

**THE DISTRIBUTION OF FAMILY INCOME AND BENEFITS**

Kathryn Shaw

Mary Ellen Benedict

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**KATHRYN SHAW**

ASSOCIATE PROFESSOR OF ECONOMICS  
GRADUATE SCHOOL OF INDUSTRIAL ADMINISTRATION  
CARNEGIE MELLON UNIVERSITY

**MARY ELLEN BENEDICT**

ASSISTANT PROFESSOR OF ECONOMICS  
BOWLING GREEN STATE UNIVERSITY

### ABSTRACT

THIS STUDY INTRODUCES TWO NEW ASPECTS TO THE ANALYSIS OF FAMILY INCOME DISTRIBUTION: IT EXAMINES THE EFFECTS OF FRINGE BENEFITS ON FAMILY INCOME INEQUALITY, AND IT COMPARES THE DISTRIBUTION OF EXPECTED LIFETIME INCOME TO THE DISTRIBUTION OF ANNUAL INCOME. PRIOR STUDIES HAVE OMITTED THESE FEATURES DUE TO DATA LIMITATIONS -- THIS STUDY USES THE SURVEY OF CONSUMER FINANCES THAT CONTAINS DATA ON INCOME, PENSION BENEFITS, AND HEALTH COVERAGE FOR A RANDOM SAMPLE OF HOUSEHOLDS. USING THE COEFFICIENT OF VARIATION AS THE MEASURE OF INCOME INEQUALITY, WE FIND THAT PENSION RAISE ANNUAL INCOME INEQUALITY SLIGHTLY, WHILE HEALTH INSURANCE BENEFITS EQUALIZE IT SLIGHTLY. LIKE PAST STUDIES, WE FIND THAT WIVES' INCOMES HAVE AN EQUALIZING EFFECT ON THE DISTRIBUTION OF MARRIED HOUSEHOLD INCOME RELATIVE TO HUSBANDS' INCOMES, AND THIS EFFECT IS VERY SIMILAR FOR LIFETIME INCOME AND WHEN PENSION BENEFITS ARE ADDED TO WAGE INCOME.

### I. INTRODUCTION<sup>1</sup>

There is mounting evidence that income inequality has worsened dramatically in the 1980s as incomes have risen for well-educated men (e.g., Blank, 1991, Levy, 1988, Juhn, et al., 1989, and Karoly, 1990). The impact of female earnings on income inequality is less clear cut, but among two-headed households, wives apparently have had an equalizing impact on the distribution of family income (Cancian, et al., 1991, and Blackburn and Bloom, 1990). Absent from previous analyses are two important elements of the distribution of welfare: an analysis of the distribution of fringe benefits and of the distribution of lifetime wealth. The distribution of total annual compensation and lifetime compensation is examined here for households and individuals, with a focus on the impact of female compensation on family income inequality.

Among large employers, fringe benefits now comprise approximately 39 percent of total compensation (U.S. Chamber of Commerce, 1989), so they have a potentially important impact on the distribution of income. Two fringe benefits comprise the largest percent of pay: health insurance and pension benefits. Each is likely to have very different impacts on the distribution of compensation.

When health insurance is offered by an employer it is offered as a lump sum subsidy, independent of the level of employee earnings, so that within firms it should equalize the distribution of compensation. In contrast, pension benefits are a function of current and future earnings, and will worsen the distribution of compensation within firms offering pensions. Both of these share one common feature: many researchers believe that these fringes are often offered by firms that pay high wages, or by firms that are in the "primary" sector of the economy. That is, low-paying service sector jobs and part-time jobs are less likely to offer these fringe benefits, in part because pensions are thought to act as bonds that attach workers to firms that require investments in firm-specific skills. If this is the case, these fringe benefits will worsen the distribution of income across firms. The net impact of pension and health benefits is an empirical issue that has not been explicitly addressed previously.<sup>2</sup>

The relationship between female earnings and fringe benefits is also unknown *a priori*, but female pension benefits are likely to worsen the distribution of family compensation relative to the distribution of family wage income. There is clear evidence that women are less likely to be covered by pensions than men, and those that are covered tend to be in higher-paying jobs (Even and Macpherson, 1990).

