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Luxembourg Income Study Working Paper Series

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How the Human Capital Model Explains
Why the Gender Wage Gap Narrowed

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How the Human Capital Model Explains Why The Gender Wage Gap Narrowed

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How the Human Capital Model Explains Why the Gender Wage Gap Narrowed

Married women's labor force participation rose dramatically from 4.6% in 1890 to 61.4% in 2001, after peaking at 61.6% in 1997. This rapid rise in female labor force participation constitutes the single most significant labor market trend in the U.S. over the last century. At the same time, men's labor force participation declined moderately from 84.3% in 1890 to 75.1% in 2001.¹ These differing trends have implications regarding secular changes in male and female human capital acquisition and earnings.

According to human capital theory, one's incentive to invest in training is directly proportional to the time one expects to work over one's lifetime. Secularly rising women's labor force participation relative to men's implies that women's human capital investments should intensify compared to men's. In turn, rising female relative to male human capital investments suggest a narrowing in the gender wage gap. Thus, during the period 1890-2001, women's earnings should have grown relative to men; and indeed, women's relative earnings grew during this period. Overall from 1890 to the present, female earnings rose from just over 30% of male earnings in 1890 to close to 80% in 2001, just as the human capital model predicts.

Whereas we are now certain that the human capital model is important in explaining these trends in the gender wage gap, this was not always the case. Early research in the area was less convincing because all initial empirical analyses of gender wage differentials concentrated on data from 1960 to 1980. In these two decades, women's wages grew not much more quickly than men's, leading to *no* significant decline in the gender wage gap. Women in 1960 earned 59 cents on the dollar, yet in 1980 women's earnings barely budged to 63 cents, compared to one dollar for males. Clearly if the human capital model were to be applicable, one should have seen convergence, rather than the stable wage ratio observed in virtually all early studies.

Concurrently, the three-to-five shekel Leviticus quote first cited by Victor Fuchs² probably made many believe that the approximately 40% gap was a constant over all recorded history. In fact, so many believed in this invariable unwavering wage ratio, that folksinger Fred Small wrote the song “Fifty-nine Cents”³ poetically articulating the seemingly eternal constant with music. But the truth is different.

Not until Claudia Goldin’s 1990 book *Understanding the Gender Gap*, did empirical analysis go beyond data between the 1960 and 1980 period.⁴ However, as it turns out, the decades from 1960 to 1980 are anomalous. In October 1992, an article appeared in the *New York Times* with the headline “Women’s Progress Stalled? Just Not So,” based on work by Claudia Goldin, Francine Blau and Marianne Ferber, as well as June O’Neill and myself.⁵ This article tells a different story. Rather than being constant, the male-female earnings gap continually declined from 1890 to 1990, with the exception

¹ The 1890 data are from *Historical Statistics of the United States From Colonial times until 1970*, Series D 49-62, p. 133. The data from 2001 are from the *2002 Statistical Abstract of the US*, Table 561 (p. 367) for males and Table 569 (p. 372) for females.

² “Speak unto the children of Israel and say unto them: When a man shall clearly utter a vow in person unto the Lord, according to thy evaluation, then thy evaluation shall be for a male from 20 years old unto 60 years old, even thy evaluation shall be 50 shekels of silver, after the shekel of the sanctuary. And if the speaker be a female, then thy evaluation shall be 30 shekels,” as reported by Victor Fuchs (1971), “Differences in Hourly Earnings Between Men and Women,” 94:9-14.

³ Fred Small, “Fifty-nine Cents,” © 1981 Pine Barrens Music. The chorus is:

59 cents for every man’s dollar
59 cents – it’s a lowdown deal
59 cents males a grown women holler
They give you a diploma; it’s you’re [sic] paycheck they steal.

(<http://www.afscme.org/otherlnk/59cents.htm>)

⁴ Claudia Goldin, *Understanding the gender gap: an economic history of American women*, New York: Oxford University Press, 1990. There are at least three exceptions. One exception is Goldin’s 1984 paper “The Earnings Gap in Historical Perspective,” in U.S. Civil Rights Commission, *Comparable Worth: Issue for the 80s*, Washington, D.C.: U.S. Commission on Civil Rights, 1984. A second is June O’Neil (1985) “The Trend in Male-Female Wage Gap in the United States,” *Journal of Labor Economics*, 3(1): S91-116. The third is Francine Blau and Andrea Beller (1988) “Trends in Earnings Differentials by Gender, 1971-1981,” *Industrial and Labor Relations Review*, 41:513-29. Also, see Chapter 4 in Francesca Bettio (1988), *The Sexual Division of Labour*, (Oxford: Clarendon Press) for data on similar trends in Italy.

⁵ Sylvia Nasser, “Women’s Progress Stalled? Just Not So,” *New York Times*, October 18, 1992.

of at least the thirty-year period 1950 to 1980. So the two decades 1960-1980, upon which all initial studies are based, were anomalous.

From 1981 on to the mid-1990s, the hourly wage gap narrowed by over 0.6% per year, and also between 1890 and 1940 the wage gap narrowed by about 0.5%. But because the decades from 1960 to 1980 are atypical, one can easily see how research results exploring trends over these two uncharacteristic decades misled scholars. However, these are just the years all the initial empirical studies analyzing the wage gap focus. Indeed, the narrowing of the gender wage gap is this book's main theme. But, I think there is at least one important implication of this theme that must also be considered, as well. That is, the applicability of the human capital model to understanding gender wage differences, in the first place. This paper concentrates on both insights. It looks at how the human capital model explains the gender wage gap, as well as how the human capital model predicts trends in the gender wage ratio.

In what follows, I outline how the human capital model accounts for the gender wage gap. Then, I explore its implications regarding secular changes in women's pay relative to men's. My conclusion is that the gender wage gap diminishes, as male-female lifetime work expectations become more similar. In the process, I show why the 1960s and 1970s are anomalous by comparing the 1970s to the 1980s. I present evidence for the United States, as well as for nine other countries using data gleaned from the Luxembourg Income Study (LIS). Finally, I conjecture that the narrowing of the gender wage gap decelerated in the mid - 1990s because in the mid -1990s male and female labor force participation trends began to converge less quickly.

Linking Expected Lifetime Work and Wages: The Human Capital Model

The human capital model links expected lifetime labor force participation to one's incentive to acquire marketable training. In turn, this training, acquired in school and on the job, determines earnings potential. Thus expected lifetime work history is the most important motivating ingredient in one's ability to eventually achieve high earnings.

The process works as follows: There are costs and benefits to human capital acquisition. The costs are direct (such as tuition and learning manuals) and indirect (mostly foregone wages during training). The benefits are mostly increased lifetime earnings. However, there are some other more intangible benefits like how one conducts him/herself in everyday life, as well as social benefits such as reduced crime, lower unemployment, and greater economic growth.⁶ The more years one works the greater the opportunity to reap the benefits of higher earnings. So, for example, were one *never* to work, marketable human capital benefits would be *zero*, independent of how many professional or Ph.D. degrees one acquires. In a similar vane, dropping out of the labor force to bear and raise children reduces lifetime work years, which in turn decreases the potential rewards from human capital. These reward reductions decrease the value of human capital investment. In contrast, those who expect to work long hours, and those who foresee the greatest number of years at work have the highest expected returns. Thus, all else constant, the less one's lifetime labor force participation, the lower the benefits to investment, and hence the smaller one's incentives to invest in training. Since, on average, women work fewer hours throughout their lives, one expects women to purchase less human capital investments than men. Lower human capital investments relative to men, translate to lower per hour relative women's wages. Hence the male-female wage gap widens. On the other hand, as women's lifetime labor force participation rises, and as men's lifetime labor force participation falls, one should expect the male-female wage gap to narrow. Indeed, as I'll show, this is what the data indicate. But first, I mention a couple other implications regarding the shape of the earnings profile.

First, as one gets older, earnings rise each year. The rate at which earnings increase from year to year varies with one's age. Young workers, below 35, experience

⁶ Some of these intangible benefits are addressed in Robert Michael (1973), "Education in Non-market Production," *Journal of Political Economy*, 81:306-327; and Dora Polachek and Solomon Polachek (1989), "An Indirect Test of children's Influence on Efficiencies in Parental Consumer Behavior" *The Journal of Consumer Affairs*, 23(1): 91-110. Such social and familial benefits might be one reason why some cultures value more highly educated wives even though these cultures advocate wives being in the home rather than the workplace. I don't deal with these social benefits in this paper.

the most rapid per year earnings increases. Workers in their 50s find earnings growth to be relatively meager. Their earnings rise hardly at all.

Here again, the human capital model explains why earnings growth varies over the lifecycle. Early in life (below age 35), individuals have a whole work-life ahead. With so many years to work, investments in training payoff big-time, since returns are reaped for a long time. Later in life, the “present value” of training is smaller since there are fewer work years to accumulate the returns.⁷ Accordingly, older individuals typically purchase less training, and concomitantly earnings rise less quickly.

Second, a worker with anticipated intermittent labor force participation follows a lifecycle-training pattern different than the typical worker. Rather than begin with large, but diminishing amounts of training, investments are initially small. They then rise moderately until the time one permanently reenters the workforce, when child rearing is completed. As a result, women’s earnings need not exhibit the usual concave age-earnings profiles characteristic of men, given these human capital investment patterns. For this reason, women’s lifecycle earnings profiles are flatter than men’s. Further, women’s earnings are often non-monotonic (i.e., exhibit a midlife dip), depending on the pattern of intermittent work behavior.⁸ Although rarely emphasized in the literature, these patterns strongly emerge in empirical studies.

⁷ The present value of a human capital investment such as training is the discounted value of the increased wages one receives over the remainder of one’s work-life. In mathematical terms, this is

$$\sum_{i=1}^R \frac{\Delta Y}{(1+r)^i}$$

where R is the number of years one expects to stay on the job reaping returns from the

investment, ΔY is the extra earnings the human capital yields, and r is the discount rate. In continuous

time, the present value is $\int_0^R \Delta Y e^{-rt} dt$. The present value of any given investment diminishes as one gets

older because R is smaller for older individuals.

⁸ See Solomon Polachek (1975) “Differences in Expected Post-School Investment as a Determinant of Market Wage Differentials,” *International Economic Review*, 16:205-29; as well as Yoram Weiss and Reuben Gronau (1981), “Expected Interruptions in Labor Force Participation and Sex-Related Differences in Earnings Growth,” *Review of Economic Studies*, 48(4):607-19 for rigorous explanations of human capital investment patterns in the presence of intermittent labor force participation. For a non-technical version, see S. Polachek, “Discontinuous Labor Force Participation and Its Effects on Women’s Earnings, in C.

Given the importance of lifetime labor force participation, the obvious question is why do women have different lifetime work patterns than men?

