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Gender-Based Wage Differentials in Pennsylvania and New Jersey Manufacturing, 1900–1950

PETER PHILIPS

This multiple regression study of women's and men's wages in New Jersey and Pennsylvania manufacturing finds that the average pay gap has changed in favor of women from 1900–1950 in several industries and in the aggregate. Technological homogenization of jobs is suggested as a possible explanation of gender-based wage convergence. An overall framework of forces and relations of production is outlined, and future work on this newly introduced body of data is suggested.

IN a whimsical yet intriguing bit of data digging, Victor Fuchs reports that the shekel price of maidservants in biblical Israel was, by order of the diety, precisely 60 percent that of manservants.¹ A report just released by the National Research Council shows that in 1978 among fully employed workers the average earnings of women equaled 63 percent of the average earnings of men.² Comparisons of widely scattered wage ratios such as these have led to the common belief that women's wages as a percent of men's wages have been constant, at least in the aggregate.

A chief contribution of this paper is to introduce a long-term time series that provides information about gender-based wage differentials on an annual basis for the states of New Jersey (1895–1915) and Pennsylvania (1910, 1916–1950) over the period 1895–1950, for all manufacturing and disaggregated by industry.³ The data set is currently being coded and this preliminary report covers the years 1900–1950 for selected industries. Of these data we ask the question, Has the gap between women's and men's wages narrowed within the confines of product-specific industries and in manufacturing as a whole?

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¹ Victor Fuchs, "Differences in Hourly Earnings Between Men and Women," *Monthly Labor Review* (May 1971), 9–15.

² Donald J. Trieman and Heidi I. Hartmann, eds., *Women, Work and Wages*, National Research Council, National Academy Press (Washington, D.C., 1981), p. 15.

³ These data were collected from the stated years of the *Annual Report* of the secretary of Internal Affairs of the Bureau of Industrial Statistics, Pennsylvania, and the *Annual Report* of the Bureau of Labor and Industry, New Jersey.

A NARROWING PAY GAP BETWEEN WOMEN'S AND MEN'S WAGES

I presuppose a narrowing pay gap in specific industries for two reasons. The lesser reason comes from the expectation that through the process of capitalist development there will be a gradual convergence of the productivity or skill attributes of men and women. This expected convergence of skills, *ceteris paribus*, should push towards a convergence of wages. A greater reason to expect wage-gap narrowing in individual industries such as the ones being studied here is a process of job homogenization associated with technological change. I expect a reduction in the distinctions between women's and men's jobs, especially in mechanically interconnected, gender-mixed jobs, that produce a relatively homogeneous product over time. Such job homogenization would include a convergence of light and heavy work, hand and machine labor, and piece rate vs. time rate jobs. This wage convergence resulting from job homogenization in particular industries would be slowed to the extent that technological change was slow, product innovation was fast, or various attitudinal or societal structures effectively resisted these two forces that pushed towards gender wage-gap convergence. Although testing these hypotheses is beyond the scope of this short report, these presuppositions are the reason that the test for gap-narrowing is posed in terms of the question, Has the average wage of women come closer to the average wage of men, especially in product-specific industries?

To answer this question, 16 regression equations were formulated. Each regression in Table 1 was written as follows. The dependent variable represents average women's wages for the specified industry as a percent of average men's wages in that industry. Only production line workers are considered. To test the question, Has this wage gap narrowed?, the dependent variable was made a function of the available years between 1900 and 1950. The expectation was that this variable's coefficient would be positive and significant in those industries that employed both sexes, that produced a homogeneous product over time, and that were technologically dynamic. The first two issues were controlled for in the selection of industries. Relative technical dynamism is yet to be measured and may require specific industry studies. A payment dummy variable was introduced to adjust for the possible effects of shifting from the weekly data reported by New Jersey to the annual data reported by Pennsylvania. In industries where women's participation rates on an annual basis are less than men's, one would expect, *ceteris paribus*, that the wage gap would be wider in Pennsylvania than in New Jersey. Thus, given the manner in which the dummy was written (Pennsylvania = 1), the expectation was that there would be scattered significant negative coefficients and no significant positive coefficients. A final variable, the aggregate unemployment rate, was

entered to capture the effect of any gender-differentiated layoff pattern through the business cycle. The supposition was that if men and women were treated as different kinds of workers and if technically they could be laid-off differently, a differential layoff and hire-back policy could exist and affect average wages. This variable also tests for the movement, in and out through the business cycle, of firms that have differing gender-based payment patterns. No presupposition about the direction of this affect was assumed. A two-tailed test, therefore, was applied to the significance of this variable's coefficient in contrast to the one-tailed test applied to the other two independent variables.

In discussing the patterns observed in Table 1, let us begin by noting possible underlying processes *not* controlled for in these equations. First, in the aggregate there is no control for shifts in the industrial structure that might alter aggregate patterns while leaving patterns in each industry the same. Second, both in the aggregate and in the chosen industries, no measures of changing skill attributes by sex or gender-based participation rates have been controlled for. These are not "standardized" pay gaps. They are the actual gender-based averages observed in each industry.

