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THE ATTAINMENT OF PAY EQUITY BETWEEN THE SEXES BY LEGAL MEANS: AN ECONOMIC ANALYSIS

George E. Johnson* and Gary R. Solon**

During the past few years there has been considerable discussion of proposals to increase the equity of the compensation system in the United States. Why, many people have asked, should society tolerate a system in which different workers with virtually identical productive characteristics—education, training, experience, and the like—receive very different wage rates? In particular, is it right for women to be paid less than men who appear to make roughly equal contributions to the output of the economy? The disturbing fact is that the ratio of women's to men's earnings has remained at approximately sixty percent throughout the postwar period.¹ Although this figure is a misleading representation of the extent to which women are discriminated against in the labor market because it fails to adjust for differences in hours worked and several other important factors discussed below, the fact remains that there has been little discernible progress in the relative labor market status of women despite the passage in the mid-1960's of far-reaching civil rights legislation.² Whether the Equal Pay Act of 1963³ and Title VII of the Civil Rights Act of 1964⁴ have been poorly enforced or were addressed to the wrong problems, these laws do not appear to have had a substantial impact on the underlying problem. This has led to new proposals, most notably comparable worth, to "do something" about the inequity of the present compensation system.

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1. For a thorough analysis of trends in the sex-earnings differential, see O'Neill, *The Trend in the Male-Female Wage Gap in the United States*, J. LAB. ECON., Jan. 1985, at S91 (Supp.).

2. *Id.*

3. 29 U.S.C. § 206(d) (1982).

4. 42 U.S.C. §§ 2000e to 2000e-17 (1982).

Some of the roughly forty percent average pay disparity between men and women can be explained by factors that most people would agree are justifiable. Numerous studies using microdata—observations on individuals rather than group averages—have attempted to decompose the average wage difference between men and women into the part attributable to differences in productivity characteristics and the remainder that is considered to be due to labor market discrimination of one sort or another.⁵ Although these studies are somewhat imperfect because of data limitations, they suggest that about half of the forty percent gap can be explained by “nondiscriminatory” variables, principally the average difference between men and women in the ratio of actual to potential labor market experience. None of the economywide studies finds that there is a zero economywide earnings gap between the sexes even after adjustment for all available relevant variables.

The purpose of this Article is to present an analysis of the gap between men’s and women’s wages with particular emphasis on the likely effects of various existing and proposed legal remedies. Part I sets out a simple “ideal” statistical model of wage determination. Its purpose is to identify carefully the potential impact of alternative legal remedies such as the Equal Pay Act, Title VII, and proposed policies like comparable worth. This model is ideal in the sense that, although it could be estimated in principle, there is no data set currently available with which it could actually be estimated. Part II explores the impact of these various legal remedies on individual organizations, because each existing or proposed remedy would be implemented on an organization-by-organization basis rather than on an economywide basis. Part III addresses the empirical dimensions of the problem raised by the comparable worth movement—the average wage disparity between “men’s jobs” and “women’s jobs.” We initially offer a range of estimates of the potential impact of comparable worth on the average male-female wage gap in the United States based on the assumption that there would be no secondary effects on employment, relative prices, and other wage levels. This assumption is lifted in Part IV, which discusses the adjustments that organizations affected by comparable worth or other laws would make in their employment of different types of labor, the

5. See, e.g., Corcoran & Duncan, *Work History, Labor Force Attachment, and Earnings Differences Between the Races and Sexes*, 14 J. HUM. RESOURCES 3 (1979); Oaxaca, *Male-Female Wage Differentials in Urban Labor Markets*, 14 INT’L ECON. REV. 693 (1973).

associated wage rates, and their product prices. Consideration of these secondary effects implies that legal interventions designed to improve the relative labor market status of women might have very different effects from those expected under the zero-adjustment assumption of Part III.

I. A COMPLETE MODEL OF WAGE DETERMINATION

The specification of a comprehensive model of the determinants of individual wage rates provides a useful starting point for a systematic analysis of the potential impact of different antidiscrimination policies. We will specify a very general "earnings function" in which the wage rate per unit of time is considered a function of several sets of explanatory variables, that is

$$(1) W = W(PC, LOC, J, E, MON, R, S, L),$$

where the sets of variables represent the following:

PC: personal productivity characteristics, such as education, training, experience, and ability

LOC: locational description, such as region, city size, and the like

J: particular job held by individual

E: employer

MON: monopoly factors, such as member of union, public employee, and the like

R: race of individual

S: sex of individual

L: luck, or any other random elements, not related to the other explanatory variables, that influence W.

The earnings function may be written in linear form as

$$(2) W = aPC + bLOC + cJ + dE + eMON + fR + gS + L,$$

where the different sets of parameters (a, . . . , g) represent the effects of the sets of explanatory variables on wages. It is convenient to define $\ln W$ as the natural logarithm of the wage rate, so that changes in any one of the elements of the sets of explanatory variables affect the predicted wage of each individual pro-

portionately rather than absolutely. For example, if S is specified as a dummy variable for males—that is, its value is one for men and zero for women—the estimated value of g indicates the proportionate wage advantage of men relative to women. If the estimated value of g were .20, this would imply that, holding other things (personal characteristics, . . ., race) constant, men on average earn $\exp(.20) - 1 = 22.1\%$ more than women.

The model embodied in equation (1) can be employed to analyze the potential impact of various antidiscrimination policies. First, however, it should be pointed out that no one has ever estimated a model as comprehensive as this because no real world data set contains all the variables that can be considered to influence wages. In the PC (personal productivity characteristics) set, for example, our hypothetical data set would have measures of motivation and individual ability that are almost never available to researchers. In many data sets, in fact, years of actual labor market experience are proxied by years of potential experience (age minus years of school completed minus six). Because women tend to have less actual experience per year of potential experience than do men, due to different life cycle patterns of labor force attachment, estimates of g (the proportionate earnings advantage of men) based on these data sets are biased in an upward direction. Our hypothetical data set, however, is free of any problems associated with “omitted variables.”

