1998

Analysis of movement in real and relative wages in the Pacific Northwest from 1977 to 1993

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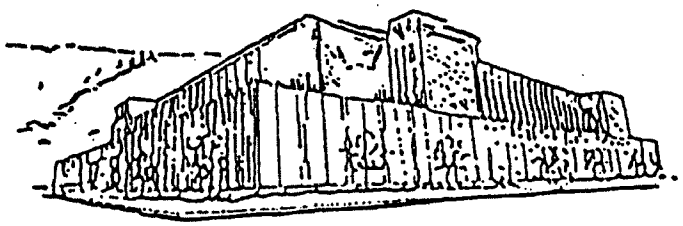

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ANALYSIS OF MOVEMENT IN REAL AND RELATIVE WAGES IN THE PACIFIC NORTHWEST FROM 1977 TO 1993

By

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B.S. University of Oregon, 1985

Presented in partial fulfillment of the requirements

for the degree of

Master of Arts

University of Montana

1998

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7-6-98
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Templeton, Neil R., M.A., July 1998 Economics

Analysis Of Movement In Real And Relative Wages In The Pacific Northwest From 1977 To 1993 (93pp.)

Chairman: Richard N. Barrett RNB

Real wages for demographic cohorts defined by experience and education declined nationwide over the decade spanning the 1980's. Wage differentials attributed to experience and education increased over the period, eroding the real and relative position of young workers with low educational attainment. This thesis examines the changes in real and relative wages for workers defined by experience, educational attainment and gender in Montana, Idaho, Oregon and Washington over the same period. It determines the impact of changes in the industrial structure of employment and non-competitive wage premia upon these wages.

Two analyses are performed. The first examines changes in real and relative wages for six cohorts defined by two levels of experience and three levels of educational attainment. The second studies wages for twelve cohorts defined by the previous levels of experience and education with an additional gender category. Real wages are found to decline over the period for all cohorts in the first analysis, and for all but the three highest earning female cohorts in the second. Wage differentials attributed to experience and education were found to increase across the board with very few exceptions. Wage differentials attributed to gender declined generally.

Changes in the industrial structure of employment and non-competitive wage premia had very little effect upon the observed changes in real and relative wages in all cases. For the lowest earning cohorts, changes in structure and wage premia acted to increase real wages slightly, but were overridden by large decreasing forces generated by the national labor market. The results of this study imply that environmental or other policy measures with secondary effects upon the local industrial structure of employment or non-competitive wage premia would have little effect upon real and relative wages for workers in the Pacific Northwest.

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Acknowledgments

Acknowledgement of gratitude is due to Professors' Dalenberg, Barrett and Graham for their careful counseling and endless patience. Also to Vicki Pengelly and Becky Hofstad, for their technical expertise.

A heartful of thanks go to Erin for her gracious assistance and unyielding support, and to Marilyn, who never lost faith. But above all I send a million thanks and a note of unpayable debt to my grandmother, Pauline Genevieve, without whom it would not have been possible.

CHAPTER I

STATEMENT OF THE PROBLEM

1.1 Introduction

This thesis consists of an analysis of the change in the structure of relative wages in four Northwest states for the period from 1978 through 1993. The states; Oregon, Washington, Idaho and Montana, were chosen for their regional significance and for certain key similarities in industrial structure, especially those devolving from a previous dependence upon resource extraction industries. The primary purpose of this study is to assess the contributions to wage variation resulting from changes in industrial structure.

Previous studies of this issue indicate three hotspots of change in wage differentials over the last thirty years. Specifically, significant increases have been observed in the earnings differentials associated with college/high school and high school/dropout educational attainment and in the differential associated with high/low levels of work experience for males of low educational attainment. Decreases have been observed in male/female differentials over all levels of educational attainment and work experience. These changes in wage differentials are of political importance, since they involve changes in the distribution of societal resources and have welfare implications. The decrease in the gender differential is generally considered to be a positive change, while the increasing skill-related earnings differentials are felt by some to have adverse effects upon social welfare.

1.2 Proposed Sources of Variation in Wage Differentials

The previous studies noted above have focused on several possible explanations of variation in relative wages. The proximate causes of variation are believed to be of two types, competitive market forces and institutions. The institutional explanations concentrate on the distribution of economic rents. Variations

in the magnitude and incidence of these rents associated with certain industries or specific types of employment may influence wage differentials. For example, manufacturing and resource extraction industries have traditionally been associated with high levels of union participation and other sources of economic rent, resulting in significant wage premia for workers employed within these low-skill intensive industries. A general decline in union strength and participation should lead to the dissipation of wage premia for industries with high levels of union membership. This decline would imply increasing skill differentials. A decline in relative employment within these industries will result in reduced incidence of premia on workers of lower educational attainment and less experience (due to seniority systems), also implying increasing skill differentials. These industries also tend to employ lower proportions of women than the average industry, so a decline in relative employment should result in decreasing male/female differentials. In order to investigate the influence of these phenomena on relative wages the model used in this analysis incorporates variables for both the magnitude and incidence of observable wage premia. Evaporation of union premia and increased competition for premium jobs would imply reductions in magnitude for wage premia. Employment shifts from high to low rent industries or shifts in the relative employment of highly skilled workers within industries would imply variation in the incidence of premia.

The competitive market explanations look toward biased technological change and alterations in the international distribution of supply and demand. For many of the cohorts, increases in relative wages were accompanied by increases in relative cohort size. This implies shifts in derived factor demand. Two likely sources of shifts in factor demand are skill-biased technical change and changes in the composition of output. Skill-biased technical change would imply increased returns to skill, partially observable through education and experience. Increases in relative demand for products which are relatively skill intensive in their production technology would imply increases in relative returns to skill intensive factors, also partially observable through education and experience. The increase in relative demand may result from outsourcing and increased import of low-skill intensive consumer durables and natural resources, or from increased export of high-skill intensive professional services.

1.3 General Approach

This thesis will first attempt to determine for the Pacific Northwest the magnitude and direction of movements in relative wages within the Northwest region between demographic groups defined by educational attainment, potential work experience and gender over a time period roughly encompassing the 1980's. Consistency with earlier studies would indicate an increase in education differentials, an increase in the experience differential for men of low educational attainment and a decrease in the gender differential. Econometric techniques will then be applied to determine the effect of variations in the magnitude and incidence of wage premia upon these differentials.

The results of this analysis will have policy implications. If changes in the magnitude and incidence of wage premia are found to have a strong influence upon relative wages, policy prescriptions may reduce increasing wage inequality. Policy could be formulated to increase employment in high premium industries, or to increase wages in industries employing large proportions of the lowest earning cohorts. If significant explanation for undesirable movement in relative wages were found in proximate causes other than technical change, social welfare considerations may suggest the application of policy to generate a more egalitarian distribution of income. If significant explanation cannot be found within changes in wage premia or changes in the distribution of employment, then public policy options to rectify wage inequality are limited.

1.4 Organization of Thesis

Chapter Two reviews the literature, surveying recent research into expanding wage inequality. Argument and evidence from both institutional and market approaches are presented. Chapter Three discusses in detail the method used in the derivation and decomposition of relative wages. Chapter Four presents and discusses results, and Chapter Five concludes the thesis. Technical details are contained within an appendix.

CHAPTER II

REVIEW OF THE LITERATURE

2.1 Introduction

Four basic trends are described repeatedly in the literature concerning movements in relative and absolute wages throughout the 1980's.

1) The last twenty-four years have seen a general slide in real wages. The average level of real wages across groups peaked in 1973 and has remained stagnant since. The average wage for many groups has declined steadily, resulting in significant losses in total annual earnings.

2) The 1980's brought marked reversal of the previous decade's compression of wage differentials between groups defined by education and experience. Relative returns to skill increased rapidly for both men and women.

3) Since 1979, women have steadily closed the wage gap with men.

4) Within-group weekly wage inequality increased steadily throughout the 70's and 80's for groups defined by gender, educational attainment and experience.

The general stagnation of real wages combined with steadily increasing education and experience differentials imply that cohorts of low experience and education suffered serious declines in real earnings throughout the 80's. Increasing variation around a stagnant mean resulted in persistent erosion of wages among the lowest earning groups. This trend affected men to a greater degree than women. The steadily improving position of women relative to men buffered this erosion to some degree for female cohorts of low experience and educational attainment.

Although there is consensus regarding the explosion of wage differentials, there is not unanimity regarding its probable cause. Competing explanations are of two main types. The first type consists of a

variety of institutional explanations, mainly concerned with the decline of union activity and the decreasing real value of the legislated minimum wage. The second type considers market factors to be of primary importance. Increases in relative wages can be attributed to increased relative demand for skill that outruns the increased relative supply of skilled labor (American workers are steadily becoming older and better educated). The increase in relative demand for skill stems from biased technological change and foreign competition in low-skill intensive resource extraction and manufacturing industries.

2.2 Empirical Evidence

A large body of empirical evidence has been collected to demonstrate the evolving character of wage differentials. A very small sample of these findings will be presented here to clarify and substantiate the problem. Listed first will be results from Johnson and Bound (1992).

Table 1 details the changes in absolute and relative real wages and in the employment distribution of workers by education, experience and gender from 1973 to 1988. Real wages reported in columns are imputed from CPS data using earnings functions and are adjusted for inflation to 1988 dollars using the GDP deflator for personal consumption expenditures. Wages are imputed for each education/experience/gender cohort after controlling for race, part-time employment, urban employment, region and industry. An important result to note from these tables is the decline in real wages for almost all groups between 1973 and 1988. Only two groups, women with some college and 20 to 29 years of experience, and female college graduates with 10 to 19 years of experience saw an increase in wages over this period.

These wage estimates are not adjusted for supplementary income (fringe benefits, employer contribution to social insurance, etc.). Thus the growth of wages understates growth in total compensation, including fringe benefits. The supplement to wages and salaries indices from National Income Accounts equal 1.15 for 1973, 1.20 for 1979 and 1.21 for 1988. Thus the wages for 1988 might be adjusted up roughly 5% from 1973. It is still clear that wages for almost all groups were essentially stagnant or in serious decline following 1973. Johnson and Bound calculate an average per annum (fixed-weight) growth of wages across

Table 2.1

Estimated Average Real Hourly Wage Rates, Relative Wage Changes and Employment Distributions by Experience, Education and Gender in 1973, 1979 and 1988 (In 1988 Dollars)

Men		Real Wage Levels			Fixed-Weight Relative Wage Δ		Employment Distributions		
Exp(Yrs)	Education	1973	1979	1988	1973-79	1979-88	1973	1979	1988
0-9	Dropouts	7.52	7.20	5.54	0.02	-0.192	0.027	0.023	0.015
0-9	High School	9.69	8.96	7.31	-0.015	-0.134	0.077	0.079	0.06
0-9	Some College	10.61	9.89	8.51	-0.008	-0.08	0.041	0.043	0.034
0-9	College	12.69	11.38	12.16	-0.046	0.136	0.043	0.048	0.041
10-19	Dropouts	9.96	9.61	7.45	0.027	-0.185	0.033	0.021	0.018
10-19	High School	12.69	12.09	10.31	0.014	-0.089	0.062	0.057	0.067
10-19	Some College	14.60	13.43	12.06	-0.021	-0.037	0.023	0.031	0.036
10-19	College	16.95	15.29	14.81	-0.04	0.038	0.028	0.036	0.05
20-29	Dropouts	11.37	10.25	8.53	-0.041	-0.113	0.037	0.024	0.014
20-29	High School	13.92	12.81	11.91	-0.02	-0.003	0.046	0.04	0.045
20-29	Some College	15.33	14.37	13.93	-0.002	0.039	0.015	0.016	0.022
20-29	College	18.62	17.10	17.08	-0.022	0.069	0.02	0.022	0.028
30+	Dropouts	11.30	10.74	10.17	0.012	0.015	0.078	0.054	0.029
30+	High School	13.65	13.02	12.05	0.015	-0.007	0.051	0.051	0.042
30+	Some College	15.39	14.60	14.27	0.01	0.047	0.014	0.015	0.014
30+	College	18.26	16.88	17.64	-0.016	0.114	0.011	0.015	0.016

Women		Real Wage Levels			Fixed-Weight Relative Wage Δ		Employment Distributions		
Exp(yrs)	Education	1973	1979	1988	1973-79	1979-88	1973	1979	1988
0-9	Dropouts	5.80	5.48	4.82	0.005	-0.058	0.014	0.012	0.008
0-9	High School	7.14	6.87	6.18	0.024	-0.035	0.066	0.069	0.055
0-9	Some College	8.91	7.79	7.52	-0.071	0.034	0.028	0.038	0.038
0-9	College	10.42	9.29	10.00	-0.052	0.144	0.027	0.036	0.04
10-19	Dropouts	6.68	5.96	5.11	-0.051	-0.084	0.016	0.013	0.011
10-19	High School	8.21	7.74	7.60	0.004	0.052	0.04	0.049	0.058
10-19	Some College	10.11	9.21	9.29	-0.052	0.079	0.011	0.019	0.034
10-19	College	11.29	10.64	11.38	0.003	0.138	0.011	0.017	0.036
20-29	Dropouts	6.17	6.31	5.81	0.085	-0.013	0.022	0.015	0.011
20-29	High School	8.22	7.96	7.74	0.03	0.042	0.04	0.038	0.049
20-29	Some College	9.23	8.90	9.64	0.027	0.15	0.009	0.012	0.022
20-29	College	12.04	10.54	11.25	-0.07	0.135	0.01	0.011	0.019
30+	Dropouts	6.38	6.59	6.20	0.095	0.009	0.04	0.029	0.019
30+	High School	8.39	8.07	7.96	0.024	0.056	0.045	0.048	0.046
30+	Some College	9.59	9.12	9.59	0.012	0.121	0.009	0.012	0.013
30+	College	12.50	10.52	11.15	-0.11	0.128	0.008	0.008	0.009

Source: Johnson and Bound, 1992.

all groups to be -1.0% for 1973-1979, and -0.8% for 1979-1988. When adjusting for wage supplements they find a per annum decline of 0.4 percent over the first period falling to a 0.7 percent per annum drop from 1979-1988. Weights are fixed using the industrial employment distribution of the first year in the interval.

