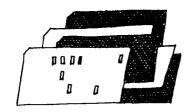# Research Summaries

Occupational segregation and earnings differences by sex

NANCY F. RYTINA

The persistence of a wide male-female earnings differential is well-documented. Through 1978, women who worked full time continued to earn about 60 percent as much as men.[1] Among the various explanations offered to account for these differences, one suggested by a growing body of literature is that occupational sex segregation plays a critical role.[2] The majority of working women are employed in a small number of occupations which are predominantly female; in both 1969 and 1979, about one-half of all working women were employed in fewer than 30 of the detailed Census occupations (in which 80 percent or more of the employees were women).[3] Among the occupations heavily dominated by women are nurses, secretaries, and elementary school teachers. While women have made some progress in entering fields dominated by men, there is little prospect for major changes in the degree of occupational sex segregation through the mid-1980's.[4]

Because earnings are lower, among both men and women, in female than in male-dominated occupations, there has been concern about how the process of occupational sex segregation operates and what bearing it might have on female earnings.[5] The *operation* of the process is outside the scope of this report which deals with the *outcome* of the process: the relation of occupational sex segregation to the sex-earnings differential, exclusive of a limited number of worker and job characteristics that also affect earnings. Empirical research on occupational sex segregation has not typically taken into account the influence of both worker and job characteristics, thus making it difficult to disentangle the effects on earnings of occupational sex segregation from

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factors such as workers' ages, education, and occupational skill or status.[6]

Data and method

The data for this research are cross-tabulations from the 1976 Survey of Income and Education, which is being used as part of a continuing study on occupational sex segregation. The median 1975 annual earnings of men and women in all detailed occupations were listed for workers grouped by age, race, and level of education as approximate indicators of worker characteristics. The percentage of women in each of the occupations was calculated as a measure of occupational sex segregation. In addition, the job characteristic of occupational status is included to take into account variations in earnings between male and female occupations which arise from the concentration of female occupations in the middle of the status hierarchy. Male occupations are more dispersed; they include the highest paying professional occupations, as well as some of the very low paid service and laborer occupations. The Duncan Socio-Economic Index, a widely used measure, indicates the status of each occupation.[7] These status scores are computed from the median level of education and income of men in detailed occupations and range from a low of 2 to a high of 96. The scores are highly correlated with other measures of status which are based either on women or all workers.

Occupations served as the units of analysis; and correlational techniques were used to examine the association of occupational sex segregation with the sex-earnings differential. Each occupation was weighted by its share of total employment in an age, race, or education category to give less weight to those occupations with few employees.[8] The results, for the most part, refer to full-time, year-round workers, owing to the availability of only annual earnings in the Survey of Income and Education and the problems that would have been posed because of the higher incidence of part-time employment among women. The survey is particularly useful for occupational research, because its large sample of about 150,000 households permits the analysis of some occupations for which no viable data could be obtained through smaller samples.

Findings discussed

Detailed occupations. The data in tables 1 and 2 provide descriptive information on the employment and the ratios of women's earnings to men's (sex-earnings ratios) in occupations ranked by the percentage of employed women. Table 1 highlights the extent to which women are employed in a small number of predominantly female occupations. Of the 419 identified occupations of full-time, year-round workers in 1975, there were 41 in which 90 percent or more of the workers were female. These occupations accounted for 40 percent of all female workers. In contrast, there were 179 occupations in which 90 percent or more of the workers were male. Nearly 50 percent of all men were employed in these occupations.

For each group of occupations in table 1, table 2 lists the 4 to 6 largest occupations within the group and the numbers of men and women employed, the status scores, and the sex-earnings ratios expressed by women's earnings as a percentage of men's earnings. The data indicate that the sex-earnings ratios are generally highest in the occupations which are predominantly female. For example, women's earnings as a percent of men's were 74 percent among waiters and waitresses, a group that was 93 percent female, 70 percent among accountants (32 percent female), 58 percent among bank officers and financial managers (27 percent female), and 41 percent among medical and osteopathic physicians (13 percent female). However, women fared comparatively well in largely public sector occupations regardless of their proportion in these occupations. For example, among postal clerks, men outnumbered women by about 2 to 1 and women earned 98 percent as much as men; the earnings of women were 86 percent as much as those of men in elementary education (84 percent female).

Sex-earnings ratios and correlations. These relationships between occupational sex segregation and earnings are summarized in table 3. The data on the left-hand side

show the average sex-earnings ratio for occupations classified as female-dominated (60 percent or more of the employees were women), male-dominated occupations (20 percent or less of the employees were women), and neutral or mixed occupations (21 to 59 percent of the employees were women).[9] In comparing the sex-earnings ratios across female, neutral, and male occupations for any race, age, or educational grouping, a higher ratio in female, followed in turn by neutral and male occupations, may be interpreted as a positive association between the percent of women in the occupations and the sex-earnings ratio.[10]

In the data on the right-hand side of table 3, each correlation coefficient shows the degree of association between sex-earnings ratios and the percent of women in occupations for those in a particular age, race, or education group. The partial correlation coefficients control for variations in occupational status that might affect the relation of occupational sex segregation to the sex-earnings ratios.

Table 3 illustrates several aspects of the relationship of occupational sex segregation to the sex-earnings ratio. First, among whites and all age and education groups the sex-earnings ratios are generally highest in female occupations and lowest in male occupations. The strength of this pattern is attested to by the positive zero-order correlation coefficients between the percent of women in occupations and the sex-earnings ratios and the positive partial correlation coefficients, which control for occupational status. This can be interpreted to mean that irrespective of age, education, and occupational status, women fare more poorly relative to men in those occupations with the highest rewards—male occupations. To the extent that these factors reflect the influence of worker and job characteristics on earnings, the findings tentatively suggest that occupational sex segregation contributes independently to the gap between women's earnings and men's.