The second interesting feature of the earnings function model is that it can be used to decompose the average difference in the wages of men and women into portions attributable to differences in the average values of each of the different sets of characteristics. Let $D(W)$ be the difference between the average logarithm of the wage for men and that for women. Thus, if, for example, women’s hourly wages averaged two-thirds of men’s, $D(W)$ would take the value of approximately $\log(1.5) = .405$. Similarly, let $D(PC)$, $D(LOC)$, etc. represent the differences between the average values for men and women of the various sets of explanatory variables used in equation (2). It therefore follows that the difference in average log wages is given by

$$(3) D(W) = aD(PC) + bD(LOC) + cD(J) + dD(E) + eD(MON) + fD(R) + g.^6$$

6. The luck variable (the random error term) is assumed to be uncorrelated with sex so that $D(L) = 0$.

The value of $aD(PC)$ reflects the effect of differences in personal productivity characteristics on $D(W)$, and past estimates, such as those of Corcoran and Duncan, have attributed roughly half of $D(W)$ to differences in the average values of personal productivity characteristics that can be observed.⁷

Another variable shown to have a significant impact on $D(W)$ is the MON variable. Specifically, the impact of union membership status on the logarithm of wages has been estimated to be about .20 during the latter 1970's,⁸ when average union membership was about thirty percent for men and fifteen percent for women.⁹ Thus, the effect of unionism on the proportionate wage advantage of men is estimated to be $.20 * (.30 - .15) = .03$, or about eight percent of the average wage gap.

Two things that most empirical studies of wage determination do *not* control for are the detailed job and employer of the individual. This is important in assessing the efficacy of existing civil rights legislation and the potential of proposals such as comparable worth. The Equal Pay Act of 1963, for example, was designed to prevent sex differences in wages *within particular jobs within particular firms*. To assess whether or not there is general compliance with the Equal Pay Act, one would have to run a full version of the model embodied in equation (2); that is, the regression equation would have to include a variable for each employer represented by an individual in the sample. If the E variables were not included, a large estimate of g might very well reflect that the average male is employed by an organization that pays higher wages than the organization employing the average female. This may be considered a bad thing, but it does not reflect violation of the Equal Pay Act.

The second set of variables usually omitted in empirical studies of women's and men's wages are those referring to the detailed job performed by the individual (the J variables). To the extent that job categories held predominantly by women, like

7. See Corcoran & Duncan, *supra* note 5. The literature stresses that one way discrimination against women occurs is that women are rewarded less for some characteristics than are men. To take account of this, a rather complicated procedure known as the Oaxaca decomposition, developed in Oaxaca, *supra* note 5, is used to obtain a good estimate of g . We will assume that if the estimated coefficients for men and women in an analysis of our hypothetical data set were different from one another—and that, of course, is an open, unanswerable question—the decomposition represented in equation (3) would reflect the appropriate Oaxaca adjustment.

8. G. JOHNSON & G. SOLON, PAY DIFFERENCES BETWEEN WOMEN'S AND MEN'S JOBS: THE EMPIRICAL FOUNDATIONS OF COMPARABLE WORTH POLICY 26, Table I (Institute of Public Policy Studies, University of Mich., Discussion Paper No. 254, 1986).

9. *Id.*

secretaries, librarians, and nurses, systematically earn less, other things (PC, LOC, etc.) held constant, than job categories held primarily by men, like truckdrivers, engineers, and medical doctors, the omission of the J variables (a one-zero dummy variable for every detailed occupation) will produce a higher estimated coefficient on the dummy variable for men. As with the omission of the E variables, this will provide an upward biased estimate of the parameter g , which is supposed to represent the extent to which men performing the same job within the same organization are overpaid relative to women, or women are underpaid relative to men. Indeed, the fact that women's jobs tend to be associated with lower compensation levels than men's jobs is the motivation behind the push for comparable worth.¹⁰ Parts III and IV say more about the quantitative dimensions of this problem.

Title VII of the Civil Rights Act of 1964 was designed to assure all qualified applicants equal access to jobs in all organizations covered by the legislation. This raises the thorny question of how much of the differential "explained" by differences between men and women in job category and employer attachment, $cD(J) + dD(E)$ in equation (3), represents voluntary choices by women as opposed to exclusionary practices by employers. To the extent that the difference between the sexes in the distributions of J and E represents exclusion rather than choice, the coefficient on the male dummy variable in a regression like equation (2) with J and E excluded would reflect the potential of full enforcement of Title VII, along with the Equal Pay Act, for reducing the sex gap in wage rates. On the other hand, women may *on average* have different preferences than men for certain characteristics of jobs and employers; for example, a smaller fraction of women than of men might prefer high-paying jobs as coal miners to low-paying jobs as secretaries. To the extent that such preference differences are responsible for sex differences in occupation and employer, estimates of g with J and E omitted tend to overstate the potential impact of Title VII.

10. COMMITTEE ON OCCUPATIONAL CLASSIFICATION AND ANALYSIS, NATIONAL RESEARCH COUNCIL, WOMEN, WORK, AND WAGES at ix (1981) [hereinafter NRC REPORT].

II. THE IMPACT OF PAY EQUITY ON AN INDIVIDUAL ORGANIZATION

It is instructive to illustrate the operation of the rather abstract model of wage determination set out in Part I by studying the potential impact of various pay equity measures on a hypothetical organization. Because wage determination in the United States is decentralized, any laws, including the existing ones, must be enforced on an employer-by-employer basis. How a particular organization would be affected by a change in the legal environment is thus of considerable importance.

