

## **The Changing Distribution of Pension Coverage\***

*Industrial Relations*, April 2000

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\* We thank the anonymous referees and seminar participants at Ohio State, Florida State, and the American Economic Association meetings for useful comments and suggestions.

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### **ABSTRACT**

Data from the Current Population Surveys reveal that between 1979 and 1993 the gap in pension coverage between workers with less than 12 years of education and those with more than 16 years of education nearly tripled among men and more than quadrupled among women. The empirical analysis reveals that differences in labor market characteristics related to gender and education have grown over time and can account for virtually all of the changing distribution of coverage. There is mixed evidence on the extent to which the growth of the 401(k) plan has contributed to the changing distribution of coverage.

Between 1950 and 1979, the pension coverage of private sector employees increased from 24 to 49 percent (Kotlikoff and Smith 1983). This trend was reversed during the 1980s for men, though coverage continues to rise among women. Earlier work shows that the decline in male coverage rates was caused by declines in unionism and employment at large manufacturing firms, and the rapid growth of 401(k) plans which made employee participation in pensions voluntary.<sup>[1]</sup> Among women, the growth in coverage rates was caused primarily by increased earnings and labor force attachment.<sup>[2]</sup>

One fact that has received relatively little attention is that, although changes in aggregate coverage rates have been relatively modest, there have been vast changes in the distribution of coverage across education groups and gender. Bloom and Freeman (1992) report that while the coverage rates of men fell 9 percentage points between 1979 and 1988, the coverage rates of men with less than 12 years of education fell 17 percentage points and the coverage rates of women fell only 1 percentage point.

The purpose of this study is to provide a better understanding of why this changing distribution of coverage rates occurred and to determine whether the trends continued into the 1990s. On the latter point, the trends recognized by Bloom and Freeman continued into the 1990s. Between 1979 and 1993, the male coverage rate fell 5 percentage points, the coverage rates of men with less than 12 years of education fell 22 points, and women's coverage rates rose 9 percentage points. Extending the data into the 1990s reveals even greater changes in the distribution of coverage.

In addition to providing more recent data, this study extends earlier work in several dimensions. First, it considers complications that arise in CPS data when classifying workers

into educational categories. Second, it explores why trends in coverage differ for men and women. Finally, evidence is presented on how the growth of the 401(k) plan and voluntary participation has affected the distribution of coverage.

The paper is organized as follows: Section 2 reviews the importance of pension coverage in national savings and describes why the decline in coverage among less educated workers is worrisome. Section 3 reviews the basic facts on trends in pension coverage rates. Hypotheses for the decline in pension and offer rates are provided in section 4. Empirical evidence related to the changing distribution of offer and participation rates is presented in sections 5 through 7.

## 2. Background.

The divergence of pension coverage across education groups has important consequences. In 1995 alone, the tax exempt status of pensions cost the U.S. Treasury \$55 billion in revenue.<sup>[3]</sup> This tax expenditure is often justified by the positive effect that pensions may have on national savings. The changing distribution of pension coverage will redistribute the tax burden from high to low income workers.

One argument in favor of the tax preference for pensions is that it enhances national saving. In fact, between 1980 and 1987 pension saving was \$720 billion and accounted for more than one-half of national saving.<sup>[4]</sup> The impact of the tax incentive on saving is a controversial issue, however. Some argue that pension saving is offset by reductions in other forms of saving. The extent of the offset has been controversial and several recent papers address the subject.<sup>[5]</sup> However, there is evidence that pension offsets are smallest for low income workers.<sup>[6]</sup> The essence of the argument is that many low income workers would have

virtually zero private saving in the absence of a pension making it difficult to offset pension saving by reduced non-pension saving.<sup>[7]</sup>

If pension offsets are smallest among the least educated, the observed changes in the distribution of pension coverage are worrisome. In particular, pension coverage is falling among the groups where pension offsets are smallest (the least educated) and rising where offsets are largest (the most educated). The end result is that total saving may suffer and tax incentives for saving will be less likely to achieve their objective.

### 3. The Changing Distribution of Pension Coverage.

Two data sources are used to document trends in pension coverage by educational attainment and gender: the pension supplements from the May 1979 and April 1993 Current Population Survey (CPS-PS), and the March CPS for 1980 through 1995 (CPS-M). Using both data sets provides a check for robustness and allows for a test of whether changes in either the definition of pension coverage or educational attainment cause a bias in the observed pension coverage trends.

For both data sets, the sample is restricted to nonagricultural private-sector wage and salary workers aged 21-55 with complete information on the pension questions and the socioeconomic characteristics used in the empirical analysis. Also, the March data restricts the sample to workers with at least 13 weeks of employment in the year prior to the survey.

The pension coverage rate in this study is defined as the percentage of workers that are actively participating in an employer-provided pension. Defined benefit plans, defined contribution plans, section 401(k) plans, and deferred profit sharing or stock plans are all

“pension plans” in the March CPS and the pension supplements in the May 1979 and April 1993 CPS. However, there are differences in the structure of the CPS-M and CPS-PS that will generate differences in the coverage statistics.

One difference between the CPS-M and CPS-PS is the reference period for determining employment and coverage. In the CPS-M, the pension questions are asked of anyone employed in the prior year, and the questions refer to coverage on any job last year. In the CPS-PS, the question is asked only of those employed in the week prior to the survey and refers to coverage on the job in that week.<sup>[8]</sup> A second difference is that in the CPS-M, there are two questions used to generate the pension coverage rate. First, "Other than Social Security did the (any) employer or union that you worked for (last year) have a pension or other type of retirement plan for any of its employees?" If the response is yes, a second question is asked: "Were you included in that plan?" If the answer to both questions is yes, the worker is defined as covered.<sup>[9]</sup>

In the 1979 CPS-PS, the same set of questions are asked. However, in the 1993 CPS-PS, there are more questions asked to determine whether a worker is covered. As noted by Doescher (1994), the pension questions were expanded in the CPS-PS over time partly in recognition of the fact that new plan types were emerging, particularly the 401(k) plan, and an increasing number of workers were confused about what constituted a pension. Parsons (1994) reports that in the 1988 CPS Pension Supplement, the additional prompts on 401(k) and profit sharing or stock plans increase coverage rates by nearly 3.5 percentage points. Given that 401(k) plans have continued to grow in popularity since 1988, the effect of the additional prompts on measured coverage is likely to have grown between the 1988 and 1993 surveys.<sup>[10]</sup>

The estimated coverage rates for 21-55 year old workers are presented in figure 1.<sup>[11]</sup> In the CPS-M, male pension coverage fell from 58.1 to 49.9 percent between 1979 and 1994 whereas female coverage rose from 38.1 to 41.2. In the CPS-PS, between 1979 and 1993, male pension coverage fell from 62.2 to 57.3 whereas female coverage rose from 39.5 to 48.3. Both data sources reveal opposite trends in coverage for men and women. Compared to the CPS-M, the CPS-PS suggests a smaller decline in male coverage and a greater increase in female coverage.

In examining the trends by education level, a comparison across data sets is instructive for two reasons. First, it is possible that the effect of the additional prompts in the 1993 CPS-PS on pension coverage rates could differ by education. Comparing the trends in coverage in the CPS-M and CPS-PS provides evidence on whether the educational differences in coverage trends can be accounted for by changes in the questions. Second, the questions used to establish years of education in the CPS changed in 1992. The changing definition of education will cause a reclassification of some workers over time and could bias the observed trends. The CPS-M data can be used to determine whether the trends in coverage rates differed across education groups before the new definitions were instituted.