Division of Labor in the Home

Catalyst is a research organization designed to expand options for women in upper level business jobs. Felice Schwartz, whose 1989 *Harvard Business Review* article prompted the debate on the “mommy track”, founded catalyst in 1962. It is one of the leading nonprofit organizations focused on women’s issues. Catalyst’s original Board of Directors consisted of the presidents of Smith College, Wellesley College, Lawrence College, Mills College, and Sarah Lawrence College. Part of the organization’s research concentrates on preparing a number of surveys on women’s attitudes. In one recent survey of 3000 women in their mid-twenties to mid-thirties, Catalyst found the *biggest* barrier to women’s advancement was personal and family responsibilities. Sixty-eight percent named this to be their main problem.⁹

To illustrate division of labor, one need only examine lifetime labor force participation patterns for married males, married females, single males and single females. Figure 1 depicts gender-marital status labor force participation patterns for the United States in 1970 and 2001. On the horizontal axis is age. On the vertical axis are labor force participation rates. These rates indicate the proportion of each gender-marital status group in the labor force. Begin with 1970, married men have the highest lifetime labor force participation. Married women have the lowest, in 1970 peaking at about 48% between the ages of 20 and 24, and then again at 46.8% between ages 35 and 44.¹⁰ The drop between 25 and 34 reflects intermittent labor force participation related to

Lloyd, ed. *Sex, Discrimination, and the Division of Labor*, (New York: Columbia University Press), 90-122.

⁹ Betsy Morris, “Trophy Husbands,” *Fortune Magazine*, (October 14, 2002), p. 80.

childbearing. The gap between single males and females is the narrowest. By 2001, the differences are appreciably smaller. The biggest change is how quickly married female labor force participation rose over the three decades. However, even in 2001, married women participate between $\frac{1}{4}$ and $\frac{1}{3}$ less than married men. The gap for singles is miniscule.

Figure 2 emphasizes gender differences by race. Interesting here is the somewhat larger gender difference in labor force participation rates for whites compared to non-whites. To see this, note that white women participate less over their lifetime than non-white women, whereas white men participate more than black men. As I shall show shortly, the bigger white male-female labor force participation gap suggests larger male-female wage differences for whites than non-whites, again as predicted by the human capital model. More on this when I compare gender wage differences for whites and blacks.

One can examine these patterns from a slightly different perspective. Retrospective work history data (asking respondents about *their* past work) as well as panel data (following respondents through time) illustrate the same lifetime work behavior but do not rely on cross-sectional synthetic cohort data comprising individual respondents across various age groups. Given that synthetic cohorts confound cohort (i.e., generational) and lifecycle (i.e., aging) effects, one can argue that retrospective and panel data are superior. Table 1 (based on the National Longitudinal Survey) contrasts work patterns for married-once-spouse-present and never-married women. Never-married white women 30-44 years old in 1967 (column 1, row 2) worked 14.5 years out of a possible 16 years. In contrast, married-spouse-present women only worked 6.4 out of about 16.8 years (column 1, row 1). As before, similar patterns emerge for black women, but again the differences are more muted, with never married black women having slightly less lifetime work and married-one-spouse present black women a bit more

¹⁰ These figures are from the 2002 *Statistical Abstract of the United States*, Table 568, p. 372, as graphed in Figure 1.

lifetime work (9.1 years versus 6.4) years than whites. Thus here too, being married greatly diminishes lifetime work, slightly more for whites than blacks.

Although large marital status and gender differences in work behavior still remain, these gender disparities are gradually diminishing. Female labor force participation is rising secularly and male participation is falling. Figure 3 emphasizes the deceleration of women's labor force participation growth during the 1990s decade. As shall be illustrated later, I believe this deceleration explains why the gender gap narrowed less quickly in the 1990s than in the 1980s.

Children exacerbate these differences. For example, as illustrated in Table 2, Susan Harkness and Jane Waldfogel find significantly lower labor force participation rates for women with children compared to women without.¹¹ This is true not just in the United States, but in Australia, Canada, the United Kingdom, and Germany. In Finland and Sweden, the same result holds, but the pattern is mitigated given Sweden and Finland's social policies promoting women's work. In virtually all cases men's labor force participation exceeds women's by a wide margin.

According to human capital theory, the *division of labor* within the family, which fosters very dissimilar gender work patterns, generates significantly smaller monetary gains from investment for women. Because of this, male human capital investments typically exceed women's, and as a result, male earnings surpass women's earnings. In addition, male earnings grow more quickly over the lifecycle than women's earnings, as well. I now examine these earnings configurations.

Earnings Profiles by Gender and Marital Status: Married Women With Children Earn the Least

¹¹ Susan Harkness and Jane Waldfogel (2003), "The Family Gap in Pay: Evidence from Seven Industrialized Countries," in S. Polachek, ed. *Worker Well-Being and Public Policy*, 2003, 369-413.

Perhaps the easiest way to view earnings is graphically in an “age-earnings” profile. As is well known, this is a plot of earnings over the lifecycle. Figure 4 contains such a graph using 1990 U.S. Census data.¹² One curve is drawn for each level of schooling. The returns to schooling are illustrated by noting how earnings rise as schooling increases. Also note how earnings rise with experience.

Earnings profiles differ for men and women. As illustrated in Figure 5, male profiles are higher and steeper, indicating not only greater earnings but also speedier more rapid earnings growth, at least through most of the lifecycle. This figure confirms the gender wage gap, but illustrates that it varies throughout the lifecycle, being small initially, then widening, and eventually decreasing somewhat at older ages. Particularly interesting, is why the gender wage gap varies over the lifecycle. But before discussing that, let us examine the gender wage gap across demographic groups.

Figure 6 plots the same type male and female age-earnings profiles for men and women, but now by marital status. A very interesting pattern emerges. Wage profiles for single males and females are very similar. The wage gap is narrow, and in many data sets actually diminishes with age. In contrast, the wage profiles for married men and women differ dramatically. Married men have far higher and steeper earnings profiles than married women.

Francine Blau and Lawrence Kahn illustrate these same findings using international data.¹³ Table 3 contains their results. For single men and women the wage gap is negligible. Single women generally earn over 90% what men earn. But married women earn far less than married men. Their wage ratio is in the 60% to 70% range.

¹² Obtained from the University of Chicago Economics 350 website:
http://lily.src.uchicago.edu/econ350/mincer_graphs.pdf

¹³ Francine Blau and Lawrence Kahn (May 1992), “The Gender Earnings Gap: Learning From International Comparisons” *American Economic Review*, 82(2):533-38.

Further deconstruction illustrates that children play a major role in the gender wage gap. Married women with children earn less than married women without children. Married women who space their births widely apart receive even lower wages. Opposite patterns hold for men. Married men with children earn more, and spacing children at wide intervals is associated with even higher earnings. The wage gap varies more by marital status, children, and spacing of children than any other variables. And interestingly, the male-female wage gap among blacks is smaller than for whites. As already mentioned, this is consistent with black women working relatively more over their lifetime compared to black men, than white women compared to white men.

Discrimination theory cannot explain these wage patterns. Were discrimination the culprit, one would need an explanation why corporations hardly discriminate against single women, but discriminate enormously against married women -- especially married women with children spaced widely apart. The truth is firms cannot even ask marital status in employment applications. But even if they could get this marital status information, they would hardly know anything about the number and spacing of one's fertility. On the other hand, given the close surroundings in a typical work environment, one might argue that an immediate supervisor actually is privy to an employee's marital status and number of children, even if corporations (or at least corporate human resources offices) do not know an employee's family history. And if so, this information can potentially influence employee performance evaluations. However, even if supervisors knew number of children, they are far less cognizant of children's ages, and hence less likely to know much about child spacing.

Statistical discrimination models are equally impotent. Advocates of statistical discrimination argue that hiring and promotion decisions are based on corporate expectations. Companies expecting women drop out of work frequently to fulfil familial responsibilities would refrain from hiring women in the first place. They would hire women in the more menial jobs and refuse to provide training. But there is no evidence of these corporate practices. To combat this type discrimination, women would counter by beginning their own businesses. However, we see little evidence of women initiating new

business more frequently than men. Nor is there evidence that female-owned businesses hire more women than male-owned businesses.¹⁴

Hiring women mostly in menial jobs is called “occupational segregation.”¹⁵ But, as will be illustrated later, occupational segregation explains a relatively small portion of the gender wage gap.

Arguments that corporations refuse to train women turn out to be incompatible with economic theory. Human capital theory shows that *both* employers *and* employees share training’s costs as well as training’s benefits. (Why sit through excruciatingly burdensome training sessions if one doesn’t expect some type reward on the job? Similarly why pay for the training if productivity doesn’t go up?) But according to the theory, the proportion of training costs paid by an employer exactly equals the proportion of productivity gains the company keeps. Similarly the proportion paid by an employee exactly equals the proportion of increased productivity the employee gets through increased wages and job advancement. In short, the corporate share of the costs equal the corporate share of productivity gains; and the employer’s share of the costs exactly equals the employee’s share of the gains.¹⁶ Were employers to misjudge an employee’s work expectations, the employee would pay a larger part of the training costs, and as a result get a bigger share of the increased productivity. But we rarely observe women taking on a bigger share of training costs and benefits.

But even more important, government policies aimed directly at corporate discrimination haven’t worked either. In the 1980s, under Reagan, affirmative action

¹⁴ The 1992 U.S. Bureau of Census *Characteristics of Business Owners* Survey indicates a smaller proportion of businesses owned by women (especially among older women where discrimination is likely to be greatest) and fewer women employed in female owned businesses. See <http://www.census.gov/csd/cbo/1992/www/cbo9201.htm>.

¹⁵ Barbara Bergmann (1974) was probably the first to popularize occupational segregation models. See her article “Occupational Segregation, Wages and Profits When Employers Discriminate by Race and Sex” *Eastern Economic Review*, 1(2):103-10.

¹⁶ The theory was developed by Masatoshi Kuratani (1973), “A Theory of Training, Earnings and Employment in Japan,” Ph.D. Dissertation, Columbia University, and repeated in Masanori Hashimoto (1981), “Specific Human Capital as a Shared Investment,” *American Economic Review*, 71:476-82.

activities diminished. Just from 1980 to 1981, the Office of Federal Compliance dropped its budget from \$48.2 million to \$43.1 million.¹⁷ Yet female wages grew 1.7% per annum faster than male wages in the 1980s than the 1970s. In the 1970s, enforcement of anti-discrimination laws increased 20-fold.¹⁸ Nevertheless, in the 1970s compared to the 1980s, female wages grew at a rate only 0.39% per year faster than male wages, resulting in very little narrowing of the gender wage gap.¹⁹ According to Harry Holzer and David Neumark, whereas there is some evidence that “affirmative action programs redistribute employment ... from white males to ... women, ... the extent of the redistribution may not be large.”²⁰ In a six country comparison of affirmative action, Jain *et al* find mixed results of affirmative action type programs and conclude that “there is no universal panacea ... for resolving the employment problems of disadvantaged groups. ... Cultural constraints ... have an impact on the success of the programs.”²¹

Clearly something other than corporate discrimination must be at work.