Second, the ratio of black women's earnings to black men's follows an opposite pattern from whites (among full-time, year-round workers), as the earnings for black women were closest to those of black men in male-dominated occupations. Several factors can be identified to help explain this pattern. The black sex-earnings ratio is lower in female-than in male-dominated occupations, possibly as a result of racial differences in employment concentration and earnings within female segregated occupations. Compared to white women, black women in female-dominated occupations are disproportionately employed in lower-paying occupations such as nursing aides, orderlies, and sewers and stitchers. However, in these occupations the earnings of black men were greater than those of black women, as well as those of white men and women. That black men earned substantially less than white men in nearly all other occupations,

Table 1. Employment among full-time, year-round workers in occupations ranked by the percent of women employed, 1975			
Percent of women	**All occupations**		
	Number of occupations	**Percent of employed**	
		Women	**Men**
Total	419	100	100
91–100	41	40	1
81–90	15	11	1
71–80	19	10	3
61–70	13	5	2
51–60	18	8	4
41–50	31	6	5
31–40	36	7	8
21–30	29	3	5
11–20	38	7	22
0–10	179	2	49

highlights what may be viewed as a racial dimension of occupational sex segregation. In contrast, the higher sex-earnings ratio in male-dominated occupations may reflect the greater benefits to black women from Equal Employment Opportunity legislation in white-collar occupations. In some of those occupations such as lawyers, public administration officials, and wholesale sales representatives, the earnings of black women were about the same as or exceeded those of black men.

Third, the variability in the sex-earnings ratios within age and education categories may be used to speculate on trends in the relation of occupational sex segregation to the sex-earnings gap. In terms of age, the high but similar sex-earnings ratios among the age cohort of 25 to 34 years suggests a narrowing of the sex-earnings differential irrespective of occupational sex segregation as successive cohorts of women pass through the life cycle. However, this is not necessarily reason to be optimistic. The lower sex-earnings ratios among the older cohorts, which result from factors such as work discontinuity

Table 2. Sex-earnings ratios of full-time, year-round workers in selected occupations ranked by the percent of women employed

Occupation	Percent of women [1]	Duncan Socio-economic Index	Number of employed workers (in thousands)		Median annual earnings (1975)		Sex-earnings ratio (women/men)
			Men	Women	Men	Women	
Kindergarten and prekindergarten teachers	99	72	(2)	49	(2)	$ 9,348	(2)
Secretaries, n.e.c.	99	61	(2)	1,655	(2)	8,070	(2)
Waiters/waitresses	93	16	35	169	$ 6,027	4,441	.74
Bookkeepers	92	51	95	685	12,300	7,455	.61
Cashiers	91	44	39	239	10,553	5,973	.57
Hairdressers and cosmetologists	91	17	32	139	9,704	5,114	.53
Nursing aides, orderlies, attendants	88	14	67	362	8,268	6,002	.73
Stenographers	88	61	(2)	56	(2)	9,408	(2)
Elementary school teachers	84	72	120	419	12,243	10,545	.86
Food service workers, n.e.c. except private household	84	11	33	82	7,897	5,398	.68
Miscellaneous clerical workers	82	44	93	333	10,220	7,710	.75
Sales clerks, retail trade	76	39	248	346	10,182	5,147	.51
Payroll and timekeeping clerks	73	44	48	98	13,028	8,309	.64
Counter clerks, except food	74	44	45	89	11,036	6,088	.55
Statistical clerks	73	44	56	134	13,127	8,075	.62
Housekeepers, except private household	71	31	(2)	86	(2)	7,243	(2)
Packers and wrappers, except meat and produce	68	18	119	171	8,775	6,885	.78
Therapists	67	60	39	61	12,508	10,898	.87
Knitters, loopers, toppers	66	02	(2)	(2)	(2)	(2)	(2)
Building interior cleaners, n.e.c.	65	09	148	172	8,021	5,628	.70
Office managers, n.e.c.	64	62	99	160	14,542	9,306	.64
Social workers	59	64	102	121	12,602	10,947	.87
Assemblers	54	17	256	235	10,497	7,019	.67
Checkers, examiners, inspectors, manufacturing	51	23	248	192	11,964	7,353	.61
Secondary school teachers	51	70	344	225	13,255	11,280	.85
Computer and peripheral equipment operators	50	45	99	80	11,450	8,358	.73
Painters and sculptors	47	67	45	27	14,348	7,772	.54
Real estate agents and brokers	46	62	181	64	15,261	8,179	.54
Personnel and labor relations workers	44	84	168	111	17,875	10,574	.59
Bartenders	42	19	80	33	7,278	4,923	.68
Insurance adjusters, examiners, investigators	40	62	65	39	13,661	8,069	.59
Sales managers and department heads, retail	38	71	178	84	14,617	7,164	.49
Accountants	32	77	512	165	15,218	10,617	.70
Machine operatives, miscellaneous specified	32	19	524	168	11,208	6,528	.58
Postal clerks	31	45	150	42	13,637	13,387	.98
School administrators, elementary and secondary	30	72	151	47	19,144	13,350	.70
Expediters and production controllers	29	44	110	39	13,537	8,693	.64
Farm laborers, (wage workers)	28	22	253	24	6,083	4,067	.67
Bank officers and financial managers	27	80	363	115	16,567	9,686	.58
Computer programmers	21	65	128	25	15,150	12,785	.84
Janitors and sextons	18	13	556	662	8,349	6,902	.83
Insurance agents, brokers, underwriters	15	66	326	50	14,947	8,758	.59
Managers and administrators, n.e.c.	15	62	3,742	514	16,657	8,445	.51
Medical and osteopathic physicians	13	92	244	34	35,960	14,893	.41
Freight and material handlers	11	09	274	29	10,169	6,873	.68
Blue-collar work supervisors, n.e.c.	10	50	1,174	99	14,297	7,832	.55
Lawyers	10	92	266	(2)	24,964	(2)	(2)
Farmers (owners and tenants)	08	14	831	40	8,020	1,869	.23
Industrial engineers	03	86	179	(2)	17,948	(2)	(2)
Dentists	02	96	63	(2)	31,329	(2)	(2)
Automobile mechanics	01	19	554	(2)	10,488	(2)	(2)

[1] Refers to all workers.

[2] Figures not shown where less than approximately 60 sample cases.