Pension coverage rates by gender and educational attainment are presented in figures 2a-b for the CPS-M, and in figures 3a-b for the CPS-PS.<sup>[12]</sup> The four education groups include those with 0 to 11, 12, 13 to 15, and 16 or more years of education. The results reveal that coverage rates rise with educational attainment and the gap in pension coverage across education groups grew at a remarkable rate between 1979 and 1993. Among men, the coverage rate in the CPS-M (CPS-PS) fell 24 (fell 22) percentage points among workers with less than 12 years of education; and fell 1 (rose 3) points among college graduates. Among women, the coverage rate

in the CPS-M (CPS-PS) fell 11 (fell 4) points among those in the least educated group but rose 9 (rose 18) points among the most educated group.

One concern with comparing coverage rates across education groups is that the questions used to determine educational attainment in the CPS changed starting in 1992. Prior to 1992, the CPS asked what the highest year of formal education ever attended was and whether the person completed that year. Since 1992, the CPS asks for the highest level of schooling completed or the highest degree received. The difference between the two questions requires that careful consideration be given to making the education groups comparable across time. Jaeger (1993) investigates the extent to which consistent education classifications can be made across time by forming a panel data set where workers are asked both the new and old questions. Using his recommendation for defining education groups causes some of the workers who were previously high school drop-outs to be shifted to the high school graduate category.<sup>[13]</sup> This could potentially drive down coverage rates in both groups and result in a greater decline in coverage among the less educated.

Two pieces of evidence suggest that the reclassification of workers cannot account for the greater decline in coverage among the less educated. First, the differential trends appear in the CPS-M data prior to changes in the education questions and there is not an unusually large drop in the coverage rates of the two lowest education groups between 1990 and 1991 when the effect of the new education questions should be seen for the first time.<sup>[14]</sup>

Second, worst-case estimates of the extent to which reclassifying workers across the high school drop out (less than 12 years of education) and high school graduate (12 years of education) would affect the coverage rates indicate that the effect of changing to the new questions in 1992 is less than a 2 percentage point decline in coverage among workers with less



than 12 years of education, and less than a 1 percentage point decline among workers with 12 years of education.<sup>[15]</sup>

In summary, both the CPS-M and the CPS-PS data indicate a substantial divergence in coverage rates across education groups. Among men, the least educated workers experienced a dramatic decline in pension coverage while the college educated experienced relatively stable coverage rates. Among women, coverage rates fell slightly among the least educated workers but rose dramatically among college graduates. Moreover, these facts cannot be explained solely by changes in the CPS questions defining educational attainment in the CPS data, or by changes in the questions used to generate measures of pension coverage across time.

#### 4. Hypotheses for the Divergence in Pension Coverage across Education Groups.

To understand why the association between pension coverage and education increased over the past 20 years, it is useful to review why coverage rates rise with education. There are at least three possible explanations. First, the tax advantages of pensions are an important reason for firm sponsored pension plans. Since income and thus the tax advantage of pension saving rises with education, more educated workers will have a greater demand for pensions.

A second explanation for pension coverage rising with education is that pension coverage is affected by the type of firm that a worker is employed with. For example, the likelihood of coverage is significantly higher among employees of large firms and the chance of being employed at a large firm rises with a worker's level of education.

A third explanation for pension coverage rising with education relies upon the fact that Social Security replaces a larger percentage of pre-retirement income for low income (and less

educated) workers.<sup>[16]</sup> Clearly, if workers wish to smooth consumption over their lives, the more educated workers with higher incomes will have to save a larger fraction of their income to supplement Social Security.

Given these explanations for the cross sectional correlation between pension coverage and education, several natural hypotheses emerge for the rising gap in pension coverage across education groups. First, it is well documented that the earnings premium for education rose during the 1980s.<sup>[17]</sup> To the extent that pension coverage rises with income, this would contribute to a rising gap in coverage across education groups. Second, as documented in our later empirical work, there has been a shift of employment away from large and unionized firms that have high coverage rates, and this shift was most pronounced among the least educated.

Potentially amplifying the education related differences in tax advantages and social security replacement on pension coverage is the recent growth of the 401(k) plan. With passage of the Revenue Act of 1978, firms were allowed to establish 401(k) plans where, unlike most defined benefit and defined contribution plans, employees could make tax-deferred contributions. This new type of plan allowed for the possibility of a tax-advantaged pension that was supported entirely by voluntary employee contributions.

The use of the new 401(k) plans increased dramatically after the IRS issued clarifying regulations on the establishment of such plans in 1981. By 1983, 4.4 million employees reported participation in a 401(k) plan.<sup>[18]</sup> By 1993, 43 percent of all workers offered a pension plan had a 401(k) plan as the primary plan.<sup>[19]</sup> However, because of the lower participation rate in 401(k) plans, only 36 percent of workers covered by a pension plan had a 401(k) plan as the primary plan.<sup>[20]</sup>

As demonstrated in Even and Macpherson (1994a, 1994b), because the 401(k) plan allows for voluntary participation in pension plans, the percentage of workers eligible for a pension that actually participates (the “participation rate”) fell over time. Employers must be wary of low participation rates, however, since minimum participation and contribution requirements are required by non-discrimination rules established by the Internal Revenue Service.

## 6. Trends in Offer and Participation Rates.

To determine whether the decline in pension coverage is due to a decrease in the percentage of workers offered a pension or a decrease in participation in available plans, offer and participation rates are calculated separately by education group and reported in table 1. Attention is limited to the CPS pension supplements since the relevance of data on offer and participation rates in the CPS-M data is questionable in this application.<sup>[21]</sup>

In the 1979 and 1993 CPS-PS data, workers are asked whether their employer offers any employee a pension. However, when workers indicate that the employer offers a pension but they are not participating in the plan, they are asked why they are not participating. To generate a time consistent definition of the offer rate, this study defines a worker to be offered a pension if he indicates that his employer offers a pension and that he is either participating in the plan, not in the plan because he chose not to contribute, or not in the plan for “other reasons.”<sup>[22]</sup>

In 1979, participation rates were 97.3 and 92.7 among men and women, suggesting that eligibility for a pension virtually implied coverage in 1979. By 1993, the respective

participation rates dropped to 87.8 and 81.6 percent. This drop in the participation rates resulted from the growth of 401(k) plans that began in the 1980s.

A comparison of trends in participation rates across education groups reveals that participation rates declined across all four education groups for both men and women, but the extent of the decline was greatest for the least educated. For example, while the participation rate for workers with 16 or more years of education fell 7.0 and 7.6 among men and women, it fell 18.8 and 13.0 points among men and women with less than 12 years of education.

The trend in offer rates also contributed to the divergence in pension coverage across education groups. Among men, offer rates fell most among the least educated and rose most among the most educated. Among women, offer rates rose for all education groups, but the increase was largest among the most educated.

#### 6. Factors contributing to the divergence in offer rates across education groups.

To determine why offer rates diverged across education groups, changes in the characteristics of workers and their employers are examined. Table 2 presents sample means for worker and firm characteristics likely to influence pension coverage.

As noted in numerous recent studies, the earnings premium for a college degree increased substantially during the 1980s. This resulted primarily from sharp decreases in the real earnings of less educated workers. In the CPS-PS, the real earnings of workers with less than 12 years of education fell by 30 percent among men and by 17 percent among women. In contrast, earnings of college graduates rose 8 percent among men and 30 percent among women.

The changing share of employment at large firms and establishments may also have contributed to the changing distribution of pension coverage since employer size has a positive effect on pension offer rates, even after controlling for worker characteristics. Scale economies in the administration of pension plans provide one explanation for the employer size effect.<sup>[23]</sup> Alternatively, it may be that the incentive effects of pensions are more important to large employers, thus making it more likely that they adopt such pensions.<sup>[24]</sup> As made evident in table 2, between 1979 and 1993 the share of employees at large firms and establishments decreased for men and increased for women. However, among men, employment at large firms decreased most among the least educated. Among women, the increases were smallest among the least educated.