The fixed-weight relative wage changes are calculated in log points using a numeraire of the mean log wage over all groups. Weights are fixed as above, and the relative wage changes measure the proportional change in relative wages between groups defined by education, experience and gender, with race, part-time employment, residence in an SMSA, region and industry held constant. Especially striking is the contrast in relative earnings for the 1979-1988 period between cohorts of low experience and educational attainment and college educated groups across both genders. Male groups recording gains over 1979-1988 were college graduates of all experience levels, the some-college cohort for the higher experience levels, and the high-school-dropout group for the highest experience level. High school dropouts of the three lower experience strata and the high-school-graduate and some-college cohorts from the lowest experience level recorded significant relative wage erosion. Women fared better overall for the period, but still suffered relative losses at the lowest education and experience levels.

Although results found in similar studies differ somewhat from those in Table 1 due to different methods of aggregation and wage imputation, the general trends are very similar, with increases in relative wage gains to women through the 1980's and declines in real wages for almost all groups. Tables 2 and 3 present comparable information in slightly different form.

Table 2.2
Change in Real Hourly Wage for Men by Educational Attainment 1973-1989
(1993 Dollars)

Education Cohort	Real Hourly Wage				Percent Change		Share of Workforce		
	1973	1979	1987	1989	1973-79	1979-89	1973	1979	1989
high school dropout	$11.85	$11.58	$9.93	$9.57	-2.3%	-17.4%	30.6%	22.4%	15.9%
high school graduate	14.02	13.49	12.24	11.83	-3.8%	-12.3%	38.1%	38.6%	38.7%
some college	14.73	14.29	13.74	13.41	-2.9%	-6.2%	15.6%	18.7%	21.0%
college graduate	19.41	18.10	18.32	18.16	-6.7%	+0.3%	8.9%	11.5%	14.2%
college & 2+ years	22.20	20.31	21.48	22.30	-8.5%	+9.8%	4.5%	6.1%	7.8%

Source: Adapted from Mishel and Bernstein, 1994

Table 2.3

Change in Real Hourly Wage for Women by Educational Attainment 1973-1989

(1993 Dollars)

Education Cohort	Real Hourly Wage				Percent Change		Share of Workforce		
	1973	1979	1987	1989	1973-79	1979-89	1973	1979	1989
high school dropout	$7.16	$7.44	$6.83	$6.64	+3.9%	-10.7%	25.4%	17.2%	11.2%
high school graduate	8.79	8.81	8.74	8.55	+0.2%	-2.9%	47.2%	46.8%	42.7%
some college	9.89	9.67	10.15	10.22	-2.3%	+5.7%	14.5%	19.6%	23.9%
college graduate	13.35	11.79	13.10	13.27	-11.6%	+12.5%	8.8%	10.4%	13.8%
college & 2+ years	17.36	15.35	16.99	17.44	-11.6%	+13.7%	2.3%	3.5%	5.8%

Source: Adapted from Mishel and Bernstein, 1994.

Table 4 describes trends in overall, between-group and within-group wage inequality. The 90/10 wage ratio is the difference between the log mean wage at the 90th percentile and the log mean wage at the 10th. The Experience/Entry wage ratio is computed for workers with 26-30 years experience and those with 1-5 years experience.

Table 2.4

90/10, 90/50, 50/10, Between-Group and Within-Group Wage Variation

Wage Differential	Wage Ratio (Log)			Percentage Point Change	
	1973	1979	1989	1973-79	1979-89
Total Wage Inequality					
90/10 Wage Ratio					
Weekly Wage	1.19	1.24	1.49	0.06	0.25
Hourly Wage	1.25	1.27	1.43	0.02	0.17
90/50 Wage Ratio					
Weekly Wage	0.58	0.57	0.68	-0.01	0.11
Hourly Wage	0.60	0.58	0.69	-0.02	0.11
50/10 Wage Ratio					
Weekly Wage	0.61	0.68	0.82	0.07	0.14
Hourly Wage	0.64	0.69	0.74	0.04	0.05
Between Group Wage Inequality					
College/H.S. ratio	0.33	0.29	0.43	-0.04	0.14
Experience/Entry ratio	0.44	0.46	0.57	0.02	0.11
Within Group Wage Inequality					
90/10 Wage Ratio					
Weekly Wage	0.96	1.06	1.20	0.10	0.14
Hourly Wage	0.98	1.00	1.11	0.01	0.10

Source: Weekly wage trends from Juhn et al. (1992) based on March CPS series. Hourly wage trends from Mishel and Bernstein.

2.3 Institutional Explanations

Two theoretical approaches have been used to explain these trends. One approach seeks to show increasing relative return to skill as primarily the result of institutional changes. These changes include the shrinking influence of trade unions, the decreasing real value of the minimum wage and government deregulation of industry. The other explains the increase in differentials using a market model, with rapidly increasing relative demand for skill outrunning the increasing relative supply of educated and experienced labor.

Collective bargaining typically expands between-group relative wages and compresses within-group relative wages. Union activity tends to raise the wage of union members relative to non-members while dampening wage variation within the union. Thus the overall impact on wage variation depends upon the extent of union coverage and the degree of centralization achieved in wage setting. Relative to most other developed nations the United States has a low level of union participation and a very decentralized system of wage bargaining. Centralized bargaining defines a process where negotiated wage agreements are accepted throughout an industry, a range of industries, or even an entire economy. Low levels of union participation imply that relatively few workers will obtain the benefit of collectively negotiated wage packages. Decentralized wage setting implies that variation between the negotiated packages of different unions will be relatively high. These characteristics have led to higher levels of wage variation within the United States than other developed nations, especially those of Europe (Blau and Kahn 1996, Katz, Loveman and Blanchflower 1995).

Union membership in the United States fell rapidly throughout the 1980's. Between 1979 and 1988 the membership rate fell from 24 to 17 percent for all workers, and from 31 percent to 21 percent among men (Fortin and Lemieux 1997). The rate for men declined relative to that for women, owing to a decline in private sector unionization relative to the public sector, which employs a higher proportion of women. Thus deunionization had greater impact upon relative wages among men than women. Fortin and Lemieux (1997) found that changes in the rate of unionization could explain 21.3 percent of the change in the variance of log wages for men from 1979-1988, but zero percent of the variance in log wages for women. Freeman (1993) found deunionization to explain 45% of the change in the white-collar/blue-collar differential between 1978

and 1988, along with 16% of the college/high-school differential. with decreased union density. Blackburn, Bloom and Freeman (1991) found deunionization to explain roughly 15-20 percent of the change from 1980-1988 in the wage gap between college educated white males and those with a high school diploma or less. This is in contrast to Bound and Johnson (1992) who could explain only 8 percent of the change in the college/high-school differential between 1979 and 1988. They multiplied an estimated union/non-union log wage differential of 0.15 by the change in the proportion of union men over the period to find this result.

The legislated minimum wage is also believed to affect relative wages by forming a "backstop" which serves to compress the low end of the wage distribution. Movement of the minimum wage upward through the distribution may also have spillover effects, as workers who make slightly more than the minimum are readjusted upward. These distortions of the wage distribution tend to reduce overall variation in wages. Of course the only groups who will be seriously affected are groups of low earning power. Women are traditionally more sensitive to movements in the minimum wage.

The real minimum wage tumbled 31.1% from 1979 to 1989. The impact of this decline on relative wages has been the subject of several studies, with mixed results. Bernstein and Mishel (1994) found the decline to be responsible for 11% of the change in the college/high-school and college/less-than-high-school differentials for males, when spillover effects were accounted for. For females, they also found the decline to explain 23% and 26% of the changes in the college/high school and college/less than high school differentials respectively. When looking at changes in the level of real hourly wages, they found the change in the minimum wage to explain only 11% of the decrease in wages for males of high school education and less, but 54% of the decrease for less than high school women and 124% of the decrease for women of high school education.

Blackburn, Bloom and Freeman (1990) found that the decline in the real minimum wage from 1980 to 1988 could explain very little of the growth in the college-graduate/high-school-dropout differential and none of the college-graduate/high-school-graduate differential. While they did not correct for spillover effects, the method used was otherwise similar to that of Bernstein and Mishel, involving a simulated redistribution of income to 1988 workers earning a wage lying between the 1988 and 1980 real minimum wages, pushing their

earnings up to the latter level. Wages for workers earning less than the 1988 real minimum were adjusted upward by 40%.

Fortin and Lemieux (1997) found the change in the real value of the minimum wage to explain 24.2% of the change in the variance of log wages for men and 32.1% of the change in the variance for women from 1979-1988. In general the change in the real minimum wage affected the wage distribution of women to a much higher degree than men, owing to substantial truncation of their distribution by the minimum wage in 1979. The real minimum wage was in fact the mode of the distribution. As the real minimum wage declined, the bottom end of the distribution tailed out, resulting in significant real losses for the lowest earning women.

Some investigators hypothesize the flurry of government deregulation in the late 70's and early 80's to have been responsible for a share of the change in relative and real wages, because in theory government regulation provides habitat for economic rent in the affected industries. Workers can then capture some of these rents and improve their real and relative wage position. The effect of this action on overall relative wages depends upon the original wage position of such workers. If they are in a low wage percentile, erosion of their position could easily generate increasing overall variation in wages and increasing relative wages of the higher earning cohorts.

Government deregulation may also have an effect upon the employment structure. If the regulated industries are being forced or subsidized to engage in unprofitable production, the relaxing of controls will lead to a decline in production and derived demand for employment within that sector. If the workers turned free into the job market must take new jobs at lower wages, this might put pressure on relative wages. Again, this depends upon the distribution of wages and the relative position of the displaced workers within that distribution.

In the late 1970's and early 1980's the United States deregulated the transportation, communications, financial and energy industries (Fortin and Lemieux, 1997). With the exception of the financial sector, these industries tend to be well unionized. This implies a possible interaction between deregulation and deunionization. In fact, Fortin and Lemieux found that only 2.6% of the change in variance in log wages of

men and 0.1% of the change in variance for men and women from 1979 to 1988 could be explained by the effect of deregulation when both unionized and nonunionized workers were considered. This expanded to 13.3% when only union men were considered. The model performed poorly in the explanation of the variance in women's log wages. By this analysis, deregulation is not a leading candidate to explain growth in wage variance, except within the cohort of union males.

2.4 Market Explanations

In contrast to these institutional arguments, many researchers have attempted to interpret changes in relative wages with shifts in the relative supply and relative demand for labor of various skill levels. The relative supply of highly skilled labor increased throughout the 1970's and 1980's. In the absence of change in relative demand, this increase in relative supply would imply decreases in the relative wages of highly skilled groups. Decreases were evident in the 70's, but not in the 80's. Thus a shift in demand toward skilled labor is required to explain the increase in relative wages through the latter decade. Two main hypotheses attempt to account for this demand shift.

The first hypothesis places responsibility for the shift upon increased international trade and outsourcing of production. The U.S. imports chiefly low skill intensive goods and exports high skill intensive ones, so increased trade implies an increase in derived demand for highly skilled labor and a drop in derived demand for low skill labor. Outsourcing exploits the comparative advantage of low skilled labor overseas, and likewise implies decreased derived demand for domestic labor of low skill.

The second hypothesis proposes skill biased technical change. This change increases the relative productive capacity of highly skilled workers, which inspires an increase in the relative demand for their services. The primary difficulty with this hypothesis concerns its testability. It is generally very difficult to measure technical change and observe its effect. New ideas and new machines are incorporated so quickly and thoroughly into the productive fabric of American industry that their effect upon productivity rapidly becomes inseparable from the effects of other explanatory variables. The impact of technical change has traditionally been measured with an unobserved residual, i.e. it is often considered the source of whatever increased

productivity that cannot be associated with other observable causes. As a result, data sets containing both relevant wage information and detailed description of technology are very difficult to find. For these reasons, attempts to confirm the first hypothesis have attracted substantially more empirical effort than the second, and failure to confirm the first is considered passive evidence for the second.

Katz and Murphy (1992) used a supply and demand framework to examine the relationship between relative factor prices and supplies. They concluded that stable factor demand was not consistent with a negative covariance of prices and supplies. A growth trend in factor demand that accelerated slightly in the 80's would be required to explain increasing returns to skill in a market framework. This increase in factor demand must be composed largely of within-group shifts in relative demand for skill with between-group shifts of lesser importance. Skill biased technical change implies changes in within-group factor demand as well as changes in between-group demand. Trade deficits and the consequent shift away from low skill intensive industries is consistent with changes in between-group factor demand, but less consistent with changes in within-group demand. They also found that growth in within-group residual wage inequality began in the early 70's, where the growth in between-group wage inequality did not commence until the 80's, with groups defined by experience and education. This implies that increasing returns to characteristics not defined by experience or education were present before the acceleration of between-group relative wages in the 80's. They did not rule out trade deficits as a source of change in relative earnings, but their analysis suggested an important role for skill biased technical change as a source of increased relative demand for skill.

Murphy and Welch (1993) decomposed variation in the relative employment of college graduates from 1968 to 1988 across 12 industry aggregates into a component of within-industry change in relative employment of college graduates and a between-industry component determined by the changing employment of all groups within that industry relative to total employment.[1] They argued that since increased trade implies a relative increase in employment for high skill intensive industries (professional services and high skill manufacturing), and a decrease in the employment share of low skill intensive manufacturing and natural

[1] If the fraction of overall labor employed in industry j in year t is K_{jt} and the share of college labor employed in industry j is R_{jt}, for t=1,2; then the aggregate fraction college, R_t, can be written $R_t = \sum_j K_{jt}R_{jt}$, and the change in this fraction from year 1 to year 2 is given by: $\Delta R_r = R_1 - R_2 = \sum_j (K_{j1}R_{j1} - K_{j2}R_{j2}) = \sum_j (K_{j1} - K_{j2})(R_{j2} - R_2) + \sum_j K_{j1}(R_{j1} - R_{j2})$. The first term captures the effect of the change in industrial composition, the second term captures the change in the effect of within-industry changes in the employment of college labor.

resource industries, then the absence of a strong between-industry component to the change in the relative employment of college graduates is evidence against the trade hypothesis. They found changes in the composition of industry to account for only 19% of the total increase in college employment. This implied strong within-industry increases in the relative employment of college-educated labor, despite its increased relative price. Thus they concluded that expanding international trade could explain a portion of the change in relative demand for college graduates, but certainly not the whole pie or even a very large piece. They looked to technical change as a primary source of residual explanation.