Table 3. Sex-earnings ratio (female/male) by categories of occupational sex segregation (percent of women in occupations) for selected demographic groups

| Demographic group | Sex-earnings ratio[1] | | | | Correlation coefficients[2] | |
| | Total | Categories of occupational sex segregation (percent of women in occupations) | | | Sex-earnings ratio and percent of women in occupations | |
		Male occupations ≤ 20 percent female	Neutral occupations 21–59 percent female	Female occupations ≥ 60 percent female	Zero-order	Partial controlling for occupational status
All workers, total	.55	.50	.55	.62	.2187	.2206
Race:						
White	.53	.49	.54	.57	.1897	.1926
Black	.81	.77	.66	.92	([3])	([3])
Full-time, year-round workers, total	.65	.62	.66	.70	.2324	2385
Race:						
White	.64	.60	.65	.68	.2024	.2089
Black	.82	86	.79	.81	([3])	([3])
Education (years completed):						
Less than 12	.65	.60	.65	.74	.2250	.2170[4]
12–15	.65	.62	.65	.71	.2558	.2560
16 or more	.71	.63	.78	.77	.2852	.3261
Age (in years):						
25–34	.74	.73	.73	.75	([3])	([3])
35–44	.60	.55	.64	.65	.2349	.2578
45–54	.64	.55	.65	.76	.2214	.2181
55–64	.61	.54	.62	.68	.2937	.2756

[1] Ratio of median female to male 1975 annual earnings weighted by occupational size for given demographic characteristic.
[2] Significant at .01 level unless otherwise noted.

[3] Refers to correlations which are not significant at the .05 level.
[4] Significant at .05 level.

and discrimination will presumably have some effect on the earnings of the younger cohort as it ages.

With respect to education, the sex-earnings ratios are lower in male-than female-dominated occupations at all levels of education. This suggests that the advances in educational attainment of women have not yet had much impact in increasing their earnings opportunities in the more highly paid, male-dominated occupations. However, these issues require a more detailed investigation.

Study conclusions

In using occupations as the units of analysis, the findings indicated that the percentage of women in detailed occupations was positively related to the male-female earnings differential. That is, when women made up only a small proportion of the workers in an occupation, their earnings were much lower than those of their male counterparts. Only in the heavily dominated and comparatively low-paying, female-dominated occupations did the earnings of women even come close to those of men. While the data for blacks was an exception to these patterns and warrants additional examination, the relationships generally held, regardless of occupational status, even when full-time, year-round workers were disaggregated into various categories in terms of age and education. These controls for worker and job characteristics are crude and further research will take into account more of the factors that might affect the relationship of occupational sex segregation to earnings. However, the findings presented here support the notion that occupational sex segregation has a

negative impact on female earnings, thereby contributing to the persistence of male and female earnings differentials. □

———FOOTNOTES———

[1] Janice N. Hedges and Earl F. Mellor, "Weekly and hourly earnings of U.S. workers, 1967–78," *Monthly Labor Review*, August 1979, pp. 31–41. Their data show that the earnings of women fluctuated around 60 percent of those of men through the period 1967–78. Current Population Survey data for the first quarter of 1980 show that women employed full time earned 63 percent as much as men. This inconclusively suggests a trend toward improvement in the relative earnings of women.

[2] Valerie K. Oppenheimer, *The Female Labor Force in the United States*, Population Monograph No. 5 (Berkeley, University of California Press, 1970), Donald J. Treiman and Kermit Terrell, "Women, Work and Wages—Trends in the Female Occupational Structure Since 1940," in Kenneth C. Land and Seymour Spilerman, eds., *Social Indicator Models* (N.Y. Russell Sage, 1975) pp. 157–199.

[3] For 1969 data, see Francine Blau, "Women's Place in the Labor Market," *American Economic Review*, May 1972, pp. 161–166. The 1979 figure was calculated from the annual average data in *Employment and Earnings*, January 1980, table 23.

[4] Francine D. Blau and Wallace D. Hendricks, "Occupational Segregation by Sex: Trends and Prospects," *Journal of Human Resources*, spring 1979, pp. 197–210.

[5] Briefly, it has been suggested that women select employment in female-dominated occupations which permit work discontinuity but at the expense of the specialized training and work experience which tend to be required in the more highly paid, male occupations. In addition, barriers in the form of stereotyping on the part of employers and outright discrimination prevent the entry of women into the more highly paid, male jobs and restrict them to employment in typical female jobs. Explanations of the lower earnings in female occupations range from the "crowding" of women into few jobs to the fact that female occupations are typically in the lower-paying secondary sector of employment, while male occupations are more commonly in the high-paying primary sector. For discussions of these issues see Oppenheimer, *The Female Labor Force;* Francine Blau and Carol Jusenius,

"Economists' Approaches to Sex Segregation in the Labor Market: An Appraisal," *Signs*, Spring 1976 Supplement, pp. 181–199, Francine Blau, "Women's Place," and Steven D. McLaughlin, "Occupational Sex Identification and the Assessment of Male and Female Earnings Inequality," *American Sociological Review*, December 1978, pp. 909–921.

⁶ For exceptions see, Andrea H. Beller, "Occupational Segregation by Sex: Determinants and Changes," paper presented at the Annual Meeting of the Population Association of America, (Denver, Colorado, April 1980) and Teresa Amott, "Mechanisms of Occupational Segregation: Some New Empirical Evidence," paper presented at the Eastern Economic Association Meetings (Montreal, Canada, May 1980).

⁷ Otis Dudley Duncan, "A Socioeconomic Index of all Occupations," in Albert Reiss, ed., *Occupations and Social Status* (N.Y., Free Press, 1961), pp. 139–161. This study uses the index recomputed for 1970 Census detailed occupations from David L. Featherman, Michael Sobel, and Peter Dickens, "A Manual for Coding Occupations and Industries into Detailed Socioeconomic and NORC Prestige Scores," Working Paper 75–1 (University of Wisconsin — Madison Center for Demography and Ecology, 1975).

⁸ In computing the weights, some of the race, age, and education groups had occupations without observations, for example, there were no medical and osteopathic physicians with less than 12 years of education.

In addition, occupations with fewer than 2,000 employees of either sex were excluded. These excluded occupations were based on at most two or three observations and tended to have extreme sex-earnings ratios, for example, less than .20 or greater than 1.50. This procedure excludes at most 10 percent of all workers with earnings in 1975.

Hence the weights are based on the number of persons employed in the following number of occupations for each demographic group:

	Number of occupations
All workers	277
Race:	
White	270
Black	129
Full-time, year-round workers	234
Race:	
White	227
Black	95
Education:	
Less than 12 years	124
12–15 years	187
16 years or more	106
Age:	
25–34	172
35–44	151
45–54	146
55–64	107

⁹ Categories of female, male, and neutral occupations have typically been defined by selecting an arbitrary percentage point spread of 5, 10, 15, or 20 points around the female proportion of total employment. See, for example, Carol L. Jusenius, "Occupational Change, 1967–71," Chapter 2 in *Dual Careers: Longitudinal Study of Labor Market Experience of Women, Vol. 3* (Columbus, Center for Human Resource Research, 1975), and McLaughlin, "Occupational Sex Identification."