A third factor that is likely to have contributed to the divergence in offer rates is the precipitous decline in private-sector unionism among less educated workers over the sample period. Between 1979 and 1993, the private sector unionization rate fell 15.4 and 5.8 percentage points among men and women. Among workers with less than 12 years of education, unionization fell 23.1 points among men and 10.4 points among women. Generally, the extent of the decline in unionism over the period was greater among less educated and male workers.

The movement of workers into new or part-time jobs could also influence pension offer rates. For example, ERISA allows firms to require that workers have at least one year of service to be eligible for coverage. Given that a year of service is defined as at least 1000 hours of work in a 12 month period, this allows firms to exclude part-time workers on a continual basis.<sup>[25]</sup> Hence, if there is an increase in the percentage of workers that are in new or part-time jobs, other things being the same, this will lead to a decrease in pension offer rates.

For men, the percentage of workers with less than a year of tenure fell by 3.9 percentage points and the percentage of workers in part-time jobs rose by 2.7 percentage points. Comparing across education groups, the increase in the percentage of workers in part-time jobs was greatest among the least educated group and unlike all the other education groups, the percentage of workers in new jobs rose among the least educated.<sup>[26]</sup> For women, the percentage of workers with less than a year of tenure fell 10.4 percentage points and the percentage that worked part-time increased 0.2 points. Comparing across education groups reveals that less educated workers had smaller decreases in the fraction with new jobs and the largest increase in the fraction employed in part-time jobs. These trends should contribute to a divergence in offer rates across education groups and generally had larger negative effects on men than women.

To quantify the effect of changing worker and firm characteristics on pension offer rates, the following approach is pursued: First, a probit model of offer outcomes is estimated for each of the four education groups in 1979. Second, using the 1979 probit coefficients, offer rates are predicted for the 1993 sample. The difference between the offer rate predicted for the 1993 sample and that observed for the 1979 sample is the “predicted” change in the offer rate based on changes in the observed worker and firm characteristics. Third, using the approach outlined in Even and Macpherson (1990), the portion of this predicted change that can be attributed to specific characteristics is calculated. The same approach can be implemented using 1993 coefficients.

The probit models for the 1979 offer outcomes are presented in an appendix (tables A2 and A3). The model includes controls for income and its square, dummy variables for union, part-time status, job tenure of less than a year, firm and establishment size, age, industry, and occupation. The estimated probit coefficients are consistent with prior research on pension

coverage. For example, the probability that a worker is offered a pension rises with income, unionism, and employer size. Also, workers with less than a year of service and part-time workers are significantly less likely to be offered a pension.

In table 3, the decomposition of the explained change in offer rates is presented. Based on changes in observed worker and firm characteristics and 1979 probit coefficients, the estimates predict that male offer rates should have declined 16.1, 8.3, and 5.4 percentage points among men with 0 to 11, 12, and 13-15 years, respectively. Offer rates were predicted to rise by 2.0 percentage points among men with 16 or more years of education.<sup>[27]</sup> Thus, based on changes in the observed worker and firm characteristics, our models predict that offer rates should have declined more than they actually did. This is in marked contrast to Bloom and Freeman (1992) who can account for about one-half of the decline in coverage by the characteristics that they control for.

The model also performs well in explaining the divergence in offer rates across education and gender groups. For example, the model predicts that the gap between the offer rates of the least and most educated group of men should have risen by 18.1 percentage points over the period while it actually rose by 23.6 percentage points. Thus, 77 percent of the divergence in offer rates between the least and most educated workers can be accounted for by changes in the worker and firm characteristics included in the analysis. For women, the model predicts that offer rates should have fallen 6.7 percentage points among workers with less than 12 years of education, but should have risen by 2.4, 5.3, and 10.6 percentage points among those with 12, 13-15, and 16 years of education. Thus, the model predicts that the gap in offer rates between the least and most educated women should have risen by 17.3 percentage points over the period whereas it actually rose 24.8 percentage points.

For all eight gender/education groups, offer rates fell less or rose more than predicted suggesting that factors external to those included in the probit model contributed to rising offer rates -- especially for women. This is somewhat surprising given that many pension administrators complained that increased regulation was responsible for the decline in defined benefit pension offerings during the 1980s. However, potentially offsetting the effect of increased regulatory costs was the enactment of section 401(k). To the extent that the 401(k) expanded the universe of pension options, more firms may be induced to offer pensions.

The decompositions reveal two striking patterns. First, there are changes in observed worker and firm characteristics that contributed to the divergence in pension offer rates across education groups for each gender. Second, among men, the divergence in offer rates across education groups is primarily due to employment conditions driving coverage down among the least educated. Among women, it is primarily because changing employment conditions are increasing offer rates most among the most educated.

A simple way to recognize this pattern is to notice that changes in characteristics generally had their largest negative effect on offer rates for the least educated men and the largest positive (or smallest negative) effect for the most educated women. For example, changes in income generated the largest decline (6.4 percentage points) in the offer rates of the least educated men and the largest increase (3.2 points) among the most educated women. Changes in unionism resulted in the largest decline (4.6) among the least educated men and the smallest decline (0.1) among the most educated women. Changes in the fraction of employment at large firms and establishments reduced coverage most among the least educated men (3.0) and increased it the most among the most educated women (4.3). Finally, a changing fraction of



employment in new jobs (a year or less of tenure) reduced coverage most among the least educated men (0.7) but increased it most among the most educated women (4.3).<sup>[28]</sup>

In summary, the majority of the divergence in offer rates across gender and education groups can be accounted for by two trends: (i) less educated workers have experienced greater declines in real wages, unionism, and employment at large firms and establishments; and (ii) changes in these labor market characteristics have generally been more favorable for female than male coverage. Finally, factors external to the model (changes not predicted based on trends in observed characteristics) have generally contributed to increased, not decreased pension offer rates. The external factors, however, had a larger positive effect on the offer rates of more educated workers and women.

#### 7. The Effect of the 401(k) on Participation and Coverage Rates.

The growth of the section 401(k) plan is the primary reason that worker participation in pension plans declined in recent years. In non-401(K) plans, only employers can make pre-tax contributions. With 401(k) plans, both employer and employee contributions are on a pre-tax basis. With the option for pre-tax contributions on the part of the employee, many 401(k) plans allow employees to decide whether to participate and how much to contribute.<sup>[29]</sup>

Some descriptive statistics on the frequency of the 401(k) plan and its effect on participation rates are provided in table 4. The statistics represent “stand-alone” 401(k) plans where the worker is eligible to participate in a 401(k) but not included in any other type of pension. Of workers eligible for a pension, 26.8 percent of men and 30.1 percent of a women have a stand-alone 401(k) plan. The participation rate is substantially lower in 401(k) plans

than other types of pensions. For men, participation rates are 59.2 percent in stand-alone 401(k) plans and 97.9 percent in non-401(K) plans. For women, the corresponding participation rates are 96.8 and 46.0 percent.

While the 401(k) has undoubtedly reduced participation rates in pension plans, it is possible that the change in worker characteristics over time has amplified (or dampened) the effect of the 401(k) on participation. To determine how much of the decline in participation rates that has occurred is due to the emergence of the 401(k) plan as opposed to changing working characteristics, we employ a decomposition method similar to that used for the analysis of offer rates. First, a probit model of pension participation is estimated for workers offered a pension in 1993. Included in the model are controls for wage income, age, tenure, and squared values of each; dummy variables for marital status, and for whether the only pension plan offered is a 401(k). Also, since some workers do not indicate whether their pension plan is a 401(k), a dummy is included to indicate whether pension type is unknown.