Human Capital and the Cross-Sectional Gender Wage Gap

Recall that human capital theory provides a cogent elucidation of how training influences earnings. The more education and on-the-job training one obtains (i.e., the more human capital one gets), the more one earns. But as we just saw, incentives for acquiring human capital depend on how much one expects to work. Getting married, having children, and spacing children widely apart accentuate the division of labor within

¹⁷ James Smith and Finis Welch (1984), “Affirmative Action and the Labor Market,” *Journal of Labor Economics*, 2:269-98.

¹⁸ Smith and Welch (*ibid*, p. 273) indicate that in 1970 only 340 Title VII cases were filed in Federal Courts, whereas in 1981 6250 cases were filed.

¹⁹ Solomon Polachek and John Robst (2001) “Trends in the Male-Female Wage Gap: The 1980s Compared with the 1970s,” *Southern Economic Journal*, 67(4): 869-888.

²⁰ Harry Holzer and David Neumark (2000): “Assessing Affirmative Action,” *Journal of Economic Literature* 38(3): 483-568, p. 558.

²¹ Harish C. Jain, Peter J. Sloane, and Frank M. Horwitz (2003), *Employment Equity and Affirmative Action: An International Comparison*, New York and London: M. E. Sharpe, p. 214.

the family. For married men, this division of labor *raises* the amount of lifetime work. But conversely the opposite is true for married women with a family. Here the division of labor *reduces* lifetime work. As a result of this bifurcation, married men's incentives to invest in human capital *increase*, while married women's incentives *decrease*. These differences lead to *higher* male wages and *lower* female wages, which is exactly just what we observe.

Economists employ statistical decomposition techniques to measure lifetime labor force participation's role in explaining male-female wage differences.²² Essentially they estimate how much women would earn, if women were to work as much as men over their lifetimes. They define discrimination to be women's predicted earnings shortfalls in this computation. Thus, they compute discrimination to be the extent they predict women to earn less than men, holding other demographic attributes constant. Unfortunately, as will be illustrated in the next section, statistical biases mar this computation.

Traditionally, the typical pattern of female lifetime labor force participation is illustrated in Figure 7. The point S reflects the year a typical woman graduates from school. After graduation, she enters the labor force for e_1 years. Following this, she drops out for H years to bear and raise children. When children enter school, she reenters the labor force for e_2 years to finish her career.²³ In 1967 the value of H was just over ten years.²⁴ In the 1985 National Longitudinal Survey, H was between 9 and 14 years.²⁵ The typical man works each year so that H approaches zero.²⁶

²² The decomposition also "adjusts" for other factors such as race, occupation, industry, and other socioeconomic/demographic factors.

²³ These patterns are illustrated in Jacob Mincer and Solomon Polachek (1974), "Family Investments in Human Capital: Earnings of Women", *Journal of Political Economy*, 82(S); S79 – S109."

²⁴ Jacob Mincer and Solomon Polachek, *ibid*.

²⁵ Elaine Sorensen (1993), "Continuous Female Workers: How Different Are They from Other Women?," *Eastern Economic Journal* 19(1): 15-32.

²⁶ Actually, it is more like 1½ years. Moon-Kak Kim (1994), "Panel Estimates of Male-Female Earnings Functions," *Journal of Human Resources* 29(2): 406-28.

Earnings profiles are illustrated in the bottom panel. They indicate how (the logarithm of) earnings change over the life cycle. The typical male earnings profile is $O''KH$. It illustrates that earnings rise (but at a diminishing rate) throughout the continuous worker's lifetime, possibly tapering off and even declining close to retirement. On the other hand, intermittent workers exhibit a different earnings profile. First, initial earnings (the y-intercept) are lower (point O). Second, the slope of the earnings profile (a_1) is initially smaller, rising to A. This lower slope indicates that the percentage increase in wages per year of experience is smaller than for the continuous worker. Third, earnings are essentially zero during the "home-time" period (H), but earnings potential (were one to work) diminishes by an "atrophy" rate d % per year out of the workforce. Fourth, the reentry wage after dropping out is lower than when one left (B is lower than A in real terms). Finally, after reentering the labor force, earnings grow at a rate a_2 (which is slightly higher in magnitude than a_1) from B to F.

Typically, the a_1 and a_2 coefficients range from 1.2% to 4.0%, depending on the population subgroup studied and on one's level of education. The d coefficient ranges from -4.5% to -0.5% depending on the respondent's amount and type education. In general, the higher one's education and the more skilled one's job, the greater the magnitude of these coefficients. As mentioned above, a_2 exceeds a_1 because upon reentering the labor one has a greater commitment to working more continuously.²⁷

How would a woman's earnings profile look if she worked continuously, instead of dropping out?²⁸ Standard decomposition projects the discontinuous worker's earnings

²⁷ This is a prediction of the human capital model. See Solomon Polachek (1975), "Differences in Expected Post-School Investment as a Determinant of Market Wage Differentials," *International Economic Review*, 16 (2): 451-70; and Yoram Weiss and Reuben Gronau (1981), "Expected Interruptions in Labor Force Participation and Sex-Related Differences in Earnings Growth," *Review of Economic Studies*, 48(4):607-19

²⁸ Alternatively, one could ask what men would earn if they had discontinuous labor force participation rather than full-time participation. Each approach gives a different answer because female earnings function parameters differ from male earnings functions parameters. Ronald Oaxaca and Michael Ransom recently became aware of this problem and as a result suggested a weighted average technique to combine the answers to both questions. But in reality, this weighted average approach is essentially comparable to estimating a gender dummy categorical variable in a wage regression using *both* male and female data. It

profile along OA to D (and finally to J). As such, earnings would grow at a_1 per year. However, another possibility is that the profile is steeper initially, rising from O at rate a_2 . This steeper profile reflects a greater rate of human capital investment, given greater expected lifetime work expectations now that home time is zero. Still another possibility is a higher profile. This higher profile accounts for more market-oriented subjects a person would take in school given greater lifetime work expectations. This third alternative leads to profile $O'M$. As mentioned, the typical decomposition study adopts the first (and simplest) approach. But as we shall see below, this simple first approach leads to an overestimate of discrimination.

The earnings gap between a male (usually a married man with children) working continuously and a female intermittent worker reentering the labor market after dropping out H years can be expressed as segment BK. This is the difference between the man's wage (K) and the intermittent worker's reentry wage (B). This gap can be divided into three segments: (1) BC - the direct depreciation of skills caused by atrophy. Distance BC amounts to product of the number of years out of the labor force (H) and the per year depreciation of earnings power measured by atrophy rate d . (2) CD - the foregone wage growth caused by lost seniority, assuming one's earnings rise from A at rate a_1 . And, (3) DK - the earnings gap a male's earnings and the earnings a female would have, should she work continuously.

According to the standard decomposition, DK depicts discrimination. It measures the male-female earnings gap, assuming women have men's labor market characteristics (e.g., worked as many years as men ($e_1 + H$)).²⁹ However, this latter gap (DK) misstates

turns out that this dummy categorical approach is the same as used in the original initial empirical wage discrimination studies, such as Victor Fuchs (1971), "Differences in Hourly Earnings Between Men and Women," *Monthly Labor Review*, 9-15. So, in a sense, the decomposition approach has finally come full-circle.

²⁹Studies without work history information (e.g., Ronald Oaxaca (1973), "Male-Female Wage Differentials in Urban Labor Markets," *International Economic Review* 14(3): 693-709) aggregate e_1 and H (i.e., $e=e_1+H$). This biases downward the e_1 coefficient; thereby leading to even lower projected female earnings, than D. This erroneous specification severely overestimates discrimination. See Jacob Mincer and Solomon

the amount of discrimination. To see this, decompose DK into three parts: DG, GN, and NK. The gap DG reflects the additional earnings growth (a_2 per annum compared to a_1) attributable to extra on-the-job training arising from expecting greater labor market continuity. (Recall that projecting earnings according to a_1 does not take account of the extra on-the-job training incumbents would make given that they gain more from human capital investment now that they are expected to work continuously.) The gap GN reflects additional earnings levels attributable to the more market-oriented schooling one obtains when one is in the labor market a greater number of years over one's lifetime. Finally, this leaves NK. This "new" unexplained gender wage differential better reflects discrimination because it accounts for the extra human capital investments women would make if they expect to work more years over their lifetime. Failing to take account of how female earnings projections change when lifetime work expectations increase biases upward the typical estimate of discrimination (DK).³⁰ Thus failure to adequately adjust

Polachek (1974), "Family Investments in Human Capital: Earnings of Women," *Journal of Political Economy*, S76-108 for details.

³⁰I explicated this bias in terms of how to appropriately account for expected lifetime labor force participation. However, the arguments are more general. This generalization can be elucidated mathematically. Typically DK is estimated from a regression model. Female earnings D are estimated from earnings function $y = f_F(x_F)$, where $y = \ln y$, and x is a vector of worker characteristics including e_1 , H and e_2 , as well as other worker attributes such as industry, occupation, race, union status, and more. The F subscript in f indicates that the earnings function is estimated with data on females. Male values for x are denoted by x_M . Female values are denoted as x_F . The value $y_F = f_F(x_M)$ equals projected female earning, had women male characteristics (e.g., zero H). It is comparable to N in Figure 7. Male earnings (K) are estimated by $y_M = f_M(x_M)$. The difference D-K represents discrimination – the gap in earnings between what males make and what females should make if they had male characteristics. This measure is often called the "Blinder-Oaxaca" decomposition because Alan Blinder ("Wage Discrimination: Reduced Form and Structural Estimates," *Journal of Human Resources*, 1973, 436-55) and Ronald Oaxaca ("Male-Female Wage Differentials in Urban Labor Markets," *International Economic Review*, 1973,14(3): 693-709) were the first to apply this type decomposition to gender differences in wages. However, the problem is that this decomposition approach is marred by bias. To see the problem, note that the measure assumes that discrimination is defined by differences in male and female earnings functions because $K - N = y_M - y_F = f_M(x_M) - f_F(x_M)$. This means that male-female differences in characteristics (i.e., $x_M - x_F$) are deemed legitimate reasons for gender earnings differences, whereas male-female differences in earnings structure (i.e., $f_M - f_F$) constitute discrimination. But, there are two major biases. First, discrimination is overestimated if f_M differs from f_F for legitimate reasons. As mentioned, human capital theory predicts f_M to be steeper than f_F when female lifetime work expectations are less than male lifetime work expectations. Second, discrimination is underestimated when x_M and x_F differ because of discrimination. As will be discussed below, one can easily argue that women work less than men do because society dictates that they are burdened with home responsibilities.

for expectations overstates discrimination. More on this in the next section, when I mention the several studies that appropriately get at this bias.

