
1973	1.48	1.40	1.58	1.14	1.08	1.30
1974	1.45	1.35	1.59	1.19	1.12	1.34
1975	1.44	1.38	1.50	1.16	1.09	1.28
1976	1.50	1.48	1.53	1.17	1.15	1.25
1977	1.43	1.37	1.50	1.14	1.09	1.25
1978	1.39	1.36	1.43	1.12	1.10	1.22
1979	1.38	1.35	1.43	1.12	1.08	1.22
1980	1.42	1.42	1.43	1.15	1.12	1.24
1981	1.49	1.48	1.51	1.18	1.15	1.28
1982	1.58	1.58	1.60	1.23	1.19	1.32
1983	1.65	1.64	1.66	1.25	1.20	1.35
1984	1.69	1.71	1.69	1.28	1.27	1.34
1985	1.74	1.78	1.72	1.32	1.31	1.39
1986	1.75	1.78	1.74	1.33	1.32	1.39
1987	1.78	1.76	1.81	1.37	1.33	1.47
1988	1.77	1.80	1.76	1.37	1.37	1.43
1989	1.77	1.74	1.81	1.40	1.36	1.50
1990	1.80	1.78	1.85	1.41	1.38	1.50
1991	1.76	1.76	1.79	1.36	1.35	1.41
1992	1.71	1.68	1.76	1.37	1.32	1.46
1993	1.75	1.75	1.80	1.39	1.36	1.48
1994	1.69	1.70	1.73	1.36	1.36	1.42
1995	1.70	1.65	1.81	1.36	1.33	1.46
1996	1.70	1.67	1.79	1.41	1.39	1.49
1997	1.72	1.73	1.75	1.40	1.38	1.50
1998	1.76	1.76	1.82	1.47	1.44	1.59
1999	1.75	1.74	1.82	1.49	1.46	1.59

See notes to Table 1.

TABLE 4
Relative wages of recent college graduates, CPS, 1973-1999:
(Ratio of recent-college-graduate to older-worker average wages)

	Relative to college graduates, age 43-46			Relative to high school graduates Age 43-46		
Year	All	Men	Women	All	Men	Women
1973	0.61	0.56	0.84	0.95	0.79	1.26
1974	0.64	0.58	0.89	0.96	0.83	1.19
1975	0.57	0.51	0.84	0.94	0.80	1.19
1976	0.61	0.55	0.87	0.96	0.84	1.21
1977	0.59	0.52	0.78	0.91	0.77	1.19
1978	0.58	0.55	0.81	0.93	0.82	1.15
1979	0.62	0.58	0.83	0.92	0.81	1.10
1980	0.62	0.59	0.81	0.94	0.83	1.12
1981	0.63	0.57	0.87	0.96	0.84	1.15
1982	0.62	0.55	0.85	0.97	0.84	1.17
1983	0.60	0.53	0.83	0.97	0.83	1.19
1984	0.62	0.56	0.80	0.95	0.84	1.15
1985	0.60	0.55	0.82	0.98	0.86	1.18
1986	0.61	0.55	0.80	0.98	0.86	1.16
1987	0.60	0.52	0.81	1.00	0.85	1.20
1988	0.61	0.54	0.80	1.00	0.88	1.18
1989	0.65	0.57	0.80	1.03	0.88	1.22
1990	0.67	0.61	0.78	1.05	0.91	1.24
1991	0.64	0.59	0.75	1.02	0.89	1.17
1992	0.61	0.55	0.73	1.00	0.86	1.16
1993	0.62	0.56	0.73	1.01	0.90	1.13
1994	0.60	0.56	0.70	1.01	0.90	1.13
1995	0.61	0.55	0.70	1.03	0.91	1.17
1996	0.62	0.58	0.68	1.00	0.91	1.11
1997	0.61	0.58	0.66	1.01	0.93	1.13
1998	0.62	0.57	0.70	1.05	0.97	1.18
1999	0.62	0.57	0.71	1.09	0.99	1.24

See notes to Table 1.

TABLE 5
Average annual salary offers for technical and nontechnical majors,* NACE, 1962-2000
(1999 dollars)

	Men			Women		
	Technical	Nontech	Ratio	Technical	Nontech	Ratio
1962	33,369	27,866	1.20	--	--	--
1963	34,310	28,832	1.19	--	--	--
1964	34,985	29,116	1.20	--	--	--
1965	35,652	29,869	1.19	--	--	--
1966	36,603	31,094	1.18	--	--	--
1967	38,086	32,479	1.17	--	--	--
1968	39,066	33,463	1.17	--	--	--
1969	39,914	34,651	1.15	--	--	--
1970	40,217	35,521	1.13	--	--	--
1971	38,580	33,863	1.14	--	--	--
1972	38,095	33,756	1.13	--	--	--
1973	37,400	32,865	1.14	--	--	--
1974	36,372	31,554	1.15	32,395	28,481	1.14
1975	37,172	30,883	1.20	33,145	28,846	1.15
1976	37,549	30,432	1.23	35,010	28,574	1.23
1977	38,081	30,018	1.27	36,419	28,218	1.29
1978	39,936	30,731	1.30	38,573	28,994	1.33
1979	40,166	30,564	1.31	39,164	29,341	1.33
1980	40,130	29,954	1.34	39,129	28,719	1.36
1981	41,291	30,248	1.37	40,066	28,956	1.38
1982	42,621	31,102	1.37	41,166	29,958	1.37
1983	41,072	30,180	1.36	39,190	29,168	1.34
1984	41,066	30,400	1.35	39,597	29,414	1.35
1985	41,075	30,828	1.33	39,919	29,577	1.35
1986	41,548	31,800	1.31	40,931	30,568	1.34
1987	38,659	31,713	1.22	40,126	30,720	1.31
1988	40,531	32,469	1.25	39,788	31,549	1.26
1989	40,117	32,472	1.24	39,615	31,041	1.28
1990	39,911	32,024	1.25	39,553	30,394	1.30
1991	40,399	31,401	1.29	39,679	29,218	1.36
1992	39,773	30,923	1.29	39,833	28,950	1.38
1993	38,661	30,544	1.27	38,631	28,743	1.34
1994	38,056	30,707	1.24	37,975	28,685	1.32
1995	38,788	29,907	1.30	38,763	28,166	1.38
1996	39,170	31,259	1.25	38,685	28,972	1.34
1997	39,852	31,967	1.25	39,549	29,492	1.34
1998	42,499	34,364	1.24	40,591	31,255	1.30
1999	42,913	35,386	1.21	41,660	32,628	1.28
2000	44,880	35,595	1.26	43,169	33,176	1.30

(continued)

TABLE 5 (continued)
Average annual salary offers for technical and nontechnical majors, NACE, 1962-2000
(1999 dollars)

	Men			Women		
	Technical	Nontech	Ratio	Technical	Nontech	Ratio
Percentage change						
1973-79**	7.4	-7.0	15.5	20.9	3.0	17.4
1979-89	-0.1	6.2	-6.0	1.2	5.8	-4.4
1989-99	7.0	9.0	-1.8	5.2	5.1	0.0
1989-95	-3.3	-7.9	5.0	-2.2	-9.3	7.8
1995-99	10.6	18.3	-6.5	7.5	15.8	-7.2
1989-2000	11.9	9.6	2.1	9.0	6.9	2.0
1995-2000	15.7	19.0	-2.8	11.4	17.8	-5.5

Source: Author's analysis of NACE data.