The probit models of pension participation (available in appendix table a4) reveal that the 401(k) has a significant negative effect on participation rates for each education group and gender. For men, the effect of the 401(k) on participation rates is greatest (50 percentage points) among high school dropouts but similar (18 to 26 percentage points) among the other three education groups. Among women, the 401(k) has a similar effect on the participation rate of all four education groups (33 to 42 percentage points). The models also reveal that the probability of participation rises (at a declining rate) with both income and years with the current employer for both sexes in all four education groups.

To determine why participation rates fell over time, the 1993 probit coefficients for the participation models are used to generate a decomposition of the change in participation rates

between 1979 and 1993.<sup>[30]</sup> The results of the decomposition, presented in table 5, suggest that, most of the decline in participation rates between 1979 and 1993 can be accounted for by the emergence of the 401(k) plan. In fact, the growth of the 401(k) plan can explain over 85 percent of the observed decline in participation rates for six of the eight gender/education groups. The two exceptions are men and women with less than 12 years of education. For these groups, the growth of the 401(k) accounts for approximately one-half of the decline in their participation rates. Declines in real earnings account for an additional one-third of the decline in participation rates for these workers.

The effect of the 401(k) on participation rates is fairly similar across education groups for men. Among women, the negative effect is largest among the most educated. This is somewhat surprising, but it is worth noting that combining all observed changes in worker characteristics and plan type, the predicted decline in the participation rate between 1979 and 1993 was largest among the least educated for both men and women.

While it is clear that the growth of 401(k) plans has reduced participation rates, the impact on coverage is less obvious. A critical issue is whether workers would have some other type of pension if the 401(k) were not possible. If 401(k) plans did not substitute for other types of pensions, the effect of introducing the 401(k) option on coverage would be non-negative regardless of how low participation rates are. Alternatively, if all 401(k) plans replaced other types of pensions, the net effect would be to reduce coverage since participation rates in 401(k) plans are lower.

Evidence on whether 401(k) plans substituted for other pension plans is mixed. Both Kruse (1995) and Papke, Petersen and Poterba (1996) find evidence that defined contribution (DC) and 401(k) plans did not replace pre-existing defined benefit (DB) plans. However, Papke

(1996) uses more recent data and finds that 401(k) and other DC plans are substituting for terminated DB plans. Even if 401(k) plans are not replacing terminated DB plans, it is possible that the firms that choose a 401(k) plan the first time they offer a pension would have offered a different plan if the 401(k) was not an option. On net, it is difficult to determine whether the 401(k) option caused a switch away from other plan types, or for that matter, the extent to which the 401(k) option has increased pension offer rates.

To provide some indication of how the growth of the 401(k) plan may have impacted the distribution of pension coverage, two extreme positions are considered. In the first, it is assumed that all 401(k) plans represent new pension offerings. In the second, 401(k) plans are assumed to have replaced other pension plans.

If all 401(k) plans are new pension offerings, the impact of the 401(k) plan on coverage can be estimated by the percentage of all workers covered by a 401(k) plan. These statistics (presented in table 4) reveal that the percentage of workers covered by a 401(k) plan rises with the level of education, for both men and women. Thus, under the assumption that all 401(k) plans are new plans, the growth of the 401(k) has contributed to the rising gap in coverage between the least and most educated workers. Among men, it has contributed to a 4.9 percentage point increase in coverage among workers with less than 12 years of education but a 14.2 percentage point increase among workers with 16 or more years of education. Among women, the 401(k) contributed to 3.2 and 11.3 percentage point increases for the least and most educated groups, respectively.

Under the second extreme where all 401(k) plans represent replacements of other pensions, the effect of the 401(k) on coverage can be calculated as the percentage of all workers offered a pension times the effect of the 401(k) on the participation rate.<sup>[31]</sup> These calculations

do not provide strong support for the contention that the 401(k) options has called coverage rates to diverge. Among men, the estimated negative effect of the 401(k) on coverage rates ranges from 4.3 percentage points among workers with less than 12 years of education to a 6.2 percentage points among the most educated workers. Among women, the estimated effects range from 3.7 percentage points among the least educated to 7.1 points among the most educated.

## 8.. Summary and Conclusions.

This study examined the source of two important changes in the distribution of pension coverage in the U.S. between 1979 and 1993: coverage rates diverged across education groups and female coverage rose while male coverage fell. To understand the reasons for the changing distribution of coverage, we analyzed trends in offer rates (the percentage of workers offered a pension) and participation rates (the percentage of workers eligible for a pension that participate). Offer rates fell most among men and less educated workers. There are three major reasons for this trend. First, real income and unionism fell more among less educated and male workers. Second, less educated and male workers realized large declines in the fraction of employment at large firms (1000 or more employees) whereas college graduates realized a modest increase in employment at such firms. Among women, changes in real income, unionism, and employment at large firms enhanced their pension coverage.

Using a statistical model of offer rates based on observed characteristics, offer rates fell less (or rose more) than predicted. It appears that forces other than those we can control for had a favorable impact on offer rates. This result is in contrast to claims made by pension

administrators who argue that increased pension regulation is responsible for the decrease in defined benefit pension coverage.

Among workers offered a pension, the percent who participate (the "participation rate") fell for all four education groups studied with the decline being most pronounced among the least educated. For the male population as a whole, participation rates fell 9.5 percentage points between 1979 and 1993. Among workers with less than 12 years of education, there was an 18.8 percentage point drop. The reason participation rates dropped is that large numbers of firms made pension participation voluntary when they introduced 401(k) plans. Participation rates dropped most among the least educated because they are more likely to decline the opportunity to participate in their employers' 401(k) plans, but also because greater declines in real income generated larger decreases in participation rates.

While the 401(k) option has resulted in the greatest decline in participation among the least educated, the impact on coverage is less obvious. The reason is that there is mixed evidence on whether the 401(k) plans represent "new" plans, or whether they are replacements for earlier defined benefit or defined contribution plans. If the assumption that all 401(k) plans are new plans is adopted, the growth of the 401(k) has contributed to the growing gap in coverage between the least and most educated workers. If the alternative assumption is adopted [i.e. that all 401(k) plans are replacements], the growth of the 401(k) has not contributed to the growing gap in coverage.

The results of this study suggest that it is primarily changes in the earnings and types of jobs held by men and women of varying levels of education that account for the changing distribution of pension coverage. One implication is that inequality in future retirement income is likely to rise. Another implication is that the tax subsidy for pensions is being shifted away

from low income workers and, assuming that pension offsets are smallest among low income workers, the overall effect of the pension subsidy on national saving is likely fall. The extent to which national saving will be affected will require additional research on the size of the pension offset and the level of pension saving by educational attainment.

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Table 1: Pension Participation and Offer Rates by Educational Attainment and Gender.