The hypothetical firm is Schwine and Son Wholesale Furniture, Inc. (S&S) of Toledo, Ohio. The company purchases household furnishings in large quantities from manufacturers who ship the merchandise to the Schwine warehouse; Schwine then fills orders from furniture retailers who pick up the merchandise at the warehouse. There are 237 employees at S&S, including the President and founder, Rudolph Schwine, and the Vice-President for Operations, Larry Schwine, Rudolph's son. The employment and annual salary distributions by each of the five major job categories are shown in table 1.

Table 1

Employment and Salary Structure at Schwine
& Son Wholesale Furniture, Inc., August 1985

Job	Number of Employees			Salary (\$000's)		
	Total	Men	Women	Entry	Max.	Average
Clerical	100	5	95	12	16	14
Warehouse	100	95	5	15	19	17
Sales	15	14	1	20	50	33
Supervisory	20	15	5	20	36	28
Management	2	2	0	40	70	55

The major function of the clerical job category is to make and take orders by phone and to record all transactions on the company computer. Warehouse workers unload incoming items, ranging from small appliances to couches and refrigerators, from trucks and boxcars, move them to the appropriate area in the warehouse, and then fill orders by loading them onto retailers' trucks. Sales workers travel to retail stores in the Greater Toledo area to induce retailers to deal with S&S rather than other

wholesalers. The supervisory job category involves supervising the activities of the clerical and warehouse workers.

Ninety-five of the 106 women employees at S&S, or ninety percent, are employed as clericals as compared to just four percent of men employees. There is no union representation at S&S, and Rudolph Schwine states that he sets compensation levels for the different job categories so as to balance employee retention and motivation against the need to keep down labor costs. "I pay what I have to," Schwine once said, "but no more." The annualized labor cost, neglecting fringe benefits, is \$4,265,000.

The average annual salary of women at S&S is \$14,800 as contrasted with men, exclusive of the Schwines, whose average annual salary is \$20,100. This represents an average disparity of \$5,300 or a 35.8% wage advantage for men, a 26.4% wage disadvantage for women. We now ask what the potential is for alternative antidiscrimination laws to improve the status of women at S&S.

First, application of the Equal Pay Act to S&S would not be very promising. The slight disparity between the average salaries of men and women employed as clericals is fully explained by the fact that the five males in this category have, on average, several more years of tenure with the company than do the ninety-five females. For warehouse workers, the average salaries of men and women are virtually identical. The sole woman on the sales force took that position five months ago and receives the same salary as three males with similar seniority. The average salary of the five women supervisors is less than that of the fifteen men supervisors, but S&S justifies this on the grounds that the competitive salary level for supervisors of clericals, which includes all five of the women, is less than the competitive salary of supervisors of material handlers, which includes ten of the fifteen men. Supporting this defense is the fact that the five male clerical supervisors earn roughly the same as their female counterparts.

Second, S&S could be attacked because it has not hired many women in the higher paying jobs in the company, indicative of a possible Title VII violation. Indeed, in 1977 two investigators from the Equal Employment Opportunity Commission discussed hiring practices with Schwine and announced that there was ample prima facie evidence indicating Title VII violations. Schwine and his attorneys never heard anything about this again. Schwine argued in 1977, and Larry would be prepared to so argue again in 1987, that the occupational structure at S&S re-

flects that women applicants generally express a strong preference for clerical as opposed to materials movement jobs in the warehouse despite the difference in remuneration. Further, any clerical worker can apply for a warehouse job or a promotion to supervisor whenever there is a vacancy. "Hell," said Schwine, "they don't *want* to move over to the warehouse, and our supervisors are promoted from the ranks on a competitive basis. I would defend every damned decision we've made." The sex distribution of the sales force is more of a problem for S&S. Schwine's attorneys advised him that his defense on this—"No retailer in Maumee is ever going to buy twenty refrigerators from a woman salesman!"—would not fly in court. In any event, possibly because the target population is too small to involve a large potential judgment or settlement, there is no legal action pending against S&S at the present time.

Existing equal opportunity legislation will therefore be unlikely to have a significant effect on firms like S&S, even though there is a large gap between the wages of men and women in these companies. To do anything about the economywide wage differential by sex, society has to do something about the individual Schwines. One possibility would be to pass a bill requiring that each firm adhere to a set of automatic affirmative action guidelines (AAAG). The AAAG law would require that each employing unit must prove that it hires women in each of its job categories at least in proportion to a certain specified set of quotas as determined by experts in the United States Office of Automatic Affirmative Action (OAAA). The simplest quota would be the fraction of all workers who are women, currently about .44,¹¹ across *all* occupations. A more interesting possibility for setting quotas would be based on an attempt to estimate what the sex distribution of jobs would be if there were no discrimination.

Application of AAAG to Mr. Schwine's company would mean that S&S would have to alter its work force to meet whatever quotas are set by the OAAA for the four nonmanagerial job categories or be subject to whatever fine is established for noncompliance. Suppose that the quotas were set for the clerical, warehouse, sales, and supervisory job categories at, respectively, .60, .35, .40, and .40. Presumably each organization in the economy would be given a fairly long period of time to meet these quotas; otherwise, each firm would have to fire large numbers of male

11. COUNCIL OF ECONOMIC ADVISERS, 1986 ANNUAL REPORT, in ECONOMIC REPORT OF THE PRESIDENT 13, 290 Table B-32 (1986).

employees with an attendant—perhaps lethal—disruption in production. This means, essentially, that all vacancies in the warehouse, sales, and supervisory job categories over the next several years would have to be filled by women.