*Technical majors are: engineering; agriculture and natural resource sciences; computer sciences; health sciences; and sciences. Nontechnical majors are: business; communications; education; home economics; humanities; and social sciences.
**For women, changes cover the period 1974-79.
See also notes to Table 1.

TABLE 6
Average annual salary offers by major, male seniors, NACE, 1962-2000
(1999 dollars)

	Business	Humanities and Social Sciences	Engineering	Sciences	Computer Science
1962	28,002	27,164	33,448	32,608	--
1963	28,894	27,621	34,402	32,939	--
1964	29,353	28,261	35,111	33,500	--
1965	30,142	28,747	35,733	34,195	--
1966	31,327	29,839	36,740	35,015	--
1967	32,726	31,157	38,213	36,552	--
1968	33,768	31,884	39,217	37,101	--
1969	34,946	32,507	40,064	38,180	--
1970	35,880	32,545	40,347	37,598	--
1971	34,260	31,142	39,165	35,376	--
1972	34,216	30,360	38,572	34,372	--
1973	33,340	29,210	37,718	33,874	35,352
1974	32,149	27,873	36,809	31,996	34,038
1975	31,504	26,904	37,858	31,502	33,381
1976	30,826	27,488	38,354	31,311	33,458
1977	30,435	26,967	38,818	31,760	34,241
1978	31,027	27,557	40,542	34,623	36,931
1979	30,799	27,517	40,624	34,888	37,539
1980	30,119	27,494	40,556	35,398	37,517
1981	30,417	27,844	41,771	37,381	38,000
1982	31,314	28,293	43,290	37,844	39,388
1983	30,338	28,565	41,798	35,050	38,871
1984	30,460	29,823	41,687	35,884	39,436
1985	30,929	29,865	41,598	36,411	38,753
1986	31,784	31,956	41,972	36,375	40,450
1987	31,667	32,070	38,794	37,675	38,713
1988	32,681	31,444	41,015	36,628	38,675
1989	32,988	30,415	40,713	35,397	38,176
1990	32,577	29,971	40,683	33,967	37,976
1991	32,039	28,823	41,304	34,435	37,465
1992	31,622	27,892	40,751	34,082	36,848
1993	31,215	28,011	39,555	32,023	36,886
1994	31,589	26,985	38,988	31,513	36,443
1995	30,730	27,177	39,571	32,144	38,005
1996	32,145	27,304	40,173	32,634	38,275
1997	32,903	27,536	40,769	33,024	39,722
1998	35,515	29,160	43,719	35,407	42,952
1999	36,594	29,756	43,874	35,310	43,996
2000	36,467	31,213	45,452	36,468	47,430

(continued)

TABLE 6 (continued)
Average annual salary offers by major, male seniors, NACE, 1962-2000
(1999 dollars)

	Business	Humanities and Social Sciences	Engineering	Sciences	Computer Science
Percentage change					
1973-79	-7.6	-5.8	7.7	3.0	6.2
1979-89	7.1	10.5	0.2	1.5	1.7
1989-99	10.9	-2.2	7.8	-0.2	15.2
1989-95	-6.8	-10.6	-2.8	-9.2	-0.4
1995-99	19.1	9.5	10.9	9.9	15.8
1989-2000	10.5	2.6	11.6	3.0	24.2
1995-2000	18.7	14.9	14.9	13.5	24.8

Source: Author's analysis of NACE data.

See notes to Table 1.

TABLE 7
Average annual salary offers by major, female seniors, NACE, 1973-2000
(1999 dollars)

	Business	Humanities and Social Sciences	Engineering	Sciences	Computer Science
1962	--	--	--	--	--
1963	--	--	--	--	--
1964	--	--	--	--	--
1965	--	--	--	--	--
1966	--	--	--	--	--
1967	--	--	--	--	--
1968	--	--	--	--	--
1969	--	--	--	--	--
1970	--	--	--	--	--
1971	--	--	--	--	--
1972	--	--	--	--	--
1973	--	--	--	--	--
1974	31,215	25,124	37,127	31,181	33,113
1975	31,199	24,214	38,930	29,632	33,176
1976	30,386	24,551	39,691	31,419	33,781
1977	29,821	23,982	40,339	31,714	33,846
1978	30,408	24,458	41,669	33,033	36,552
1979	30,276	24,729	41,557	33,361	36,741
1980	29,553	24,477	41,250	33,454	36,943
1981	29,788	24,569	42,211	34,871	37,409
1982	30,698	25,134	43,883	35,441	39,429
1983	29,945	25,380	42,105	33,032	37,899
1984	29,982	26,335	41,981	33,945	38,217
1985	30,155	26,454	41,992	34,297	37,886
1986	30,972	27,873	42,395	35,527	39,617
1987	31,000	29,176	41,583	35,275	37,961
1988	32,188	28,305	41,466	34,182	38,405
1989	32,554	27,524	41,468	33,092	38,280
1990	32,154	26,597	41,537	33,443	37,529
1991	31,080	25,696	42,346	31,825	37,734
1992	30,924	25,135	42,272	30,613	36,286
1993	30,674	25,354	41,620	29,453	35,778
1994	30,545	24,701	40,220	30,121	36,454
1995	30,090	24,779	40,941	28,971	35,430
1996	31,021	25,145	41,519	29,890	37,276
1997	31,730	24,725	42,534	31,336	37,816
1998	33,910	26,537	43,991	32,263	41,039
1999	35,306	27,577	44,913	33,578	43,320
2000	35,435	28,795	45,789	33,866	45,714

(continued)

TABLE 7 (continued)
Average annual salary offers by major, female seniors, NACE, 1962-2000
(1999 dollars)

	Business	Humanities and Social Sciences	Engineering	Sciences	Computer Science
Percentage change					
1974-79	-3.0	-1.6	11.9	7.0	11.0
1979-89	7.5	11.3	-0.2	-0.8	4.2
1989-99	8.5	0.2	8.3	1.5	13.2
1989-95	-7.6	-10.0	-1.3	-12.5	-7.4
1995-99	17.3	11.3	9.7	15.9	22.3
1989-2000	8.9	4.6	10.4	2.3	19.4
1995-2000	17.8	16.2	11.8	16.9	29.0

Source: Author's analysis of NACE data.

See notes to Table 1.