Years of Education	Year	Offer Rate	Men		Women		
			Participation Rate	Coverage Rate	Offer Rate	Participation Rate	Coverage Rate
All	1979	64.0	97.3	62.2	42.6	92.7	39.5
	1993	65.2	87.8	57.3	59.2	81.6	48.3
	change	1.2	-9.5	-4.9	16.6	-11.1	8.8
<12	1979	55.0	98.1	54.0	35.9	91.7	32.9
	1993	39.9	79.3	31.7	37.2	78.7	29.2
	change	-15.1	-18.8	-22.3	1.3	-13.0	-3.7
12	1979	64.6	98.0	63.2	43.2	95.0	41.0
	1993	61.0	89.1	54.3	55.2	83.7	46.2
	change	-3.6	-8.9	-8.9	12.0	-11.3	5.2
13-15	1979	64.4	96.7	62.3	45.0	91.3	40.2
	1993	66.5	86.2	57.4	60.7	80.2	48.6
	change	2.1	-10.5	-4.9	16.7	-11.1	8.4
16+	1979	69.1	96.4	66.6	44.5	88.7	39.4
	1993	77.6	89.4	69.4	70.6	81.1	57.3
	change	8.5	-7.0	2.8	26.1	-7.6	17.9

Table 2: 1979 and 1993 Sample Means by Educational Attainment

	Years of Education														
	All			<12			12			13-15			16+		
	1979	1993	change	1979	1993	change	1979	1993	change	1979	1993	change	1979	1993	change
	Males														
Wage Income (1000s of 1993 \$)	34.6	32.7	-1.9	26.8	18.7	-8.1	32.0	26.2	-5.8	34.4	30.5	-3.9	44.7	48.3	3.6
% Unionized	32.5	17.1	-15.4	42.0	18.9	-23.1	43.6	24.4	-19.2	31.0	17.4	-13.6	9.8	6.2	-3.6
% with tenure less than 1 year	25.1	21.2	-3.9	22.1	25.9	3.8	23.2	20.4	-2.8	28.0	21.0	-7.0	27.2	20.9	-6.3
Part-time worker	2.6	5.3	2.7	3.3	8.5	5.2	1.7	4.1	2.4	3.4	7.3	3.9	2.6	3.8	1.2
Firm size (no. of employees)															
1-99	36.1	36.9	0.8	46.9	55.4	8.5	37.4	40.3	2.9	33.2	34.5	1.3	29.6	28.8	-0.8
100-999	17.3	19.4	2.1	18.2	18.4	0.2	14.8	20.1	5.3	18.0	19.3	1.3	19.5	19.2	-0.3
1000 or more	46.6	43.7	-2.9	35.0	26.3	-8.7	47.9	39.7	-8.2	48.8	46.2	-2.6	50.9	52.0	1.1
Establishment size (no. of employees)															
1-24	33.5	33.1	-0.4	38.2	41.0	2.8	33.4	35.0	1.6	32.6	32.4	-0.2	31.2	28.8	-2.4
25-99	21.3	23.8	2.5	20.4	27.2	6.8	21.7	25.0	3.3	23.7	24.5	0.8	18.7	20.6	1.9
100 or more	45.2	43.1	-2.1	41.4	31.8	-9.6	44.8	40.1	-4.7	43.6	43.1	-0.5	50.1	50.7	0.6
Age Ranges															
21-30	39.3	29.4	-9.9	25.3	32.0	6.7	40.7	30.0	-10.7	48.6	32.8	-15.8	37.1	24.4	-12.7
31-45	23.9	31.8	7.9	27.9	23.8	4.1	24.5	29.5	5.0	19.8	33.1	13.3	24.3	36.0	11.7
46-55	19.7	19.6	0.1	35.1	27.1	8.0	19.8	20.8	1.0	12.4	16.4	4.0	16.3	18.8	2.5
Industry:															
Trade	20.7	22.1	1.4	18.0	22.0	4.0	21.3	24.8	3.5	25.0	24.5	-0.5	17.3	16.1	-1.2
Service	18.5	26.3	7.8	12.5	17.8	5.3	10.3	17.1	6.8	17.4	24.1	6.7	36.9	43.8	6.9
Manufacturing	37.3	30.5	-6.8	42.6	33.6	-9.0	40.8	33.1	-7.7	33.6	28.7	-4.9	32.2	27.7	-4.5
Other	23.5	21.1	-2.4	26.9	26.6	-0.3	27.6	25.0	-2.6	24.0	22.7	-1.3	13.6	12.4	-1.2
Percent in Subgroup	100.0	100.0		16.5	8.6	-7.9	35.9	36.1	0.3	25.1	28.5	3.4	22.6	26.8	4.2
Sample Size	5698	6445		941	556		2043	2328		1428	1834		1286	1727	

Table 2: 1979 and 1993 Sample Means by Educational Attainment

	Years of Education														
	All			<12			12			13-15			16+		
	1979	1993	change	1979	1993	change	1979	1993	change	1979	1993	change	1979	1993	change
	Females														
Wage Income (1000s of 1993 \$)	17.8	20.5	2.7	14.4	11.9	-2.5	17.0	16.8	-0.2	18.3	29.0	2.1	22.9	29.9	7.0
% Unionized	14.1	8.3	-5.8	22.4	12.0	-10.4	14.8	9.3	-5.5	11.2	7.8	-3.4	8.8	6.2	-2.6
% with tenure less than 1 year	34.2	23.8	-10.4	31.4	27.0	-4.4	30.6	21.7	-8.9	38.2	25.1	-13.1	41.9	24.5	-17.4
Part-time worker	22.8	23.0	0.2	23.2	26.5	3.3	22.0	22.4	0.4	24.0	25.0	1.0	23.0	19.9	-3.1
Firm size (no. of employees)															
1-99	46.8	39.4	-7.4	49.7	51.6	1.9	45.9	40.5	-5.4	46.9	40.8	-6.1	46.8	31.7	-15.1
100-999	19.7	20.1	0.4	21.3	15.8	-5.5	18.6	19.4	0.8	19.5	19.7	0.2	22.2	23	0.8
1000 or more	33.5	40.5	7.0	29.0	32.5	3.5	35.5	40.1	4.6	33.5	39.5	6.0	31.0	45.4	14.4
Establishment size (no. of employees)															
1-24	40.9	36.8	-4.1	37.9	40.7	2.8	40.9	37.7	-3.2	42.2	39.6	-2.6	41.3	29.7	-11.6
25-99	19.7	22.0	2.3	22.2	27.0	4.8	19.0	23.2	4.2	19.1	20.6	1.5	21.1	20.2	-0.9
100 or more	39.4	41.3	1.9	39.8	32.2	-7.6	40.1	39.1	-1.0	38.7	39.8	1.1	37.6	50.2	12.6
Age Ranges															
21-30	41.0	30.2	-10.8	20.9	21.6	0.7	36.4	27.5	-8.9	54.0	32.9	-21.1	53.7	33.4	-20.3
31-45	24.4	32.1	7.7	32.7	27.8	-4.9	26.9	32.1	5.2	18.9	32.4	13.5	18.0	32.5	14.5
46-55	18.9	19.1	0.2	32.2	26.5	-5.7	21.2	22.7	1.5	12.4	15.7	3.3	9.3	15.4	6.1
Industry:															
Trade	22.5	23.4	0.9	23.4	30.8	7.4	25.6	29.1	3.5	21.4	21.9	0.5	13.3	12.8	-0.5
Service	48.2	54.4	6.2	32.8	38.0	5.2	42.7	45.1	2.4	54.6	58.5	3.9	70.3	69.9	-0.4
Manufacturing	22.2	15.6	-6.6	42.2	29.0	-13.2	23.4	18.9	-4.5	15.6	12.0	-3.6	10.5	11.2	0.7
Other	7.1	6.6	-0.5	1.6	2.2	-0.6	8.3	6.9	-1.4	8.4	7.6	-0.8	5.9	6.1	0.2
Percent in Subgroup	100.0	100.0		13.6	6.3	-7.3	47.7	39.3	-8.4	25.1	32.9	7.8	13.6	21.5	7.9
Sample Size	3941	5825		535	366		1881	2290		990	1919		535	1250	

Table 3: Factors Contributing to Change in Offer Rates Between 1979 and 1993.