Borjas and Ramey (1994) used time series analysis to show that movements in the college/high-school-dropout and college/high-school-graduate relative wages over the span 1963-1988 were highly correlated and Granger-caused by changes in the trade deficit of durable goods. Their estimates of the coefficients on import durables and export durables indicated imports to have a 35 to 65 percent greater impact on relative wages than exports.

They hypothesized that the high concentration of firms in the durable goods industries led to the generation of rents which are partially exploited by workers within these industries, primarily high school graduates and dropouts. Increasing imports of these goods implies foreign firms are able to capture some of these rents, forcing the average wage within these industries to decrease while domestic employment also drops. Thus the college premia may increase in two ways. First, through the reduction of average wages within industries which employ large proportions of less educated workers, and second through the migration of substantial numbers of former durables workers into more competitive, lower wage sectors of the economy. An implication of this model is that the wage bills of firms within these concentrated industries should decrease relative to the rest of the economy with increases in the durable goods trade deficit. Thus movement in the wage bills should be correlated with movement in college wage premia.

Berman, Bound and Griliches (1994) analyzed the employment structures of four-digit manufacturing industries for shifts from production to nonproduction employment for the period from 1959-1987. They decomposed employment shifts for these industries into a between-industry component and a within-industry component. They found that between-industry shifts could account for less than one-third of the movement from production to nonproduction workers over the period 1979-1987. They further decomposed the within

and between-industry components into components of changes in imports, exports, domestic consumption and defense procurements. They found the defense component to dominate the between-industry share of change in employment structure, and for domestic consumption to far and away carry the within-sector share. Imports and exports accounted for about 30% of the between-industry share from 1979-1987, but had no real influence upon the within-industry component. Thus changes in trade and defense expenditures had some influence on the shift from production to nonproduction workers in manufacturing industries, but primary responsibility could only be attributed to the residual "domestic consumption" sector. From this they inferred the most important source of skill upgrading was biased technological change.

They also explored possible sources of within-industry changes in employment shares of nonproduction labor, applying regression analysis to estimate the relationship between within-industry variation in the nonproduction share of the wage bill and the change in the log relative wage of nonproduction labor and changes in the log ratios of capital, plant and equipment to real output. The relative wage was assumed constant across industries to circumvent endogeneity bias. The estimated coefficients suggested that capital accumulation was capable of explaining little of the observed skill upgrading. They considered this to be more evidence for explanation through biased technological change.

Lawrence and Slaughter (1993) presented formidable evidence challenging the importance of trade in the growth of skill premia. Following the Stolper-Samuelson international trade theorem, they argued that a rise in the relative wage of nonproduction to production workers should accompany an increase in the relative price of goods produced with a high relative intensity of nonproduction labor. A rise in this relative wage would also imply increased substitution of relatively less expensive production labor for the relatively more expensive nonproduction labor. With this in mind they examined data on U.S. manufacturing from 1979 to 1989. They found that only 10% of the industries combined increased relative nonproduction/production wages with decreased relative nonproduction/production employment. They also compared percentage changes in import and export prices over the 80's with the ratio of nonproduction to production labor employed in 1979 by the industries manufacturing these goods. Although by Stolper-Samuelson they could expect a positive relation between the change in output prices and the relative use of nonproduction labor, they

in fact observed no relation or a small negative relation. They concluded from this that the Stolper-Samuelson effect was dominated by some larger effect.

Lawrence and Slaughter also calculated weighted-average total factor productivity (TFP) increases for import and export industries, using nonproduction and production-labor shares as weights. They found that for import industries, TFP weighted by nonproduction-labor shares rose by 20.5 percent over the 1980's, but TFP weighted by production-labor shares increased only 11.9 percent. Similarly, for export industries nonproduction weighted TFP increased 18.6 percent, while production weighted TFP climbed only 10.7 percent. They concluded that technological progress was concentrated in skilled-labor intensive industries. Combined with the fact that the relative employment of nonproduction labor increased within these industries over this period, this implied that biased technological change was primarily responsible for increasing returns to skill.

Concerning concrete evidence of biased technological change, Mincer (1993) using time series analysis, presented results showing positive correlation between college/high-school-wage differentials and research and development expenditures per worker, as well as expenditures on capital equipment per worker over the period 1963-1987. A variable measuring the ratio of net exports to GNP had a negative effect upon the wages of young high school graduates, but not upon the wages of older high school or college graduates. Krueger (1993) examined CPS data from October of 1984 and 1989 in an effort to determine whether the use of computers at work conveyed an earnings premium to workers. These surveys contained supplemental questions on computer use. His results suggested that employees who use computers at work earn a 10-15% premium. He also found that between 33% and 50% of the increase in the rate of return to an additional year of education could be explained with the expansion of computer use.

Johnson and Bound (1992) formulated a test to discern the relative contributions of labor supply, labor demand, changes in employment structure, wage premia and technology to changes in real and relative wages over the period 1973-1988. Using a constant elasticity production function they determined that rents (industry wage premia), structure, supply and demand could not explain a significant amount of variation in the education, gender and experience wage differentials. They attributed the unexplained residual to a combination of biased technical change and unobserved labor quality.

They approximated the impact of changes in rents and structure with the expression $\Sigma_j(\phi_{ij}\Delta M_j + M_j\Delta\phi_{ij})$, where ϕ_{ij} is the proportional employment of cohort i in industry j and M_j is the estimated wage premium for industry j, both measured at the beginning of the period. Changes over the period are given by the Δ's. The first term in this expression gives the effect of changes in industry wage premia upon real or relative wages, and the second term gives the impact of changes in the industrial structure of employment.

They divided the sample into two periods, 1973-79 and 1979-88. Over the first period they found a general compression of relative wages, particularly the college/high-school differential for both men and women. This trend reversed in the second period, with the college/high-school, high-school/dropout and old/young (non-college) differentials increasing for both men and women. The college/high-school log wage differential was particularly expansive, growing 0.163 for men and 0.118 for women from 1979-1988. Of the 0.163 log increase for men, 0.016 was due to changes in the structure of employment, and 0.020 was caused by changes in industry employment rents. Changes in structure were responsible for 0.010 of the increase in the log wage differential for women, and 0.005 of this increase was the result of changes in wage premia. Clearly, they did not find changes in structure and rents to be highly effective in increasing college/high-school wage differentials over the period, and these changes were found to have even less input into the increase of the other differentials.

Bound and Johnson surveyed 17 industries in the imputation of rents and proportional employment. To glance at results from a few important industries, they found rents to increase in durables/mining, nondurables, finance, business services and professional services from 1979-88, and decrease in construction, transport, retail trade, entertainment and personal services. Proportional employment increased in retail trade, finance, business services, entertainment, personal services and professional services, but decreased in durables/mining, nondurables and transport over the period. Proportional employment in the construction industry held constant.

2.5. Summary

The most important sources of wage variation are not yet articles of consensus. The debate is only beginning, and new proposals may be brought forth. What the debate needs most is more data to substantiate the arguments. But most analysts would probably concur with Robert Topel, "If skill-biased technical change is the underlying cause of rising inequality, then policy options for reducing inequality are severely limited. The demand for low-wage American men will not improve on its own, so the solution is to affect supply through education and training. Even if we assume that private and public decisions respond to the demand for greater skills, however, the flow of such investments will only slowly reduce the stock of low-skilled labor. Under these conditions, wage inequality close to the levels that we observe today will be with us for the indefinite future." (Topel 1997).

CHAPTER III

METHODOLOGY

3.1 Introduction

This chapter describes the techniques used to define, measure and decompose changes in relative wages which occurred in the Pacific Northwest from 1977 to 1993. A relative wage is the ratio of wages between any pair of demographic groups, and is taken to reflect their relative economic status and earning power. The concern of this thesis is to examine movement in relative wages between cohorts of different gender, potential work experience and educational attainment. These characteristics are chosen to define groups because of their importance in determining earnings, their empirical simplicity and policy relevance. Change in these relative wages will be decomposed into changes due to variations in industry wage premia, the industrial structure of employment and exogenous market forces.

Data from the Current Population Survey is first aggregated over two time periods spanning 1977-1981 and 1988-1993. Observations are restricted to individuals working for wages or salary under one employer; self-employed persons are not included. These individuals are divided into demographic cohorts based upon gender, potential work experience and educational attainment. Hourly wages are imputed, deflated and adjusted for supplemental income. For each cohort, an earnings function is estimated using regression analysis. Wages are considered to be a function of a set of explanatory variables representing demographic features and other significant characteristics such as state of residence, year of observation, occupation and industry. Estimated coefficients from these regressions are used to derive mean wages for each cohort. These predicted mean wages are used to derive relative wages using the predicted mean wage of a base cohort as numeraire. The proportional change of the relative wage between two cohorts over the interval (t_2-t_1) is shown to be equivalent to the difference of their change in log mean wage.

The coefficients on the industry indicators in the earnings regression for each cohort are averaged using weights of proportional employment by industry to find a mean industry effect. Subtracting this mean effect from the mean log cohort wage and adding coefficients from the individual industry dummies gives the mean log cohort/industry wages (Y_{ij}). This assumes that industry effects are constant across cohorts. These mean log cohort/industry wages are then used as the dependent variable in a regression against dummies for cohort and industry. This decomposes the Y_{ij}'s into a demographic component, an industry component and a competitive residual component. The industry coefficients are then used to derive a vector of log wage premia by industry. These industry premia are used in conjunction with the values for proportional cohort employment by industry to derive the contributions of changes in industry premia and industry employment structure to the proportional change in relative wages. The method closely follows that of Bound and Johnson (1992).

3.2 Data

The data used in the analysis were taken from the March Demographic section of the Current Population Survey. The population is the civilian, noninstitutional population and members of the Armed Forces living in housing units. A probability sample is used in selecting housing units. The March Demographic section of the survey is used, which provides demographic and employment information from recipients of the questionnaire concerning their activities over the previous calendar year. Observations were taken for more than 25,000 individuals in the states of Montana, Idaho, Oregon and Washington. Variables considered are state of residence, age, sex, marital status, race, highest grade completed, weeks worked per year, average hours worked per week, occupation by major category, industry of employment by major category, value of compensation and form of compensation (wages and salaries, self-employed, farm self-employment).

Analysis is restricted to individuals 16 to 65 years of age working for wages or salary from only one employer, with no income from self-employment. Individuals with more than one employer are not included because of uncertainty with regard to their industry of employment. The period of interest is the 1980's. Data

from 1977, 1978 and 1981 is grouped to form a set of observations for the starting point of the period.[2] The endpoint of the period is aggregated from the years 1988-1993. Value of compensation is top-coded at $50,000 for the first time period and $99,999 for the second. This implies some downward bias on earnings estimations, but the bias is assumed negligible owing to the small number of observations involved.

These observations are divided into six demographic groups defined by potential work experience and educational attainment. Potential work experience is defined to be an individual's age less his completed years of schooling and five years of preschool development. Educational attainment is simply years of schooling completed. Two categories of experience, less than fifteen years and fifteen years or greater, and three categories of educational attainment, high school dropout, high school graduate and college graduate, are used. These six initial groups are expanded to twelve with the addition of a gender category.

Nominal hourly wages are calculated for the included individuals, using data on weeks worked per year, hours worked per week and total wage/salary compensation. Total compensation is divided by hours worked per year to impute an hourly wage. This hourly wage is deflated to 1988 dollars using the GDP deflator for personal consumption expenditures, and adjusted for fringe benefits and employer contributions to social insurance. These unobserved elements of compensation are estimated using an adjustment index which gives the ratio (by year) of supplemental income to total wage and salary compensation for the nation. The GDP deflator and supplemental income index were obtained from the national income accounts.[3]

3.3 Imputation of Mean Cohort Wages

The determination of mean cohort wage requires the specification of an earnings function. This function relates earnings to a host of explanatory demographic and employment variables.

The general specification is:

(Eq. 3.1) $Y_i = \beta_i X_i + \alpha_i T_i + \theta_i I_i + \sigma_i O_i + \varepsilon_i;$

[2] Data from 1979 and 1980 were not available.

[3] Economic Report of the President, 1994.

where Y_i is the log of the adjusted real wage for cohort i, $\mathbf{X}_i$ is a vector of demographic variables, $\mathbf{T}_i$ is a vector of dummy variables for year, $\mathbf{I}_i$ is a vector of industry dummies, $\mathbf{O}_i$ is a vector of dummies for occupation, β_i, α_i, θ_i and σ_i are coefficient vectors and ε_i is an error term. There are m cohorts i, n industries j, and q=m*n cohort/industry combinations ij. The independent variables are chosen to meet two constraints. First they must conform with economic theory. Since theory predicts that compensation is determined by productivity, then the explanatory variables for real wages must determine (in theory at least) the productivity of labor. The second constraint is the availability of data. For instance, these regressions use potential experience and years of formal education as proxies for skill. This is obviously a crude approximation of a worker's total human capital, but experience and education are easily measurable and readily found in available data sets. Other valuable components of skill, such as the ability to get along with co-workers or learn tasks quickly and easily, are generally difficult to quantify and are not found in the CPS.

The demographic variables included in $\mathbf{X}_i$ are potential experience, completed years of formal education, gender and marital status, race, employment status (part or full-time) and state of residence. With the exception of experience and education, these characteristics are represented with indicator variables.

To compute cohort mean log wages this function is estimated separately for each cohort, using the notion of a "representative worker" for whom all characteristics except cohort membership are held constant. The mean log wage for cohort i is then given by equation (3.1) when evaluated at chosen midpoints of experience and education for a white male of mean marital status, working full-time in a mean occupation, industry, state and year. Mean marital status, occupation, industry, state and year are given by the mean values of the respective indicator variables.[4] The mean for year is calculated separately for each time period. The means for the other indicators are averaged from an aggregation of both time periods. Exponentiating (Y_i) then gives the geometric mean wage for cohort i, evaluated for consistent demographic characteristics across the time interval.