A program like AAAG is not going to take hold in the United States political system. If only a relatively small number of business firms were subject to its provisions, these firms would be driven out of business by firms that did not have to follow AAAG. If its provisions covered a large portion of the labor market, there would be a political revolt on the part of the majority of the adult population that would be hurt by its provisions. We thus turn to an alternative policy, comparable worth, that, although not yet enshrined in law, has received a great deal of legislative and judicial attention.

Under comparable worth, the sex-neutrality of wages and salaries within each organization would be subject to assessment by "job evaluation" procedures. Under these procedures, each job within an organization would be assigned points in each of several dimensions such as skill requirements, responsibility, effort, and working conditions, and these scores would somehow be aggregated to an overall index of the job's worth. If it appeared that the employer systematically paid lower wages in predominantly women's jobs than in predominantly men's jobs with similar total scores, the employer would be in violation of the law and would be required to increase pay in women's jobs.

Now consider what the existence of a law establishing comparable worth would mean to our exemplary organization, S&S. Assume that comparable worth were established as an amendment to the Equal Pay Act so that its strictures would be applied on a case-by-case basis rather than automatically as in our hypothetical AAAG. The slogan underlying the amendment would be "equal pay for jobs of comparable value" rather than "equal pay for equal work."

The most obvious target of opportunity at S&S is the \$3,000 average pay disparity between the clerical and warehouse job categories. Suppose some attorneys take on the case for the plaintiffs, the "class" of 100 clerical workers at S&S. The plaintiffs' attorneys hire the firm of Job Experts Limited (JEL) to perform job evaluations of the two relevant job categories to obtain an objective, scientific measure of the relevant contribution of each to the output of S&S. JEL proceeds to rank each of the jobs with respect to four characteristics: (a) training requirements and intellectual demands, (b) responsibility and necessary individual judgment, (c) physical exertion required, and (d) poor

working environment. The scores, from 0 to 100, on each of these four characteristics are then averaged, assigning equal weights to each of the four characteristics, to provide an overall score for each job. If the compensation level for each job category is related in a nondiscriminatory manner to its contribution to the production of the firm, JEL argues and is prepared to so testify in court, relative average compensation levels will be in proportion to their scores in the job evaluation. As can be seen in table 2, JEL's analysis of S&S concludes that the contributions of the two job categories are approximately equal and that, therefore, clerical and warehouse workers at S&S ought to be paid according to the same compensation scheme.

Table 2

Results of Job Evaluation of Clerical and Warehouse
Job Categories at Schwine and Son by Job Evaluation
Limited and Amendments by Defense Associates

Results	JEL Results			DA
	Clerical	Warehouse	Weight	Weight
(a) Training	60	89	.25	.36
(b) Responsibility	60	5	.25	.11
(c) Physical	3	84	.25	.33
(d) Environment	15	40	.25	.20
Clerical Average	34.50			32.19
Warehouse Average	34.25			39.15
Warehouse/Clerical	0.993			1.216

Schwine's attorneys, having deposed the JEL experts, hire their own independent experts, a group from Defense Associates (DA). The DA group, after a lengthy—and rather costly—analysis, concludes that there is nothing wrong with the scores assigned by JEL to each characteristic for the two job categories. They do, however, disagree strongly with JEL's assumption that each of the four characteristics are equally important determinants of relative contribution. DA proposes, instead, an alternative set of weights, shown on the right hand side of table 2, that they argue are justified in the job evaluation literature and by several studies conducted by DA staff. Interestingly, the DA experts point out, *their* results suggest that the average salary of warehouse workers relative to that of clerical workers

should equal 1.216 as compared to its actual value of $17/14 = 1.214$.

This case is likely to go to court, and its outcome will depend on which set of experts the judge believes, as well as, of course, on his or her predisposition on the comparable worth question. There is no "scientific" way to resolve which set of experts is the more correct because proponents of comparable worth have acknowledged that job evaluation procedures are "inherently judgmental."¹² Their principal application with respect to comparable worth is to provide some justification for raising pay levels for women's jobs relative to men's jobs.

Assume that S&S loses this case and is directed by the judge to increase the salaries of its clerical workers by an average of \$3,000 so that their disparity with the warehouse workers is eliminated. What would Schwine do? Would women workers, at S&S and in the Greater Toledo area generally, be better or worse off? Part IV returns to these and related questions.

III. EMPIRICAL ESTIMATES OF THE POTENTIAL IMPACT OF COMPARABLE WORTH

This Part provides some evidence about the potential impact of a hypothetical law that attempts to increase the equity of the United States compensation system by removing the differential in pay between men's and women's jobs. In terms of Part II, we assume that the comparable worth law applies to all employers in the economy and that the plaintiffs always win and the Schwines always lose. Further, we assume that employers make no adjustments after comparable worth is put into effect—specifically, that the higher wages they have to pay workers in women's jobs have no impact on wages in men's jobs or on relative employment levels and prices. Both of these assumptions are unrealistic; unless comparable worth were set up to work automatically, there would be ample room for judgment on the part of the legal system—the Schwines would sometimes win—and, as Part IV will point out, there *would* be very significant wage and employment effects.

Under these assumptions, the potential impact of comparable worth on the average gap between the wages of men and women can be approximated by the negative of the differential effect of femaleness of job on the male wage advantage. Suppose that in-

12. NRC REPORT, *supra* note 10, at 96.

stead of including a dummy variable for each occupation (the J variables) in equation (2) we include a single variable F , which stands for the fraction of all workers in that occupation who are women. The value of F varies from less than one percent, for firefighters, plumbers, and the like, to ninety-nine percent, for secretaries, housekeepers, and the like. To the extent that the wages of women's jobs are, other things equal, less than those for men's jobs, we would expect that the coefficient of F in an empirical earnings function would be negative. This should be true for both men and women.¹³

The linear version of this modified wage function is given by

$$(4) W = mF + aPC + bLOC + dE + eMON + fR + gS + L,$$

where, given that W is entered in logarithmic form, m represents the proportionate difference between wages in a completely female job ($F=1$) and a completely male job ($F=0$). The actual implementation of an equation like (4), of course, must be on the less than perfect data sets that are available to researchers. The resultant estimates of the relevant parameters, in particular m and g , are biased, but, alas, they are the only available estimates.