TABLE 8
Median annual salaries of college graduates, one year after graduation, RCG/B&B, various years
(1999 dollars)

	Humanities	Social and Behavorial Sciences	Natural Sciences	Computer Science and Engineering	Education	Business	Other professional or technical
1973	--	--	--	--	--	--	--
1974	--	--	--	--	--	--	--
1975	--	--	--	--	--	--	--
1976	--	--	--	--	--	--	--
1977	--	--	--	--	--	--	--
1978	20,775	23,297	25,589	38,175	22,381	29,820	26,794
1979	--	--	--	--	--	--	--
1980	--	--	--	--	--	--	--
1981	19,904	20,858	23,352	37,894	19,167	26,643	25,140
1982	--	--	--	--	--	--	--
1983	--	--	--	--	--	--	--
1984	--	--	--	--	--	--	--
1985	21,043	22,584	24,549	37,405	20,635	27,071	25,505
1986	--	--	--	--	--	--	--
1987	22,878	25,174	26,902	37,052	22,456	28,308	26,782
1988	--	--	--	--	--	--	--
1989	--	--	--	--	--	--	--
1990	--	--	--	--	--	--	--
1991	22,823	23,983	25,995	37,324	23,390	27,754	27,059
1992	--	--	--	--	--	--	--
1993	--	--	--	--	--	--	--
1994	22,060	22,591	22,963	33,705	21,020	27,393	25,647
1995	--	--	--	--	--	--	--
1996	--	--	--	--	--	--	--
1997	--	--	--	--	--	--	--
1998	--	--	--	--	--	--	--
1999	--	--	--	--	--	--	--
Percent change							
1978-91	9.9	2.9	1.6	-2.2	4.5	-6.9	1.0
1981-91	14.7	15.0	11.3	-1.5	22.0	4.2	7.6
1991-94	-3.3	-5.8	-11.7	-9.7	-10.1	-1.3	-5.2

Source: Author's calculations based on NCES (2000), Table 34-1, deflated using the CPI-U-RS.

See notes to Table 1.

TABLE 9
Variance of log real wages, college graduates, ages 23-26, CPS, 1973-79

	All	Men	Women
1973	0.164	0.145	0.174
1974	0.175	0.168	0.173
1975	0.161	0.176	0.131
1976	0.160	0.165	0.141
1977	0.180	0.199	0.150
1978	0.151	0.159	0.129
1979	0.168	0.180	0.139
1980	0.174	0.172	0.152
1981	0.193	0.204	0.168
1982	0.220	0.238	0.192
1983	0.213	0.228	0.191
1984	0.225	0.233	0.201
1985	0.226	0.252	0.192
1986	0.224	0.242	0.196
1987	0.235	0.263	0.205
1988	0.229	0.262	0.194
1989	0.201	0.207	0.192
1990	0.210	0.216	0.200
1991	0.202	0.223	0.179
1992	0.212	0.213	0.209
1993	0.218	0.233	0.203
1994	0.222	0.248	0.198
1995	0.228	0.240	0.216
1996	0.221	0.227	0.213
1997	0.220	0.239	0.201
1998	0.229	0.239	0.216
1999	0.219	0.251	0.190
Difference			
1973-79	0.004	0.036	-0.035
1979-89	0.033	0.027	0.053
1989-99	0.017	0.044	-0.002
1989-95	0.027	0.033	0.024
1995-99	-0.010	0.011	-0.026

See notes to Table 1.

TABLE 10
10th, 50th, and 90th percentiles of the log real wage distribution, CPS, 1973-99: all recent college graduates, ages 23-26

	Log real wage by percentile			Differentials		
	10th	50th	90th	90-10	90-50	50-10
1973	2.017	2.506	2.972	0.955	0.466	0.489
1974	2.006	2.476	2.923	0.916	0.446	0.470
1975	1.927	2.486	2.908	0.981	0.421	0.560
1976	2.053	2.464	2.897	0.844	0.433	0.411
1977	1.914	2.451	2.908	0.993	0.457	0.536
1978	1.966	2.460	2.930	0.964	0.470	0.494
1979	1.940	2.461	2.946	1.006	0.485	0.522
1980	1.908	2.465	2.958	1.050	0.492	0.557
1981	1.901	2.437	2.986	1.085	0.549	0.537
1982	1.895	2.454	3.034	1.139	0.580	0.560
1983	1.854	2.470	3.004	1.150	0.535	0.615
1984	1.864	2.443	3.019	1.155	0.575	0.580
1985	1.900	2.482	3.042	1.142	0.560	0.582
1986	1.882	2.516	3.043	1.161	0.527	0.635
1987	1.944	2.513	3.052	1.109	0.539	0.570
1988	1.918	2.506	3.016	1.099	0.511	0.588
1989	1.875	2.568	3.017	1.142	0.449	0.693
1990	1.956	2.519	3.050	1.095	0.531	0.564
1991	1.896	2.483	3.014	1.118	0.531	0.588
1992	1.859	2.457	3.017	1.157	0.560	0.598
1993	1.872	2.432	2.991	1.119	0.560	0.560
1994	1.860	2.413	2.955	1.095	0.542	0.553
1995	1.875	2.441	2.987	1.112	0.546	0.567
1996	1.847	2.432	2.959	1.111	0.527	0.585
1997	1.859	2.480	2.991	1.132	0.511	0.621
1998	1.948	2.546	3.026	1.078	0.480	0.599
1999	1.981	2.530	3.091	1.110	0.561	0.549
Difference						
1973-79	-0.078	-0.045	-0.027	0.051	0.018	0.033
1979-89	-0.064	0.107	0.071	0.136	-0.036	0.172
1989-99	0.106	-0.038	0.074	-0.032	0.113	-0.144
1989-95	-0.001	-0.127	-0.030	-0.029	0.097	-0.126
1995-99	0.106	0.089	0.104	-0.002	0.016	-0.018

See notes to Table 1.

TABLE 11
10th, 50th, and 90th percentiles of the log real wage distribution, CPS, 1973-99: male recent college graduates, ages 23-26

	Log real wage by percentile			Differentials		
	10th	50th	90th	90-10	90-50	50-10
1973	2.101	2.595	3.017	0.916	0.422	0.495
1974	2.102	2.554	2.962	0.860	0.407	0.453
1975	1.991	2.620	2.981	0.990	0.361	0.629
1976	2.094	2.564	3.009	0.915	0.445	0.470
1977	1.991	2.502	2.972	0.981	0.470	0.511
1978	2.055	2.578	3.036	0.981	0.458	0.523
1979	2.014	2.559	3.063	1.050	0.504	0.546
1980	2.042	2.583	3.053	1.012	0.470	0.542
1981	1.952	2.581	3.091	1.139	0.511	0.629
1982	1.895	2.523	3.111	1.216	0.588	0.629
1983	1.854	2.505	3.125	1.270	0.620	0.651
1984	1.955	2.557	3.128	1.174	0.571	0.602
1985	1.927	2.580	3.135	1.208	0.555	0.653
1986	1.987	2.585	3.132	1.145	0.547	0.598
1987	1.954	2.558	3.132	1.179	0.574	0.604
1988	1.918	2.573	3.096	1.179	0.524	0.655
1989	1.971	2.568	3.061	1.090	0.492	0.598
1990	2.009	2.580	3.100	1.092	0.520	0.571
1991	1.891	2.544	3.082	1.191	0.538	0.653
1992	1.898	2.482	3.034	1.136	0.552	0.584
1993	1.878	2.509	3.085	1.207	0.577	0.630
1994	1.899	2.484	3.013	1.114	0.529	0.585
1995	1.875	2.491	3.027	1.153	0.536	0.616
1996	1.883	2.501	3.012	1.129	0.511	0.618
1997	1.892	2.521	3.045	1.153	0.524	0.629
1998	1.967	2.589	3.095	1.128	0.506	0.622
1999	1.981	2.584	3.180	1.199	0.596	0.603
Difference						
1973-79	-0.087	-0.036	0.046	0.134	0.083	0.051
1979-89	-0.043	0.009	-0.003	0.040	-0.012	0.052
1989-99	0.010	0.016	0.119	0.108	0.103	0.005
1989-95	-0.096	-0.078	-0.034	0.062	0.044	0.018
1995-99	0.106	0.093	0.152	0.046	0.059	-0.013

See notes to Table 1.