[4] Means and standard deviations may be found in Appendix A.

3.4 Derivation of Relative Wages from Mean Cohort Wages

The relative wage of cohort i is defined as the ratio of the estimated (geometric) mean wage of cohort i to that of a numeraire. This is expressed $R_{ib} = W_i / W_b$; where R_{ib} is the relative wage of cohort i, $W_i = \exp(Y_i)$ and $W_b = \exp(Y_b)$. Thus the relative wage of groups i and k is:

(Eq. 3.2) $R_{ik} = W_i / W_k = (W_i / W_b) / (W_k / W_b) = R_{ib} / R_{kb} = \exp(Y_i) / \exp(Y_k) = \exp(Y_i - Y_k)$.

The interest is in the movement in relative wages over a specified period of time. This is expressed as the proportional change in a relative wage. Thus if $R_{ik,1}$ is the relative wage of groups i and k at time 1, and $R_{ik,2}$ is the relative wage at time 2, then $\ln(R_{ik,2}/R_{ik,1})$ gives the proportional change in the relative wage of groups i and k over the interval.

So, by substitution $\ln(R_{ik,2}/R_{ik,1}) = \ln[\exp(Y_{i,2}-Y_{k,2})/\exp(Y_{i,1}-Y_{k,1})] = \ln[\exp((Y_{i,2}-Y_{i,1})-(Y_{k,2}-Y_{k,1}))] = \Delta Y_i - \Delta Y_k$. Thus the proportional change in the relative wage of cohorts i and k is given by the difference in the change in the log wage of cohort i and the change in the log wage of cohort k.

The derivation of the values of ΔY_i and the proportional changes found in the relative wages follow readily from the estimation of the Y_i's over the two time periods.

3.5 Decomposition of Proportional Change in Relative Wages

The analysis of the proportional change in a relative wage consists of an assessment of the contribution of changes in industry wage premia and the industrial structure of employment to this change. To aid in this assessment a q×1 vector **Y** of mean log wages by cohort and industry is created. The elements of **Y** (Y_{ij}) are formed in similar fashion as Y_i, but evaluated for specific industries rather than a mean industry. The wage rate by cohort and industry is assumed to be the product of a competitive wage and a relative rent, or wage premium associated with the industry of employment. Wage premia are the non-competitive components of wages. This is expressed: $W_{ij} = W_{ic} * \mu_{ij}$; where W_{ij} is the mean wage for members of cohort i employed in industry j, W_{ic} is the competitive wage for cohort i, and μ_{ij} is the wage premium associated with

cohort i and industry j. W_{ic} is assumed to be determined in the national labor market and exogenous to the model.

The log geometric mean wage (Y_i) is thus given by:

(Eq. 3.3) $Y_i = \ln[\Pi_j(W_{ij})]^{1/n} = \ln[\Pi_j (W_{ic}\,\mu_{ij})^{1/n}] = \ln(W_{ic}) + \ln(\Pi_j\mu_{ij})^{1/n} = Y_{ic} + (1/n)\Sigma_j M_{ij}$;

where Y_{ic} is defined to be $\ln(W_{ic})$ and M_{ij} is defined to be $\ln(\mu_{ij})$. Then define ϕ_{ij} to equal N_{ij} / N_i, where N_i is the supply of workers in cohort i, and N_{ij} is the supply of workers in cohort i and industry j. Thus ϕ_{ij} denotes proportional employment of industry j within cohort i. Thus we can write: $Y_{ic} + \Sigma_j\phi_{ij}M_{ij} \cong Y_{ic} + (1/n)\Sigma_j M_{ij} = Y_i$.[5]

The change in this wage is found with:

(eq. 3.4) $dYi = dY_{ic} + \Sigma_j(\phi_{ij}\, dM_{ij} + M_{ij}\, d\phi_{ij})$.

In this fashion Y_i can be decomposed into a change in the competitive cohort wage (dY_{ic}), a change in log industry wage premia (ΣdM_{ij}), and a change in the composition of employment within industries ($\Sigma d\phi_{ij}$). The change in cohort competitive wage is assumed to be determined in the national labor market and will be ignored in this analysis. The ($\phi_{ij}\, dM_{ij}$) factor of the second piece of the differential represents the contribution of a change in the ij^{th} industry premium weighted with the proportion of cohort i employed in industry j. The ($M_{ij}\, d\phi_{ij}$) factor represents the contribution of a change in the structure of employment by industry j within cohort i. In this way the proportional change in the relative wage R_{ik} between time periods t_1 and t_2, found above to be given by (ΔY_i - ΔY_k), can be decomposed into a competitive component, a premia component and a structure component.

The competitive component is assumed exogenous. The ϕ_{ij}'s can be imputed from the proportion of workers working in the various industries. To find the M_{ij}'s, it is assumed that industry wage premia are constant across the cohort strata. Mathematically, $\mu_{ij} = \mu_j$. Therefore, $M_{ij} = M_j$. This assumption is supported by evidence gathered by Johnson and Bound (1992). The q×1 vector Y of elements Y_{ij} is regressed against a matrix of dummy variables for demographic group and a matrix of dummies for industry. This decomposes the Y_{ij}'s into a group effect and an industry effect. The regression may be expressed:

(3.5) $\mathbf{Y} = \rho + \mathbf{D}\gamma + \mathbf{I}\delta;$

where **Y** is the stacked q×1 vector of Y_{ij}'s, **D** is a q×m matrix of dummy variables for demographic group, **I** is a q×n matrix of industry dummies, γ is an m×1 vector of coefficients on the demographic dummies, δ is an n×1 vector of coefficients on the industry dummies and ρ is a q×1 vector of residual values.

The vector δ gives the industry effect. δ_{ij} is the contribution of industry j to the mean log wage for individuals of cohort i employed in industry j. The difference between each element in δ and the mean of all elements in δ is an estimate of the log industry premium, M_j.

This difference is shown by:

(3.6) $M_j = \delta_j - \Sigma_k\delta_k/n;$

where δ_j is the j^{th} element of δ, and n gives the number of industries.

As found above, the proportional change in the relative wage of groups i and k over the time interval (t_2-t_1) is given by $(Y_i - Y_k)$, where Y_i is the estimated mean log wage for cohort i. Equation (3.4) gives the differential for a change in Y_i. The second part of the right half of the equation can be estimated empirically with:

(3.7) $\Sigma_j(\phi_{ij}\, dM_{ij} + M_{ij}\, d\phi_{ij}) \equiv \Sigma_j\phi_{ij}^{*}\,\Delta M_j + \Sigma_j M_j^{*}\,\Delta\phi_{ij};$

where ϕ_{ij}^{*} and M_j^{*} are the values of ϕ_{ij} and M_j at the beginning of the interval. $\Sigma_j\phi_{ij}^{*}\Delta M_j$ gives the estimated contribution of changes in wage premia to the proportional variation in the mean log wage of cohort i. $\Sigma_j M_j^{*}\,\Delta\phi_{ij}$ gives the estimated contribution of changes in the structure of industrial employment in cohort i to the proportional change in Y_i. Likewise $(\Sigma_j\phi_{ij}^{*}\,\Delta M_j - \Sigma_j\phi_{kj}^{*}\,\Delta M_j)$ gives the premia contribution to proportional change in R_{ik}, and $(\Sigma jMj^{*}\,\Delta\phi_{ij} - \Sigma_j M_j^{*}\,\Delta\phi_{kj})$ gives the structural contribution.

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[5] This uses a simplifying assumption used by Bound and Johnson 1992.

CHAPTER IV

RESULTS

4.1 Introduction

This chapter presents the results of the relative wage analysis. In the main predicted mean real wages declined over the period in the region as they did in the rest of the nation. The decomposition of mean and relative wages revealed that changes in industry premia and employment distributions had little influence on observed variation in all but a few cases. In some instances changes in wage premia and the industrial composition of employment contributed to growth in wage inequality; in others, it served to reduce such growth.

4.2 Six Cohort Analysis

4.2.1 Trends in Real and Relative Wages

Table 4.1 presents estimated starting and ending real hourly wages for cohorts defined by education and experience, evaluated for a white male of mean marital status, working full-time in a mean occupation, industry, state and year. Also shown are the percentage change in wages over the period, log wages, changes in log wages, distribution by cohort of employment for the beginning and endpoints of the period, and the changes in these employment distributions.

Real wages decreased for all cohorts. This means that real wages were decreasing as the economy expanded in the mid-to-late 80's. Note the sharp reductions in real wages for high school dropouts and graduates of low experience. A small surprise is that high school graduates of high experience suffered a smaller drop in real wages than college graduates of high experience. This result differed from the national

trend and reflects a softening job market for experienced college graduates. A sharp decrease is also seen in employment for dropouts of high experience, with concomitant milder increases in employment for high school and college graduates of high experience. This shows the steadily increasing educational attainment of the workforce. The employment share of young dropouts also decreased over the period, implying same sign movements of wages and quantity demanded of the lowest skilled labor. This suggests an inward shift in demand for the skills of high school dropouts. The percentage decrease in real wages for the aggregate of all cohorts was less than that of any cohort taken individually. This curious effect is due to the shift toward increased employment of the higher earning cohorts and the consequent upward bias on the aggregate real wage.

Table 4.1
Estimated Real Hourly Wages, Real Log Wages and Employment Distributions for Six Cohorts from 1977-1981 to 1988-1993. (1988 dollars)

Cohort	Adjusted Real Wages			Log Adjusted Real Wages			Employment Distributions		
Education	1977-81	1988-93	%Change	77-81	88-93	Log Change	77-81	88-93	ΔEmp
Low Experience (<15 years)									
Dropout	5.24	3.92	-25.2	1.66	1.37	-0.290	0.115	0.074	-0.041
HS Grad	7.84	6.43	-18.0	2.06	1.86	-0.198	0.228	0.246	+0.018
C. Grad	10.31	10.14	-1.6	2.33	2.32	-0.016	0.090	0.082	-0.008
High Experience (≥15 years)									
Dropout	9.23	8.33	-9.8	2.22	2.12	-0.103	0.247	0.071	-0.176
HS Grad	10.22	10.01	-2.1	2.32	2.30	-0.020	0.257	0.393	+0.136
C. Grad	15.12	14.34	-5.2	2.71	2.66	-0.053	0.064	0.134	+0.070
All Workers									
All	9.18	9.16	-0.3	2.22	2.21	-0.003	Not Applicable		

Table 4.2 gives real and log wages for the five cohorts of higher skill relative to the low experience dropout cohort. Changes in these wages over the period are also given. Within levels of experience, changes in relative wages increase with education except for the high experience college graduate cohort. The sheer magnitude of these wages is also of interest. If one assumes that a high school dropout of low experience in 1990 was earning a "living wage", or enough to keep one adult alive, then a low experience college graduate was earning enough to keep two and a half adults alive, perhaps enough to start a family. Of course a glance at Table 4.1 might suggest that a low experience dropout was not earning a living wage in 1990. Three dollars

and ninety-two cents[6] per hour suggests he would have had to have a pretty small appetite, and a strong penchant for living outdoors.

Table 4.2
Estimated Real Relative Wages and Log Relative Wages by Cohort, 1977-81 to 1988-93
Using Low Experience Dropouts as Numeraire

Cohort	Real Relative Wages			Log Real Relative Wages		
Education	1977-81	1988-93	% Change	1977-81	1988-93	Log Change
Low Experience (<15 years)						
HS Grad	1.50	1.64	+ 9.3%	0.403	0.495	+0.092
C Grad	1.97	2.59	+31.5%	0.677	0.951	+0.274
High Experience (≥15years)						
Dropout	1.76	2.13	+21.0%	0.566	0.754	+0.188
HS Grad	1.95	2.55	+30.8%	0.668	0.938	+0.270
C Grad	2.89	3.66	+26.7%	1.060	1.297	+0.237

Table 4.3 gives relative wages and their changes by education, holding experience constant.

Table 4.3
Estimated Relative Wages and Log Relative Wages by Education, 1977-81 to 1988-93

Cohort A / Cohort B	Real Relative Wages			Log Real Relative Wages		
Education	1977-81	1988-93	% Change	1977-81	1988-93	Log Change
Low Experience (< 15 yrs)						
HS Graduate / Dropout	1.50	1.64	+9.3%	0.403	0.495	+0.092
College Grad / HS Grad	1.31	1.58	+20.6%	0.274	0.455	+0.182
College Grad / Dropout	1.97	2.59	+31.5%	0.677	0.951	+0.274
High Experience (≥ 15yrs)						
HS Graduate / Dropout	1.11	1.20	+8.1%	0.102	0.184	+0.082
College Grad / HS Grad	1.48	1.43	-3.3%	0.392	0.359	-0.033
College Grad / Dropout	1.64	1.72	+4.9%	0.494	0.543	+0.049

For the low experience cohorts, changes in relative wages steadily increase with education, showing the substantial increase in the relative return to a college degree over the period. This relationship does not hold for the high experience cohorts, with the college/high-school differential actually *decreasing* over the period. The change in the high-school/dropout relative wage is also more pronounced than the change in the

[6] 1988 Dollars

college/dropout differential. These results show the increase in the relative return to a high school diploma for workers of high experience, providing material for interesting speculation. This may be an effect of downsizing, as less-productive members of the college-educated cohort are removed from management positions to become re-employed in lower paying jobs.

Table 4.4 shows relative wages and their changes by experience, holding education constant.

Table 4.4
Estimated Relative Wages and Log Relative Wages,
High Experience / Low Experience, 1977-81 to 1988-93

Education Level	Real Relative Wages			Log Real Relative Wages		
	1977-81	1988-93	% Change	1977-81	1988-93	Log Change
HS Dropout	1.76	2.13	+21.0%	0.566	0.754	+0.188
HS Graduate	1.30	1.56	+20.0%	0.265	0.443	+0.178
College Graduate	1.47	1.41	-4.1%	0.383	0.346	-0.037

Returns to experience increased substantially for high school dropouts and graduates, but decreased a bit for college graduates. This reflects the strong performance of young college grads over the period, along with the real losses sustained by the young cohorts of less education.