A variety of estimates of the m parameter based on microdata from the May 1978 Current Population Survey are presented in table 3.¹⁴

13. The five male clerical workers at S&S earn less than the 95 male warehouse workers. The female warehouse workers earn more than clerical workers.

14. The Current Population Survey is a monthly household survey conducted by the U.S. Bureau of the Census. Our data from the May 1978 survey contain observations on 24,056 men and 19,412 women. For more detail on the data base and estimates, see G. JOHNSON & G. SOLON, *supra* note 8.

Table 3

Estimates for Men and Women of the Proportionate
Effect of Femaleness of Occupation on Wages With
Alternative Adjustments for Other Factors

Adjustments	Men	Women
(a) none	-.343	-.244
(b) full	-.168	-.090
(c) limited	-.176	-.085
(d) limited (less schooling and experience)	-.233	-.093
(e) full (with 48 industry variables)	-.160	-.068
(f) limited (with 48 industry variables)	-.157	-.057

Variables in full model (underscored variables are included in limited model):
PC: schooling, experience (and its square), part time, marital status, children

Occupational Characteristics: educational development, vocational preparation, required strength, physical demands, job environment, fraction part time

LOC: region, city size

R: black, other race

E: 20 industry variables (or 48 industry variables)

MON: union membership and representation, public employee

The equations on which these estimates are based were estimated separately for men and women because several of the coefficients clearly differed by sex. Three sets of facts are contained in these parameter estimates. First, it is true for both men and women that wages are lower in women's than in men's jobs.¹⁵ For example, for the case in which no adjustments are included—that is, W is related only to F—the estimated value of m is -.343 for men. This implies that for men the estimated ratio of the wage in a completely male job to an almost completely female job is $\exp(.343) = 1.409$, or, for men, women's jobs pay 29.0% less than men's jobs. For women, the men's job/women's job wage ratio is 1.276, or women's jobs pay 21.7% less than men's jobs.

The second fact is that the magnitude of the effect of F on W is greater for men than for women. This is true for all variations of the model with different included control variables, and, indeed, the magnitude of the effect for men relative to women becomes greater when the number of included control variables is increased.

15. The estimated standard errors of the various estimates of m range from .013 to .016, so the effect is highly significant in a statistical sense.

The third fact is that the negative relation between W and F falls as more control variables are added to the regression equation. Moving from no control variables, (a), to a full set of controls, (b), the estimated ratio of the wages of men's to women's jobs falls from 1.409 to 1.183 for men and from 1.276 to 1.094 for women. Notice that instead of a full set of variables on the individual's employer, this data set (like all other similar data sets) only permits the inclusion of industry control variables.¹⁶ These industry variables, it turns out, are responsible for the majority of the reduction in the absolute values in the estimated m 's for men and women. Moreover, moving from the inclusion of twenty industry dummy variables to the inclusion of forty-eight industry variables (from (b) to (e) and from (c) to (f)) reduces the estimated impact of F on W still further. We suggest that the absolute magnitudes of the estimates of m would be reduced still further if we could include a proper adjustment for each individual's employer rather than simply the industry in which the individual is employed.

If the estimated coefficients on F had been roughly the same for men and women, the task of estimating the initial impact of comparable worth on $D(W)$, the proportionate wage advantage of men over women, would be rather straightforward. The mean value of F is .21 for men and .71 for women, so the difference between men and women in the mean value of this variable is $D(F) = -.50$. If the m for both sexes were, say, $-.15$, the contribution of the differential effect of femaleness of job to the male-female wage gap would be $(-.15) * (-.50) = .075$. This would mean that a comparable worth law that was applied throughout the economy and had no secondary effects would eliminate .075 of the gross male wage advantage, which was equal to .411 in the 1978 Current Population Survey sample, or eighteen percent of the gap.

It turns out, of course, that we cannot assume that m is the same for men and women; its absolute value is significantly greater for men than for women in all specifications of the model reported in table 3. To know how comparable worth would affect the wage structure and the economy, it is necessary to understand *why* we get the consistent result that femaleness of job lowers the wages of men more than it lowers the wages of women. The most plausible explanation we can think of is that high-paying firms pay premiums in certain, primarily male job

16. The industry variables are 20 dummy variables indicating in which industry the individual works: mining, construction, durable goods manufacturing, etc.

categories to attract workers with low turnover rates. Because women have higher average turnover rates than men,¹⁷ these firms are less likely than lower paying, high-turnover firms to hire women in these positions. On average, then, women in an occupation with a large proportion of males earn less relative to males in the same occupation than do women in an occupation with a large proportion of females. The argument does not apply in reverse to males in occupations with a large proportion of females, for employers gear their work and supervisory patterns in these jobs to the expected work pattern of women. This argument, which is not "proven" but, rather, merely consistent with the second fact mentioned above, does imply a greater penalty to the average man taking a job held primarily by women than to the average woman doing the same thing.