Another major flaw with this decomposition is its failure to attribute the lower female levels of lifetime work to discrimination. In particular, the approach legitimizes gender differences in lifetime work because it seeks to determine female wages had women the *same* lifetime work patterns as men. But the very fact that women work less than men may itself reflect discrimination, in the first place. After all, is it not possible that society discriminates by shackling women with home responsibilities, thereby forcing them to drop out of the labor market to raise their children? Isn't it possible that this division of labor is exacerbated by the unavailability of day care, not to mention hefty taxes on wives' "secondary" earnings? Also, is it not possible that guidance counselors discriminate by advising female students against market oriented fields of study, such as science and engineering? If so, male and female differences in work history (as well as other differences) also constitute discrimination. Yet the decomposition approach does not treat these lifetime labor market differences as comprising discrimination. Neglecting these societal forces causing women to work less over their lifetime leads one employing the decomposition approach to underestimate discrimination.

To recapitulate, the statistical decomposition approach hinders one from accurately measuring discrimination.³¹ There are two major biases. The first results from ignoring legitimate reasons why men and women have different lifetime wage trajectories. This bias yields overestimates of discrimination. The second results from adjusting for gender differences in lifetime work, when these lifetime work differences can be caused by discrimination. This bias yields underestimates of discrimination. Because of these potential biases, researchers and policy makers would be better served

³¹ These biases are pointed out in a number of papers. Three examples are: Solomon Polachek (1975), "Potential Biases in Measuring Male-Female Discrimination," *Journal of Human Resources*, 10(2):205-30; Richard J. Butler (1982), "Estimating Wage Discrimination in the Labor Market," *Journal of Human Resources*, 17(4):606-21; and F. L. Jones (1983), "On Decomposing the Gender Wage Gap: A Critical Comment on Blinder's Decomposition," *Journal of Human Resources*, 18(1): 126-130.

to use the decomposition approach to answer specific questions regarding the gender wage gap, rather than to estimate discrimination. This is the approach I adopt here. I now use the decomposition to explore the importance of the human capital model in explaining the gender wage gap

How Important is the Human Capital Model in Explaining the Wage Gap?

At least in the past, the typical woman dropped out of the labor force over 10 years. From this, one can compute BD. As indicated above, BD is a lower bound estimate of the human capital model's importance (in explaining the earnings difference between the intermittent and continuously employed worker). The typical d is about -.5%, but is as large as -4.5% for highly educated workers. The typical a_1 coefficient is between 1.5-2.0%. Multiplying d by the ten years out of the workforce yields a 5% atrophy of earnings power. This 5% is the direct earnings power loss caused by dropping out. Multiplying a_1 by the ten years out of the workforce yields a further potential earnings loss of 15-20%. This 15-20% is a lower-bound estimate of how much earnings would have risen had one remained in the labor force. Summing these two imply that a worker would earn 20-25% more were she to remain in the workforce continually. This means that about 50-62.5% of the gender wage gap is explained, given the 40% male-female wage differential.³² However, as indicated above, this simple computation is biased. While it accounts only for direct depreciation of skills, it *underestimates* the steeper wage growth (DG) that would have been achieved as well as the effects of more market-oriented schooling (GN) that would come about were one to anticipate greater lifetime work activity. The few studies that incorporate DG and GN (Table 4) explain between 63 and 95% of the wage gap.³³

³² This is obtained as follows: $0.20/0.40=50\%$ and $0.25/0.40=62.5\%$.

³³ For example see, Polachek (1975), "Differences in Expected Post-School Investment as a Determinant of Market Wage Differentials," *International Economic Review*, 16 (2): 451-70; Goldin and Polachek (May 1987), "Residual Differences by Sex: Perspectives on the Gender Gap in Earnings," *The American*

Interestingly, gender differences are smaller among blacks than whites. In 2001 the gender earnings ratio (for full-time wage and salary workers) was 0.75 for whites and 0.87 for blacks.³⁴ Recall from Figure 2, the gender gap in labor force participation for blacks is smaller than whites. A smaller lifetime labor force participation difference implies smaller differences in investment incentives. As such, smaller differences in human capital investment should result. Accordingly gender wage differences for blacks should be smaller than for whites. This is precisely what is observed, just as human capital theory predicts.

The Negligible Explanatory Power of Corporate-Based Occupational Segregation

In contrast to the human capital approach, feminist economists originally led by Barbara Bergmann espoused “segmented” labor market theories to explain gender wage differences. These economists believed that the economy was divided into “good” and “bad” jobs. Either implicit or explicit corporate discrimination policies prevented women from getting the good jobs, thus leading to “occupational segregation.” Although this theory rings true (given the vastly different male and female occupational distributions), statistical analysis reveals that occupational segregation explains very little of the male-female wage gap. For example, Chiswick *et al.* explain 28% of the wage gap when using the 1970 U.S. Census.³⁵ However, they find that single women’s wages would fall, had they the male occupational distribution. Using the same approach, Treiman and

Economic Review, Papers and Proceedings, 77 (2): 143-151; and C. Kao et al. (1994), "Male-Female Wage Differentials in Taiwan", *Economic Development and Cultural Change*, 42 (2): 351-74.

³⁴ Computed from Table 613, Statistical Abstract of the United States: 2002.

³⁵ Barry Chiswick, James Fackler, June O’Neill and Solomon Polachek (April 1975), “The Effect of Occupation on Race and Sex Differences in Hourly Earnings”, *Review of Public Use* 3 (7): 2-9.

Hartmann³⁶ explain between 11 and 18% of the gender earnings differential when using data on 222 U.S. Census occupations and 35-39% using 495 occupations.³⁷

One problem is that these studies do not hold constant demographic characteristics. Thus they do not account for how much human capital one might have acquired. In particular, men may achieve higher paying occupations because their greater lifetime work led them to invest more. As such, the studies mentioned above likely overestimate occupational segregation's importance because lower levels of human capital, rather than discrimination, might instigate women to be in lower paying occupations.³⁸ Some studies remedy this defect by incorporating a multivariate approach. When adjusting for worker demographic characteristics, occupational segregation explains less than 7%. For example, Johnson and Solon³⁹ get an explanatory power of 3%, Paula England⁴⁰ less than 5%, and Victor Fuchs⁴¹ between 0 and 6%. The latest and

³⁶ Donald Treiman and Heidi Hartmann, eds, *Women, Work and Wages: Equal Pay for Equal Value* (Washington, D.C.: National Academy Press) 1981.

³⁷ Trond Peterson and Laurie Morgan (1995), "Separate and Unequal: Occupation-Establishment Sex Segregation and the Gender Wage Gap," *American Journal of Sociology*, 101(2):329-65 argue that occupational segregation explains as much as 64% of the gender wage gap. However, this study is not comparable to others because it restricts itself to two narrow samples (one a 16-industry study and the other a study of 10 professional and administrative occupations), rather than an economy-wide investigation as in other studies. But more importantly, the study appears to contain computational idiosyncrasies. For example, it finds women earn 5.3% *more* than men in the hospital industry. Yet, the study claims that occupation explains 178.7% of this industry's gender wage *gap*. Surely occupational segregation might be important in this industry, especially if it includes physicians. But according to the table there is no wage gap; women earn more than men!

³⁸ Solomon Polachek (1981), "Occupational Self-selection: A Human Capital Approach to Sex Differences in Occupational Structure," *Review of Economics and Statistics*, 63(1): 60-69 how lifetime human capital accumulation helps determines occupational choice. Although there has been some debate about the model's validity, the latest evidence seems to corroborate its predictions. See John Robst and Jennifer VanGilder (2000), "Atrophy Rates in Male and Female Occupations," *Economics Letters*, 9(3): 407-13.

³⁹ George Johnson and Gary Solon (1986), "Estimates of the Direct Effects of Comparable Worth Policy," *American Economic Review*, 76(5): 1117-25.

⁴⁰ Paula England (1982), "The Failure of the Human Capital Model to Explain Occupational Sex Segregation," *Journal of Human Resources*, 17(3): 358-70. Also see my rebuttal in S. Polachek (1985), "Occupational Segregation: A Defense of Human Capital Predictions," *Journal of Human Resources*, 20(3): 437-440 and S. Polachek (1987) "Occupational Segregation and the Gender Wage Gap," *Population Research and Policy Review*, 6:47-67 (1987).

most comprehensive study by MacPherson and Barry Hirsch⁴² also finds that occupational segregation explains less than 7% of the male-female wage gap.

Secular Changes in the Wage Gap

If the human capital model carries weight, as I indicate above, then the gender wage gap should narrow as women's lifetime labor force participation increases. As I now show, this is exactly what one finds.

Figure 8 examines wage ratio data for the United States compiled from Goldin (1990) and O'Neill (2002). The vertical axis depicts the female-to-male earnings ratio and the horizontal axis represents year. In all, five sets of data are plotted. Three cover the period from 1815 to just prior to 1940, one covers the time period from 1955-1987, and finally one covers 1979 to 2001. The early data clearly trend upward. Similarly, the latter period from the mid-1970s do as well, with the possible exception of 1994-2000 (though the data again rebound in 2001).⁴³ Only the data from about 1935 to around the early-1980s are flat, showing virtually no increase in female relative to male economic success. But as I mentioned, these decades are anomalous.

By comparing the 1970s and 1980s, my own research with John Robst⁴⁴ offers an explanation why the 1970s (and probably the 1960s) might be anomalous. We show that the wage gap beginning in 1980 narrowed 1.7% more quickly than in the 1970s. In a sense this more rapid convergence is strange because female labor force participation

⁴¹ Victor Fuchs, "Differences in Hourly Earnings Between Men and Women," *Monthly Labor Review*, 94: 1971.

⁴² David MacPherson and Barry Hirsch (1995), "Wages and Gender Composition: Why Do Women's Jobs Pay Less," *Journal of Labor Economics*, 13:426-71.

⁴³ Based on CPS Outgoing Rotation Groups, June O'Neill finds that the gender wage ratio is 0.792 in 1994, 0.788 in 1995, 0.795 in 1996, 0.796 in 1997, 0.793 in 1998, 0.789 in 1999, 0.793 in 2000, and 0.798 in 2001. See June O'Neill (2003), "The Gender Gap in Wages, Circa 2000," Paper presented at the American Economic Association Meetings, Washington, D.C.

⁴⁴ S. Polachek and J. Robst (April 2001), "Trends in the Male-Female Wage Gap: The 1980s Compared to the 1970s," *Southern Economic Journal*, 67(4): 869-888.

rose a bit faster in the 1970s than the 1980s.⁴⁵ As was mentioned earlier, this more rapid 1980s wage convergence is equally startling for advocates of strong Equal Employment Opportunity policies. Enforcement of anti-discrimination laws increased twenty-fold in the 1970s, but actually fell in Ronald Reagan's presidency in the 1980s. Yet women's wages relative to men rose in the 1980s but hardly budged in the 1970s.