	YEARS OF EDUCATION			
	< 12	12	13 to 15	16 or more
Explained change using 1979 coefficients:	Men			
Wage Income	-6.4	-3.6	-0.7	0.3
Union Coverage	-4.6	-3.5	-3.4	-0.5
Establishment and Firm Size	-3.0	-1.3	-0.6	0.6
% with tenure less than one year.	-0.7	0.4	1.2	0.8
Age	-0.3	0.7	0.4	1.7
% Part-time	0.1	0.0	-0.6	-0.1
Industry	-1.0	-0.3	-1.1	-0.5
Occupation	-0.2	-0.8	-0.6	-0.2
Total predicted change with 1979	-16.1	-8.3	-5.4	2.0
Total predicted change with 1993	-16.0	-7.7	-3.7	0.6
Actual change	-15.1	-3.6	2.1	8.5
Explained change using 1979 coefficients:	Women			
Wage Income	-3.6	-0.4	1.4	3.2
Union Coverage	-1.2	-0.9	-0.3	-0.1
Establishment and Firm Size	-0.4	1.8	2.1	4.3
% with tenure less than one year.	0.8	1.5	2.3	3.4
Age	-1.1	0.5	1.3	-0.7
% Part-time	-0.3	0.0	-0.1	0.6
Industry	-0.4	-0.3	-0.4	0.1
Occupation	-0.4	0.2	-0.9	-0.2
Total predicted change with 1979	-6.7	2.4	5.3	10.6
Total predicted change with 1993	-6.0	0.7	4.3	13.5
Actual change	1.3	12.0	16.5	26.1

Table 4: The Impact of the 401(k) Plan on Pension Participation and Coverage Rates.

	Years of Education				
	All	Less than 12	12	13 to 15	16 or more
	Men				
% offered a pension.	65.2	39.9	61.0	66.5	77.6
Pension coverage rate	57.3	31.7	54.3	57.4	69.4
Among those offered a pension, % offered a stand-alone 401(k).	26.8	29.8	23.9	28.5	27.8
Participation rate in 401(k) plans	59.2	40.7	59.9	54.9	65.9
Participation rate in non-401(k) plans	97.9	95.7	98.0	98.0	98.2
Percent of all workers covered by a 401(k) plan.	10.4	4.9	8.7	10.4	14.2
	Women				
% offered a pension.	59.3	37.2	55.2	60.7	70.6
Pension coverage rate	48.3	29.2	46.2	48.6	57.3
Among those offered a pension, % offered a stand-alone 401(k).	30.1	23.5	29.2	29.8	32.6
Participation rate in 401(k) plans	46.0	37.0	48.0	42.3	48.6
Participation rate in non-401(k) plans	96.8	93.2	98.3	95.9	96.3
% of all workers covered by 401(k) given pension coverage.	8.2	3.2	7.8	7.7	11.3



Table 5: Factors Contributing to Change in Participation Rates Between 1979 and 1993.

	YEARS OF EDUCATION			
	< 12	12	13 to 15	16 or more.
	Men			
Explained change using 1993 coefficients:				
Offered 401(k) Main Plan	-10.9	-7.6	-10.3	-8.0
DK if Offered 401(k) Main Plan	-0.9	-0.3	-0.2	-0.4
Wage Income	-5.4	-1.0	-0.7	0.1
Age	-0.6	0.0	-0.2	0.0
Tenure	0.4	-0.3	-0.3	-0.1
Marital Status	-0.6	0.1	0.7	0.7
Total predicted change with 1993	-18.0	-9.0	-10.9	-7.7
Actual change	-18.8	-8.9	-10.5	-7.0
	Women			
Explained change using 1993 coefficients:				
Offered 401(k) Main Plan	-6.6	-12.8	-15.0	-17.6
DK if Offered 401(k) Main Plan	-3.2	-1.0	-1.4	-1.2
Wage Income	-5.3	-0.7	0.7	2.9
Age	0.4	0.1	1.1	1.8
Tenure	0.0	0.0	0.0	-0.2
Marital Status	-0.9	0.5	1.6	3.4
Total predicted change with 1993	-15.7	-14.0	-13.2	-10.8
Actual change	-13.0	-11.3	-11.1	-7.6

Appendix Table A1: Pension Coverage by Educational Attainment and Gender.						
March CPS						
Year	Years of Education.					Difference between 16 or more and 0-11
	All levels of education.	0 -11 years	12 years	13 to 15 years	16 or more years	
Men						
1979	58.1	50.9	59.7	56.9	64.8	13.9
1980	56.9	49.0	58.6	55.9	63.3	14.3
1981	55.6	46.2	56.9	55.5	62.6	16.4
1982	53.6	44.1	54.9	52.3	61.1	17.0
1983	53.0	42.7	54.1	51.5	61.0	18.3
1984	51.4	39.7	51.2	50.3	62.1	22.4
1985	51.8	38.6	50.6	52.2	62.8	24.2
1986	50.8	37.8	50.4	50.4	61.1	23.3
1987	48.4	34.0	48.1	47.9	59.0	25.0
1988	48.3	32.5	48.0	47.7	59.8	27.3
1989	48.3	30.1	46.9	49.9	61.0	30.9
1990	48.6	28.5	47.5	50.2	62.2	33.7
1991	48.3	27.8	46.2	50.1	61.6	33.8
1992	48.1	24.7	45.8	49.4	62.0	37.3
1993	47.6	24.8	44.8	48.7	61.5	36.7
1994	49.9	27.1	46.5	51.1	64.1	37.0
1979-94 Change	-8.2	-23.8	-13.1	-5.5	-0.7	23.1
CPS Pension Supplements.						
1979	62.2	54.0	63.2	62.3	66.6	12.6
1993	57.3	31.7	54.3	57.4	69.4	37.7
1979-93 Change	-4.9	-22.3	-8.9	-4.9	2.8	25.1

Appendix Table A1: Pension Coverage by Educational Attainment and Gender.						
March CPS						
Year	Years of Education.					Difference between 16 or more and 0-11
	All levels of education.	0 -11 years	12 years	13 to 15 years	16 or more years	
Women						
1979	38.1	30.7	39.6	38.0	43.2	12.5
1980	38.6	30.2	40.1	40.0	42.0	11.8
1981	38.2	29.2	38.9	41.0	41.9	12.7
1982	38.2	30.3	39.0	39.4	41.7	11.4
1983	37.9	28.3	38.7	38.3	43.9	15.6
1984	37.5	28.4	37.2	39.0	43.4	15.0
1985	38.0	26.6	38.2	38.9	44.8	18.2
1986	37.8	25.8	37.0	39.1	45.6	19.8
1987	36.1	23.0	35.3	38.6	43.3	20.3
1988	36.0	22.8	36.4	36.1	43.1	20.3
1989	38.0	22.5	37.5	39.6	46.6	24.1
1990	37.8	21.6	37.4	39.2	46.4	24.8
1991	38.4	21.3	36.5	39.7	48.5	27.2
1992	39.2	20.3	37.0	40.4	49.8	29.5
1993	39.5	19.7	37.3	40.6	50.1	30.4
1994	41.2	19.8	38.7	42.2	52.3	32.5
1979-1994 change	3.1	-10.9	-0.9	4.2	9.1	20.0
CPS Pension Supplements.						
1979	39.5	32.9	41.0	40.2	39.4	6.5
1993	48.3	29.2	46.2	48.6	57.3	28.1
1979-93 Change	8.8	-3.7	5.2	8.4	17.9	21.6