TABLE 12
10th, 50th, and 90th percentiles of the log real wage distribution, CPS, 1973-99: female recent college graduates, ages 23-26

	Log real wage by percentile			Differentials		
	10th	50th	90th	90-10	90-50	50-10
1973	1.995	2.484	2.843	0.847	0.359	0.488
1974	1.944	2.412	2.833	0.889	0.421	0.467
1975	1.886	2.397	2.802	0.916	0.405	0.511
1976	1.939	2.402	2.787	0.849	0.386	0.463
1977	1.886	2.369	2.821	0.935	0.452	0.483
1978	1.915	2.413	2.797	0.881	0.384	0.498
1979	1.908	2.370	2.796	0.887	0.425	0.462
1980	1.872	2.360	2.824	0.953	0.464	0.488
1981	1.887	2.398	2.868	0.981	0.470	0.511
1982	1.856	2.380	2.911	1.054	0.531	0.524
1983	1.854	2.396	2.911	1.056	0.514	0.542
1984	1.815	2.374	2.913	1.099	0.539	0.560
1985	1.872	2.411	2.921	1.050	0.511	0.539
1986	1.882	2.441	2.939	1.057	0.498	0.560
1987	1.892	2.493	2.965	1.073	0.473	0.601
1988	1.918	2.477	2.955	1.037	0.477	0.560
1989	1.875	2.490	2.974	1.099	0.483	0.615
1990	1.922	2.481	2.982	1.060	0.500	0.560
1991	1.896	2.458	2.953	1.058	0.495	0.562
1992	1.815	2.457	2.943	1.127	0.486	0.642
1993	1.856	2.432	2.955	1.099	0.523	0.575
1994	1.830	2.410	2.902	1.071	0.491	0.580
1995	1.832	2.395	2.931	1.099	0.536	0.563
1996	1.808	2.381	2.909	1.101	0.528	0.573
1997	1.826	2.432	2.895	1.069	0.463	0.606
1998	1.892	2.506	2.977	1.085	0.472	0.613
1999	1.981	2.498	3.005	1.024	0.507	0.517
Difference						
1973-79	-0.087	-0.113	-0.047	0.040	0.066	-0.026
1979-89	-0.033	0.120	0.178	0.211	0.058	0.153
1989-99	0.106	0.008	0.031	-0.074	0.023	-0.098
1989-95	-0.043	-0.096	-0.043	0.000	0.052	-0.052
1995-99	0.149	0.104	0.075	-0.074	-0.029	-0.046

See notes to Table 1.