What we observe is the following. Based on a one-tail test at the 5 percent level of significance, 7 of the 14 selected industries show narrowing wage gaps ranging from 0.2 to 0.7 percent per year while the

TABLE 1
PENNSYLVANIA AND NEW JERSEY, ALL MANUFACTURING AND SELECTED
INDUSTRIES, 1900-1950

| Industry | R ² | N | Year | Unem- | | Payment | | DW | |
|-----------|----------------|----|------|-------------------|----------|--------------------|-------|--------------------|-------------------|
| | | | | t | ployment | t | Dummy | | |
| Shoes | .70 | 33 | .003 | 5.38 ^a | .002 | 2.14 ^b | -.007 | -.44 | 1.33 ^c |
| Shirts | .68 | 34 | .007 | 8.42 ^a | .000 | 0.19 | -.117 | -4.89 ^a | 2.17 |
| Cigars | .67 | 32 | .000 | -.01 | .003 | 1.02 | .247 | 5.38 ^a | 1.90 |
| Silk | .55 | 34 | .005 | 6.23 ^a | .025 | 1.98 | -.131 | -5.50 ^a | 2.09 |
| Hats | .49 | 31 | .006 | 3.87 ^a | .008 | 3.63 ^b | -.101 | -2.45 ^a | 2.23 |
| Elect. | | | | | | | | | |
| Machinery | .18 | 34 | .002 | 1.77 ^a | .003 | 1.69 | -.019 | -.56 | 1.89 |
| Rubber | .12 | 30 | .002 | 1.86 ^a | .001 | 0.70 | -.086 | -2.61 ^a | 2.60 ^c |
| Cutlery | .12 | 32 | .004 | 2.51 ^a | .000 | 0.16 | -.078 | -1.58 | 2.14 |
| Carpets | .14 | 33 | .000 | -.16 | .003 | 2.21 ^b | .029 | .94 | 1.57 |
| Hosiery | .14 | 32 | .001 | 0.55 | -.006 | -2.83 ^b | .000 | -.001 | 1.34 ^c |
| Food | .04 | 33 | .002 | 1.30 | .000 | 0.05 | -.028 | -.98 | 1.13 ^c |
| Corsets | .04 | 34 | .002 | 1.13 | -.004 | 1.82 | -.007 | -.17 | 2.30 |
| Paper | .06 | 34 | .001 | 0.61 | .000 | -.10 | .003 | .07 | 1.82 |
| Woolens | .05 | 32 | .000 | -.20 | .001 | 0.51 | .032 | .76 | 1.85 |
| All Manf. | .32 | 50 | .002 | 2.71 ^a | .002 | 1.91 | -.094 | -4.74 ^a | 1.44 |

^a Significant at the 5 percent level, one tail test.

^b Significant at the 5 percent level, two tail test.

^c In the uncertainty region regarding serial correlation at 1 percent.

Dependent variable is average women's wages divided by average men's wages.

Source: New Jersey and Pennsylvania Bureau of Labor Statistics *Reports*.

remainder of industry time coefficients are mostly positive but not significant. None are significantly negative. The aggregate equation for all manufacturing also reflects the gap-narrowing pattern. The relatively moderate pace in the aggregate may reflect the combined effects of summing different industry patterns and shifting industry weights within the overall structure of manufacturing.

Based on a two-tailed test at the 5 percent level of significance, six industries showed a relationship between the measured pay gap and the aggregate employment rate. Silk just missed the cut-off point, and the aggregate equation for all industries also just missed significance based on a two-tail test at the 5 percent level. Three more industries had t statistics for the unemployment rate of over ± 1.00 . I believe a cyclical measure more attuned to specific industrial cycles would reveal that the majority of industries, at least in this period, laid off men and women differentially. I also believe that a better cycle-layoff measure would eliminate the serial correlation problems found in 5 of the 17 equations reported.

The payment pattern dummy variables, with the exception of cigars, emerged as expected, showing significant negative coefficients in five industries and negative but insignificant coefficients in six industries. The cigar industry is an interesting case where the wage gap is constant in New Jersey and constant but higher in Pennsylvania. Some sensitivity to the unemployment rate appears in both states. A possible explanation worth investigation is that in New Jersey in the 1900 to 1915 period, cigars were rolled by hand with the use of skilled male labor, while in Pennsylvania in the next period cigars were machine- or form-rolled, reducing the employment of male craft labor. If this were so, then the cigar equation despite its appearance may reflect the homogenization-of-jobs process hypothesized for other industries.

Thus if the data are to be believed, over the period 1900–1950 the gap between average women's and men's wages narrowed in the aggregate of manufacturing industries. It also narrowed in some but not all industries that employed women.