	Appendix Table A2: Estimated Probit Models of Offer Outcomes for 1979 Male CPS-PS Sample. <sup>a</sup>							
	Years of Education							
	0-11		12		13-15		16 or more	
	MPE	t-stat.	MPE	t-stat.	MPE	t-stat.	MPE	t-stat.
Wage income (100,000s of 1993 dollars)	1.45	3.60	1.37	6.24	0.35	1.42	0.30	1.60
Wage income squared	-0.66	-1.50	-0.97	-5.26	-0.25	-1.33	-0.09	-0.75
Union coverage	0.29	6.06	0.24	8.22	0.35	8.16	0.17	3.05
Tenure less than one year	-0.25	-4.63	-0.18	-6.11	-0.23	-6.76	-0.16	-4.98
Part time worker	0.02	0.14	0.01	0.11	-0.24	-2.40	-0.12	-1.23
Firm Size (1-24 reference)								
25-99 employees	0.35	4.18	0.28	5.30	0.19	3.18	0.15	2.69
100-499 employees	0.36	3.99	0.50	8.95	0.34	5.86	0.18	3.19
500-999 employees	0.44	3.79	0.50	6.85	0.49	5.81	0.25	3.44
1000 or more employees	0.52	5.98	0.62	11.98	0.56	9.93	0.46	8.58
Establishment Size (1-24 reference)								
25-99 employees	-0.15	-1.89	-0.07	-1.51	-0.02	-0.37	-0.02	-0.47
100 or more employees	0.06	0.72	-0.08	-1.73	0.07	1.34	0.00	0.16
Age (21-25 reference)								
26-30	0.17	2.15	0.10	2.69	0.10	2.39	0.06	1.34
31-35	0.13	1.56	0.05	1.23	0.17	3.41	0.13	2.56
36-40	-0.03	-0.36	0.13	2.92	0.10	1.76	0.18	3.17
41-45	0.18	2.23	0.13	2.68	0.11	1.70	0.19	3.08
46-50	0.11	1.46	0.15	2.85	0.15	2.14	0.13	1.93
51-55	0.16	1.97	0.14	2.83	0.08	1.02	0.03	0.51
Log-Likelihood	-392.93		-786.10		-556.06		-569.86	
Scale factor	0.39		0.35		0.35		0.32	
Sample Size	941		2,043		1,428		1,286	

<sup>a</sup> The marginal probability effect (MPE) is the estimated effect of a one unit change in the explanatory variable on the probability that a worker with characteristics equal to the sample mean is offered a pension. The MPE divided by the scale factor yields the associated probit coefficient. The model also includes an intercept and dummy variables for 11 industries and 11 occupations. When a sub-sample had an empty industry or occupation cell, the number of dummies was reduced accordingly.

Appendix Table A3: Estimated Probit Models of Offer Outcomes for 1979 Female CPS-PS Sample.<sup>a</sup>

	Years of Education							
	0-11		12		13-15		16 or more	
	MPE	t-stat.	MPE	t-stat.	MPE	t-stat.	MPE	t-stat.
Wage income (100,000s of 1993 dollars)	2.08	1.26	1.74	2.74	2.71	4.58	0.61	1.01
Wage income squared	-1.39	-0.34	-1.52	-1.30	-2.35	-2.72	-0.02	-0.03
Union coverage	0.13	2.35	0.24	5.57	0.13	2.01	0.07	0.78
Tenure less than one year	-0.20	-3.36	-0.24	-7.46	-0.24	-5.83	-0.25	-4.55
Part time worker	-0.09	-0.99	-0.16	-3.42	-0.14	-2.28	-0.26	-3.29
Firm Size (1-24 reference)								
25-99 employees	0.04	0.26	0.21	3.33	0.17	1.99	0.18	1.64
100-499 employees	0.31	2.27	0.32	5.34	0.22	2.57	0.21	2.04
500-999 employees	0.25	1.61	0.44	5.95	0.37	3.90	0.31	2.53
1000 or more employees	0.40	2.96	0.52	9.07	0.44	5.49	0.37	3.58
Establishment Size (1-24 reference)								
25-99 employees	0.19	1.49	0.00	-0.04	0.07	1.01	-0.02	-0.23
100 or more employees	0.18	1.46	0.09	1.78	0.17	2.39	0.07	0.80
Age (21-25 reference)								
26-30	-0.11	-1.08	0.11	2.33	0.13	2.47	0.12	1.77
31-35	-0.03	-0.34	0.16	3.40	0.05	0.87	0.05	0.59
36-40	0.05	0.54	0.07	1.53	0.14	1.89	-0.08	-0.82
41-45	-0.05	-0.51	0.09	1.90	0.07	0.98	0.03	0.27
46-50	0.07	0.69	0.17	3.32	0.25	2.88	0.04	0.32
51-55	0.11	1.11	0.25	4.59	0.21	2.31	0.12	0.87
Log-Likelihood	-190.79		-816.74		-438.95		-271.38	
Scale factor	0.31		0.38		0.39		0.39	
Sample Size	535		1,881		990		535	

<sup>a</sup> The marginal probability effect (MPE) is the estimated effect of a one unit change in the explanatory variable on the probability that a worker with characteristics equal to the sample mean is offered a pension. The MPE divided by the scale factor yields the associated probit coefficient. The model also includes an intercept and dummy variables for 11 industries and 11 occupations. When a sub-sample had an empty industry or occupation cell, the number of dummies was reduced accordingly.

Appendix Table A4: Estimated Probit Models of Participation Outcomes for 1993 CPS-PS Sample. <sup>a</sup>

	Years of Education							
	0-11		12		13-15		16 or more	
	MPE	t-stat.	MPE	t-stat.	MPE	t-stat.	MPE	t-stat.
Men								
Intercept	0.13	0.33	0.01	0.28	0.04	0.59	0.16	2.24
Offered 401(k) Main Plan	-0.50	-6.78	-0.20	-12.50	-0.26	-12.32	-0.18	-10.92
DK if Offered 401(k) Main Plan	-0.11	-2.42	-0.02	-3.08	-0.01	-1.57	-0.02	-2.68
Wage income (100,000s of 1993 dollars)	1.12	1.14	0.03	0.29	0.21	3.37	0.15	3.91
Wage income squared	-0.41	-0.22	0.14	0.80	-0.09	-1.41	-0.07	-3.01
Tenure/10	0.11	1.16	0.07	6.46	0.15	8.17	0.13	7.75
Tenure/10 squared	-0.02	-0.48	-0.02	-4.67	-0.04	-6.57	-0.04	-6.44
Age/10	-0.08	-0.41	0.00	-0.12	-0.02	-0.62	-0.09	-2.05
Age/10 Squared	0.016	0.60	0.001	0.20	0.003	0.54	0.013	2.16
Married	-0.09	-1.44	0.03	5.06	0.03	2.97	0.00	0.33
Spouse Absent	0.05	0.65	0.03	3.04	0.01	0.69	0.00	-0.50
Log-Likelihood	-59.18		-248.61		-234.62		-263.69	
Scale factor	0.15		0.04		0.06		0.05	
Sample Size	222		1,419		1,221		1,340	
Women								
Intercept	0.04	0.08	0.03	0.35	-0.06	-0.38	-0.08	-0.44
Offered 401(k) Main Plan	-0.33	-4.03	-0.39	-14.33	-0.42	-14.63	-0.38	-12.09
DK if Offered 401(k) Main Plan	-0.21	-2.57	-0.08	-5.33	-0.11	-4.66	-0.07	-3.46
Wage income (100,000s of 1993 dollars)	1.35	0.59	0.74	3.93	0.57	2.96	0.69	5.65
Wage income squared	0.07	0.00	-0.78	-2.25	-0.14	-0.51	-0.39	-4.24
Tenure/10	0.32	1.94	0.14	4.79	0.21	3.93	0.27	5.20
Tenure/10 squared	-0.06	-0.65	-0.03	-2.61	-0.06	-2.21	-0.10	-3.59
Age/10	-0.052	-0.24	0.003	0.05	0.044	0.49	0.021	0.20
Age/10 Squared	-0.001	-0.04	0.001	0.13	-0.002	-0.19	0.001	0.10
Married	0.11	1.42	-0.02	-1.06	0.02	0.90	-0.01	-0.48
Spouse Absent	0.05	0.59	-0.03	-1.38	0.03	0.93	-0.02	-0.63
Log-Likelihood	-38.34		-295.50		-335.90		-243.75	
Scale factor	0.15		0.10		0.17		0.14	
Sample Size	136		1,263		1,164		883	

<sup>a</sup> The marginal probability effect (MPE) is the estimated effect of a one unit change in the explanatory variable on the probability that a worker with characteristics equal to the sample mean is offered a pension. The MPE divided by the scale factor yields the associated probit coefficient.