If this explanation, or a related variant of it, is the reason for the sex difference in the estimated values of m , it is straightforward to show that the initial impact of comparable worth on the male-female wage differential is bracketed by the estimates obtained by using the coefficients of W on F for men and for women. For the full model, the (b) estimates in table 3, the effect of comparable worth is seen to be between $.090 * .5 = .045$ and $.168 * .5 = .084$.¹⁸

The remaining question concerns which adjustments in earnings in table 3 are appropriate. This is equivalent to the question of which variables employers would be allowed to use for determining pay under comparable worth. If they would have to base pay primarily or solely on job characteristics, rather than worker characteristics, then the results from the limited specifications are more relevant. On the other hand, if "worker characteristics regarded as legitimate compensable factors" also were allowed, as recommended in a National Research Council report,¹⁹ the full specifications might be more relevant. In any case, it is clear that whatever form comparable worth eventually takes it will be administered on an employer-by-employer basis rather than on an economywide, industrywide, or areawide basis. Thus, inferences about the likely initial effects are best based on a model that includes as much detail as possible on the industry in which the individual is employed. Once our most detailed in-

17. See, e.g., Hall, *The Importance of Lifetime Jobs in the U.S. Economy*, 72 AM. ECON. REV. 716, 723 (1982).

18. Demonstration of the result that the "true" effect of comparable worth is bracketed by the estimates from the male and female coefficients is (somewhat tediously) given in G. JOHNSON & G. SOLON, *supra* note 8.

19. NRC REPORT, *supra* note 10, at 86.

dustry variables are included, there is not very much difference between the full and limited specifications in the estimated m 's. In either case, the estimated impact of comparable worth on the male-female wage differential is between about .03 and .08.

These estimates are based on the explicit assumption that comparable worth would effectively cover the entire economy. This would not be true, though, if very small firms were excluded from coverage as they are presently under the Equal Pay Act²⁰ and Title VII of the Civil Rights Act.²¹ Further, moderately small firms, although formally subject to comparable worth, might be effectively uncovered because the affected classes might be too small to motivate plaintiffs and/or attorneys to undertake litigation. Finally, if the comparable worth law were worded as ambiguously as its precursors, some noncomplying firms would win their cases, which would further reduce the law's impact.

IV. LONG RUN IMPLICATIONS OF COMPARABLE WORTH AND OTHER PAY EQUITY LEGISLATION

The results in Part III are based on the explicit assumption that comparable worth would have no impact on relative product prices, the wages of other types of labor, that is, for men's jobs, or relative employment demand in organizations affected by the law. This is, in fact, an unrealistic assumption, and this Part investigates the impact of comparable worth and other fair employment laws in a longer run context.

First, consider the impact on S&S of a victory by the plaintiffs in the hypothetical comparable worth suit discussed in Part II. S&S's total wage costs of \$4.3 million are increased by \$300,000—\$3000 per clerical worker times 100 employees in that category—or by seven percent. Obviously, Schweine will be forced to make some adjustments in the production process of the company. Larry Schweine has been trying for some time to get his father to agree to an order system that makes use of a centralized computer. Schweine Senior has rejected this on the grounds that "my girls can do better than that (expletive deleted) computer any day." Upon the loss of the comparable worth case, Larry immediately shows Papa that the company can reduce its clerical work force to just fifty of the original one

20. 29 U.S.C. § 203(s)(1)-(2) (1982).

21. 42 U.S.C. § 2000e(b) (1982).

hundred as long as they hire five computer operators, and that this move would, in the long run, save S&S \$175,000 per year.

Another possibility is that S&S will no longer be able to compete in the wholesale furniture business and will have to close. This will depend upon whether the competition also has been forced to abide by the new comparable worth law. If the other firms in the industry are not forced to raise their clerical wages, they will have a price advantage over S&S whether or not the Schwines decide to "automate."²²

In either event, at least some, and possibly all, of the incumbent clerical workers at S&S are going to lose their jobs and will be forced to seek employment elsewhere. Many other organizations in the Toledo area—the Jeep plant, the Lucas County government, and several other large employers—have also been forced to raise the wages of their clerical workers and have made the appropriate employment adjustments, so there are *a lot* of people looking for clerical jobs in the area and, because comparable worth is a national program, throughout the country. Many firms and industries, of course, are not covered by the law, and they find that, because of the new availability of clerical workers displaced from covered employment, they are able to hire all the clerical workers they want at lower wages than they used to pay. Further, many new firms that offer to sell businesses clerical services have sprung up. These firms are careful not to have any men's jobs so that there is no obvious comparison group necessary for a successful comparable worth suit. They are able to offer clerical services to large firms affected by comparable worth at a price much lower than what it would cost the firms to produce these services with their own (overpriced) labor.

It is straightforward to set out an economic model that investigates the effect of comparable worth on the average wage rates for women's jobs, both absolutely and relative to the wages of men's jobs. There are several directions that one can take in this sort of endeavor, but the basic elements of the problem are contained in the following very simple model. Suppose that there are three jobs in the economy. Jobs 1 and 2 are both women's jobs, in the sense that most of them are held by women, and job 3 is the men's job. Prior to the imposition of comparable worth, the wage rates of both jobs 1 and 2 are equal to sixty-five percent of the wage for job 3, the men's job, which is, arbitrarily,

22. If Larry's original proposal had been profitable before the unfavorable court decision, S&S—and the competition—would have put it in place already.

equal to one hundred. We will also assume that the total level of employment in the women's jobs is forty-five and that the employment level in job 3 is fifty-five. This corresponds to the relative proportions of men and women in the labor force. The level of real GNP due to labor services—that is, net of capital and other factors of production—is thus equal to $65 * 45 + 100 * 55 = 8425$.

Now consider the imposition of a comparable worth law that covers job 1 but not job 2. Assume that the initial level of employment in both jobs 1 and 2 is 22.5, so that the law effectively covers fifty percent of employment in women's jobs. We will assume that comparable worth increases the wage of job 1 to .75 of the wage of job 3 from the initial ratio of .65.²³ What would happen to the wages and employment levels in the three jobs and to the level of GNP as a result of the imposition of comparable worth? First, assume that the level of GNP is determined by an aggregate production function with the employment levels of the three different jobs described above. This production function has a constant elasticity of substitution between the three labor inputs, which will be referred to as s . The larger the value of s the more readily employment of one type of labor can be substituted for each of the other types. The demand for each of the three types of labor depends negatively on its real wage level and also depends on the wage levels of the other two kinds of labor. The absolute own wage elasticity of labor demand is greater the higher the assumed value of s .