Focusing on pension benefits also highlights another limitation of current studies of income inequality, namely, that they examine only the distribution of current income rather than the distribution of expected lifetime income. For pension benefits, the more relevant notion of compensation is lifetime compensation, because pension benefits are "backloaded", or they rise dramatically at the end of a worker's career because benefits are tied to rising wages. In this case, annual pension accruals provide a poor indicator of total welfare, and the more relevant measure is the expected present value of the pension. The expected present value of earnings is also the more relevant measure of the earnings distribution if earnings are shifted intertemporally by individuals. Intertemporal shifts occur when individuals make investments in human capital that lower current earnings and when they alter their labor supply over their lifecycle. For these reasons, the distribution of lifetime compensation provides a truer picture of welfare (Shaw, 1989). The drawback, however, of modeling the distribution of lifetime compensation is that econometric forecasts of expected lifetime incomes are less accurate than actual observed earnings and are subject to cohort biases.

A very unique data set, the Survey of Consumer Finances (SCF), provides us with the first opportunity to model the distribution of earnings and pensions benefits. No previous random sample of individuals has had information on individuals pension benefits. Section II contains the calculations of the distribution of annual total compensation, including the impact of female compensation on the distribution of income. In section III, a model of earnings determination is used to calculate the distribution of expected lifetime compensation. The conclusions follow in section IV.

## II. THE DISTRIBUTION OF ANNUAL COMPENSATION

This analysis uses the Survey of Consumer Finances (SCF), which contains information on a random sample of 3824 households in 1983, including data on current income, demographic variables, and pension benefits. The Employer Provider Survey provides detailed pension information by surveying all employers of individuals in the SCF who claimed pension coverage. We limit our sample to individuals of ages 21-64, who have complete pension information<sup>3</sup> and who were not students or retirees. For married couples, spouses must have complete information for both individuals to be used in the analysis. These restrictions result in a sample size of 2892 individuals and 1843 households.

This data set is used for two purposes in studying the distribution of income: to add pension and health benefits to compensation, and to examine the impact that female compensation has on the distribution of family income. Females comprise 46 percent of the sample and are included in 72 percent of the households (286 of the singles and all of the 1049 married households). The coefficient of variation, or CV, is used as the measure of income inequality because it can be conveniently decomposed by type of compensation.<sup>4</sup> The CV, equal to the standard deviation divided by the mean, can be decomposed as follows:

$$CV^2 = \sum \alpha_j^2 + 2 \sum \sum \alpha_j \alpha_k \rho_{jk} CV_j CV_k$$

for ( $k = j+1 \dots J$ ) and where  $CV_j^2$  is the squared CV of the  $j$ th component of income,  $\rho_{jk}$  is the correlation between the  $j$ th and  $k$ th components of income, and  $\alpha_j$  is the share of the  $j$ th component of income as a proportion of total income. The income components can be either the types of compensation, such as earnings and pension benefits, or the sources of the compensation, such as the husband and wife.

Table 1 displays the distribution of total annual compensation by household type. Wage earnings are annual values. The pension benefit is the annual legal value of the pension accrual, calculated as the difference in the expected present value of pension benefits in 1983 minus those expected in 1982.<sup>5</sup> Information on household health insurance coverage is contained in the survey, but no dollar amount is given. To place a dollar amount on the value, the average value of the Blue Cross/Blue Shield low-coverage fee to non-group subscribers by family size is matched to the coverage data. While this clearly does not incorporate the different generosity levels of health insurance plans, it provides a valuable measure of the dollar impact of health insurance coverage that is a reasonable first approximation. The much higher quality of the pension benefit data makes pensions the primary focus of the paper.