4.2.2 Decomposition of Real and Relative Wages

The following section gives results from the decomposition of real and relative wage changes using the method described in chapter three. Listed for each cohort or cohort pair are their respective real and relative wages, the effect upon these wages due to changes in industry wage premia (rents), the effect due to changes in the industrial structure of employment, and the sum of these two effects.

Table 4.5 gives results from the decomposition of changes in log wages by cohort. All six cohorts were affected positively by changes in rents. This indicates these cohorts had substantial employment in rising rent industries. For young high school graduates and all three older cohorts this was combined with a negative structural effect. For these four cohorts a positive net change in rents was combined with significant movement out of high rent industries or into low-rent industries. Seven industries showed an increase in wage premia over the period. They include nondurable goods, retail trade, finance et.al., personal services,

professional services, mining and public administration. Of these seven, the first five carried wage premia less than zero in the first period, with only mining and public administration considered "high rent" industries. Of the five low rent industries, only finance and professional services showed an increase in proportional employment over the period. Both mining and public administration suffered drops in employment though decline in the latter was very small.

Table 4.5

Analysis of Changes in Log Wages for Six Cohorts from 1977-81 to 1988-93

Education	Change in Log Wages	Change Due to Δ in Rents	Change Due to Δ in Structure	Total
Low Experience (< 15 yrs)				
HS Dropout	-0.290	+0.0076	+0.0047	+0.0123
HS Graduate	-0.198	+0.0072	-0.0219	-0.0148
College Grad	-0.016	+0.0152	+0.0065	+0.0217
High Experience (≥ 15yrs)				
HS Dropout	-0.103	+0.0077	-0.0222	-0.0145
HS Graduate	-0.020	+0.0066	-0.0076	-0.0011
College Grad	-0.053	+0.0113	-0.0018	+0.0096

Note that low experience dropouts are the cohort that suffered the greatest wage losses over the period, with a 25% drop in their real wage, yet changes in rents and employment had a *positive* effect upon this wage. Thus the cohort of greatest concern might actually lose ground under policy prescriptions designed to ameliorate industry changes. Perhaps the most important implication of this decomposition is the small effect upon wages of changes in wage premia and industry structure. The total effect is generally less than two percent. This indicates that wages in the Pacific Northwest were dropping due to forces working in the national labor market, captured within the residual term of the decomposition.

Table 4.6 gives the decomposition of relative wages into rent and structure components. Four out of six premia effects and five out of six industry structure effects are positive, indicating that changes in rents and structural employment helped to expand the relative wage gaps between skill groups and therefore contributed to wage inequality. Only the low experience high-school/dropout differential showed a negative total effect. It is important to note, however, that all of these effects were quite small. The low experience college/high-school differential increased almost 21%, but the combined effect of rent and structure changes boosted the

differential less than 4%. The low experience college/dropout relative wage swelled over 30%, but rent and structure effects were responsible for only a negligible portion. The primary source of increase in these differentials must have been changes in the national labor market, not observable through changes in local wage premia and structural employment.

Table 4.6
Analysis of Changes in Log Relative Wages by Education from 1977-81 to 1988-93

Cohort A / Cohort B	Change in Relative Wage	Change Due to Δ in Rents	Change Due to Δ in Structure	Total
Low Experience (< 15 yrs)				
HS Grad / Dropout	+0.092	-0.0004	-0.0266	-0.0271
College Grad / HS Grad	+0.182	+0.0080	+0.0284	+0.0365
College Grad / Dropout	+0.274	+0.0076	+0.0018	+0.0094
High Experience (≥ 15yrs)				
HS Grad / Dropout	+0.083	-0.0011	+0.0146	+0.0134
College Grad / HS Grad	-0.033	+0.0047	+0.0058	+0.0107
College Grad / Dropout	+0.049	+0.0036	+0.0204	+0.0241

Table 4.7 gives the decomposition of relative wages for cohorts grouped by experience, with education held constant.

Table 4.7
Analysis of Changes in Log Relative Wages by Experience,
High Experience / Low Experience, 1977-81 to 1988-93

Education Level	Change in Relative Wage	Change Due to Δ in Rents	Change Due to Δ in Structure	Total
HS Dropout	+0.188	+0.0001	-0.0269	-0.0268
HS Graduate	+0.178	-0.0006	+0.0143	+0.0137
College Graduate	-0.037	-0.0039	-0.0083	-0.0122

This table shows that changes in wage premia had a very small impact upon experience differentials. The impact of structural changes was slightly greater, but not substantial. The greatest effect observed was changes in structure upon the experience differential for dropouts, but these changes worked to shrink the relative wage. This was primarily due to the two percent decrease in the real wage of high experience dropouts brought about by changes in the structure of employment. This evidence indicates that changes in

rents and structure did not have important influence on experience differentials for cohorts defined by education over the period of observation.

4.3 Twelve Cohort Analysis

Gender provides another facet for investigation. Gender differentials are generally of significant magnitude and also attract political interest. Results from the imputation and decomposition of real and relative wages for cohorts defined by experience, education and gender are discussed below.

4.3.1 Trends in Real and Relative Wages

Table 4.8 gives estimated real wages, log wages and distributions of employment for twelve cohorts defined by education, experience and gender over the period 1977-1993. The changes in real wages for males resemble the six cohort results. There were large drops for low experience high school dropouts and graduates, with a small decrease in wages for college graduates of low experience. Young males clearly faced dramatically increasing returns to higher education over the period. Wage losses for older males varied between twelve and fourteen percent, with slightly increasing returns to education.

Wage trends of women differed from those of men over the period. Three female cohorts enjoyed increasing real wages, with only the low experience dropouts and high school graduates suffering losses greater than five percent. Women of both low and high experience encountered strongly increasing returns to education. Women in the aggregate received a 10% increase in real wages, while the aggregate male wage declined by almost 8%, shrinking the gender gap significantly.

Table 4.9 displays estimated real wages and wage changes for ten cohorts, relative to the low-experience-dropout cohort of their respective gender categories for the period from 1977 to 1993. All wage changes in both gender categories were positive, showing the wage decline of the high-school-dropout cohorts relative to all cohorts of higher skill. An important gender difference is that young college graduates were the great relative gainers in the male category, while older college graduates made the largest relative gains for females. Relative wage changes by cohort for women were greater than relative wage changes for men for all cohorts. This reflects greater returns to skill for women through the 1980's.

Table 4.8
Estimated Real Hourly Wages, Real Log Wages and Employment Distributions For Twelve Cohorts from 1977-1993[7]

Men

Cohort	Adjusted Real Wages			Log Adjusted Real Wages			Employment Distributions		
Education	1977-81	1988-93	% Change	77-81	88-93	Log Change	77-81	88-93	ΔEmp
Low Experience (<15 years)									
Dropout	6.03	4.38	-27.4%	1.80	1.48	-0.32	0.060	0.040	-0.020
HS Grad	9.38	7.04	-24.9%	2.24	1.95	-0.29	0.107	0.125	+0.018
C. Grad	11.30	10.77	-4.7%	2.42	2.38	-0.04	0.053	0.042	-0.011
High Experience (≥15 years)									
Dropout	11.88	10.25	-13.7%	2.48	2.33	-0.15	0.143	0.039	-0.104
HS Grad	14.61	12.73	-12.9%	2.68	2.54	-0.14	0.125	0.190	+0.065
C. Grad	18.87	16.58	-12.1%	2.94	2.81	-0.13	0.040	0.077	+0.037
All Men									
All	11.82	10.92	-7.6%	2.47	2.39	-0.08	0.529	0.513	-0.016

Women

Cohort	Adjusted Real Wages			Log Adjusted Real Wages			Employment Distributions		
Education	1977-81	1988-93	% Change	77-81	88-93	Log Change	77-81	88-93	ΔEmp
Low Experience (<15 years)									
Dropout	4.05	3.20	-21.0%	1.40	1.16	-0.24	0.054	0.033	-0.021
HS Grad	6.51	5.74	-11.8%	1.87	1.75	-0.12	0.120	0.121	+0.001
C. Grad	8.52	9.20	+8.0%	2.14	2.22	+0.08	0.037	0.039	+0.002
High Experience (≥15 years)									
Dropout	6.49	6.21	-4.3%	1.87	1.83	-0.04	0.103	0.032	-0.071
HS Grad	7.45	7.95	+6.7%	2.01	2.07	+0.06	0.133	0.204	+0.071
C. Grad	10.49	11.92	+13.6%	2.35	2.48	+0.13	0.023	0.057	+0.034
All Women									
All	6.84	7.53	+10.1%	1.92	2.02	+0.10	0.471	0.487	+0.016

[7] The twelve cohort analysis used only five occupation and five industry groups rather than the seven occupation and fourteen industry groups used in the six cohort analysis. This aggregation was done in order to allow estimation of the cohort earnings functions.

Table 4.9
Estimated Real Relative Wages and Log Relative Wages by Cohort, 1977-81 to 1988-93, Using Low Experience Dropouts as Numeraire

Men

Cohort	Real Relative Wages			Log Real Relative Wages		
Education	1977-81	1988-93	% Change	1977-81	1988-93	Log Change
Low Experience (<15 years)						
HS Grad	1.55	1.61	+3.9%	0.441	0.476	+0.034
C. Grad	1.87	2.46	+31.6%	0.627	0.900	+0.273
High Experience (≥15years)						
Dropout	1.97	2.34	+18.8%	0.678	0.852	+0.174
HS Grad	2.42	2.91	+20.2%	0.884	1.068	+0.184
C. Grad	3.13	3.79	+21.1%	1.140	1.332	+0.192

Women

Cohort	Real Relative Wages			Log Real Relative Wages		
Education	1977-81	1988-93	% Change	1977-81	1988-93	Log Change
Low Experience (<15 years)						
HS Grad	1.61	1.79	+11.2%	0.474	0.584	+0.110
C. Grad	2.10	2.88	+37.1%	0.743	1.056	+0.313
High Experience (≥15years)						
Dropout	1.60	1.94	+21.3%	0.470	0.663	+0.192
HS Grad	1.84	2.48	+34.8%	0.608	0.909	+0.301
C. Grad	2.59	3.72	+43.6%	0.951	1.315	+0.364

Table 4.10 gives similar information for real wages by cohort of men relative to those of women. This table reveals that women's wages increased relative to men's wages across all cohorts. These gains increased with experience and education with one exception: for women with low experience, the gender gain was smaller for college than for high school graduates. The gender gain was most prominent for experienced college graduates. Intuitively, these results suggest that women were better poised than their male counterparts to take advantage of new wage opportunities in the 80's, and that older female college graduates were in the most favorable position of all.

Table 4.10

Estimated Real Relative Wages and Log Relative Wages by Gender, 1977-81 to 1988-93

Men / Women

Education	Real Relative Wages			Log Real Relative Wages		
	1977-81	1988-93	% Change	1977-81	1988-93	Log Change
Low Experience (<15 years)						
Dropout	1.49	1.37	-8.2%	0.398	0.313	-0.085
HS Grad	1.44	1.23	-14.6%	0.365	0.205	-0.161
C. Grad	1.33	1.17	-12.0%	0.282	0.157	-0.125
High Experience (≥15years)						
Dropout	1.83	1.65	-9.8%	0.605	0.502	-0.104
HS Grad	1.96	1.60	-18.4%	0.674	0.472	-0.202
C. Grad	1.80	1.39	-22.8%	0.587	0.330	-0.257
All (Men / Women)						
All	1.73	1.45	-16.2%	0.547	0.372	-0.175

Table 4.11 shows the estimation and movement of relative wages by educational attainment, holding gender and experience constant. This table expresses the difference between genders with respect to changes in returns to a high school diploma. The 1980's brought little change in the advantage conferred by a high school diploma for men, but saw 11% gains in the relative return to a diploma for women of both experience categories. Both sexes experienced increasing returns to education over all categories.

Table 4.12 gives estimated relative wages for cohort pairs defined by experience, holding gender and educational attainment constant. There are striking differences between men and women in the returns to experience for college graduates. Young male college graduates actually made gains relative to their older colleagues. Older female college graduates, on the other hand, made slight gains relative to the younger cohort, but these paled when compared to the returns to experience for female high school graduates and dropouts. Returns to experience varied inversely with the level of education for both sexes.

Table 4.11
Estimated Relative Wages and Log Relative Wages by Education, 1977-81 to 1988-93

Men

Cohort A / Cohort B	Real Relative Wages			Log Real Relative Wages		
Educational Level	1977-81	1988-93	% Change	1977-81	1988-93	Log Change
Low Experience (< 15 yrs)						
HS Graduate / Dropout	1.55	1.61	+3.9%	0.441	0.476	+0.034
College Grad / HS Grad	1.20	1.53	+27.5%	0.186	0.425	+0.239
High Experience (≥ 15yrs)						
HS Graduate / Dropout	1.23	1.24	+0.8%	0.206	0.217	+0.010
College Grad / HS Grad	1.29	1.30	+0.8%	0.256	0.264	+0.008

Women

Cohort A / Cohort B	Real Relative Wages			Log Real Relative Wages		
Educational Level	1977-81	1988-93	% Change	1977-81	1988-93	Log Change
Low Experience (< 15 yrs)						
HS Graduate / Dropout	1.61	1.79	+11.2%	0.474	0.584	+0.110
College Grad / HS Grad	1.31	1.60	+22.1%	0.269	0.473	+0.203
High Experience (≥ 15yrs)						
HS Graduate / Dropout	1.15	1.28	+11.3%	0.138	0.247	+0.109
College Grad / HS Grad	1.41	1.50	+6.4%	0.343	0.405	+0.063

Table 4.12
Estimated Relative Wages and Log Relative Wages by Experience, High Experience / Low Experience, 1977-81 to 1988-93

Men

Education	Real Relative Wages			Log Real Relative Wages		
	1977-81	1988-93	% Change	1977-81	1988-93	Log Change
HS Dropout	1.97	2.34	+18.8%	0.678	0.852	+0.174
HS Graduate	1.56	1.81	+16.0%	0.443	0.593	+0.150
College Graduate	1.67	1.54	-7.8%	0.513	0.432	-0.081

Women

Education	Real Relative Wages			Log Real Relative Wages		
	1977-81	1988-93	% Change	1977-81	1988-93	Log Change
HS Dropout	1.60	1.94	+21.3%	0.470	0.663	+0.192
HS Graduate	1.14	1.38	+21.1%	0.134	0.326	+0.191
College Graduate	1.23	1.29	+4.9%	0.208	0.258	+0.051

4.3.2 Decomposition of Real and Relative Wages

Table 4.13 gives the decomposition of imputed wages by changes in rents and industrial structure for the twelve cohorts defined by experience, gender and educational attainment. It shows that changes in rents contributed negatively to wages for all cohorts except for the lowest skilled from each gender category. This implies that the lowest earning cohorts were not being punished by changes in wage premia over the period. All four dropout cohorts also benefited from changes in structure. It does not appear that the two lowest skilled cohorts were employed predominantly in decreasing rent industries or moving out of high-rent industries.