Fig. 1: Index, average real hourly wages, BA ages 23-26, CPS

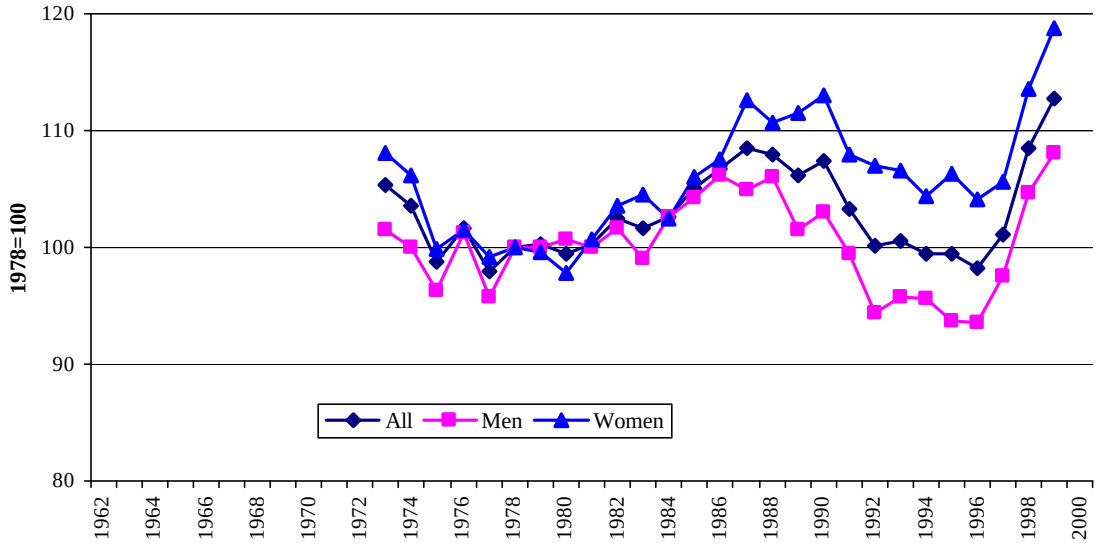

Fig. 2: Index, average real annual offers to seniors, NACE

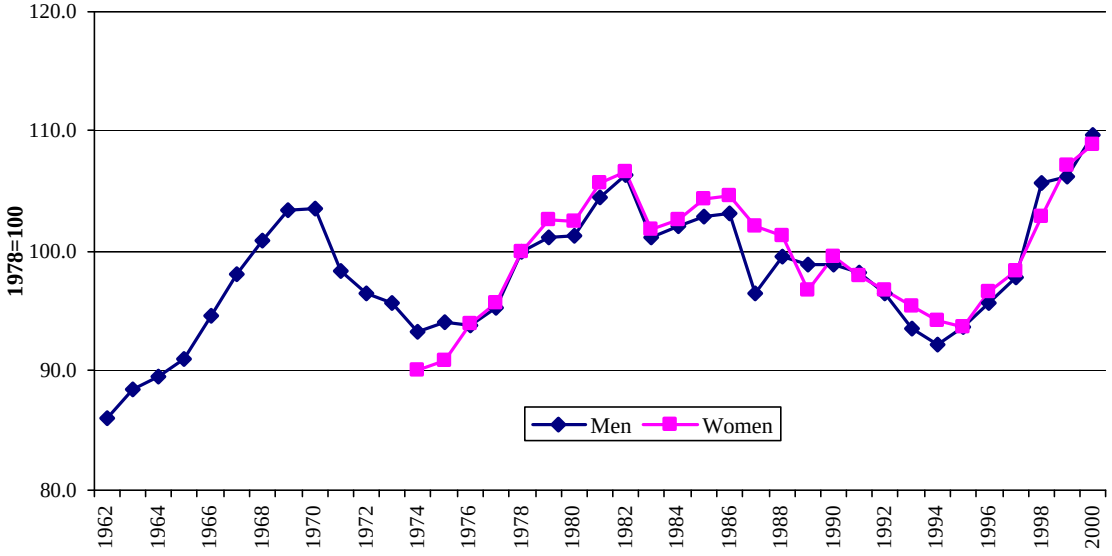

Fig. 3: Index of average real annual salary, RCG, RCG/B&B

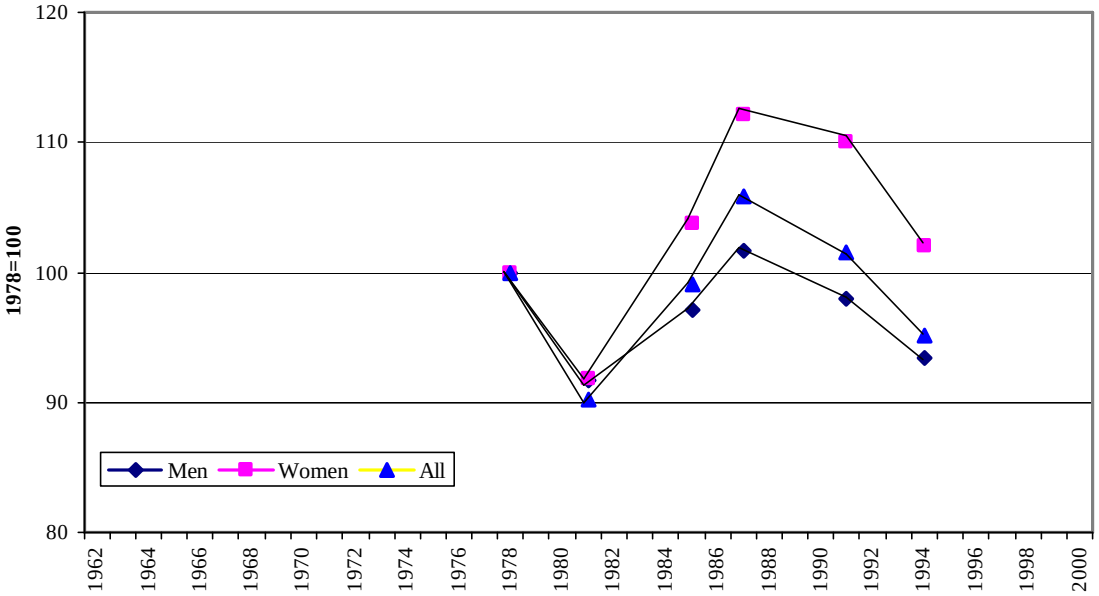

Fig. 4: Ratio of average wages of BA aged 23-26 to HS aged 19-22, CPS

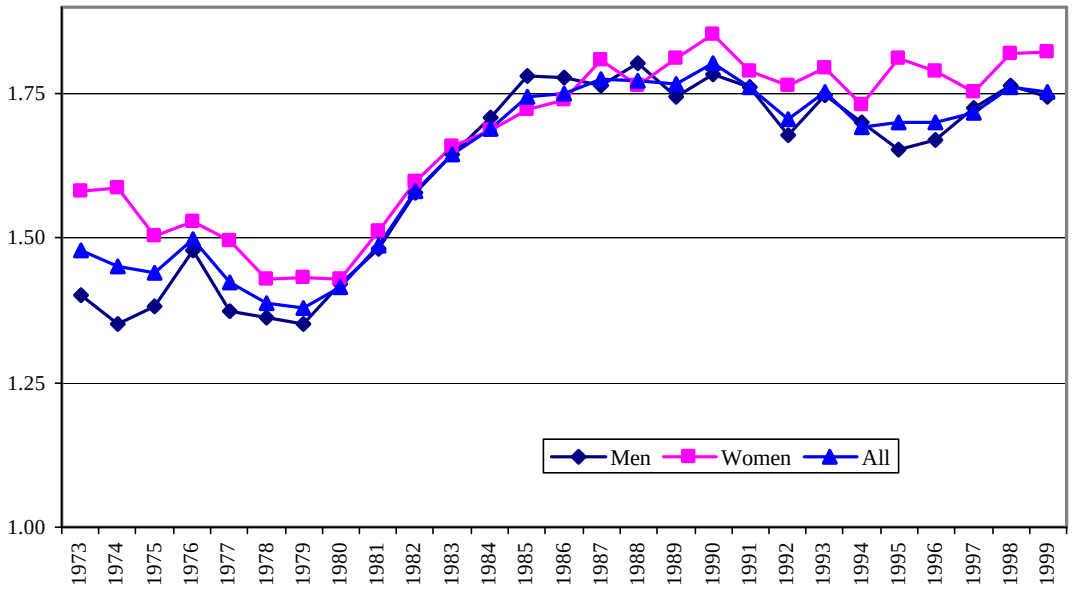