The results in Table 1 show that annual pension income very modestly worsens the distribution of income relative to the distribution of wage income (compare columns 2 and 3). For all individuals, the coefficient of variation rises from 1.062 to 1.072. When health benefits are added, they lower inequality for single individuals and for married couples.<sup>6</sup>

Pensions worsen the distribution of income for two reasons: They are positively correlated with wage earnings, with a  $\rho$  of .131 for individuals, and the variance of pension benefits is large, with a pension CV of 6.432 for individuals (equation (1) shows that these factors will increase the CV of total compensation, all else constant). The apparent reason that pensions don't have a larger unequalizing effect on income is that the average annual value of pension accruals is very small, at only 2.9 percent of total compensation. Large firms do pay substantial pension benefits -- in our data, the annual pension share of income for those covered by pensions is 13 percent for unionized workers, and 9 percent for workers in firms with more than 100 employees (Benedict and Shaw, 1993). However, the overall population is dominated by workers not covered by pensions -- young workers, workers in small firms, and women -- so that the effect of pensions on income inequality is small.

Turning now to an analysis of the impact of female income on the distribution of married household incomes (Table 2), wives' earnings tend to have an equalizing effect on the distribution of income.<sup>7</sup> Among two-headed households, female earnings can have offsetting effects on the distribution of income. On the one hand, they are likely to worsen the distribution of family income relative to the distribution of husbands' incomes. Assortative marriage, when individuals of like ability marry, worsens the distribution of income. And the recent increase in the return to a college education

(Juhn, et. al, 1989) would have made this more pronounced in recent years (though changes over time cannot be examined here). On the other hand, the husband's negative income effect creates an equalizing effect. Women who are married to highly-paid men will work fewer hours if the negative income effect is strong. Our results suggest that although the variance of wives' incomes is greater than that of husbands, the reason wives have an equalizing effect on family income is that the husband's and wives' actual income correlations are close to zero (which is evidence of a negative husband's income effect on wives' labor supply) and male compensation dominates household income. This is true with and without pensions, where the CV is reduced by more than 10% for wage earnings and when pension benefits are added to wages.

### III. THE DISTRIBUTION OF LIFETIME WEALTH

The distribution of annual compensation provides a misleading picture of the distribution of welfare of families if incomes are shifted intertemporally over time. This point has been made clearly by Lillard (1977) and Shaw (1989) when the focus is on earnings. Intertemporal shifts have two effects: (1) the more able individuals are more likely to invest in on-the-job training that lowers their income when young and raises it when old, so that the earnings inequality worsens with age; (2) during the child-rearing years, when the negative income effect of the husband's earnings on the wife's labor supply is likely to be the greatest, income inequality will improve. Previous work indicates that overall, the distribution of lifetime earnings is more equally distributed than the distribution of annual earnings (Lillard, 1977; Shaw, 1989).

The inclusion of pension benefits offers an additional reason for focusing on lifetime values. As mentioned in the introduction, standard pension plans are characterized by "backloading," where the value of the pension benefits will grow with age as a worker's tenure with the firm increases.<sup>8</sup> Thus, annual accrual values will dramatically underestimate expected pension values for young workers, and the better measure is the expected lifetime present value of the pension which is calculated (as described above) using the individual's response to a question about how long he or she expects to stay on the current job.

The expected present value of wage earnings is calculated for each person by estimating a longitudinal earnings functions and using it to project wage income forward and backwards. The earnings function is:

$$(2) \ln Y_{it} = (\beta' X_{it}) \ln Y_{i,t-1} + \gamma' Z_{it} + e_{it}$$

where  $X$  is a set of variables that interacts with lagged income,  $Z$  is a set of standard wage regression variables, and  $e$  is distributed i.i.d.. The covariance structure of individual earnings over time is captured by the lagged income variable, whose coefficient varies by experience and educational group. The lagged income variable can be thought of as a proxy for the unobserved individual fixed effect present in most income regressions.<sup>9</sup> Fifteen years of longitudinal data from the Panel Study of Income Dynamics is used to estimate separate income regressions for six

educational groups by sex.<sup>10</sup> Equation (2) is then used to forecast wage income given estimates of  $\beta$  and  $\gamma$ , and adding a random draw from the residual distribution of  $e$ , assuming a normal distribution with the estimated variances from the regressions (See Appendix 1).