While these researchers both used a 10-percentage-point spread, this study uses the more stringent 20 percentage points to define the limits of male and female occupations. Given that 39.9 percent of the work force was female in 1975, this results in the following categories of occupational sex segregation: female occupations (40+20) or 60 percent or more female, male occupations (40–20) or 20 percent or less female, neutral occupations form the remainder or 21 to 59 percent female.

¹⁰ Age may be viewed as a very rough proxy for work experience, because direct measures of work history are not available from the Survey of Income and Education and indirect measures — such as age minus years of education minus 6 — were not calculated for this research.

Wives' earnings as a factor in family net worth accumulation

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Over the last decade, the dramatic increase in the proportion of married women who are in the labor force has had a profound impact on both the family and the economy. By March 1979, the labor force participation rate of married women was 49.4 percent — up nearly 9 percentage points since 1970.[1] The earnings of wives often allow their families to enjoy a higher level of living than that provided by husbands' earnings alone. In 1978, for example, median income among families in which both husband and wife were employed was $22,109, compared with the $15,796 reported for families of wives who did not work outside the home.[2] In many cases, the additional earnings have lessened the inroads that inflation has made on family purchasing power.[3]

Previous research[4] has shown that wives' labor force participation tends to be higher when husbands' income is relatively low, indicating that economic need is a major influence on wives' employment. Although labor force participation is still greater among wives of men at the lowest earnings levels, the largest increase in recent years has been among those whose husbands are in the upper earnings ranges.[5] There is evidence that income distribution between working-wife and nonworking-wife families has become more unequal over the years,[6] and increased labor force participation among wives of high earners could further widen the differential.

Of particular interest to many concerned with the effects of married women's employment is whether the pattern of consumption and saving in a family in which the wife works differs from that in a family in which the same amount of money is earned by the husband alone. This question is significant because the family's allocation of its human and material resources affects its economic well-being and ultimately its quality of life.

The purpose of this study is to explore the relationship between a wife's earnings and family net worth accumulation. Do working-wife and nonworking-wife families have comparable net worth, given similar composition and income, and to what extent do earnings affect net worth? Because the labor force participation rate of married women is predicted to increase, the relationship between a wife's earnings and net worth accumulation should be clarified.

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Theoretical background

A wife's employment is not without cost. Part of her earnings may have to be used to purchase goods and services she formerly provided at home, such as cooking and child care. An additional portion may also be claimed by transportation and other job-related expenditures. These factors may account for previous findings that, other things being equal, working-wife families have higher consumption-to-income ratios than non-working-wife families.[7]

Family goals also greatly influence the use of financial resources. Among these goals is improvement in the level of living—the quantity and quality of goods and services consumed. Another goal is financial security, or the assurance that resources will be available to meet future needs. During a particular period, a family may use its total current income to meet consumption needs and enhance its level of living, or it may choose to save some of this income to increase net worth and financial security. Similarly, assets may be liquidated and the proceeds used to increase or maintain current consumption, or they may be held in reserve to provide for financial security.

Methodology

Data underlying this study of the impact of wives' earnings are from the 1967 and 1972 National Longitudinal Surveys of Labor Market Experience, conducted by the Ohio State University Center for Human Resources Research under contract to the U.S. Department of Labor, and relate to the cohort of mature women (age 30 to 44) in mid-1967.[8] The initial multistage probability sample of 5,083 women was drawn by the Census Bureau in 235 areas of the United States to represent the Nation's noninstitutionalized mature female population at the time of data reference.[9] For purposes of this study, that sample was further refined to include only those respondents who were married for the first time prior to 1967 and who resided with their husbands during the 1967–72 period. In addition, each respondent must have provided information on all characteristics of interest in this research. Despite these eligibility criteria, the net sample size of 807 is quite large compared with those used in other studies of the allocation of family financial resources.

It should be noted here that economic and social changes took place after this sample was drawn which might significantly alter the results of the following analysis. For example, the sharp increase in married women's labor force participation over the last decade probably reflects a different mix of reasons why women work. At the same time, inflationary pressures may have considerably changed the distribution of family income between current consumption and net worth accumulation. And finally, the appreciation of housing since 1967 would make homeownership a much more important factor in explaining the stock of and change in family net worth.

Dependent variables

In the cross-sectional analyses of the relationship between wife's earnings and family net worth, the dependent variable of interest was family net worth in 1967 and 1972. Data for 2 years were analyzed because of the recent changes in the social and economic roles of American women. As previously indicated, intervening events during the period covered by the study could mean that variation in 1972 net worth was the result of factors different from those affecting 1967 net worth.

Net worth was determined by subtracting a family's total liabilities from its total assets. Assets used in the computation of net worth were:

Savings and checking accounts
U.S. savings bonds
Stocks, bonds, and mutual funds
Home
Farm
Business
Other real estate

The value of savings and checking accounts was the dollar amount on deposit at the time of the interview, while face value was used in determining the worth of U.S. savings bonds. For remaining assets, current market value was used to assess worth. Liabilities used in the computation included obligations, such as mortgages and back taxes, connected with the ownership of home, farm, business, or other real estate, as well as debt for other goods and services.

In the longitudinal analysis of the effect of wife's earnings on net worth change, the dependent variable of interest—dollar change in family net worth during the 1967–72 period—was computed by subtracting 1967 net worth from 1972 net worth.

Independent variables

The following independent variables were included in the cross-sectional analyses:

Respondent's earnings
Family income
Respondent's occupation, current or last job
Respondent's age
Respondent's race
Respondent's education
Number of family members
Number of years married
Homeownership status
Number of durables purchased in previous year

In addition, the "employment-to-marriage" ratio was included in the 1967 analysis. This ratio consisted of

the number of years in which a respondent worked 6 months or more between marriage and 1967, divided by the number of years married.[10]

Respondent's earnings the major independent variable of interest, was the total of her pretax earnings in the calendar year prior to the survey from wages, salaries, commissions, tips, or operation of her own business. Family income was the total pretax income received from all sources over the same period. In addition to earnings of all family members, these sources included interest, dividends, rent, and social insurance and public assistance payments. Except for homeownership status and race, all independent variables were treated as continuous variables. Homeownership status was a dichotomous variable; nonhomeowners were coded 0, and homeowners, 1. Race was treated as a set of dummy variables based on the categories white, black, and "other"; the latter category was the reference category embodied in the regression constant.