Fig. 5: Ratio of wages of BA aged 23-26 to HS aged 23-26, CPS

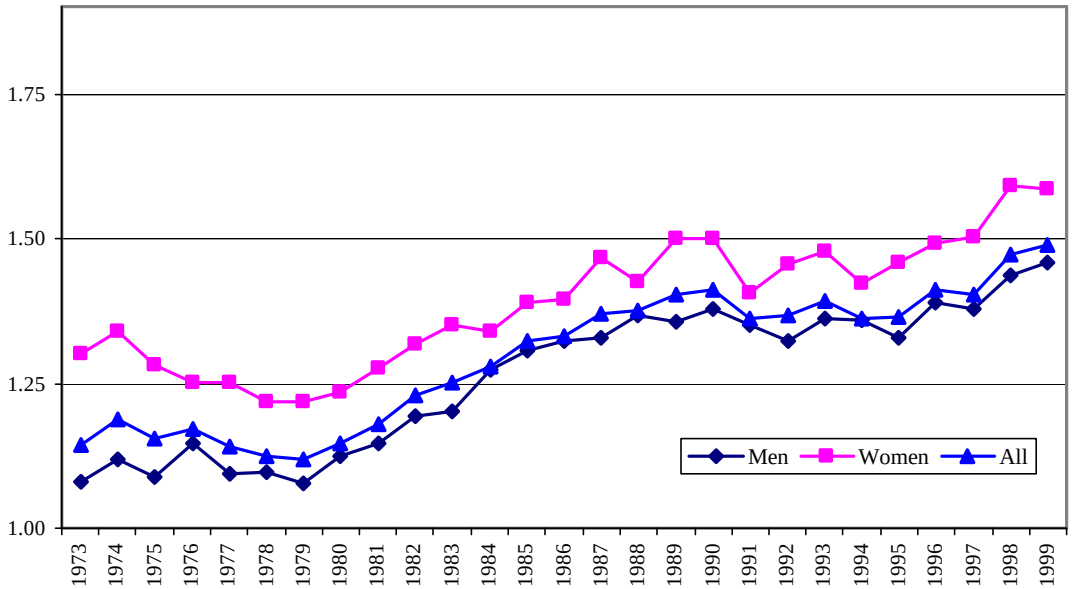

Fig. 6: Ratio of wages of BA aged 23-26 to BA aged 43-46, CPS

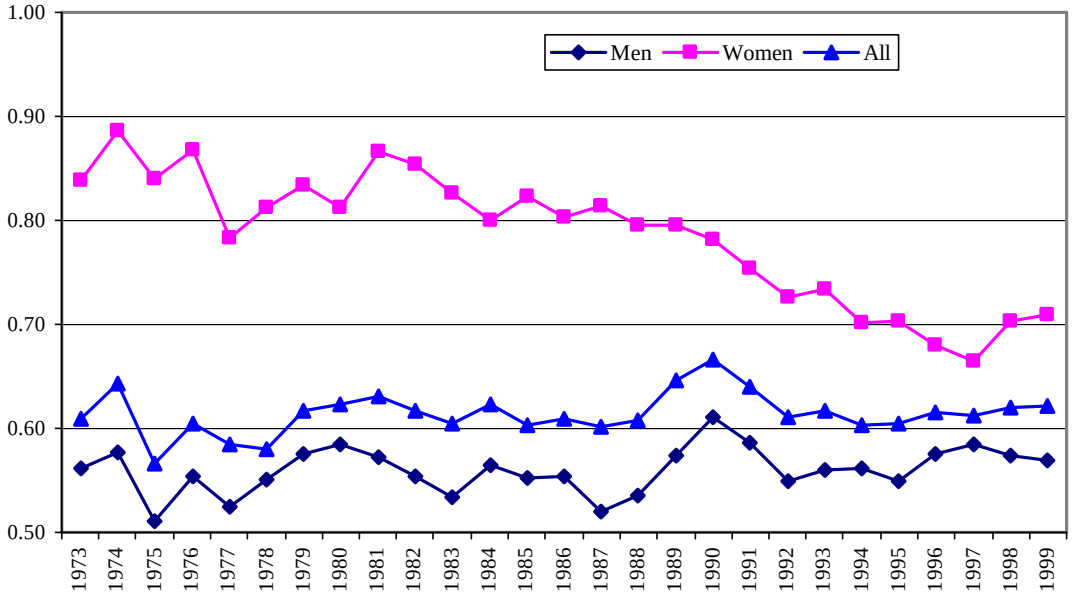

Fig. 7: Ratio of wages of BA aged 23-26 to HS aged 43-46, CPS

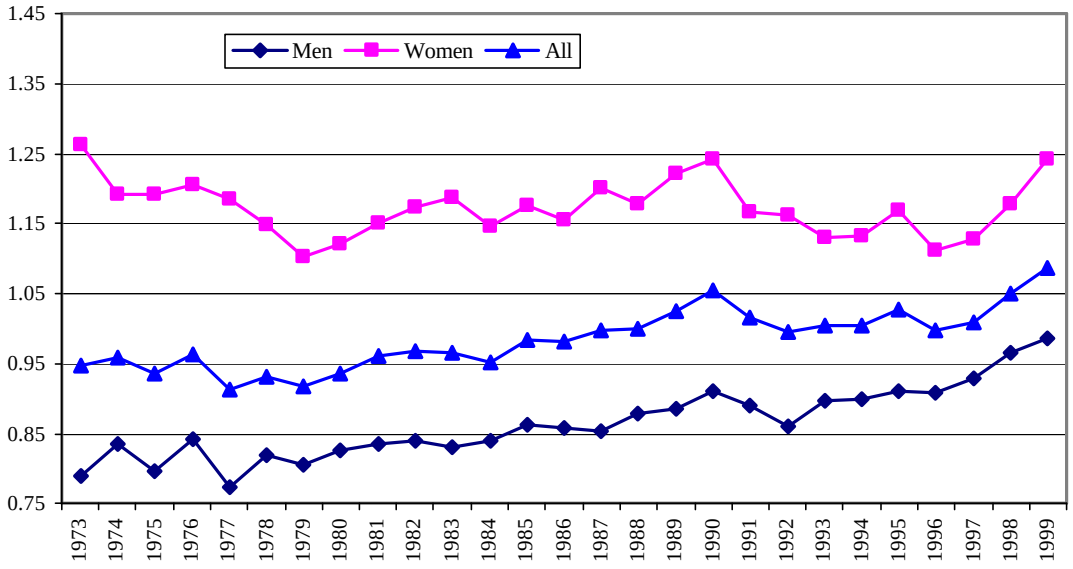

Fig. 8: Ratio of offers to seniors, technical to nontechnical majors, NACE