When focusing on expected lifetime retirement income, an important income source is social security income. Social security taxes are subtracted from wage earnings, and expected benefits are calculated using formulas provided by the Social Security Administration.

The coefficients of variation for expected lifetime values are presented in Table 3. Pensions have a very small equalizing effect on the distribution of lifetime compensation, but social security benefits have a clear equalizing effect. The social security effect occurs for three reasons: the social security CV is low; the correlation between social security and lifetime wage earnings is negative, at  $-.058$  for all individuals; and social security is a substantial proportion of lifetime income, at 9 percent of lifetime income for individuals. In contrast, pension benefits should increase compensation inequality because they have a higher CV than earnings and they are positively correlated with earnings ( $.161$  for individuals), but they comprise only 2.7 percent of total lifetime compensation (across all individuals, covered and uncovered), so they have little net effect on income inequality. Note that for all measure of income, lifetime income inequality is lower than annual income inequality.

Turning to the impact of wives' compensation on the distribution of married household compensation (Table 4), wives' wage and pension income tends to equalize household compensation (relative to the husband's value) slightly more than the equalizing effect of only wage income. However, the pension effect is very small for the reasons given in the paragraph above.

#### IV. CONCLUSIONS

Using the first available randomly sampled individual data on pension benefits, we find that wives earnings have a strong equalizing effect on the distribution of household income (relative to the distribution of husbands' income), and this effect is little changed when pension benefits are added to income or when we analyze the distribution of expected lifetime income and benefits. Pension benefits do raise income inequality, but only very slightly. and health benefits lower income inequality very slightly. Though large firms and unionized firms do offer generous pension benefits, the majority of the population, and women in particular, do not receive these benefits and consequently pensions are too minor a source of income to alter the distribution of family income.

TABLE 1: COEFFICIENT OF VARIATION (CV)  
FOR ANNUAL COMPENSATION, 1983

	W+P+H	W+P	EARNINGS (W)	PENSION (P)	HEALTH (H)
All households	.710	.750	.718	5.100	1.250
Single Heads	.912	.924	.925	4.548	1.420
Married Heads	.696	.709	.704	4.685	1.220
All individuals	n.a.	1.072	1.062	6.432	n.a.
Men		.844	.836	5.726	
Women		1.125	1.114	5.434	

TABLE 2: THE DECOMPOSITION OF ANNUAL CV  
FOR MARRIED HOUSEHOLDS

	CV	CV <sup>h</sup>	CV <sup>w</sup>	$\alpha^h$	$\rho$
Wage Earnings	.704	.821	1.193	.762	.068
Pension Accruals	4.685	5.423	5.868	.842	.028
Wages + Pensions	.709	.821	1.208	.765	.058

CV<sup>h</sup> = husbands' CV; CV<sup>w</sup> = wives' CV;  $\alpha^h$  = husband's share of family income;  $\rho$  = husband-wife income correlation.

TABLE 3: COEFFICIENT OF VARIATION (CV)  
EXPECTED LIFETIME COMPENSATION

	W+P+S	W+P	EARNINGS (W)	PENSION (P)	SOCIAL SECURITY (S)
All households	.487	.514	.518	2.270	.522
Single Heads	.695	.732	.736	3.083	.682
Married Heads	.467	.496	.502	2.214	.659
All individuals	.726	.764	.766	3.070	.701
Men	.581	.607	.615	2.684	.731
Women	.730	.783	.774	3.433	.661

TABLE 4: THE DECOMPOSITION OF LIFETIME CV  
FOR MARRIED HOUSEHOLDS

	CV	CV <sup>h</sup>	CV <sup>w</sup>	$\alpha^h$	$\rho$
Wage Earnings (W)	.502	.606	.770	.689	.103
Pensions (P)	2.214	2.552	3.393	.791	.113
Social Security (S)	.659	.714	.673	.534	.797
W + P	.496	.595	.780	.692	.092
W + P + S	.467	.569	.721	.684	.082

CV<sup>h</sup> = husbands' CV; CV<sup>w</sup> = wives' CV;  $\alpha^h$  = husband's share of family income;  $\rho$  = husband-wife income correlation.