The reasons for these exceedingly paradoxical trends are consistent with the human capital model. The rapidly rising female labor force participation in the 1960s and 1970s actually brought down female wages because the new inexperienced entrants earned less than the older more senior employees, thereby making female wage growth appear less rapid. The decline diminished in importance during the 1980s as the relative growth in new female entrants declined, and as the proportion of years actually worked by women increased. If one were to adjust for labor market joiners (and labor market leavers), the male-female wage convergence is actually very similar for both decades.⁴⁶ Indeed the findings by Blau and Kahn (1997)⁴⁷ indicate that current research understates male-female wage convergence in the 1980s, as well. Using statistical techniques that account for changes in the earnings structure, they find that women's progress is considerably greater than previously thought. June O'Neill uses NLSY data to find that the adjusted female-to-male wage ratio in 2000 was over 95%.⁴⁸ This certainly corroborates the convergence.

But similar trends are also observed for other nations. The Luxembourg Income Study (LIS) is a collection of household data compiled from ongoing statistical surveys in

⁴⁵ According to Francine Blau, Marianne Ferber and Anne Winkler (2002), the average annual increase in labor force participation was .7 percentage points for the 1980s and .8 percentage points for the 1970s, but declined to .3% in the 1990s. See Francine Blau, Marianne Ferber and Anne Winkler (2002), *The Economics of Women, Men and Work*, (Upper Saddle, New Jersey: Prentice Hall), Chapter 4, footnote 4.

⁴⁶ Polachek and Robst, op. cit.

⁴⁷ F. Blau and L. Kahn (1997), "Swimming Up Stream: Trends in the Gender Wage Differential in the 1980s," *Journal of Labor Economics*, 15:1-42.

⁴⁸ June O'Neill (2003), "The Gender Gap in Wages, Circa 2000," Paper presented at the American Economic Association Meetings, Washington, D.C.

26 countries.⁴⁹ The database provides statistics on demographic, income and expenditure variables on three levels: households, persons and children. I concentrate on extracting education, age, and earnings data for white males and females from the person files of the countries, at least half of which contain information on hourly earnings⁵⁰. Of those, I present plots (Figure 9) of female-to-male earnings ratios adjusted education, potential labor market experience and marital status (when available). For each country, the ratios were computed from at least three cross-sectional wage regressions. Most countries exhibit increasing female wage ratios. For example, in the figure, Australia, Belgium, Canada, Germany, Hungary, and Israel exhibit greater gender wage convergence than the United States. Given rising female labor market participation in these countries, this convergence is consistent with the human capital model's predictions.

In the US gender wage convergence mitigated somewhat in the 1990s. This weakening of women's relative wage gain is apparent in Figure 8. The hourly wage series, which rose so precipitously from 1980, becomes relatively flat from 1993 through 2001. During this seven-year period, women's wages rose just 0.1 percentage points per year, compared to a 1.0 percentage per year from 1980-1993. What brought about this reversal is the obvious interesting question.

Human capital theory argues that wages rise in conjunction with human capital investments. But, as I have shown earlier in this chapter, the prime impetus for human capital investments is a strong lifetime work commitment. As already noted, women's (especially married women's) lifetime work expectations rose dramatically at least from 1890. (The trend from 1980 is given in Figure 10.) But, in the mid-1990s something different seems to have happened to married women's labor force participation. The upward trend moderated radically. Whereas married women's labor force participation rose almost 1% per year from 1970 to 1990, growth in women's participation nose-dived

⁴⁹ An appendix containing a list of the countries contained in the LIS data is available from the author upon request. Also available is an appendix with the particular country surveys comprising the data.

to ½ percent per year from 1990 to 1995. It declined even further to just 0.1 percent from 1995-2001.

The same logic that explains why a rising female labor force participation rate boosts women's earnings can be employed to account for the how a *decreasing* labor force participation *reduces* women's earnings growth. Recall earnings power depends on human capital training investments. In turn, training depends on lifetime labor force participation. The more one works the greater one's incentive to get trained. And the more sizeable one's training, the more one earns. Concomitantly, the less one works the smaller the incentive to acquire training. The less one trains, the smaller one's human capital, and the less one earns.

As female labor force participation rose throughout the century, women undertook more schooling and other complementary on-the-job post-school training. On the other hand, incentives to continue investing more precipitously fall as labor activities begin to hold steady, so that women's human capital investments cease to grow. Apparently, such is the case from 1993. The fervor of human capital investment intensity ceased, and hence wage growth dropped virtually to zero as women's labor force participation growth dwindled. This relationship is evident in Figure 10. The relative female-to-male wage ratio virtually parallels the married female labor force participation rate. As female participation rose from 1980 to 1993, so did relative female wages. As the growth in female participation tapered off in 1993, so did relative female wages. These are just the patterns the human capital model predicts.

Concluding Thoughts

⁵⁰ Those countries with no reported hourly wages have annual earnings. These data could have been used to compute earnings variance. But in order to be consistent with the computations done for the U.S., I limited the analysis to countries reporting hourly earnings.

The October 14, 2002 issue of Fortune magazine features the 50 most powerful women in business. But the cover story “The New Trophy Husband” seeks to find out who is “behind every powerful woman.” It argues that “increasingly it’s a stay-at-home dad.” The article⁵¹ depicts over a dozen successful women who attribute their accomplishments to an at-home husband managing the family. According to the article,

“At Ford, Xerox, Sun, Schwaab, Verizon, J P Morgan, Chase, Coca Cola, almost everywhere you look in the upper ranks of the Fortune 500, it could be the woman wearing the pants and the man minding hearth and home. Call him what you will, househusband, stay-at-home-dad, domestic engineer, but credit him with setting aside his own career by dropping out, retiring early or going part-time so that his wife’s career might flourish and their family might thrive. ... Behind a great woman at work there is often a great man at home. He is the new trophy husband.”⁵²

More specifically, Doreen Tobin who is the CFO at Verizon proclaims that “almost all the senior women here at Verizon have husbands at home.”⁵³ How important are these at-home husbands? Dena Dublon, CFO at J. P. Morgan, argues “Very important. There is no doubt in my mind that the extent to which I can do this is because of [my husband’s] willingness to stay at home.”⁵⁴ He is incidentally a PHD physicist, and the reason he decided to stay at home was economic. Physics professors make a pittance compared to CFOs, so the efficient decision to raise a family was for her to specialize in market work while he specialized in managing the home. Laurie and Brian Shanahan did the same type economic computations. She is Chief Counsel at the Gap, and he was vice-president of an engine distributing company. But given their desire for a functional

⁵¹ Betsy Morris, “Trophy Husbands,” Fortune Magazine, (October 14, 2002): 79-98.

⁵² Ibid, p. 80.

⁵³ Ibid, p.80.

⁵⁴ Ibid, p.80.

family, they chose specialization, since they perceived that the Chief Counsel at the Gap has a higher income potential than the vice-president at a local distributor.

The *Fortune* article portrays atypical families. For most families the division of labor is the opposite. At least in the past, husbands typically specialized in market work, *not* home management. In contrast, wives as a rule dedicated themselves to home activities, *not* employment for pay. This is the adverse household *division of labor*, which I believe is of paramount importance in explaining social stratification and the resulting gender inequality. As illustrated by *Fortune Magazine*, the *opposite* division of labor in the home is compatible with high-wage-breadwinner women and stay-at-home husbands.

One other important point about the article: Fortune Magazine tried to write a “trophy husband” article five years ago, but without success. Not because the editors couldn’t find enough women at the top, but because the women at the top believed it too great a stigma to depict their spouses as househusbands. So although Fortune attempted to do the article five years ago, it simply could not find enough executive women who would talk about their husbands in *that* way, let alone get *that* kind of publicity.

I view this stigma to be one aspect of what I call *societal* discrimination. I define societal discrimination to be processes instigated by the social order, *not* the corporation, which lead to gender role differentiation responsible for women’s ultimate economic weakness. This role delineation may result because of several reasons. First, efficient behavior within the household (perhaps resulting from husbands being almost two years older and slightly more educated than their wives) makes it economically efficient for household members to specialize. Second, social norms inherent in the culture make it difficult for women to take on work responsibilities.⁵⁵ Third, many past and present government labor market and tax policies blatantly favor men. The fact that men tend to be very reluctant to share household responsibilities, the fact women acquiesce to taking

⁵⁵ The classic film “Manhanagar” (The Big City) by Satyajit Ray (1963) describes such an example for India, but the story could have taken place in many other countries including the United States. Orley Ashenfelter recently showed this film at Princeton University’s “Labor Economics Film Series.”

on most of the household burdens, the fact that high school guidance counselors frequently discourage women from certain male-dominated courses, the fact that the governments often impose hefty taxes on a wife's earnings (the marriage tax), and the fact that in the big scheme of things women got the right to vote only very recently are all symptoms of societal discrimination. I suggest that societal discrimination relates to the division of labor within the home.

I go as far as to argue that this detrimental division of labor is at the root of almost *all* the wage gap. Further, I make a case that decreases in societal discrimination diminish the divide between a husband's and wife's participation in the workforce, and that the rising female lifetime labor force participation coupled with decreasing male participation are causing movements in the direction of gender parity. I believe this is in part the reason why Fortune could do its story in 2002, but it couldn't do it in 1997. And I think that this societal discrimination is far more important than corporate hiring and promotion discrimination.

As has been seen, women and men's roles have been changing over time. Clearly while there is still a division of labor in the home, this division has been converging. Men's lifetime labor force participation is diminishing and women's is rising. Human capital theory predicts that this coming together implies males invest *less* in human capital, while females invest *more*. As a result, wage differences should have narrowed, and in fact they did. While throughout our history, the biggest economic change (in the US and worldwide) has been the rise in women's for-pay labor force activities, only recently have scholars compiled enough data to show a continually narrowing wage gap (with the exception of about 1935-1980). But this is precisely what human capital theory predicts.

As lifetime work expectations rise, individuals' incentives to invest in human capital go up. Concomitantly, individual earnings rise. From 1890 through at least the mid-1990s, women's lifetime work and earnings rose. However, at least from 1950 to 1980 women's labor force participation growth accelerated to such an extent that

increased entrants of low wage inexperienced women workers retarded how quickly the gender earnings gap converged.

A new trend may be emerging since the mid-1990s. The growing women's labor force participation and wage growth waned from 1993 to 2001. To illustrate, a recent issue of the *New York Times* magazine ran a story "The Opt-Out Revolution," which perhaps demonstrates this trend.⁵⁶ This article portrays a new breed of potentially high-powered women -- women who are well educated, articulate, and on the fast track to success -- but women who decide to "opt-out," rather than pursue their careers steadfastly.