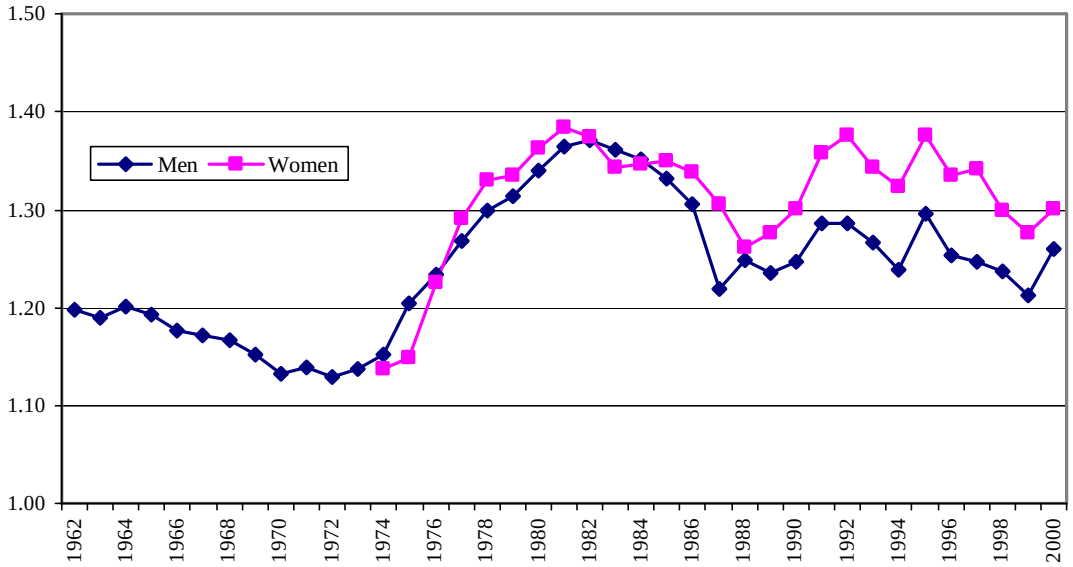

Fig. 9: Average real annual offers to male seniors, by major, NACE

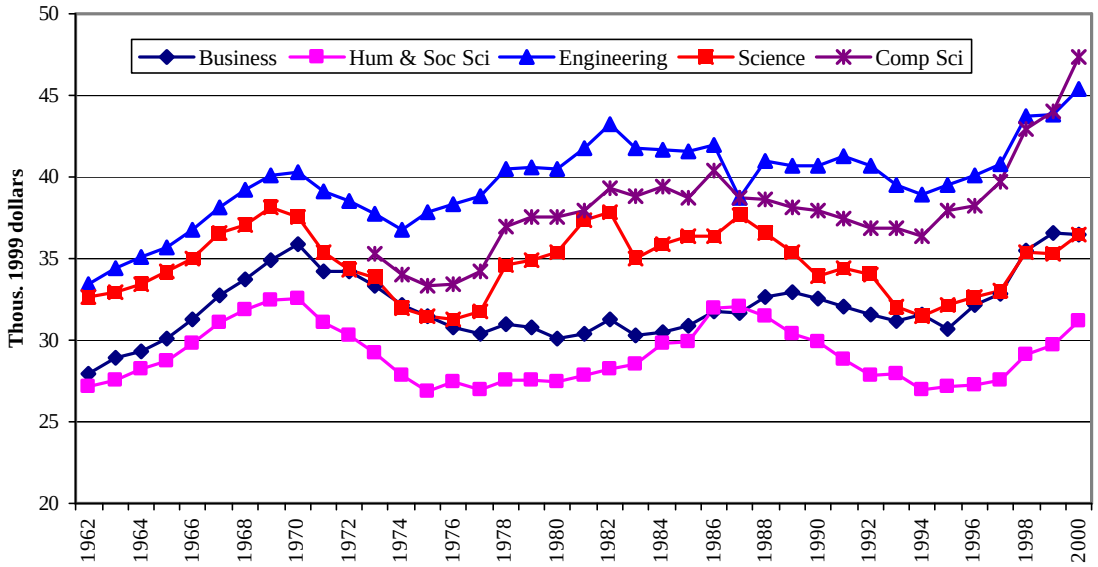

Fig. 10: Average real annual offers to female seniors, by major, NACE

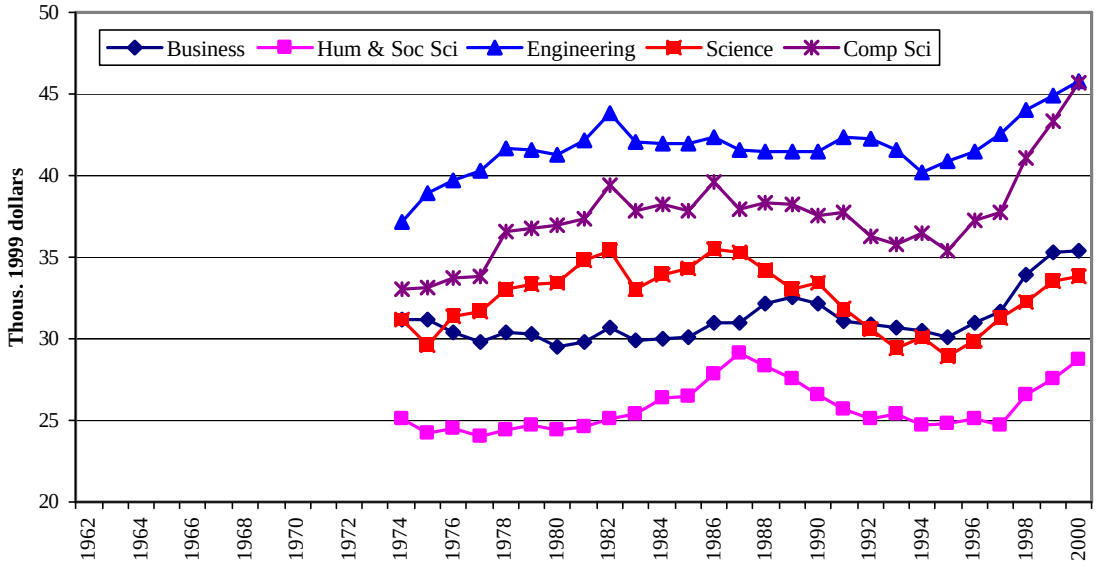

Fig. 11: Average real salary offers to seniors, by major, RCG/B&B

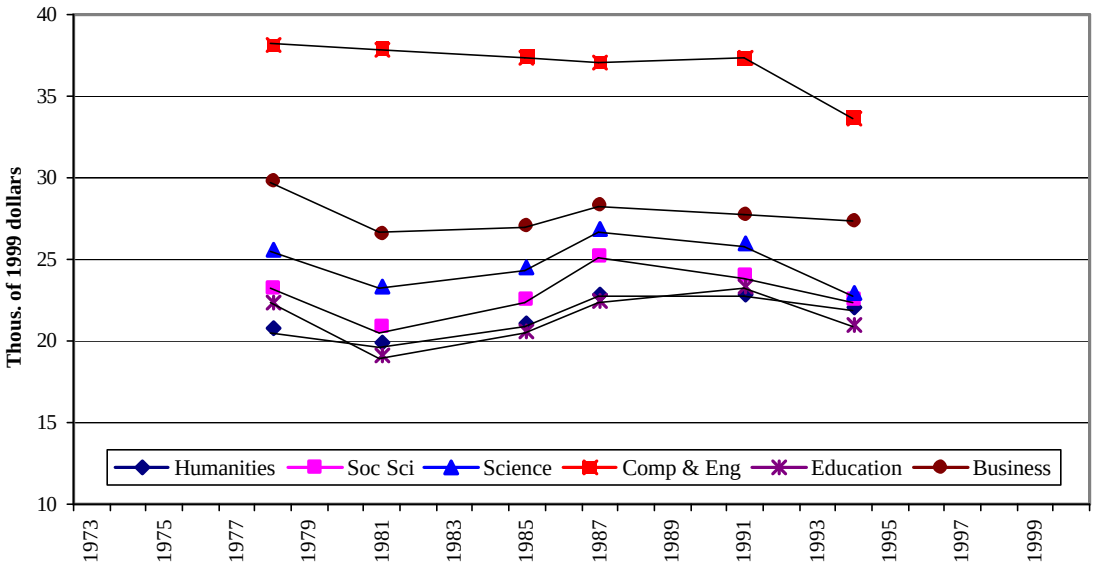

Fig. 12: Ratio of earnings, male-to-female, CPS, NACE, RCG/B&B