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## Appendix 1: Calculation of Present Values and Weights

## A. The Expected Present Value of Earnings

In order to predict the present value of earnings, the Panel Study of Income Dynamics<sup>11</sup> for 1968-1982 was used to estimate log wage equations. The regressions were estimated for six education groups by gender: those with less than a 10th grade education, those with an education of 10th or 11th grades, high school graduates, those with some college but not a degree, college graduates, and those with more than a college degree. Wages were estimated as a function of lagged wages and experience.

We start by estimating a longitudinal earnings function which is then used to predict the natural logarithm of annual wage income:

$$(1) \quad \ln Y_{it} = \gamma_0 + \gamma_1 X_{it} \ln Y_{i,t-1} + \gamma_2 X_{it} + e_{it}$$

where  $Y_{it}$  = estimated earnings in year  $t$  for person  $i$

$Y_{i,t-1}$  = lagged earnings

$X_{it}$  = vector of personal characteristics, including experience and experience squared

$e_{it}$  = an error term

and the  $\gamma$ s are coefficients estimated with the PSID data.

To project wage income for the SCF individuals, we used the estimated coefficient values from equation (1) to predict  $\ln Y_{it}$  as a function of the 1982 income and characteristics of the SCF respondent. Future  $Y$ s are then calculated as:<sup>12</sup>

$$(2) \quad \hat{Y}_{it} = \exp(\ln Y_{it}) \cdot g/r - SS_{it} + \hat{\epsilon}_{it}$$

We multiply by  $g$ , which represents expected wage growth and expected inflation, and divide by the discount rate  $r$  (the 1982 Treasury Bond rate).

$\hat{SS}_{it}$ , the discounted annual social security deduction, is estimated using information about past and expected income caps (estimated by the Social Security Administration) and rates of deduction for given income levels:

$$(3) \quad \hat{SS}_{it} = \min(Y_{it}, \text{Cap}_i) * \text{the rate of deduction} * (g/r)$$

$\epsilon_{it}$  is the random draw from the residual distribution whose variance was estimated in (1), separately for the twelve subgroup regressions.

The present value of earnings equals the sum of the annual predicted expected income (based on equation (2)) from 1982 to the year of expected retirement. To obtain the expected retirement date, a variable in the SCF was used that indicated the respondent's expected time of retirement, if the respondent was at least 49 years old. For younger respondents, we assumed a retirement age of 65.

Wages were predicted backwards from 1982 for each individual using a separate set of regressions with fundamentally the same assumptions as future wages. These values were also summed, then added to the future present value of earnings to yield a total value for the expected present value of earnings.

**B. The Expected Present Value of Social Security Benefits**

The expected present values of social security benefits were calculated using formulas provided by the Social Security Administration, which contain information on rates for different level of earnings (predicted from above), early retirement, and spousal benefits. Life expectancy tables from the Statistical Abstract of the United States provided expected length of benefits. Wives were given the estimated benefits based on their husband's work experience if these benefits exceeded the wives own estimated benefits.<sup>13</sup>

**C. Weights to Account to Missing Pension Information**

Not all of those who were recorded as having a pension in the SCF were matched to the employer information from the Pension Provider Survey (PPS), so some observations had to be deleted due to this missing information. We therefore developed weights to insure that the final analysis accounted for this underreporting. To develop the weights, we began by estimating a probit model of the probability of having employer-provided pension information for all those employed individuals who themselves claimed to be covered by a pension plan. This dependent variable was regressed on tenure, experience, gender, hours of work, union attachment, firm size, industry, and region. Given these probit results, those individuals who had employer-provided pension information were assigned a weight equal to the inverse of the estimated probability of having this employer-provided information, i.e., a weight that is greater than one. All individuals who claimed to be covered by a pension but had no employer-provided pension information were dropped from the sample, and those individuals who were not covered by pension received a weight equal to one. The weights were then used in calculating all CVs and weighted least squares was used in estimating the regressions.