The article describes eight women; "each earned a degree from Princeton, which was a citadel of everything male until the first co-educated class entered in 1969. And after Princeton, the women ... went on to do other things that women once were not expected to do. They received law degrees from Harvard and Columbia. They chose husbands who could keep up with them, not simply support them. They waited to have children because work was too exciting. They put on power suits and marched off to take on the world." And yet suddenly, they stopped. According to the article, Katherine Brokaw left a prestigious law firm to stay home with three children. She maintained, "I don't want to be on the fast track leading to a partnership."⁵⁷ Similarly, Sarah McArthur Amsbary declared, "I don't want to be famous; I don't want to conquer the world; I don't want that kind of life."⁵⁸

Indeed according to the article, a recent survey by Catalyst found that "26 percent of women at the cusp of the most senior level of management don't want the promotion. And it's why Fortune Magazine found that of the 108 women who have appeared on its

⁵⁶ Lisa Belkin (October 26, 2003), "The Opt-Out Revolution," *The New York Times Magazine*, 43-86.

⁵⁷ *Ibid.* p. 43.

⁵⁸ *Ibid.* p. 44.

list of top 50 most powerful women over the years, at least 20 have chosen to leave their high-powered jobs....”⁵⁹

Whether the recent shrinking growth in women’s labor force participation prevails as a continuing trend remains to be seen. But at least for now, one cannot help noting the relevance of human capital theory in explaining this recent new phenomenon. Just as the human capital model predicted rising relative female wages from 1890, it explains the recent waning wage growth trends, as well.

⁵⁹ Ibid. p. 45.

Table 1
Female Work History Data*

Population Group	Actual Years Worked	Years Out of the Labor Force (Home Time)
Whites		
Married Once Spouse Present With Children	6.4	10.4
Never Married (No Children)	14.5	1.5
Blacks		
Married Once Spouse Present With Children	9.1	10.3
Never Married (No Children)	13.6	4.7

* Source: Jacob Mincer and Solomon Polachek, "Family Investments in Human Capital: Earnings of Women," *Journal of Political Economy*, 1974

Table 2
Men's and Women's Full-Time Employment Status Age 24-44 – An International Comparison

Full-Time Employment	AU 1995	CN 199	UK 1995	US 1994	GE 1994	FI 1991	SW 1991
All men	.830	.762	.790	.844	.830	.777	.771
Women without children	.731	.677	.763	.731	.722	.851	.745
Women with children	.258	.469	.256	.495	.352	.710	.611

Source: Susan Harkness and Jane Waldfogel, "The Family Gap in Pay: Evidence From Seven Industrial Countries," in S. Polachek, ed. *Worker Well-Being and Public Policy*, Volume 22 of Research in Labor Economics, 2003. Based on the Luxembourg Income Study data. Employment is defined as the share of individuals who have a job during the survey week. Full-time employment is defined as the share who have a job during the survey week and who work 30 or more hours per week.

Table 3
Female/Male Earnings Ratios by Country Corrected for Hour

Country	All Workers	Married Workers	Single Workers
Germany (monthly)	0.688	0.573	1.027
UK (annual)	0.634	0.597	0.949
US (annual)	0.685	0.594	0.955
Austria (monthly)	0.723	0.656	0.970
Switzerland (monthly)	0.617	0.578	0.945
Sweden (annual)	0.767	0.724	0.935
Norway (annual)	0.731	0.716	0.916
Australia (annual)	0.749	0.691	0.914

Note: the earnings ratios were evaluated at 40 hours. The earnings ratios for married workers are for married workers with one person other than spouse in the household (for Sweden, Norway, and Austria, one child); those for single workers are for non-married people with no other persons in the household.

Source: Francine Blau and Lawrence Kahn (May 1992), "The Gender Earnings Gap: Learning From International Comparisons" *American Economic Review*, 82(2):533-38.

Table 4
Proportion of Gender Wage Gap Explained by Human Capital Model

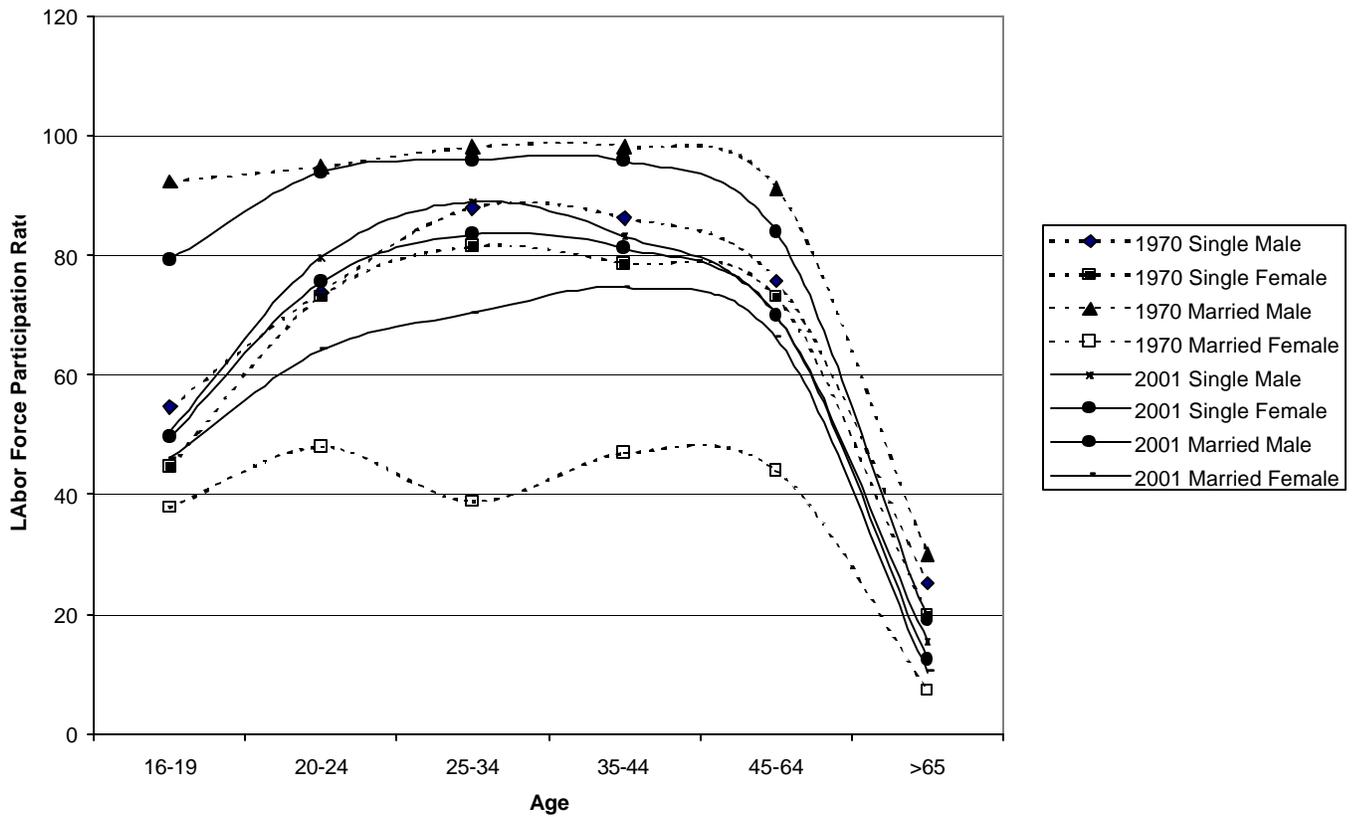
<u>Year</u>	<u>Proportion Explained</u>
1960	93% ^a
1980	84% ^b
2000	95% ^c

^a Based on Married Once Spouse Present Males and Females in the 1960 U.S. Decennial Census. S. Polachek, "Differences in Expected Post-School Investment as a Determinant of Market Wage Differentials," *International Economic Review*, June 1975 16 (2): 451-70.

^b Based on Married Once Spouse Present Males and Females in the 1980 U.S. Decennial Census. C. Goldin and S. Polachek, "Residual Differences by Sex: Perspectives on the Gender Gap in Earnings," *American Economic Review, Papers and Proceedings* (May 1987), 77 (2): 143-151.

^c Based on Men and Women Ages 35-43 computed from the National Longitudinal Survey (NLSY). J. O'Neill, "The Gender Gap in Wages, Circa 2000," Paper Presented at the American Economic Association Annual Meetings, Washington, D.C., January 2003.

Figure 1: US Labor force Participation by Marital Status



Source: U.S. Census Bureau, Statistical Abstract of the United States 2002, Table No. 568, p.