Independent variables employed in the longitudinal analysis of change in net worth were:

> Respondent's earnings (1966)
> Change in respondent's earnings (1966–1971)
> Number of weeks respondent worked between 1967 and 1972 surveys
> Family income (1966)
> Change in family income (1966–1971)
> Net worth (1967)
> Respondent's age (1967)
> Respondent's education (1967)
> Respondent's race
> Number of family members (1967)
> Change in number of family members (1967–1972)
> Change in homeownership status (1967–1972)

Change in homeownership status was a set of dummy variables based on the following categories: (1) non-homeowner 1967 and 1972, (2) nonhomeowner 1967— homeowner 1972, (3) homeowner 1967 and 1972, and (4) homeowner 1967—nonhomeowner 1972. The latter category was the reference category. Except for race, which employed the same measurement used in the cross-sectional analyses, the remaining independent variables were treated as continuous variables.

Multiple regression model

In each analysis, independent variables were entered into an initial stepwise multiple regression model which was then refined to include only those variables which would collectively have the greatest impact on net worth or change in net worth. An independent variable was left in the final model if it explained at least 1 percent of total variance in the dependent variable or if it had a zero-order correlation coefficient of ±.25, indicating a moderate degree of association with the dependent variable. A variable was also included in the final model if mandated by conceptual considerations, as in the case

of respondent's earnings. To facilitate comparisons between the two cross-sectional analyses, variables which met any criterion in one analysis were automatically included in the other.

Results of cross-sectional analyses

The final multiple regression model explained 29.7 percent of total variance in 1967 net worth and 25.5 percent in 1972. As tables 1 and 2 show, the relative importance of factors influencing net worth varied somewhat between the 2 years. In both analyses, family income made by far the greatest contribution to explained difference in net worth, although the variable's contribution was substantially less in 1972 than in 1967. B values indicate that for each additional dollar of family income, net worth was $1.98 higher in 1967 and $1.51 higher in 1972. It should be noted that a family's net worth at any time is, in large measure, a result of past saving behavior. Current income may be influential because it reflects a relatively high past income which allowed saving to occur and thus, net worth to increase.

Although much smaller than that of family income, the second greatest contribution to total variance in both analyses was made by homeownership status. The amount contributed to explained variance by this variable was greater in the 1972 study. Families who were homeowners in 1967 had net worth positions $5,914 higher than nonhomeowners, but in 1972, homeownership was associated with an $11,227 differential.

Respondent's earnings were not significant in explaining variance in 1967 net worth. The moderately high zero-order correlation coefficient of .23, however,

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Table 1. Multiple regression of selected variables on 1967 net worth

[Sample size = 807]

Independent variables	Coefficient of determination[1] (R²)	Variable contribution to final coefficient of determination (ΔR²)	Coefficient of correlation (r)	[2]b
Family income	.274	. . . .	.52	[3]1.98 (0.15)
Respondent's earnings	.276	.002	.23	−0.26 (0.23)
Respondent's education	.276	. . . .	.22	−112.91 (219.75)
Homeownership status	.296	.020	.27	[3]5,913.76 (1,253.51)
Race — white	.297	.001	.19	−3,563.36 (3,411.93)
Race — black			−.22	−3,292.08 (3,571.99)

[1] Each entry represents the contribution to the ratio of explained variation to total variation in net worth made by the associated variable and those variables which precede it.
[2] Partial regression coefficient, in dollars. Each b value indicates how much a one-unit change in the independent variable affects net worth when the effects of other independent variables in the multiple regression model are controlled. Standard error of the estimate is shown in parentheses.
[3] Significant at the .01 level.

Table 2. Multiple regression of selected variables on 1972 net worth

[Sample size=807]

Independent variables	Coefficient of determination[1] (R²)	Variable contribution to coefficient of determination (ΔR²)	Coefficient of correlation (r)	[2]b
Family income	.196	...	.44	[3]1.51 (0.15)
Respondent's earnings	.209	.013	.11	[3]-1.09 (0.29)
Respondent's education	.218	.009	.26	[4]709.66 (337.06)
Homeownership status	.247	.029	.28	[3]11,226.90 (2,101.83)
Race—white	.255	.008	.25	-8,186.60 (5,101.72)
Race—black			-.28	[4]-12,923.94 (5,323.97)

[1] Each entry represents the contribution to the ratio of explained variation to total variation in net worth made by the associated variable and those variables which precede it.
[2] Partial regression coefficient, in dollars. Each b value indicates how much a one-unit change in the independent variable affects net worth when the effects of other independent variables in the multiple regression model are controlled. Standard error of the estimate is shown in parentheses.
[3] Significant at the .01 level.
[4] Significant at the .05 level.

indicates that net worth, in the absence of other factors, was greater among working-wife families. A fairly high degree of association found between respondent's earnings and family income (r = .51) suggests that the effect of the former variable may have been indirect. It was determined that without a respondent's earnings, total income among working-wife families would have been substantially below that of nonworking-wife families in both 1966 and 1971. The fact that a working wife's contribution increased family income substantially appears to have had an important influence on net worth position in 1967. It seems that the amount, not the source, of family income was relevant in determining the level of net worth.

In 1972, however, respondent's earnings did make a statistically significant contribution to total variance in net worth. Although there was a slight positive zero-order correlation between respondent's income and net worth, when other factors were held constant, there was a weak negative association. For each additional dollar earned by a respondent in 1971, net worth in 1972 was lower by $1.09. As in the previous analysis, it appears that the influence of a wife's earnings was indirect, increasing the financial resources available for strengthening net worth position.

The negative relationship is not inconsistent. Given two families of equal income and composition, a lower saving-to-income ratio, and thus lower net worth, would be expected in the family in which a wife earns a portion of this income. One explanation for the lower saving-to-income ratio is increased job-related expenditures and more frequent substitution of market goods and services for household production. These factors

would reduce discretionary income available for saving, relative to that of a nonworking-wife family. Another explanation is that the economic hazards of unemployment, death, and disability would be less in a family with more than one earner. Therefore, a working-wife family may feel less need to increase its financial security.