Note that a few of the fundamental effects changed sign from the six cohort decomposition. For instance, changes in real wages due to changes in the industrial structure of employment were negative for older high school dropouts in the six cohort analysis, yet positive for both sexes in the twelve cohort analysis. These discrepancies are probably due to the different aggregations of occupations and industries used in the latter. A higher degree of aggregation was necessary in order to estimate earnings for twelve cohorts.

Changes in structure and rents had negative impact upon the wages of male high school and college graduates of both experience levels. This implies these cohorts were employed substantially in decreasing rent industries and were also moving into lower rent industries. These groups might benefit from economic policy designed to support diminishing rents or subsidize rent producing industries. The wages of all male cohorts except for young dropouts were reduced slightly by the changes in structure and rents, but only young high school graduates lost more than four percent.

Changes in industrial structure had a negative effect upon the aggregate wage of women, but only young high school graduates suffered as a cohort. They were also the only female cohort whose wage changes moved in the same direction as the net structural effect. The wages of all female cohorts except for young and old dropouts were adversely affected by the changes in structure and rents, but only young high school and college graduates lost more than two percent. The weak effect of changes in rents and structural employment suggest that most of the change in real wages for both sexes was caused by changes in the national labor market.

Table 4.13
Analysis of Changes in Log Wages for Twelve Cohorts from 1977-81 to 1988-93

Men

Education	Change in Log Wages	Change Due to Δ in Rents	Change Due to Δ in Structure	Total
Low Experience (< 15 yrs)				
HS Dropout	-0.32	+0.003	+0.011	+0.015
HS Graduate	-0.29	-0.015	-0.037	-0.052
College Grad	-0.04	-0.022	-0.008	-0.030
High Experience (≥ 15yrs)				
HS Dropout	-0.15	-0.019	+0.008	-0.012
HS Graduate	-0.14	-0.022	-0.013	-0.035
College Grad	-0.13	-0.025	-0.008	-0.033
All Men				
All	-0.08	-0.009	-0.008	-0.017

Women

Education	Change in Log Wages	Change Due to Δ in Rents	Change Due to Δ in Structure	Total
Low Experience (< 15 yrs)				
HS Dropout	-0.24	+0.015	+0.007	+0.022
HS Graduate	-0.12	-0.003	-0.015	-0.018
College Grad	+0.08	-0.025	+0.003	-0.022
High Experience (≥ 15yrs)				
HS Dropout	-0.04	-0.008	+0.011	+0.004
HS Graduate	+0.06	-0.009	+0.0006	-0.008
College Grad	+0.13	-0.027	+0.015	-0.012
All Women				
All	+0.10	-0.0015	-0.003	-0.005

Table 4.14 shows the decomposition of log relative wages by gender, holding experience and educational attainment constant. This table reveals that changes in structure for young dropouts, and changes in rents for college graduates of both experience levels worked to increase the male/female wage differential. These effects were very small in magnitude. All other rent and structural effects served to compress relative wages. Net changes in rents and structure trimmed gender differentials for all education/experience combinations, though only for young high school graduates did the decrease exceed two percent. If reducing the gender gap is a policy objective, these results indicate that policy aimed at reversing structural changes of the 80's would be counterproductive at best.

Table 4.14
Analysis of Changes in Log Relative Wages by Gender from 1977-81 to 1988-93

Men / Women

Education	Change in Relative Wage	Change due to Δ in rents	Change Due To Δ in Structure	Total
Low Experience (< 15 yrs)				
Dropout	-0.085	-0.012	+0.005	-0.007
HS Grad	-0.161	-0.011	-0.022	-0.034
C. Grad	-0.125	+0.003	-0.011	-0.008
High Experience (≥ 15yrs)				
Dropout	-0.104	-0.011	-0.003	-0.016
HS Grad	-0.202	-0.013	-0.014	-0.027
C. Grad	-0.257	+0.002	-0.023	-0.021
All Men / All Women				
	-0.175	-0.007	-0.005	-0.012

Table 4.15 shows the analysis of relative wages between cohorts defined by educational attainment, with experience and gender held constant. The wages of high school graduates increased relative to the wage of dropouts for all four gender/experience levels, yet changes in structure and rents worked to ameliorate this increase in every instance. For young males, these changes engendered a decrease equal to twice the net increase. This implies competitive forces operating in the national labor market which offset the equalizing effect of the changes. Only male college/high-school differentials were affected positively by these changes. For older males this effect was inconsequential, and for young men it amounted to less than ten percent of the total increase in the relative wage. Policy measures designed to address changes in rents and industrial structure may improve the position of young male high school graduates.

Table 4.16 breaks down movement in relative wages by experience, holding gender and educational attainment constant. This table shows increasing returns to experience provided by net changes in structure and rents for three gender/education groups, male high school graduates and female high school and college graduates. These wage effects implied a 2% increase in the experience differential for female high school graduates and less for the others. In the absence of changes in the national labor market, changing rents and structure in the local market would have decreased the experience differential for male high school dropouts by 1.4%, and reduced the same for female dropouts by 1.2%. This suggests that older workers of low

Table 4.15
Analysis of Changes in Log Relative Wages by Education from 1977-81 to 1988-93

Men

Educational Level	Change in Relative Wage	Change Due to Δ in Rents	Change Due to Δ in Structure	Total
Low Experience (< 15 yrs)				
HS Graduate / Dropout	+0.034	-0.018	-0.048	-0.067
College Grad / HS Grad	+0.239	-0.007	+0.029	+0.022
High Experience (≥ 15yrs)				
HS Graduate / Dropout	+0.010	-0.003	-0.021	-0.024
College Grad / HS Grad	+0.008	-0.003	+0.005	+0.002

Women

Educational Level	Change in Relative Wage	Change Due to Δ in Rents	Change Due to Δ in Structure	Total
Low Experience (< 15 yrs)				
HS Graduate / Dropout	+0.110	-0.018	-0.022	-0.040
College Grad / HS Grad	+0.203	-0.022	+0.018	-0.004
High Experience (≥ 15yrs)				
HS Graduate / Dropout	+0.109	-0.001	-0.010	-0.012
College Grad / HS Grad	+0.063	-0.018	+0.014	-0.004

educational attainment were *not* capturing rents at the expense of younger ones, or driving them out of high rent industries. This stands in contrast to the popular conception of dropouts drinking the last draughts from an evaporating pool, with the younger members of the cohort driven back away from the water.

For male college graduates, changes in rents contributed less than four percent of the change in the shrinking experience differential. Changes in industrial structure did not affect the relative wage at all. Thus it appears that young fireballs were *not* moving into newly created high-rent industries while leaving the old relics behind. Compression of this differential was generated by changes in the national labor market, across industries and not between them.

Table 4.16
Analysis of Changes in Log Relative Wages by Experience,
High Experience / Low Experience, 1977-81 to 1988-93

Men

Education Level	Change in Relative Wage	Change Due to Δ in Rents	Change Due to Δ in Structure	Total
HS Dropout	+0.174	-0.022	-0.003	-0.027
HS Graduate	+0.150	-0.007	+0.024	+0.017
College Graduate	-0.081	-0.003	0.000	-0.003

Women

Education Level	Change in Relative Wage	Change Due to Δ in Rents	Change Due to Δ in Structure	Total
HS Dropout	+0.192	-0.023	+0.004	-0.019
HS Graduate	+0.191	-0.006	+0.016	+0.020
College Graduate	+0.051	-0.002	+0.012	+0.010

CHAPTER V

CONCLUSION

The results of this thesis suggest that movements in wage premia and the industrial structure of employment played a very small part in the expansion of wage differentials during the 1980's. Observed movements in real and relative wages must be largely attributed to market forces operating in the national labor market. This suggests that policy efforts made to redistribute wage premia or alter the industrial composition of employment in the local market would not significantly reduce the growing inequity implicit in these wage differentials. Policy changes made at the national level may be more effective, but mainly through their effect upon the "national" wage W_{ic}, which is not observed through changes in local premia and employment distributions.

In the six cohort analysis, real wages declined for all cohorts. Young high school dropouts saw their wage plummet 25% from its previous level. Young high school graduates faced an 18% drop. The dropout/high-school wage differential increased by almost 10%, and the college/high-school differential swelled over 20% above its 1977-81 level. The experience differential for dropouts climbed 21%, while that for high school graduates increased by 20%.

Changes in both the structure of employment and industry wage premia had small but positive effects upon the real wages of young high school dropouts over the period. Total effects of structure and rents were positive for three of the six cohorts, and small in all cases. The contribution of changes in structure and rents was negative to changes in the low experience dropout/high school differential, and negligible for changes in the college/high school relative wage. Changes in both structure and rents had decreasing effects upon the experience differential for dropouts, and their total effect was small but positive upon the same differential for high school graduates.

Real wages also declined for all cohorts in the twelve cohort analysis except for young female college graduates and older female high school and college graduates. Changes in the industrial structure of

employment and changes in industry wage premia were found to decrease the real wage of young male high school graduates by about 5%, and to have a smaller effect on all other cohorts. The total effect was positive upon the real wages of older female dropouts and young dropouts of both sexes.

Gender differentials decreased in all cases, with the relative wage for older college graduates dropping almost 23%. Changes in these differentials due to changes in the structure of employment and wage premia were negative for all cohorts, implying these changes were shrinking gender differentials. Education differentials increased in all cases, with the college/high-school relative wage rising 27.5% for young men, and 22.1% for young women. The only experience differential found to decrease was that for male college graduates. Experience differentials increased more than 21% for female dropouts and high school graduates. Changes in structure and rents had a negative effect on many of these relative wages defined by education and experience, and a small effect upon all of them.

The movements of real wages observed in this study closely followed results cited above in national analyses. An interesting exception is the decrease found in the college/high-school differential for older workers in the six cohort analysis. This may be the result of "downsizing" and a shuffling of deadweight employees down to lower rungs on the wage ladder. Results from the decomposition of real and relative wages generally agreed with those found by Bound and Johnson (1992) in their seminal analysis. Changes in structure and wage premia had little effect upon real and relative wages in the 1980's.

Room for further research may be found in the analysis of wage variation within industries. Proximate causes of variation in the local market have been shown to originate within changes in the national market. This implies the presence of market-wide forces working across industries, not between them. Analysis of these forces will require information regarding technological developments spanning across industries that might precipitate increasing returns to skill. As stated above, the central difficulties with this program are a shortage of data and the necessity of more sophisticated technique to deal with the lower volume of observations. These difficulties must be dealt with if further progress is to be made on this problem. Potential rewards justify the increasing concentration of effort.

Interesting results may also be found in Appendix B, showing the changes in wage premia and employment by industry. Slight decreases in proportional employment occurred in agriculture, forestry and

fisheries, mining and non-durable goods. A more substantial decrease is seen in durable goods. These industry groups contain the primary resource extraction industries. Increases show in finance, insurance and real estate; business and repair services; entertainment and recreation services; and professional and related services. These may be considered important service industries. These results concur generally with national movements in proportional employment found by Bound and Johnson (1992). The increase in employment for professional and related services was substantial. Personal services including private households experienced a slight decline in employment. This conflicts with an increase in personal services found by Bound and Johnson. Remarkable increases in wage premia are seen in mining and nondurable goods, with more moderate gains occurring in finance, personal and professional services. Business and entertainment services suffered substantial setbacks, with some decrease also seen in agriculture and durable goods. These changes in industry premia are of the same sign as those found nationwide by Bound and Johnson, with the exception of business and personal services.[8] Thus the important resource industries show consistent declines in relative employment to balance the increased employment in most service industries, but the evidence is mixed regarding changes in wage premia. While the service industries generally show lower levels of premia, these premia increased for a few of the services. Deeper analysis may be in order to explain these changes, which may be induced by within-industry variation.

The twelve cohort analysis was performed using a rather high degree of aggregation for occupation and industry. Occupations were aggregated into five categories rather than seven, and industries were grouped into five categories rather than fourteen. The different aggregations appeared to affect the results. Thus the twelve cohort results should be considered less robust than those from the six cohort analysis.

The main thrust of this thesis is that changes in industry wage premia and the industrial structure of employment were not significantly responsible for movements in relative wages in the Pacific Northwest over the 1980's. The sources of variation in relative wages may be accessible to analysis of the local labor market, but this analysis will have to address the within-industry variation in differentials which reflects changes in the national labor market.

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[8] Bound and Johnson combined the durables and mining industries.