Figure 2

1974 Labor force Participation Rates (BLS Employment and Earnings, Table A-3)

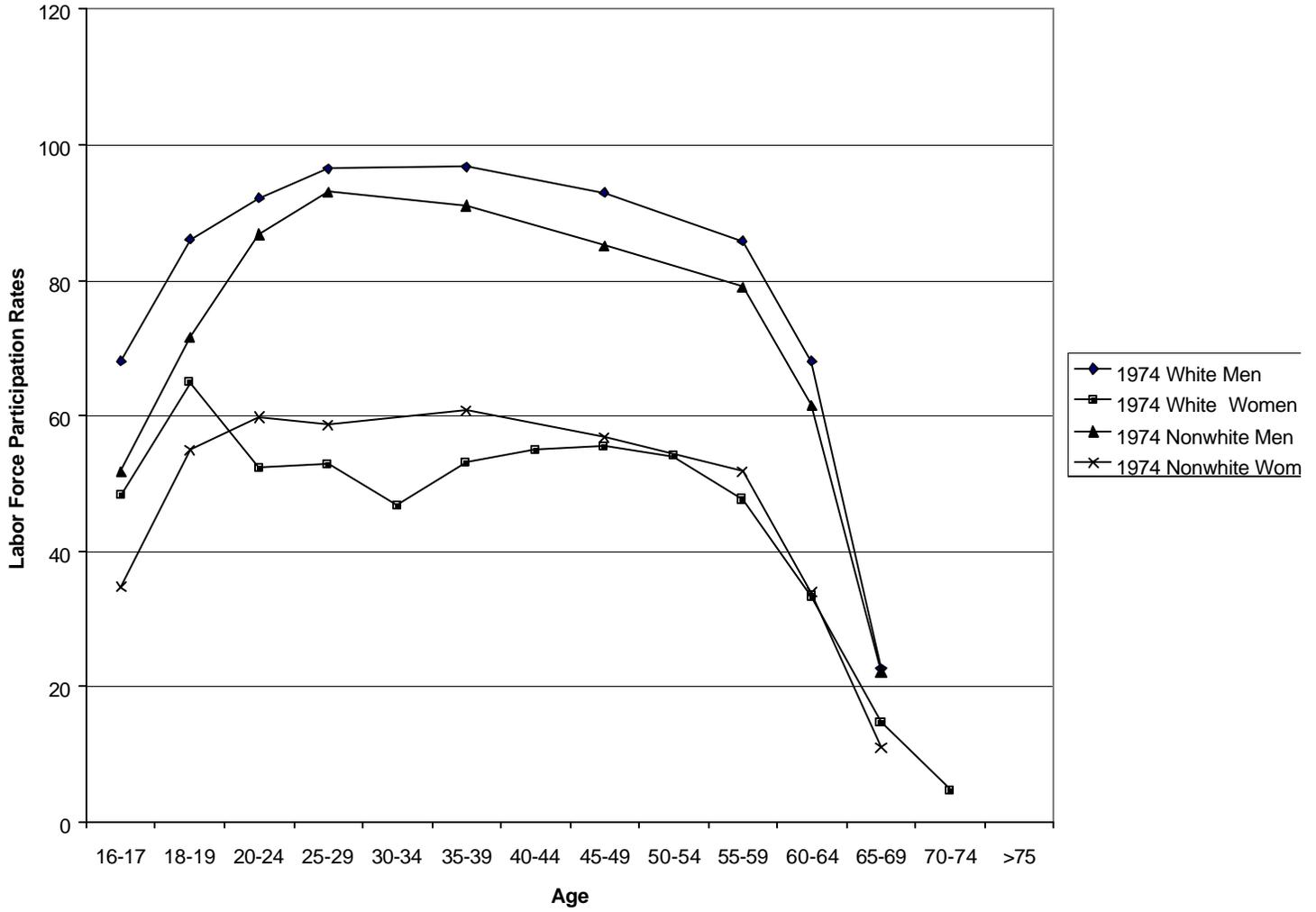
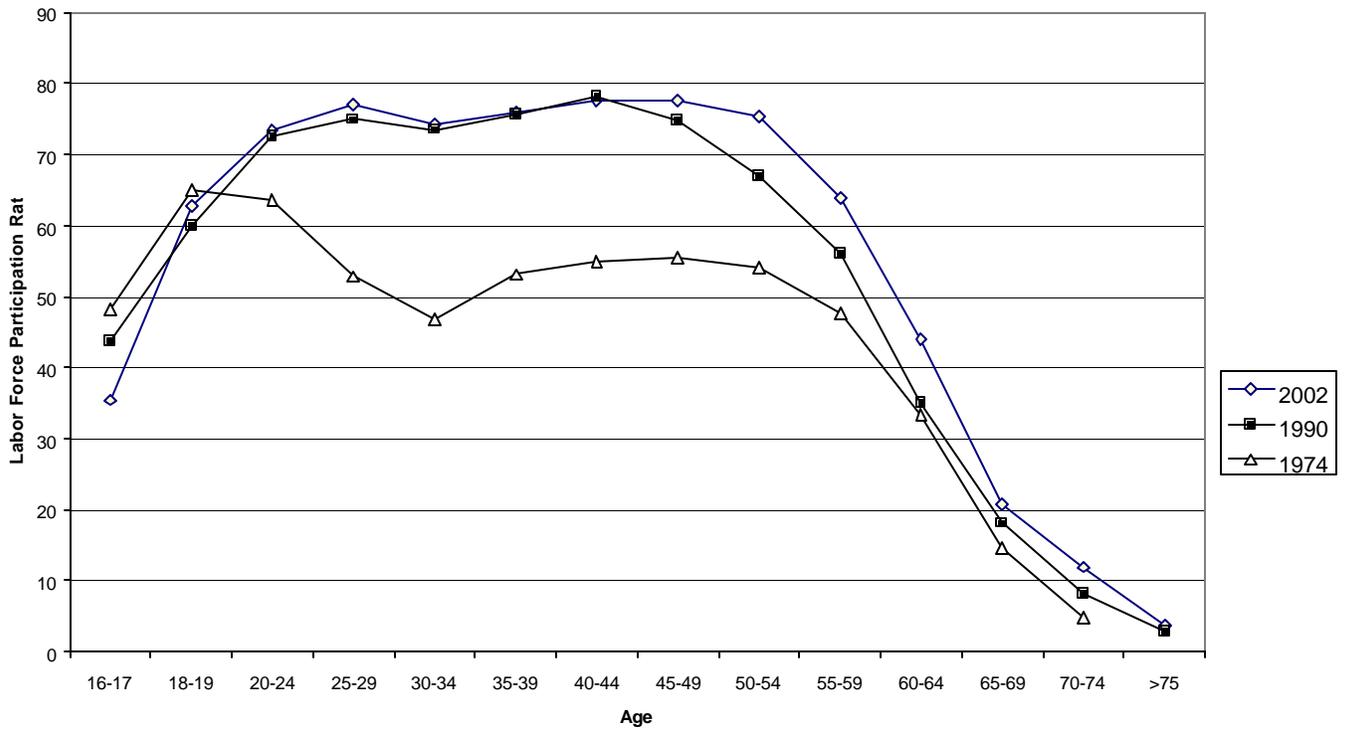
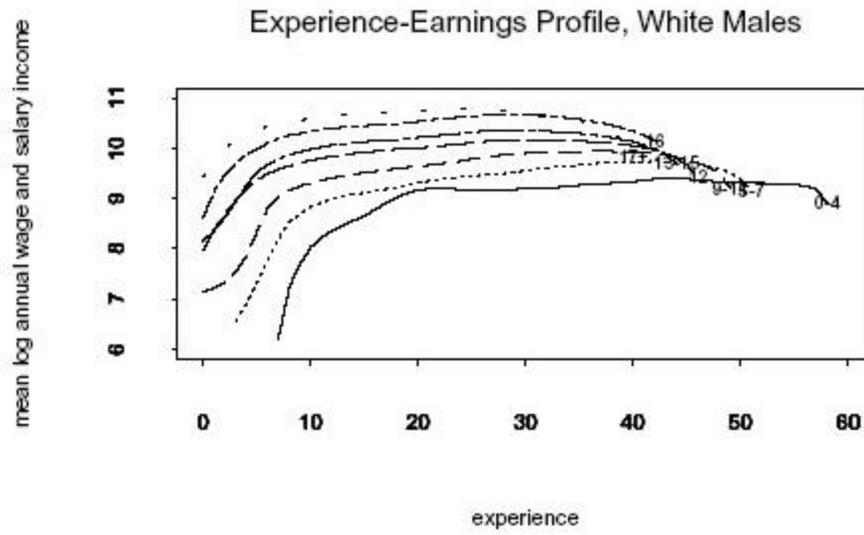


Figure 3: Female Labor Force Participation by Age



Source: U.S. Employment and Earnings

Figure 4



Source: University of Chicago, Economics 350 website.

Figure 5

Typical Earnings Patterns

Males compared to Females

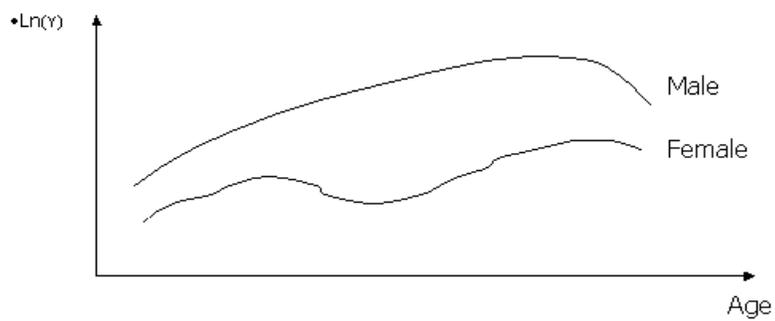


Figure 6

Age-Earnings Profiles by Gender, Marital Status and Children

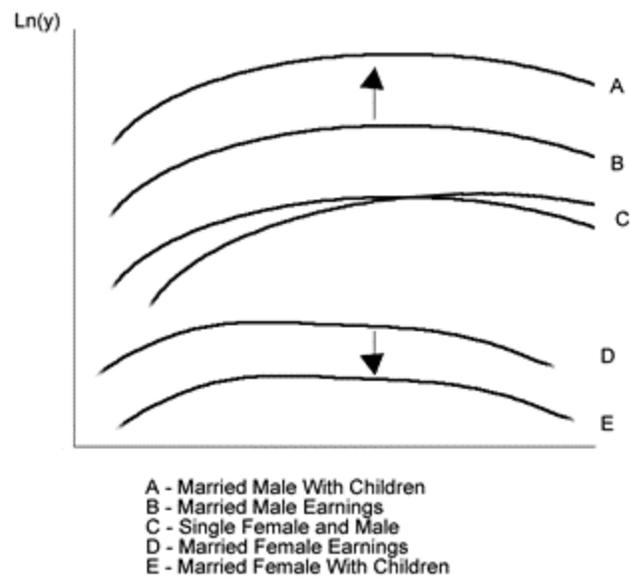
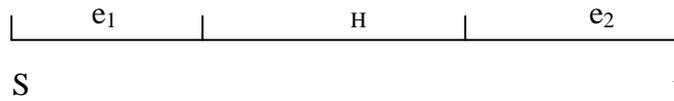