One question of interest is whether the phenomenon measured in the New Jersey-Pennsylvania data can be observed elsewhere. The equation in Table 2 shows wages for fruit and vegetable canning drawn from a variety of sources and covering scattered years spanning the period 1865–1974, but with only one case after 1948.⁴ No unemployment variable has been introduced because of the time span (1865–1974) covered. The payment dummy variable distinguishes weekly from daily (or hourly) wages. Despite the eclectic and intermittent character of these data, the results are quite similar both in magnitude and significance to ones found from the New Jersey-Pennsylvania data set. This

⁴ For sources and data see, Peter Philips, *Towards A Historical Theory of Wage Structures*, unpublished Ph.D. Thesis (Stanford University, 1980).

TABLE 2
FRUIT AND VEGETABLE CANNING, CALIFORNIA (1865-1974)

| | R^2 | N | $Year$ | t | $Payment$ $Dummy$ | t | DW |
|---------|-------|-----|--------|-------------------|----------------------|--------------------|------|
| Canning | .57 | 28 | .003 | 6.16 ^a | -.057 | -1.73 ^a | 1.47 |

^a Significant at the 5 percent level, one tail test.

Dependent variable is average women's wages divided by average men's wages.

Source: See footnote 4.

compatibility of results gives me considerable confidence that a real phenomenon is being observed and that it holds true for at least the pre-1950 period.

PRODUCTION LINE AND OFFICE WORKERS

Table 3 shows two regressions testing time trends in gender-based wage differentials. Again general patterns are confirmed and, interestingly, the convergence of pay gaps appears to be twice as fast on the production-line compared to office-plus-salaried personnel. Assuming it to be true, one might say that this result reflects male office workers maintaining a human-capital-stock differential relative to female office workers while the skills of production-line workers converged. Such a process would be compatible with the proposition that technology over time homogenizes the skill requirements of mechanically interconnected jobs, but does not force such a convergence as quickly between disconnected jobs such as secretaries and salesmen.

The process we are observing is complex, and I do not wish to reduce it merely to a matter of technological changes. The beginnings of a general framework will be suggested in the next section. For the moment the following remark is sufficient. The pay-gap convergence is slow, geologically slow, and however slow it may be on the production line, it is twice as slow in the office. The question then is, What contending forces account for the definite but snail's-paced convergence of women's and men's wages in manufacturing?

A TURNING POINT

Gender-based wage differentials are nothing less than a reflection of the ongoing relationship between women and men in our society within

TABLE 3
PRODUCTION LINE AND OFFICE PLUS SALARIED PERSONNEL (1916-1950)

| | R^2 | N | $Year$ | t | $Unemp.$ | t | DW |
|------------|-------|-----|--------|-------------------|----------|-------------------|-------------------|
| Production | .28 | 36 | .002 | 3.04 ^a | .002 | 2.35 ^b | 1.08 ^c |
| Office | .10 | 35 | .001 | 1.93 ^a | .001 | 1.10 | 1.68 |

^a Significant at the 5 percent level, one tail test.

^b Significant at the 5 percent level, two tail test.

^c In the uncertainty region regarding serial correlation at 1 percent.

Dependent variable is average women's wages divided by average men's wages.

Source: New Jersey and Pennsylvania Bureau of Labor Statistics Reports.

the context of, and in interaction with, the drives of a developing capitalist economy. The matter is therefore complex and requires specific historical examinations for its elucidation. From a theoretical standpoint one may expect countervailing forces. At the level of technology and within a certain process of proletarianization, one may expect forces pushing towards the homogenization of labor and gender-based wage convergence. This force towards homogenization of labor, however, will be resisted by a variety of prevailing social relations and attitudes rooted in the family, in certain types of unions, in societal attitudes, and in some employer policies. Although this resistance does not reduce to a narrowly defined notion of market discrimination, its ability to counteract the forces of technological homogenization of jobs and the convergence of skills possessed by women and men probably accounts for the evident slowness in gap-narrowing recorded here.

Still the possibility exists of a turning point in the rate at which convergence is taking place. For if the above speculations are correct, then we are viewing a phenomenon that fits nicely into a framework of contending forces and relations of production, with various technical forces gradually eroding existing relations of production, in this case the wage relation between women and men. At some point a rapid change in the relations between women and men, as reflected in the gap between average gender-based wage differentials, may be expected to take place. This leads to some final thoughts about clarifying hypotheses and further work.

WHAT IS TO BE DONE?

Much remains to be done. Analytically the guiding objective should be to identify the forces pushing for and resisting pay-gap convergence and to assess their cumulative strength and systemic connections. On an empirical level, we may ask, Does the observed movement up to 1950 continue to the present and, if so, at what rate? How can the technological-homogenization hypothesis be specified either quantitatively or through comparative descriptive studies of industries? What accounts for the three gender-based layoff patterns attributable to different industries? What has been the role of unions in determining the pace of this gap-narrowing over the period studied? What has been the effect of employer policy—has it been dominated by divide-and-conquer tactics reinforcing gender division, or has it largely sought to hire the cheapest qualified laborer regardless of sex? What has been the interplay between gradual wage convergence at the workplace and the structure of the attitudes emerging from the family regarding gender roles? Is pressure accumulating for discrete and rapid change, or will average women's wages equal average men's wages in manufacturing only in the year 2200, as these straight-line equations indicate?