APPENDIX A

MEANS, STANDARD DEVIATIONS, COEFFICIENT ESTIMATES AND t-VALUES OF REGRESSIONS; LISTED BY VARIABLE, COHORT AND PERIOD

Appendix A.1

EXP

Delineates Potential Work Experience Found By Subtracting Years Of Formal Education And Five Formative Years From Age[9]

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout			0.054	4.67			0.043	5.94
<15 Yrs.	HS Graduate			0.031	8.54			0.032	12.75
<15 Yrs.	College			0.020	4.97			0.033	6.59
≥15 Yrs.	HS Dropout			0.003	2.73			0.0007	0.44
≥15 Yrs.	HS Graduate			0.003	2.32			0.002	2.23
≥15 Yrs.	College			-0.003	0.91			0.002	0.99
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout			0.054	3.38			0.063	6.83
<15 Yrs.	HS Graduate			0.037	7.43			0.034	9.46
<15 Yrs.	College			0.025	4.53			0.041	7.53
≥15 Yrs.	HS Dropout			0.004	2.91			0.002	0.71
≥15 Yrs.	HS Graduate			-0.0006	0.42			0.003	2.73
≥15 Yrs.	College			-0.0002	0.04			0.003	1.44
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout			0.059	3.37			0.025	2.22
<15 Yrs.	HS Graduate			0.027	5.04			0.032	8.80
<15 Yrs.	College			0.013	1.98			0.027	3.10
≥15 Yrs.	HS Dropout			0.001	0.54			-0.002	0.89
≥15 Yrs.	HS Graduate			0.006	2.68			0.0005	0.40
≥15 Yrs.	College			-0.007	1.27			-0.003	1.04

[9] Means and Standard Deviations are not available at present.

Appendix A.2

EDAT

Educational Attainment In Years[10]

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout			0.054	5.47			0.041	1.96
<15 Yrs.	HS Graduate			0.016	0.99			0.072	6.83
<15 Yrs.	College			0.053	2.82			0.048	1.83
≥15 Yrs.	HS Dropout			0.004	1.56			0.010	1.28
≥15 Yrs.	HS Graduate			0.003	0.19			0.043	5.85
≥15 Yrs.	College			-0.026	0.99			0.045	2.84
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout			0.056	3.97			0.080	3.23
<15 Yrs.	HS Graduate			0.023	1.05			0.072	5.12
<15 Yrs.	College			0.045	1.85			0.074	2.81
≥15 Yrs.	HS Dropout			0.005	1.38			0.023	2.45
≥15 Yrs.	HS Graduate			-0.010	0.60			0.024	2.43
≥15 Yrs.	College			-0.035	1.07			0.016	0.77
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout			0.051	3.67			-0.006	0.17
<15 Yrs.	HS Graduate			0.019	0.74			0.087	5.45
<15 Yrs.	College			0.070	1.99			0.016	0.34
≥15 Yrs.	HS Dropout			-0.003	0.67			0.007	0.61
≥15 Yrs.	HS Graduate			0.010	0.36			0.071	6.41
≥15 Yrs.	College			0.001	0.02			0.078	3.14

[10] Means and Standard Deviations are not available at present.

Appendix A.3

PRTTIME1

Dummy Variable For Average Workload Of Less Than 35 Hours Per Week

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.56674	0.49579	0.201	3.83	0.56356	0.49616	0.249	4.38
<15 Yrs.	HS Graduate	0.19157	0.39364	-0.106	2.70	0.23416	0.42353	-0.083	3.23
<15 Yrs.	College	0.11290	0.31669	-0.098	1.84	0.14630	0.35355	-0.142	2.54
≥15 Yrs.	HS Dropout	0.16404	0.37040	-0.010	0.26	0.19535	0.39665	-0.006	0.12
≥15 Yrs.	HS Graduate	0.17500	0.38006	-.0003	0.009	0.17137	0.37686	-0.176	8.64
≥15 Yrs.	College	0.09943	0.29952	-0.159	2.08	0.12726	0.33335	-0.209	5.41
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.49296	0.50045	0.121	1.57	0.47890	0.49996	0.245	3.34
<15 Yrs.	HS Graduate	0.064626	0.24600	-0.170	2.22	0.13060	0.33705	-0.067	1.55
<15 Yrs.	College	0.015982	0.12555	-0.231	1.42	0.06201	0.24137	-0.267	3.14
≥15 Yrs.	HS Dropout	0.059322	0.23633	-0.198	3.00	0.09354	0.29143	0.026	0.34
≥15 Yrs.	HS Graduate	0.029183	0.16840	0.091	1.15	0.04086	0.19800	-0.298	6.11
≥15 Yrs.	College	0.024242	0.15403	-0.568	3.19	0.03578	0.18581	-0.223	2.56
Females		Mean	Std Dev	Coef	Coef	t-value	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.64877	0.47789	0.274	3.68	0.66601	0.47210	0.313	3.51
<15 Yrs.	HS Graduate	0.30444	0.46040	-0.148	2.98	0.34093	0.47415	-0.140	4.23
<15 Yrs.	College	0.25163	0.43466	-0.051	0.84	0.23706	0.42564	-0.087	1.13
≥15 Yrs.	HS Dropout	0.30941	0.46252	-0.003	0.07	0.31828	0.46629	-0.041	0.64
≥15 Yrs.	HS Graduate	0.31227	0.46363	-0.046	1.07	0.29300	0.45521	-0.201	8.63
≥15 Yrs.	College	0.22798	0.42062	-0.117	1.26	0.25086	0.43376	-0.256	5.82

Appendix A.4

PRTTIME2

Dummy Variable For Average Workload Greater Than Or Equal To 35 Hours Per Week

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.43326	0.49579	Omitted Variable		0.43644	0.49616	Omitted Variable	
<15 Yrs.	HS Graduate	0.80843	0.39364			0.76584	0.42353		
<15 Yrs.	College	0.88710	0.31669			0.85370	0.35355		
≥15 Yrs.	HS Dropout	0.83596	0.37040			0.80465	0.39665		
≥15 Yrs.	HS Graduate	0.82500	0.38006			0.82863	0.37686		
≥15 Yrs.	College	0.90057	0.29952			0.87274	0.33335		
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.50704	0.50045	Omitted Variable		0.52110	0.49996	Omitted Variable	
<15 Yrs.	HS Graduate	0.93537	0.24600			0.86940	0.33705		
<15 Yrs.	College	0.98402	0.12555			0.93798	0.24137		
≥15 Yrs.	HS Dropout	0.94068	0.23633			0.90646	0.29143		
≥15 Yrs.	HS Graduate	0.97082	0.16840			0.95914	0.19800		
≥15 Yrs.	College	0.97576	0.15403			0.96422	0.18581		
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.35123	0.47789	Omitted Variable		0.33399	0.47210	Omitted Variable	
<15 Yrs.	HS Graduate	0.69556	0.46040			0.65907	0.47415		
<15 Yrs.	College	0.74837	0.43466			0.76294	0.42564		
≥15 Yrs.	HS Dropout	0.69059	0.46252			0.68172	0.46629		
≥15 Yrs.	HS Graduate	0.68773	0.46363			0.70700	0.45521		
≥15 Yrs.	College	0.77202	0.42062			0.74914	0.43376		

Appendix A.5

RACE1

Dummy Variable For White

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.94174	0.23436	Omitted Variable		0.93333	0.24955	Omitted Variable	
<15 Yrs.	HS Graduate	0.94984	0.21833			0.93130	0.25297		
<15 Yrs.	College	0.96102	0.19367			0.94936	0.21936		
≥15 Yrs.	HS Dropout	0.95911	0.19808			0.90791	0.28929		
≥15 Yrs.	HS Graduate	0.97406	0.15900			0.95524	0.20680		
≥15 Yrs.	College	0.97323	0.16156			0.94958	0.21886		
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.92958	0.25612	Omitted Variable		0.93344	0.24946	Omitted Variable	
<15 Yrs.	HS Graduate	0.94558	0.22698			0.92838	0.25792		
<15 Yrs.	College	0.96119	0.19337			0.94109	0.23565		
≥15 Yrs.	HS Dropout	0.95593	0.20533			0.91497	0.27917		
≥15 Yrs.	HS Graduate	0.97471	0.15709			0.95845	0.19960		
≥15 Yrs.	College	0.97879	0.14431			0.95315	0.21140		
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.95526	0.20697	Omitted Variable		0.93320	0.24992	Omitted Variable	
<15 Yrs.	HS Graduate	0.95363	0.21039			0.93431	0.24781		
<15 Yrs.	College	0.96078	0.19443			0.95826	0.20015		
≥15 Yrs.	HS Dropout	0.96353	0.18757			0.89938	0.30113		
≥15 Yrs.	HS Graduate	0.97344	0.16086			0.95224	0.21329		
≥15 Yrs.	College	0.96373	0.18745			0.94476	0.22857		

Appendix A.6

RACE2

(1977-81): Race Dummy For "Other"
(1988-93): Race Dummy For Asian Or Pacific Islander

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.05826	0.23436	-0.307	3.10	0.01778	0.13220	-0.113	0.65
<15 Yrs.	HS Graduate	0.04963	0.21723	-0.061	0.94	0.01764	0.13167	-0.051	0.68
<15 Yrs.	College	0.03898	0.19367	-0.155	1.99	0.03537	0.18479	-0.207	2.05
≥15 Yrs.	HS Dropout	0.04089	0.19808	-0.186	2.93	0.04000	0.19605	-0.018	0.19
≥15 Yrs.	HS Graduate	0.02594	0.15900	0.107	1.48	0.00985	0.09879	-0.083	1.19
≥15 Yrs.	College	0.02677	0.16156	-0.380	2.93	0.03133	0.17424	-0.141	2.04
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.070423	0.25612	-0.327	2.53	0.01461	0.12008	-0.212	0.88
<15 Yrs.	HS Graduate	0.05442	0.22698	-0.170	2.22	0.01843	0.13454	-0.067	1.55
<15 Yrs.	College	0.03881	0.19337	-0.368	3.60	0.04186	0.20043	0.061	0.61
≥15 Yrs.	HS Dropout	0.044068	0.20533	-0.125	1.65	0.03061	0.17241	-0.171	1.31
≥15 Yrs.	HS Graduate	0.025292	0.15709	0.025	0.30	0.01143	0.10630	-0.009	0.10
≥15 Yrs.	College	0.021212	0.14431	-0.802	4.41	0.03152	0.17478	-0.096	1.04
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.044743	0.20697	-0.168	1.04	0.02161	0.14555	0.006	0.02
<15 Yrs.	HS Graduate	0.045363	0.20820	-0.068	0.64	0.01683	0.12867	-0.050	0.43
<15 Yrs.	College	0.039216	0.19443	0.130	0.95	0.02838	0.16620	-0.594	3.09
≥15 Yrs.	HS Dropout	0.036471	0.18757	-0.254	2.22	0.05134	0.22091	0.062	0.46
≥15 Yrs.	HS Graduate	0.026557	0.16086	0.047	0.39	0.00839	0.09123	-0.233	2.07
≥15 Yrs.	College	0.036269	0.18745	-0.040	0.19	0.03107	0.17361	-0.245	2.29

Appendix A.7

RACE3

(1988-93): Race Dummy For "Other"

Cohort (All)		1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.04889	0.21573	0.117	1.08
<15 Yrs.	HS Graduate	0.05106	0.22014	-0.086	1.88
<15 Yrs.	College	0.01527	0.12269	-0.091	0.61
≥15 Yrs.	HS Dropout	0.05209	0.22232	-0.082	0.99
≥15 Yrs.	HS Graduate	0.03491	0.18356	0.009	0.23
≥15 Yrs.	College	0.01909	0.13687	-0.112	1.29
Males		Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.05194	0.22210	-0.005	0.04
<15 Yrs.	HS Graduate	0.05319	0.22446	-0.052	0.86
<15 Yrs.	College	0.01705	0.12957	-0.088	0.58
≥15 Yrs.	HS Dropout	0.05442	0.22704	-0.021	0.20
≥15 Yrs.	HS Graduate	0.03013	0.17096	0.029	0.52
≥15 Yrs.	College	0.01533	0.12292	-0.151	1.17
Females		Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.04519	0.20792	0.191	1.09
<15 Yrs.	HS Graduate	0.04886	0.21563	-0.093	1.31
<15 Yrs.	College	0.01336	0.11489	-0.149	0.55
≥15 Yrs.	HS Dropout	0.04928	0.21668	-0.213	1.60
≥15 Yrs.	HS Graduate	0.03937	0.19450	0.025	0.48
≥15 Yrs.	College	0.02417	0.15365	-0.041	0.34

Appendix A.8

MARGEN1

Dummy Variable For Married Male

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.05932	0.23635	0.094	0.78	0.09867	0.29835	0.427	4.57
<15 Yrs.	HS Graduate	0.27108	0.44463	0.181	4.11	0.23042	0.42116	0.181	6.00
<15 Yrs.	College	0.44892	0.49772	0.172	3.59	0.32878	0.46996	0.068	1.22
≥15 Yrs.	HS Dropout	0.43202	0.49548	0.219	5.66	0.40000	0.49013	0.117	2.14
≥15 Yrs.	HS Graduate	0.42877	0.49502	0.135	2.63	0.38834	0.48741	0.116	4.63
≥15 Yrs.	College	0.55641	0.49728	0.267	3.24	0.46941	0.49919	0.221	5.44
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.11268	0.31651	Omitted Variable		0.18019	0.38466	Omitted Variable	
<15 Yrs.	HS Graduate	0.57596	0.49448			0.45392	0.49800		
<15 Yrs.	College	0.76256	0.42600			0.63411	0.48205		
≥15 Yrs.	HS Dropout	0.74322	0.43704			0.73129	0.44366		
≥15 Yrs.	HS Graduate	0.88424	0.32009			0.80506	0.39623		
≥15 Yrs.	College	0.88182	0.32331			0.81687	0.38694		
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.16779	0.37409	Omitted Variable		0.20039	0.40069	Omitted Variable	
<15 Yrs.	HS Graduate	0.63004	0.48304			0.52823	0.49934		
<15 Yrs.	College	0.64379	0.47966			0.63272	0.48247		
≥15 Yrs.	HS Dropout	0.67176	0.46985			0.70226	0.45774		
≥15 Yrs.	HS Graduate	0.79029	0.40729			0.72604	0.44606		
≥15 Yrs.	College	0.76684	0.42394			0.71231	0.45295		