The second key assumption of the model is that the total supplies of labor to both women's jobs (jobs 1 and 2) and the men's job (job 3) are fixed. This means that any changes in the wage rates of the three jobs caused by the imposition of comparable worth is assumed to have no impact on either the aggregate labor force or the fraction of the labor force that chooses to work in the two women's jobs versus the men's job. There are several ways in which this assumption could be altered,²⁴ but simulation results based on the simplest assumption are of considerable interest.

These simulation results are shown in tables 4 and 5:

23. This corresponds to a value of m of -.143.

24. For example, the fraction of the labor force seeking women's jobs could be assumed to depend positively on the ratio of the *average* wage of the two women's jobs to the wage of the men's job.

Table 4

Impact of CW (as Described in Text) on GNP,
Employment Levels, Wage Rates, and Average
Wage Level for Women's Jobs

	GNP	N1	N2	W1	W2	W3	AV
(a) Initial	8425	22.5	22.5	65.0	65.0	100.0	65.0
(b) Free Lunch	8650 +2.7%	22.5	22.5	75.0 +15.4%	65.0	100.0	70.0 +7.7%
(c) s=.5	8411 -0.2%	20.9 -7.1%	24.1	74.8 +15.0%	56.7 -12.8%	99.7 -0.3%	65.1 +0.1%
(d) s=1	8398 -0.3%	19.5 -13.3%	25.5	74.8 +15.0%	57.2 -12.0%	99.7 -0.3%	64.8 -0.3%
(e) s=2	8379 -0.6%	16.9 -24.9%	28.1	74.8 +15.1%	58.0 -10.8%	99.7 -0.3%	64.3 -1.1%
(f) s=5	8344 -1.0%	11.0 -51.2%	34.0	74.9 +15.2%	59.7 -8.1%	99.8 -0.2%	63.4 -2.4%

Table 5

Changes in GNP and Its Distribution in Response
to CW for Alternative Elasticities of Substitution

Change in Income of:

Substitution Assumption	GNP	= Job 1	Job 2	Job 3
(b) None	.0267	.0267	0	0
(c) s=.5	-.0017	.0242	-.0237	-.0022
(d) s=1	-.0031	.0226	-.0237	-.0020
(e) s=2	-.0055	.0196	-.0233	-.0018
(f) s=5	-.0097	.0129	-.0213	-.0013

The initial values of GNP, the employment levels in the two women's jobs (N1 and N2), the three wage rates (W1, W2, and W3), and the average wage of the two women's jobs (AV, which is weighted by the employment levels of the two jobs) are given in row (a) of table 4. Row (b) shows what happens to these variables on the assumption that comparable worth is a free lunch, i.e., the law has no impact on employment levels and other wages. W1, the wage of the covered women's job, increases by 15.4% to 75, and the average wage of women's jobs increases by 7.7% to 70. The increase in the real wage bill for holders of job 1 is equal to .0267 of the pre-comparable worth level of GNP. Because payments to the three types of labor must equal GNP at-

tributable to labor services, the free lunch assumption implies that GNP must rise by 2.7%. However, because employment levels in the three jobs are assumed to be constant in the free lunch calculation, this scenario obviously cannot happen. Only Democrats before 1980 and Republicans after 1980 can make something from nothing.

Rows (c) through (f) of tables 4 and 5 show the effects of comparable worth for different assumed elasticities of substitution when employers are free to make appropriate adjustments. For the low value of s (row (c)), 7.1% of the initial holders of job 1 are forced to transfer to job 2. Those initial holders of job 1 who are sufficiently lucky to retain their jobs experience a 15.0% wage increase, but other holders of women's jobs, those initially in job 2 and those who lost job 1, incur a 12.8% wage reduction. With $s = .5$, the average wage of all holders of women's jobs rises slightly, and the wage of the men's job falls by a little more than AV rises. For higher values of s , however, AV falls both absolutely and relative to W3.

The reduction in GNP associated with comparable worth is fairly small as compared with its redistributive impact. For $s = 1$, for example, GNP falls by 0.3%—about \$12 billion in 1985 terms. The real incomes of holders of men's jobs and of all holders of women's jobs also fall by 0.3%. The important effect of comparable worth is a redistribution of income from workers in the women's job 2 to those who are lucky enough to obtain a covered women's job. The size of this transfer is much larger (by a factor of about eight) than the aggregate efficiency loss. This general result—that the major effect of comparable worth is to transfer income *between* women rather than from men to women workers—is quite insensitive to the assumed elasticity of intrafactor substitution in the economy.²⁵

It could be argued that the "real world" effect of comparable worth on the absolute and relative earnings of women would be more favorable than is implied by the results of our simple model. First, many noneconomists might dispute our assumption that all or even a majority of organizations would react to the higher relative wages for their women's jobs by substituting machinery and other types of labor for women's jobs. This is, of course, an empirical question, and we would argue that there is a

25. The available empirical evidence on the size of the substitution elasticity in the United States suggests that it is larger than one but finite, probably between 1.5 and 2. For a survey of this topic, see Hamermesh & Grant, *Econometric Studies of Labor-Labor Substitution and Their Implications for Policy*, 14 J. HUM. RESOURCES 518 (1979).

great deal of evidence against the notion that organizations—including governments and nonprofit institutions—are insensitive to relative prices when they make employment decisions. Further, the availability of the “out-sourcing” option would tend to make many women’s jobs more price sensitive than other types of labor in organizations.