Figure 7

The Impact of Intermittent Labor Force Participation on Earnings

The Life Cycle



The Earnings Profile

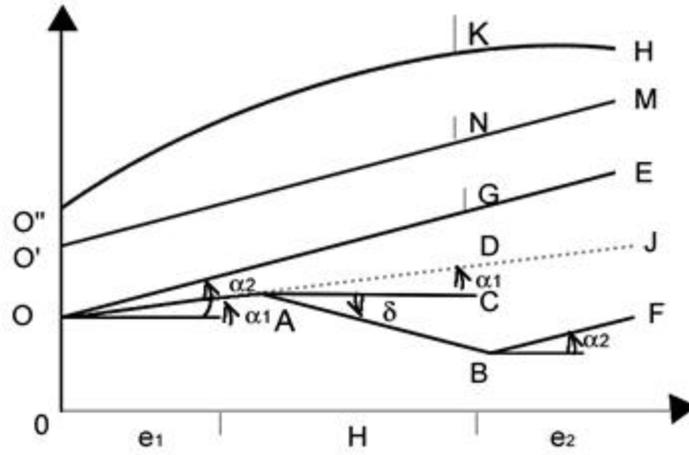
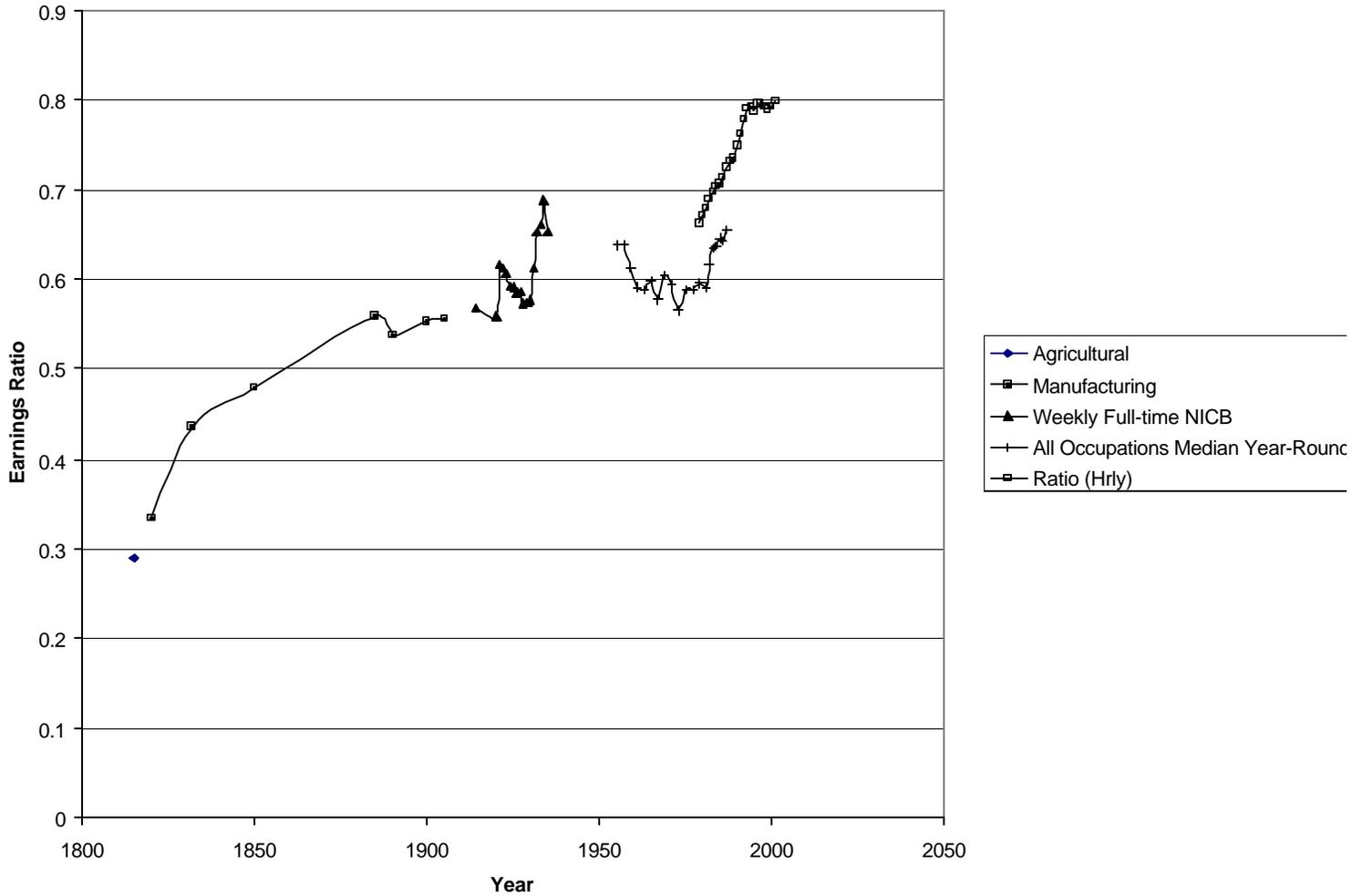
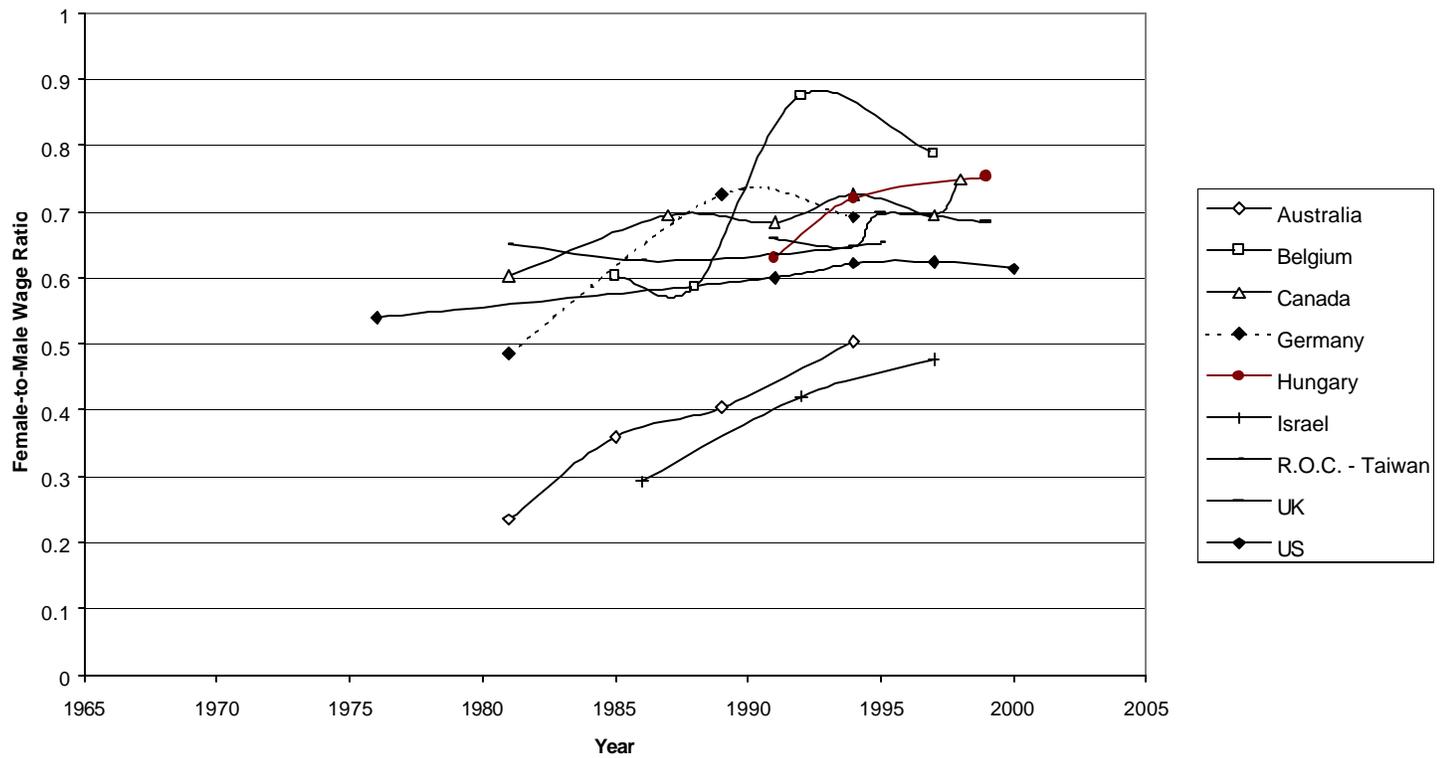


Figure 8: Ratio of Female-to-Male Earnings



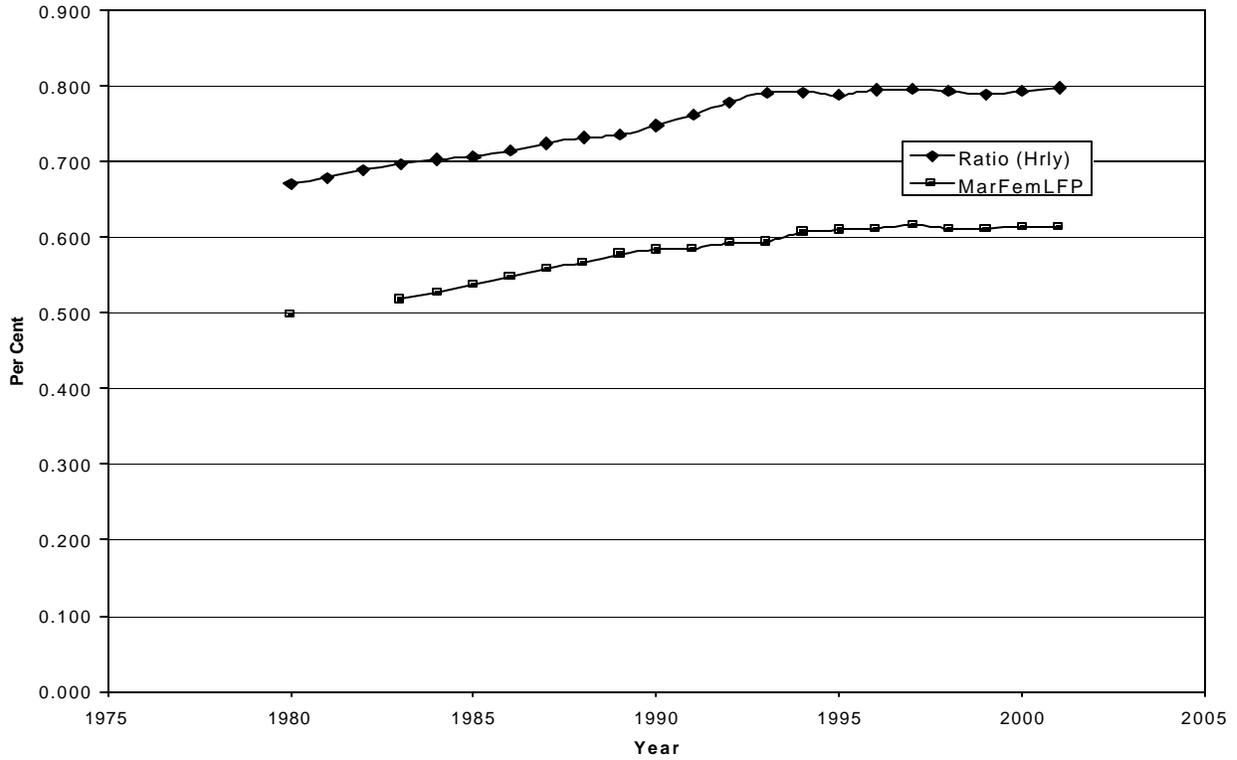
Sources: First four series obtained from Claudia Goldin, *Understanding the gender gap: an economic history of American women*, New York: Oxford University Press, 1990, Table 3.1, pp. 60-1. Hourly wage ratios based on CPS outgoing rotation groups computed by June O'Neill (2003), "The Gender Gap in Wages, Circa 2000," Paper presented at the American Economic Association Meetings, Washington, D.C.

Figure 9: Female-to-Male Wage Ratio Trends By Country (Adjusted for Education, Potential Experience and Marital Status)



Source: Computed from Luxembourg Income Study (LIS) data.

Figure 10: Female Wage Ratios and Married Female Labor Force Participation



Sources: Hourly Wage Ratios are based on June O'Neil's (2003) computations from the CPS Outgoing Rotation Groups (Paper Presented at the AEA Convention, Washington, D.C.); Married Women's Labor Force Participation is obtained from Table 569 of the 200 Statistical Abstract of the United States.