Factors influencing net worth change

The greatest influence on net worth change was exerted by the family income variables. As table 3 illustrates, both dollar change in family income and 1966 family income were positively associated with the dependent variable. It would appear that, among these families, the goal of financial security was sufficiently strong for at least a portion of any income increase to be allocated to net worth accumulation. Because 1966 family income had a fairly high zero-order correlation (r = .52) with 1967 net worth, its influence on net worth change may have been due to its being a proxy for initial net worth. Other factors being equal, families with high levels of income in 1966 probably experienced increased net worth accumulation relative to those at

Table 3. Multiple regression of selected variables on dollar change in net worth, 1967-72

[Sample size=807]

Independent variables	Coefficient of determination (R²)[1]	Variable contribution to final coefficient of determination (ΔR²)	Coefficient of correlation (r)	b[2]
Change in family income, 1966-77	.039	...	.20	0.74[3] (0.13)
Family income in 1966	.069	.030	.17	0.63[3] (0.16)
Change in homeownership status:				
Nonhomeowner in 1967 and 1972			-.18	1,961.11 (3,824.66)
Nonhomeowner in 1967, homeowner in 1972	.089	.019	-.01	6,930.07[4] (3,917.87)
Homeowner in 1967 and 1972			.17	8,219.29[3] (3,592.01)
Change in respondent's earnings, 1967-72	.091	.002	.02	-0.71[3] (0.31)
Total weeks worked	.092	.001	.05	14.21 (8.49)
Respondent's earnings in 1966	.095	.003	.07	-0.62 (0.37)

[1] Each entry represents the contribution to the ratio of explained variation to total variation in net worth made by the associated variable and those variables which precede it.
[2] Partial regression coefficient, in dollars. Each b value indicates how much a one-unit change in the independent variable affects net worth when the effects of other independent variables in the multiple regression model are controlled. Standard error of the estimate is shown in parentheses.
[3] Significant at the .01 level.
[4] Significant at the .05 level.

lower levels because of subsequent appreciation of assets which comprised 1967 net worth.

Homeownership also had a positive influence on the dependent variable. Families who were homeowners in both 1967 and 1972 or who became homeowners by 1972 experienced increased net worth compared to families who were homeowners in 1967 only.

Of the remaining variables, only change in respondent's earnings was significant in explaining net worth change. Controlling for the effects of other factors uncovered a negative association; for each additional dollar increase in respondent's earnings change in net worth was $.71 less. These findings indicate that in two families experiencing similar income increases, net worth accumulation was lower in the family in which the wife's earnings accounted for part of this change than in the family in which the wife made no monetary contribution. Again, factors such as increased job-related expenditures, substitution of market goods and services for household production, or preference for improvement in standard of living over financial security in working-wife families could account for these findings. It should be noted that change in respondent's earnings and change in family income had a moderately strong positive zero-order association (r = .38). This finding would indicate that by increasing the level of family income available for saving, change in respondent's earnings may have had an indirect positive influence on change in net worth.

Implications

Findings clearly indicate that the absolute amount of family income, rather than its sources, was the most important factor in determining the extent of net worth accumulation among sample families. Without a wife's earnings, however, income among working-wife families would have been appreciably lower than that of nonworking-wife families. Thus, a wife's earnings were important because they increased the family income available for transformation into both an improved level of living and increased financial security.

As noted earlier, the trend toward increased labor force participation among women whose husbands are at the highest earnings levels could increase the income inequality between working-wife and nonworking-wife families. Although they would have more time available for household production and leisure than working-wife families, this increased income inequality would most likely be reflected in a lower level of living among nonworking-wife families. Research findings of a positive association between level of family income and net worth accumulation suggest that, in the future, working-wife families should also have more favorable net worth positions and increased financial security compared to nonworking-wife families.

————FOOTNOTES————

[1] Beverly L. Johnson, "Marital and family characteristics of the labor force, March 1979," *Monthly Labor Review*, April 1980, p. 48.

[2] *Money Income of Families and Persons in the United States: 1978*, Current Population Reports, Consumer Income, Series P-60, No. 123 (Bureau of the Census 1980), p. 6.

[3] See, for example, Howard Hayghe, "Families and the rise of working wives—an overview," *Monthly Labor Review*, May 1976, p. 18.

[4] This relationship has been uncovered in a number of studies. For example, see William C. Bowen and T. Aldrich Finegan, *The Economics of Labor Force Participation* (Princeton University Press, 1969); Glen C. Cain, *Married Women in the Labor Force: An Economic Analysis* (University of Chicago Press, 1966); and Jacob Mincer, "Labor force participation of married women: A study of labor supply," in National Bureau of Economic Research, ed., *Aspects of Labor Economics* (Princeton University Press, 1962).

[5] Paul Ryscavage, "More wives in the labor force have husbands with 'above-average' incomes," *Monthly Labor Review*, June 1979, pp. 40–42.

[6] Dong W. Cho, "Working women and family income distribution," *The Collegiate Forum*, Winter 1979, p. 5.

[7] Myra H. Strober, "Wives' labor force behavior and family consumption patterns," *American Economic Review*, February 1977, pp. 410–17.

[8] Previous research in this area includes "Survey of financial characteristics of consumers," *Federal Reserve Bulletin*, March 1964, pp. 285–92; Ruth E. Deacon and Janet A. Krofta, *Economic Progress of Rural Nonfarm and Part-time Farm Families*, Research Bulletin 1976 (Wooster, Ohio, Agricultural Research and Development Center, December 1965); Flora L. Williams and Sarah L. Manning, "Net worth change of selected families," *Home Economics Research Journal*, December 1972, pp. 104–13; Rosemary Walker, *Wife's Hours of Market Work Related to Family Saving Behavior*, Ph.D. dissertation (Purdue University, 1978); and Colien Hefferan, "Saving behavior in multiple earner families," in *Proceedings 25th Annual Conference of the American Council on Consumer Interests* (Columbia, Mo., American Council on Consumer Interests, 1979), pp. 177–78.

[9] For a more detailed description see, *The National Longitudinal Surveys Handbook* (Columbus, Ohio State University, Center for Human Resources, 1976).

[10] This variable was not used in the 1972 analysis because data on the number of years in which a respondent worked 6 months or more between 1967 and 1972 were unavailable.