A second criticism might center on our assumption that the supply of labor to women’s jobs would not be affected by the law. It is, in fact, not clear what would be the effect of altering this assumption. On the one hand, women who do not receive “good” women’s jobs—that is, jobs in organizations effectively covered by comparable worth—might choose to take men’s jobs or drop out of the labor force rather than accept a “bad” women’s job—that is, a job in an organization not covered by comparable worth. This would reduce the negative impact of comparable worth on wages in uncovered women’s jobs and would also, to a limited extent, reduce the average wage in men’s jobs. On the other hand, the best outcome for someone who wanted a women’s job prior to the imposition of comparable worth is to receive a high-paying women’s job. If there is sufficiently high turnover in these jobs, many people will queue for them and take temporary low-paying women’s jobs in the meantime. Indeed, if comparable worth did increase the average wage of women’s relative to men’s jobs, a larger fraction of both women and men would probably decide to train for women’s jobs. If, as is more likely, comparable worth had a negative impact on the relative attractiveness of women’s jobs, the resultant training decisions would lessen the negative relative wage impact of comparable worth.

It should be pointed out that other antidiscrimination policies, such as a more vigorous enforcement of Title VII or the hypothetical AAAG program discussed in Part II, may be subject to similar dismal conclusions concerning their long-run impact. Consider, for example, an economy in which there are two types of jobs, job A, which requires very little employer-specific training, and job B, which requires a great deal of such training. Abstracting from other aspects of jobs—their educational requirements, nonpecuniary attributes, etc.—employers will obviously attempt to hire people for job B who can be expected to remain on the job for a long time. If, on the contrary, an organization trained applicants who were likely to quit after a relatively short stay with the firm, its costs would be higher than if it were careful to train only applicants who could be expected to exhibit a low rate of labor turnover. Now assume that the expected num-

ber of years that any job applicant will stay with the firm is related to some function of observable characteristics that we shall call the applicant's "score." This would be related to his or her education and training, previous job history, and the like. Assume also that, given identical scores, women have shorter expected job attachment duration than men, or at least that employers believe this to be so. Given this assumption, a cost-minimizing organization will obviously require a higher minimum score for the women it hires to train for job B than for men.²⁶ If it did not practice this form of "statistical discrimination" (and, for example, set the same hiring requirements for both sexes) and if women indeed have shorter average job duration than men with the same score, a nondiscriminating organization would incur higher costs than its discriminating competitors. In a competitive situation, it would be driven out of business; if the organization were a government agency, it would be labeled as inefficient and its function recommended by the Grace Commission for contracting out to the private sector.

Given the practice of statistical discrimination in this simple but very relevant model, if employers are correct in expecting shorter job duration for women, then the economy *does* operate at maximum efficiency. It is, however, not a "fair" outcome in the sense that women whose scores are equal to or a little above the cutoff for men are relegated to the lower paying job A rather than the higher paying job B. Further, because women receive a lower return on characteristics that raise their scores into the marginal range, they will have less incentive than men to acquire these characteristics. This tends to exacerbate sex differences in occupation which, of course, provide the underlying motivation for the comparable worth movement.

Now consider the vigorous enforcement of Title VII of the Civil Rights Act in the context of this model. It would now be illegal for any organization to set different hiring standards for men and women. This means that the cutoff score to be hired into job B would be lowered for women and raised for men with the obvious result that more women and fewer men would enter the higher paying occupation. This would mean, because of the assumption that women have higher *ceteris paribus* turnover rates, that the aggregate level of GNP would fall to some extent due to the inefficiency caused by the increased training costs made necessary by the increased hiring of women for job B.

26. See Aigner & Cain, *Statistical Theories of Discrimination in Labor Markets*, 30 INDUS. & LAB. REL. REV. 175 (1977).

The gainers from this policy would be the women who would be hired as B's under the new rules but would have been A's without it. Women with low scores (who would be A's both before and after the new policy) and with very high scores (B's in both regimes) and their male counterparts would incur a slight loss in income.²⁷ The big losers would be the men with marginal characteristics who would no longer be eligible to be B's because of the increase in the cutoff score for men. The major difference between the Title VII and comparable worth options is that the big income transfer in the former is from men to women rather than between women in the latter.

CONCLUSION

We have examined several options for increasing the equity of the compensation system in the United States with particular emphasis on comparable worth. Our main concern is with the question of what economic effects a policy would have. Our main points are as follows:

1. Between three and eight percentage points of the thirty-five percent gap between the average wages of men and women is attributable to sex differences in occupation.²⁸ This range represents the maximum potential initial impact of a comparable worth law with universal coverage and compliance and no secondary effects. A comparable worth law of this form would also eliminate violations of the Equal Pay Act, but the available evidence is that these are not quantitatively important.²⁹ In proportionate terms, then, our estimates of the maximum potential initial impact of comparable worth range from eight to twenty-three percent of the current wage gap, which is not, in our view, trivial.

2. The actual implementation of a comparable worth law, assuming it contained enforcement mechanisms similar to those for the Equal Pay Act and Title VII of the Civil Rights Act, would not be comprehensive. This means that the wages of women's jobs in some organizations would be increased, but this would reduce employment in women's jobs in such organizations and would lower wages for women's jobs in organizations not effectively covered by the law. The effect of comparable worth on

27. Their loss is similar to the fall in GNP in the comparable worth example.

28. See *supra* Part III.

29. G. JOHNSON & G. SOLON, *supra* note 8, at 3-4.

the average compensation of women, both relatively and in real terms, is ambiguous, but the preponderance of evidence suggests that substitution elasticities between labor types are sufficiently large that the impact of comparable worth on the labor market status of women would likely be negative. By comparison, a vigorous enforcement of Title VII of the Civil Rights Act would raise the average labor market status of women, although some women would be hurt by the policy.