## Endnotes

[1] See Parsons (1991), Bloom and Freeman (1992), Even and Macpherson (1994a,1994b), and Reagan and Turner (1995).

[2]See Even and Macpherson (1994b).

[3]See Employee Benefits Research Institute (1995).

[4]See Bernheim (1991).

[5]For recent reviews of this literature, see Hubbard and Skinner (1996); Poterba, Venti and Wise (1996); and Engen, Gale, and Scholz (1996).

[6]See, for example, Gale (1995); Bernheim and Scholz (1993); and Venti and Wise (1996).

[7]There are several explanations for the low savings rate among low income workers. First, Social Security replacement rates can be as high as 90 percent for low income workers. Second, asset-based means testing for social insurance programs can have tremendous savings disincentives for low income workers (see Hubbard, Skinner, and Zeldes 1995). Finally, less educated workers may have higher time preference rates.

[8]Doescher (1994) argues that as the length of the reference period increases (e.g. from coverage last week for people working last week, to coverage last year for those that worked some time last year), the coverage rate declines since more transient workers will be included. To reduce the effect of transient workers, the CPS-M sample is restricted to include only those with 13 or more weeks of employment in the year prior to the survey.

[9] Since the CPS-M coverage questions refer to the prior year, a given year of the CPS-M will

provide the coverage rate for the prior year. That is, while we use CPS-M data for the years 1980 through 1995, the coverage rates are for 1979 through 1994.

[10] Even and Macpherson (1994c) report that, among men aged 21-65, the percentage of workers offered a pension whose primary plan is a 401(k) plans rose from 22 to 48 percent between 1988 and 1993.

[11] Tables with the corresponding numerical values are presented in the appendix (Table A1).

[12] Tables with the corresponding numerical values are presented in the appendix (Table A1).

[13] Following Jaeger's recommendation for defining education groups, two types of workers will be treated differently beginning in the 1992 CPS. First, all G.E.D. recipients will be defined as having 12 years of education beginning in 1992 whereas some were counted as having less than 12 years of education prior to 1992. Second, all workers indicating that they completed 12 years of education but did not receive a high school diploma are treated as having 12 years of education beginning in 1992. Jaeger estimates that prior to 1992, 45 percent of such workers were classified as non-graduates and the remaining 55 percent were high school graduates.

[14] Although the new education questions were first used in 1992, the 1992 CPS-M asks about pension coverage in 1991. Hence, the change in the education question is reflected for the first time in the coverage rates for 1991.

[15] According to Jaeger, 8 percent of the workers in the high school drop out group will be shifted to the high school graduate group because of the change in the treatment of workers with G.E.D.s and workers with 12 years of education but no diploma. Assuming that these shifted workers have a coverage rate equal to that of workers with 12 years of education, the reclassification would cause the group with less than 12 years of education to drop by less than 1.6 percentage points in the 1993 CPS-M, and by less than 1.8 percentage points in the CPS-PS.



This is computed as .08 times the difference between the coverage for those in the "12" and "less than 12" categories. These decreases in the 1993 coverage rate due to reclassification are "worst case" estimates in the sense that the shifted workers are likely to have coverage rates below high school graduates since Jaeger's work suggests that part of the shifted group (those with 12 years of education but no diploma) have earnings that are more similar to high school drop-outs than high school graduates. Also, Cameron and Heckman (1993) find that G.E.D. recipients (the other shifted group of workers) have economic outcomes more similar to high school drop outs than high school graduates. In terms of the impact on the coverage rates for high school graduates, since the shifted workers will represent only about 2 percent of the group with 12 years of education (i.e. there are about four times as many people with 12 years of education than with less than 12), the effect on coverage rates for high school graduates is only one-fourth as large as that for non-graduates even assuming that the shifted workers have the coverage rates of high school drop-outs.

[16] In 1997, the Social Security marginal replacement rates were 90 percent of the first \$455 of average indexed monthly income (AIME), 32 percent of the AIME between \$455 and \$2,741, and 15 percent of the AIME above \$2,741.

[17] See Levy and Murnane (1992) for a survey of this literature. Some of the explanations for the rise in the earnings premium for more educated workers include technological change biased toward high skill labor, increased import competition that reduced the demand for low skill labor, a reduction in the real value of the minimum wage, and a decline in unionism.

[18] See Andrews (1992).

[19] Part of the 401(k) plan's rapid growth may be attributable to employers' desire to utilize the

inherent incentive features of the contribution matching provisions in typical 401(k) plans [see Ippolito (1996)].

[20] Even and Macpherson (1994c).

[21] In the CPS-M, workers are asked whether their employer or union offers a pension plan for anyone in their company. Hence, being "offered" a pension in the March data does not necessarily imply that the worker is actually eligible for the pension. Moreover, in the CPS-M, it is impossible to determine whether workers employed by a firm offering a pension plan are actually eligible to participate in the plan.

[22] Unfortunately, in 1979, "choose not to contribute" is not included as a possible response.

Hence, we include those who indicate they are not eligible for "other reasons" as being offered a pension to make the offer rate time consistent.

[23] See Andrews (1989) and Lichtenstein (1992).

[24] Even and Macpherson (1996) present evidence consistent with this view. Namely, pensions at large firms have a larger effect on turnover than pensions at small firms, even after controlling for plan type and plan generosity. See Dorsey (1995) for a survey of studies examining pension portability and worker turnover.

[25] See Employee Benefit Research Institute (1990), pp. 31-32.

[26] The increase in employee turnover among high school drop-outs is consistent with evidence in Diebold, Neumark, and Polsky (1997) and Farber (1995).

[27] Using the coefficients from 1993 instead of those from 1979 generates only a small change in the predicted change in offer rates. Nevertheless, a likelihood ratio test of the hypothesis that 1979 and 1993 probit coefficients are identical was rejected at the .01 level for all but female high school dropouts.

[28] Using 1993 probit coefficients for the decomposition generates the same qualitative results. Perhaps the most notable difference is that unionism appears to have a smaller effect on pension offer rates in 1993. The results are generally robust to the choice of reference year for doing the calculation.

[29] Not all 401(k) plans have voluntary participation. For example, a firm can establish a 401(k) plan and make contributions for the employee without giving the employee an option to take the contribution as cash. Also, a collective bargaining agreement can mandate employee contributions to a 401(k) plan.

[30] It is not possible to use the 1979 coefficients for the decomposition since the 401(k) plan did not exist in 1979 and thus, it is impossible to estimate the effect of the 401(k) on participation with the 1979 sample.

[31] The percentage of workers offered a pension is reported in table 4. The impact of the 401(k) on participation rates is reported in table 5 as the explained change in participation rates due to the 401(k) plan being the main pension.