Occupational earnings in appliance repair facilities

Pay levels for full-time repairers of major electrical appliances typically ranged from $6 to $8 an hour, according to a November 1978 BLS survey of 19 metropolitan areas.[1] In every area where comparisons were possible (except Washington, D.C.), electrical appliance technicians—those servicing white goods such as refrigerators and washers—had higher pay averages than their TV-radio (brown goods) counterparts. The typical pay spread was 5 to 15 percent (see table 1.) In the limited instances where both worked in the same repair facility, brown-goods technicians were commonly paid as much as or more than white-goods repairers. The higher average earnings for the latter, therefore, are partly attributable to a larger proportion of the electri-

cal appliance repairers being in higher paying establishments than TV-radio technicians.

In contrast to job averages, individual earnings varied widely within the same job classification and geographic area. For example, the hourly earnings of the highest paid worker exceeded those of the lowest paid in each classification and area by at least $4.50 in all 19 areas; in many instances, the spread reached $8 or more. Varied earnings primarily result from the predominant methods of pay for repairers—ranges of rates that take into account length of service and informal plans wherein rates are based chiefly on the qualifications of the individual workers.

In the 19 areas combined, about one-tenth of all TV-radio and white-goods technicians received some form of commissions for the sale of maintenance contracts, parts or appliances, in addition to their straight-time earnings. In about seven-tenths of the areas, the proportion of these commissions to straight-time earnings plus commissions commonly averaged under 10 percent. The pay advantage of workers with commissions over those without was more evident for brown-goods than for white-goods repairers. For the latter, the pay edge went to workers without commissions in one-half of the areas compared.

In addition to the employment in the selected occupations at the time of the survey, the study also measured the number of job openings for which firms were actively trying to recruit workers.[2] For full-time, TV-radio technicians, the job vacancy rate was 3 percent in the

19 areas combined; for their apprentices, the rate was 5 percent. Job vacancy rates for full-time, white-goods repairers and their apprentices were 1 and 3 percent, respectively. Despite the low job vacancy rates reported, just over one-third of the establishments visited indicated that one or more service technicians or apprentices would be hired if they applied for a job on their own initiative.

Paid holidays and vacations were provided to the overwhelming majority of full-time workers in all areas. Typical leave provisions were 6 to 10 holidays and 2 to 4 weeks of paid vacation annually, depending upon completed service. Various forms of health, insurance, and pension plans were also available to most full-time repairers.

A comprehensive report, Industry Wage Survey: Appliance Repair, November 1978 (BLS Bulletin 2067), is available from the Bureau or any of its regional offices. Separate releases for the 19 areas listed in table 1 were issued earlier.   □

——————FOOTNOTES——————

[1] The survey covered 16,300 nonsupervisory service workers in 1,771 establishments classified in one of the following industries: electrical repair shops; department stores; retail television and radio stores; wholesalers of appliances, television sets, and radios; and retail appliance stores. Three-fourths of all workers in the survey were employed as technicians or apprentices repairing white or brown goods—the four occupational classifications for which wage and related benefit data were developed.

[2] Job vacancy rates were defined as the number of vacancies as a proportion of employment in the occupation, plus reported vacancies in the facilities visited.

Table 1. Average straight-time hourly earnings[1] of workers in selected occupations in appliance repair facilities, November 1978

| Area | Full-time technicians | |
	TV-radio	Electrical appliance
Atlanta	$6.38	$7.97
Boston	6.64	7.01
Buffalo	6.05	6.84
Chicago	7.66	7.82
Cleveland	7.26	7.75
Dallas-Fort Worth	6.13	6.58
Denver-Boulder	6.34	6.95
Kansas City	6.79	7.18
Los Angeles-Long Beach	7.01	7.82
Memphis	6.60	([2])
Miami	7.22	7.73
Minneapolis-St. Paul	7.01	8.22
Nassau-Suffolk	6.88	7.36
Newark	6.55	7.54
New York	6.37	6.40
Philadelphia	6.94	7.41
St. Louis	7.04	7.64
San Francisco-Oakland	7.54	8.34
Washington	6.94	6.40

[1] Information on wages relates to straight-time hourly earnings, excluding premium pay for overtime and for work on weekends, holidays, and late shifts, as well as commissions paid for the sales of maintenance contracts, parts, or appliances. Premiums paid for licenses held by employees, if any, are included. Incentive payments, such as those based on flat-rate hours, flat-percentages, or other piecework or production bonus systems, and cost-of-living bonuses were included as part of the workers' regular pay. Nonproduction bonus payments, such as Christmas and year-end bonuses, were excluded.
[2] Data did not meet publication criteria.

Pay relationships examined for hospitals and nursing homes

Average hourly earnings of private hospital and nursing home workers differed markedly within the same occupation, according to September 1978 BLS surveys of selected metropolitan areas.[1] At that time, nonprofessional hospital employees typically held a 30 to 50 percent pay advantage over their nursing home counterparts, while professional hospital workers usually averaged from 10 to 20 percent more per hour. (See table 1.) Such pay spreads may be partly attributable to differences in proprietorship status—nine-tenths of all private hospital workers covered by the survey were employed by "nonprofit" establishments compared to three-tenths of the nursing home work force—and to differences in establishment size—hospital employment was concentrated in facilities employing at least 1,000 workers, while nursing homes rarely employed as many as 250 workers. However, despite disparate pay levels, broad earnings ranges frequently resulted in some overlap of the

Table 1. Average hourly earnings differentials for selected occupations, private hospitals and nursing homes, September 1978

[Nursing homes averages=100]

Area	Occupation			
	Professional		Nonprofessional	
	General duty nurses	Licensed practical nurses	Nursing aids	Cleaners
Northeast:				
Boston	118	114	139	135
Buffalo	117	117	121	118
New York	94	88	102	97
Philadelphia	109	110	146	143
South:				
Atlanta	109	106	122	119
Baltimore	112	116	132	127
Dallas-Ft. Worth	107	97	119	116
Houston	110	100	126	107
Miami	126	116	126	121
Washington	113	106	139	136
North Central:				
Chicago	116	118	150	144
Cleveland	121	117	146	136
Detroit	127	120	151	147
Kansas City	111	107	124	116
Milwaukee	97	93	135	125
Minneapolis-St. Paul	106	99	112	117
St. Louis	111	108	130	128
West:				
Denver-Boulder	119	107	131	128
Los Angeles-Long Beach	107	97	137	134
San Francisco-Oakland	121	122	172	168
Seattle-Everett	118	105	128	129

NOTE: Pay relationships are limited to full-time workers; earnings data exclude premium pay for overtime and for work on weekends, holidays, and late shifts, as well as the value of room, board, or other perquisites.

industries' individual earnings within the same occupation.