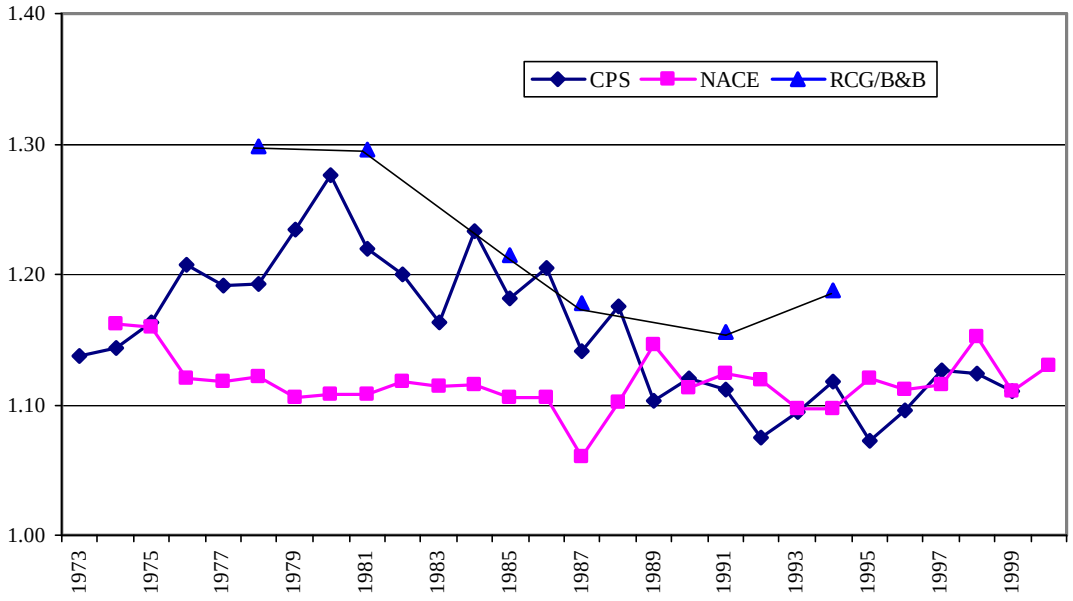

Fig. 13: Variance of log real wages, BA 23-26, CPS

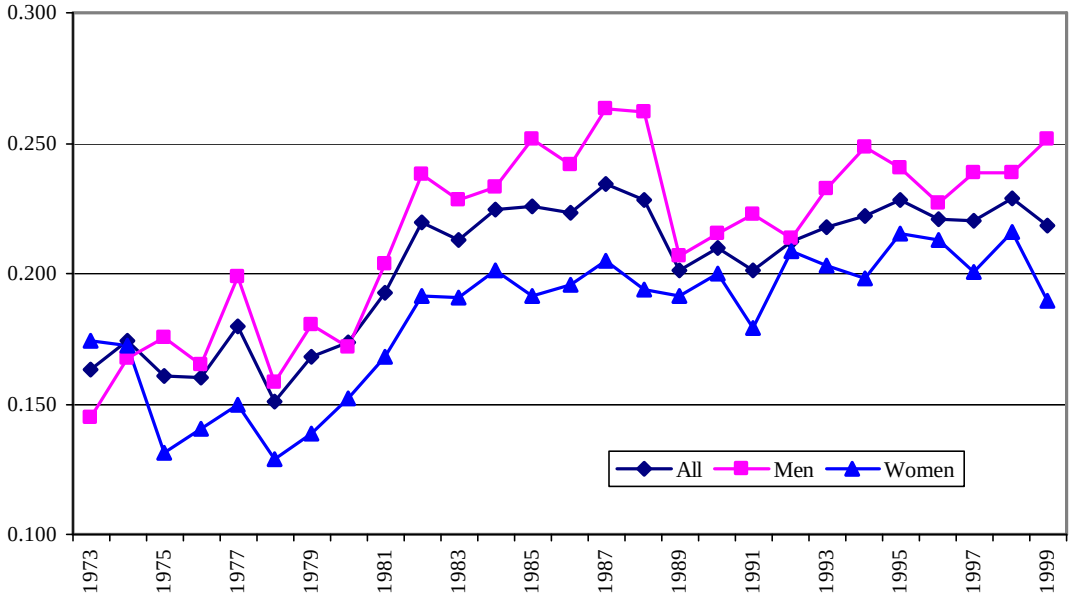

Fig. 14: Log real wage differentials, BA 23-26, All, CPS

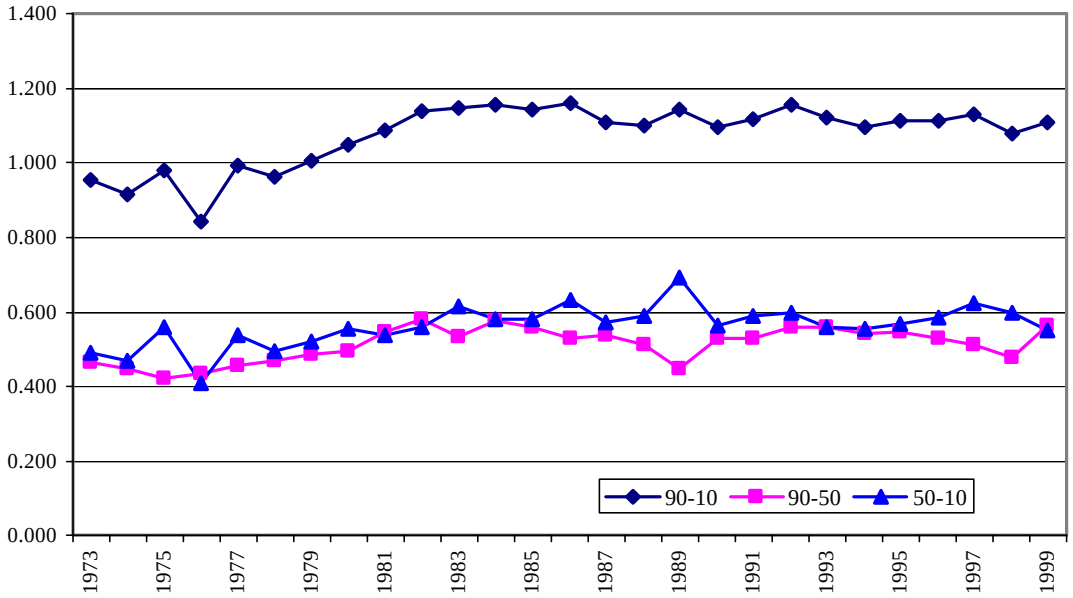

Fig. 15: Log real wage differentials, BA 23-26, Men, CPS

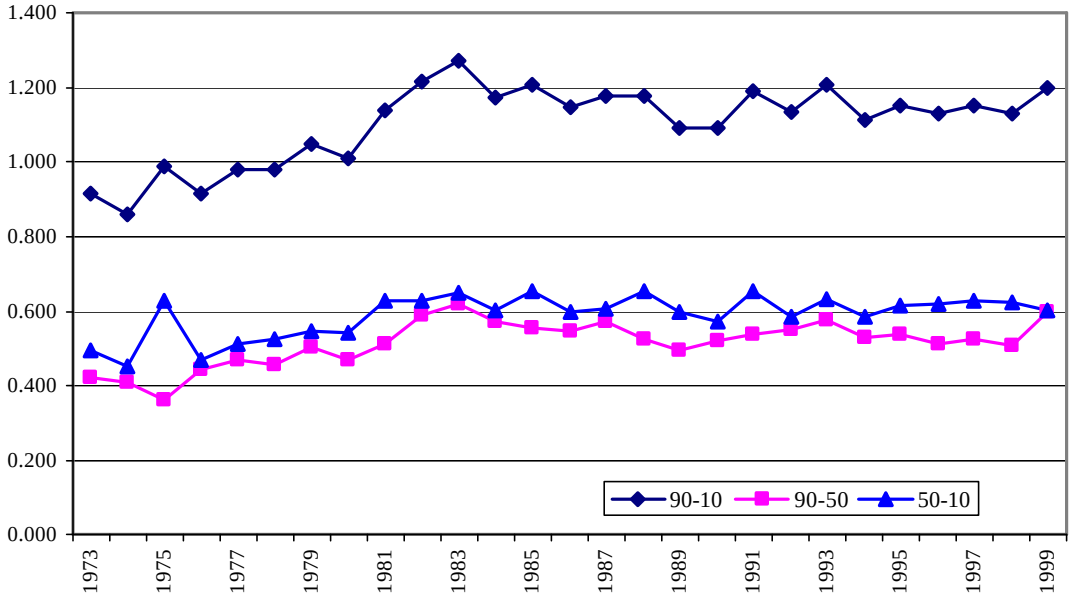

Fig. 16: Log real wage differentials, BA 23-26, Women, CPS