**ENDNOTES**

1. Original version presented at the American Economic Association meetings in 1992. We would like to thank session participants for their helpful comments.
2. Lazear and Rosen (1987) match pension benefit information from large firms to CPS data to calculate expected pension benefits, but ours is the first study to have actual individuals' pension benefit information. More recently, Benedict and Shaw (1993) use this same data to investigate the impact of pensions on income distribution in relation to firm size and unionism.
3. Not all employers responded to the Employer Provided Survey: the response rate was 73%. Therefore, some individuals claim to have pension coverage, but have no calculated pension values. Dropping all these individuals from the sample would bias the income distribution results. In order to correct for this problem, the observations for which we have calculated pension values are weighted. See Appendix 1 for details.
4. In comparing the CV to similar measures of income inequality, such as the Gini coefficient, all measures exhibit similar trends in recent years (Karoly, 1990; Cancian, et.al., 1991).
5. The pension present values are based on firms' benefit formulas, which incorporate firm-specific data on vesting age, Social Security offsets, early retirement provisions, etc. We assume a discount rate equal to the nominal 1982 thirty-year T-bill rate of 10.85, expected inflation of 6.85, and a real interest rate of 4 percent. The worker's expected tenure with the current firm is based on his or her response to a survey question asking expected tenure.
6. Health benefits are 4.6 percent of total compensation for individuals and 4.3 percent for married households.
7. Most previous studies have found the net effect of wives' earnings to be equalizing, but they have not incorporated fringe benefits (Cancian, et.al., 1991; Blackburn and Bloom, 1990). The focus here is on two-headed households because the data set here is too small for a separate analysis of female-headed households. Cancian, et.al., show that among all white families, wives earnings equalize the distribution of income for married couples and for all families.
8. The current legal value of a pension (which is the value used in the annual accruals above) is the cost of the pension if the worker quits today. Defined benefit pension plans (which are 80 percent of all pension plans) make pension benefits a function of the income earned during the worker's last years on the job. If a young worker quits today the value of the pension will be very small relative to the pension value if the worker stays until age 65, because the latter's pay will grow with inflation and with personal productivity growth. Thus, the worker who expects to stay with an employer can expect a much greater pension than a young worker who leaves. There is a good deal of evidence that the worker's implicit value of his or her pension is the "option value" of the pension, or the expected rising value of the pension, rather than the legal value.

9. There are two alternative ways of forecasting income: estimate an income regression with an unobserved individual fixed effect that can be included in the individual's income forecast; or, estimate a random effects model (Lillard, 1977). The latter is rejected for its poor assumption that the individual effect is uncorrelated with the X variables. The fixed effects model cannot be used here because the SCF data set contains at most two years of longitudinal data -- not a sufficient number to calculate consistent fixed effects.

10. Regression results are available on request. The Survey of Consumer Finances used in the rest of the paper also has longitudinal data, from surveys in 1983 and 1986, but only two-thirds of the survey responded in 1986 so income data for that year is not used here. Income regressions based on the SCF longitudinal data were also estimated and used to calculate present values of income, which are available from the authors. The much larger PSID data set provides a richer functional form for the income regression estimates and smaller coefficient standard errors.

11. The Panel Study of Income Dynamics (PSID) is a longitudinal data set following approximately 3000 household for the years 1968-1982 (which are the years prior to the SCF survey), for a total sample size of 28,544. The regression results are available from the authors on request. The SCF data also has longitudinal data, from the 1983 and 1986 surveys, but only two-thirds of the sample responded in 1986, so income data for that year is not used here in calculating the expected present values of income. The much larger PSID data set provides a much richer functional form for the income regression estimates and smaller coefficient standard errors.

12. For women who are currently working in the 1983 survey, the future probability of working is not assumed to be one. Instead, future income is weighted by the estimated probability of working based on a probit model that contains the lagged work status. For men and women who are not working in 1983, income is projected using standard income and probability of working regressions, all estimated by educational group (clearly, we do not include lagged income in these regressions since it is unobserved for these individuals). Pension values are not projected for these individuals, due to the very poor regression results for pension prediction equations. Thus, the lifetime income results will slightly underestimate the impact of pensions when including the unemployed in the analysis.

13. Details are available on request from the authors.