In the majority of the 23 areas studied, average hourly earnings of hospital workers fell into three distinct ranges. The top range—from about $7.50 to $10 an hour—embraced such professional jobs as clinical specialists, head nurses, and pharmacists. The middle range —$5.50 to $7.50 an hour—included general duty nurses and various types of medical technicians, technologists, and therapists. The lowest rates—$3.50 to $5.50 an hour—usually applied to occupations such as licensed practical nurses and clerical and other nonprofessional jobs.

In nursing homes, average hourly earnings were usually highest for physical therapists—about $7 to $9 an hour—and lowest for most nonprofessional jobs, such as cleaners and food service helpers—usually between $2.90 to $3.20 an hour. General duty nurses, the most populous professional position surveyed, typically reported average hourly earnings from $5.50 to $6.50.

Paid holidays and vacations were provided to virtually all hospital and nursing home workers, although hospital employees were normally covered by more liberal leave plans, that is, 9 paid holidays or more a year and a 4-week vacation after 5 years of service. In addition, health, insurance, and retirement plans were avail-able to at least 90 percent of all hospital workers in almost every area studied, while similar coverage in nursing homes usually fell below 75 percent, and for retirement plans, rarely applied to more than one-fourth of the workers.

A comprehensive report, *Industry Wage Survey: Hospitals and Nursing Homes, September 1978* (BLS Bulletin 2083), is available from the Bureau or any of its regional offices. Separate releases for each area studied were issued earlier. ☐

————— FOOTNOTE —————

[1] The hospital survey covered approximately 1,250 private and State/local government facilities employing about 1.2 million workers in 23 selected metropolitan areas. Excluded were all Federal hospitals and any facility with fewer than 100 workers. The nursing home survey covered about 2,800 private facilities employing 286,000 workers in 21 of the same metropolitan areas. Excluded were nursing homes with fewer than 20 employees.

Occupational pay in drug manufacturing

Weekly averages for biologists, chemists, and engineers ranged from nearly $270 for entry-level chemists to about $650 for highly experienced engineers, according to a first-time Bureau of Labor Statistics survey of drug manufacturing conducted in September 1978.[1] Among the three professional categories surveyed, biologists and chemists had similar average salaries—somewhat below that for engineers at each of six levels of skill and responsibility studied. (See table 1.) Workers in these three jobs accounted for slightly more than half of the 18,000 professionals covered by the survey.

Science technicians, numbering about 4,700 in the industry, generally averaged less than the professionals. Divided into three levels of skills and responsibility, the top level technician averaged $294 weekly; the middle level, $231; and the lowest level, $199. Approximately

Table 1. Weekly pay levels for three professional jobs in drug manufacturing, September 1978

Work level [1]	Average straight-time weekly earnings		
	Biologists	Chemists	Engineers
I	$280.50	$268.50	$340.50
II	328.50	317.00	361.00
III	373.50	377.50	434.00
IV	450.50	466.00	496.00
V	551.00	541.50	570.00
VI	642.50	641.00	653.00

[1] Excluded were workers at higher levels who make decisions and recommendations that are recognized as authoritative and have an important impact on extensive company activities, such as fostering technological breakthroughs and advances. Also excluded were executive and administrative officers. Copies of the job descriptions used in the survey are available upon request.

NOTE: Earnings data exclude premium pay for overtime and for work on weekends, holidays, and late shifts; pay levels are rounded to the nearest half dollar.

two-thirds of all technical workers in the survey were science technicians.

The survey's 54,400 production and related workers averaged $5.81 per hour. About half of these workers were in the Middle Atlantic Region, where the average was $6.42. In the other regions permitting comparison,[2] hourly pay levels were $4.78 in the Southeast, $5.72 in the Middle West, and $5.07 in the Pacific.

Production workers in union plants or in metropolitan areas enjoyed pay advantages over their counterparts in nonunion plants or in smaller communities. However, nationwide differences were influenced by the disproportionate employment of these workers in the high-paying Middle Atlantic region. For example, three-fourths of all union workers were in the Middle Atlantic region. Thus, while the nationwide union-to-nonunion pay advantage was 16 percent, the corresponding differential was 6 percent in the Middle Atlantic. Similarly, a 24-percent pay advantage for metropolitan-area workers nationwide was reduced to less than 1 percent in the Middle Atlantic, where three-fifths of these workers were employed.

Twenty-one occupations, selected to represent the wage structure and production activities, accounted for half the drug industries' production work force. Hourly pay levels in these job categories ranged from $8.14 for maintenance pipefitters to $4.44 for packagers performing hand and machine tasks. The latter category was also the largest studied—almost one-tenth of the production work force. Other numerically important jobs and their averages included machine packagers, $5.27; hand packagers, $4.97; janitors, $5.54; top-level chemical operators, $7.19; and lower-level operators, $5.92. Virtually all production workers were paid time rates; the proportion paid under rate-range plans (75 percent) was the highest among manufacturing industries studied in the BLS occupational wage survey program.

A comprehensive bulletin, *Industry Wage Survey, Drug Manufacturing* (BLS Bulletin 2077) is available from the Bureau or any of its regional offices. Separate locality releases were issued earlier for New York-Northeastern New Jersey, the State of New Jersey, and Los Angeles-Long Beach. □

———*FOOTNOTES*———

[1] The drug manufacturing industries consist of three segments: (1) biological products, such as diagnostic agents, plasma, serums, and vaccines; (2) medicinal chemicals and botanical products, primarily in bulk form; and (3) pharmaceutical preparations. "Pharmaceuticals" is by far the largest of the three, accounting for more than four-fifths of the industries' work force.

[2] Survey coverage was reduced to 84 percent of the nationwide employment in the drug industry because of the unavailability of data from large establishments in the industries that could not be adequately represented by other establishments. Because these nonrespondents were centered in the Great Lakes region, which has about one-fourth of the industries' work force, data for that region could not be shown separately.