Appendix A.9

MARGEN2

Dummy Variable For Married Female

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.07944	0.27058	-0.246	2.39	0.09067	0.28726	-0.102	1.06
<15 Yrs.	HS Graduate	0.33351	0.47159	-0.271	5.73	0.26009	0.43874	-0.081	2.60
<15 Yrs.	College	0.26478	0.44152	0.017	0.30	0.30466	0.46045	-0.135	2.33
≥15 Yrs.	HS Dropout	0.28128	0.44973	-0.276	6.33	0.31814	0.46597	-0.299	5.06
≥15 Yrs.	HS Graduate	0.40708	0.49141	-0.411	7.35	0.37581	0.48437	-0.268	9.71
≥15 Yrs.	College	0.28298	0.45088	-0.131	1.46	0.30299	0.45966	-0.026	0.59
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.88732	0.31651	-0.010	0.07	0.81981	0.38466	-0.331	3.47
<15 Yrs.	HS Graduate	0.42404	0.49448	-0.150	3.54	0.54608	0.49800	-0.184	5.92
<15 Yrs.	College	0.23744	0.42600	-0.158	3.15	0.36589	0.48205	-0.044	0.98
≥15 Yrs.	HS Dropout	0.25678	0.43704	-0.196	5.16	0.26871	0.44366	-0.137	2.62
≥15 Yrs.	HS Graduate	0.11576	0.32009	-0.147	3.56	0.19494	0.39623	-0.115	4.69
≥15 Yrs.	College	0.11818	0.32331	-0.293	3.66	0.18313	0.38694	-0.228	5.49
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.83221	0.37409	0.069	0.60	0.79961	0.40069	-0.104	0.89
<15 Yrs.	HS Graduate	0.36996	0.48304	0.085	1.73	0.47177	0.49934	-0.024	0.73
<15 Yrs.	College	0.35621	0.47966	0.010	0.18	0.36728	0.48247	-0.037	0.53
≥15 Yrs.	HS Dropout	0.32824	0.46985	-0.061	1.31	0.29774	0.45774	-0.038	0.62
≥15 Yrs.	HS Graduate	0.20971	0.40729	0.036	0.74	0.27396	0.44606	-0.026	1.10
≥15 Yrs.	College	0.23316	0.42394	-0.062	0.66	0.28769	0.45295	-0.027	0.65

Appendix A.10

MARGEN3

Dummy Variable For Unmarried Female

Cohort (All)		1977-1981					1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value		Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.39407	0.48891	-0.123	2.27		0.36178	0.48073	-0.080	1.47
<15 Yrs.	HS Graduate	0.19584	0.39695	-0.195	4.00		0.23229	0.42235	-0.092	3.09
<15 Yrs.	College	0.14651	0.35385	0.056	0.96		0.17685	0.38169	-0.161	2.61
≥15 Yrs.	HS Dropout	0.13744	0.34439	-0.334	6.86		0.13488	0.34176	-0.338	4.88
≥15 Yrs.	HS Graduate	0.10802	0.31048	-0.347	5.59		0.14181	0.34888	-0.268	8.76
≥15 Yrs.	College	0.08604	0.28069	-0.137	1.30		0.12237	0.32779	-0.043	0.85

Appendix A.11

MARGEN4

Dummy Variable For Unmarried Male

Cohort (All)		1977-1981					1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value		Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.46716	0.49918	Omitted Variable			0.44889	0.49760	Omitted Variable	
<15 Yrs.	HS Graduate	0.19957	0.39979				0.27720	0.44768		
<15 Yrs.	College	0.13978	0.34700				0.18971	0.39223		
≥15 Yrs.	HS Dropout	0.14926	0.35643				0.14698	0.35425		
≥15 Yrs.	HS Graduate	0.05613	0.23023				0.09404	0.29190		
≥15 Yrs.	College	0.07457	0.26295				0.10524	0.30693		

Appendix A.12

STMT

Dummy Variable For Residence In Montana

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.25000	0.43324	Omitted Variable		0.25244	0.43461	Omitted Variable	
<15 Yrs.	HS Graduate	0.24386	0.42953			0.25982	0.43860		
<15 Yrs.	College	0.26075	0.43934			0.26206	0.43993		
≥15 Yrs.	HS Dropout	0.23448	0.42378			0.18419	0.38782		
≥15 Yrs.	HS Graduate	0.25189	0.43420			0.26858	0.44326		
≥15 Yrs.	College	0.20459	0.40379			0.27166	0.44492		
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.28974	0.45410	Omitted Variable		0.25000	0.43336	Omitted Variable	
<15 Yrs.	HS Graduate	0.26304	0.44053			0.26962	0.44388		
<15 Yrs.	College	0.24658	0.43151			0.20620	0.40489		
≥15 Yrs.	HS Dropout	0.23644	0.42508			0.18537	0.38893		
≥15 Yrs.	HS Graduate	0.22957	0.42076			0.26143	0.43949		
≥15 Yrs.	College	0.21818	0.41364			0.27172	0.44504		
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.20582	0.40475	Omitted Variable		0.25540	0.43652	Omitted Variable	
<15 Yrs.	HS Graduate	0.22681	0.41898			0.24973	0.43297		
<15 Yrs.	College	0.28105	0.45025			0.32220	0.46771		
≥15 Yrs.	HS Dropout	0.23176	0.42221			0.18275	0.38686		
≥15 Yrs.	HS Graduate	0.27289	0.44565			0.27525	0.44671		
≥15 Yrs.	College	0.18135	0.38631			0.27158	0.44503		

Appendix A.13

STID

Dummy Variable For Residence In Idaho

Cohort (All)		1977-1981				1988-93			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.24470	0.43014	-0.028	0.42	0.31733	0.46565	0.011	0.18
<15 Yrs.	HS Graduate	0.21238	0.40910	-0.007	0.02	0.27747	0.44781	-0.028	1.03
<15 Yrs.	College	0.18952	0.39218	0.028	0.62	0.19775	0.39846	-0.0002	.003
≥15 Yrs.	HS Dropout	0.22906	0.42033	-0.046	1.26	0.39814	0.48974	-0.076	1.47
≥15 Yrs.	HS Graduate	0.21321	0.40967	0.050	1.48	0.25305	0.43479	-0.004	0.23
≥15 Yrs.	College	0.21415	0.41062	-0.083	1.28	0.22124	0.41519	-0.016	0.48
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.21529	0.41144	-0.140	1.51	0.33279	0.47160	-0.032	0.40
<15 Yrs.	HS Graduate	0.20748	0.40573	0.004	0.07	0.26962	0.44388	-0.030	0.80
<15 Yrs.	College	0.21918	0.41416	0.074	1.28	0.22791	0.41981	0.060	1.00
≥15 Yrs.	HS Dropout	0.22458	0.41748	-0.065	1.43	0.39796	0.48989	-0.13	2.07
≥15 Yrs.	HS Graduate	0.20233	0.40194	-0.048	1.20	0.25104	0.43369	-.00007	0.003
≥15 Yrs.	College	0.19091	0.39361	0.004	0.05	0.22658	0.41879	0.068	1.49
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.27740	0.44822	0.063	0.64	0.29862	0.45811	0.078	0.79
<15 Yrs.	HS Graduate	0.21673	0.41223	0.015	0.23	0.28556	0.45180	-0.041	1.00
<15 Yrs.	College	0.14706	0.35474	-0.111	1.33	0.16528	0.37174	-0.025	0.26
≥15 Yrs.	HS Dropout	0.23529	0.42443	-0.024	0.39	0.39836	0.49006	-0.027	0.33
≥15 Yrs.	HS Graduate	0.22344	0.41674	0.105	1.89	0.25492	0.43589	-0.020	0.69
≥15 Yrs.	College	0.25389	0.43637	-0.051	0.44	0.21404	0.41039	-0.093	1.77

Appendix A.14

STOR

Dummy Variable For Residence In Oregon

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.22352	0.41682	0.093	1.38	0.23467	0.42398	0.14	2.11
<15 Yrs.	HS Graduate	0.26628	0.44213	0.045	1.12	0.20369	0.40279	0.112	3.75
<15 Yrs.	College	0.26075	0.43934	0.043	1.03	0.21704	0.41240	0.141	2.59
≥15 Yrs.	HS Dropout	0.25862	0.43798	0.137	3.81	0.22512	0.41785	0.068	1.18
≥15 Yrs.	HS Graduate	0.23113	0.42166	0.059	1.77	0.22465	0.41739	0.145	7.28
≥15 Yrs.	College	0.23136	0.42210	0.078	1.23	0.21929	0.41386	0.132	3.80
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.19920	0.39980	-0.030	0.32	0.23539	0.42459	0.180	2.12
<15 Yrs.	HS Graduate	0.26531	0.44175	0.048	0.94	0.20011	0.40018	0.074	1.84
<15 Yrs.	College	0.26484	0.44175	0.042	0.76	0.24031	0.42760	0.184	3.08
≥15 Yrs.	HS Dropout	0.27203	0.44520	0.164	3.76	0.22959	0.42093	0.052	0.73
≥15 Yrs.	HS Graduate	0.22957	0.42076	0.097	2.51	0.22957	0.42063	0.114	4.13
≥15 Yrs.	College	0.23333	0.42359	0.032	0.42	0.21295	0.40957	0.162	3.47
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.25056	0.43382	0.189	1.89	0.23379	0.42366	0.104	0.99
<15 Yrs.	HS Graduate	0.26714	0.44269	0.015	0.23	0.20738	0.40554	0.172	3.82
<15 Yrs.	College	0.25490	0.43652	0.050	0.69	0.19199	0.39419	0.102	1.11
≥15 Yrs.	HS Dropout	0.24000	0.42733	0.123	1.98	0.21971	0.41448	0.079	0.85
≥15 Yrs.	HS Graduate	0.23260	0.42268	0.002	0.04	0.22007	0.41436	0.167	5.69
≥15 Yrs.	College	0.22798	0.42062	0.205	1.72	0.22785	0.41969	0.144	2.750.0

Appendix A.15

STWA

Dummy Variable For Residence In Washington

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.28178	0.45010	0.025	0.40	0.19556	0.39680	0.160	2.31
<15 Yrs.	HS Graduate	0.27748	0.44788	0.070	1.75	0.25902	0.43816	0.183	6.58
<15 Yrs.	College	0.28898	0.45359	0.137	3.29	0.32315	0.46787	0.245	4.96
≥15 Yrs.	HS Dropout	0.27783	0.44804	0.120	3.39	0.19256	0.39449	0.073	1.24
≥15 Yrs.	HS Graduate	0.30377	0.45999	0.139	4.48	0.25372	0.43517	0.229	11.9
≥15 Yrs.	College	0.34990	0.47740	0.129	2.17	0.28781	0.45285	0.206	6.31
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.29577	0.45685	0.026	0.30	0.18182	0.38601	0.071	0.79
<15 Yrs.	HS Graduate	0.26417	0.44114	0.089	1.75	0.26066	0.43911	0.204	5.50
<15 Yrs.	College	0.26941	0.44416	0.141	2.53	0.32558	0.46896	0.230	4.08
≥15 Yrs.	HS Dropout	0.26695	0.44255	0.207	4.78	0.18707	0.39030	-0.038	0.52
≥15 Yrs.	HS Graduate	0.33852	0.47344	0.124	3.47	0.25796	0.43759	0.200	7.50
≥15 Yrs.	College	0.35758	0.48001	0.164	2.27	0.28876	0.45338	0.212	4.86
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.26622	0.44248	-0.003	0.03	0.21218	0.40925	0.278	2.60
<15 Yrs.	HS Graduate	0.28931	0.45367	0.063	1.00	0.25733	0.43728	0.206	4.83
<15 Yrs.	College	0.31699	0.46607	0.142	2.02	0.32053	0.46707	0.282	3.53
≥15 Yrs.	HS Dropout	0.29294	0.45538	0.076	1.27	0.19918	0.39979	0.187	1.98
≥15 Yrs.	HS Graduate	0.27106	0.44471	0.152	2.90	0.24976	0.43294	0.269	9.47
≥15 Yrs.	College	0.33679	0.47384	0.093	0.86	0.28654	0.45240	0.244	4.92

Appendix A.16

YR77, YR78

Dummy Variables For 1977 And 1978

COHORT (ALL)		1977				1978			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.31356	0.46419	0.033	0.57	0.30297	0.45978	Omitted Variable	
<15 Yrs.	HS Graduate	0.26734	0.44269	-0.002	0.06	0.26948	0.44381		
<15 Yrs.	College	0.26747	0.44294	0.008	0.20	0.26747	0.44294		
≥15 Yrs.	HS Dropout	0.29163	0.45462	0.049	1.51	0.28670	0.45233		
≥15 Yrs.	HS Graduate	0.30472	0.46040	-0.027	0.92	0.28396	0.45103		
≥15 Yrs.	College	0.29063	0.45449	0.015	0.27	0.24474	0.43035		
MALES		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.31388	0.46454	0.010	0.12	0.28370	0.45125	Omitted Variable	
<15 Yrs.	HS Graduate	0.26304	0.44053	0.016	0.32	0.26077	0.43930		
<15 Yrs.	College	0.28082	0.44991	-0.030	0.58	0.28311	0.45102		
≥15 Yrs.	HS Dropout	0.29322	0.45543	0.044	1.12	0.29492	0.45620		
≥15 Yrs.	HS Graduate	0.31226	0.46364	.00003	.0009	0.28599	0.45211		
≥15 Yrs.	College	0.30606	0.46156	-0.032	0.46	0.24545	0.43101		
FEMALES		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.31320	0.46431	0.067	0.81	0.32438	0.46867	Omitted Variable	
<15 Yrs.	HS Graduate	0.27117	0.44479	0.013	0.21	0.27722	0.44785		
<15 Yrs.	College	0.24837	0.43277	0.079	1.08	0.24510	0.43085		
≥15 Yrs.	HS Dropout	0.28941	0.45376	0.027	0.48	0.27529	0.44693		
≥15 Yrs.	HS Graduate	0.29762	0.45742	-0.075	1.47	0.28205	0.45020		
≥15 Yrs.	College	0.26425	0.44208	-0.054	0.51	0.24352	0.43032		

Appendix A.17

YR81

Dummy Variable For 1981

Cohort (All)		1981			
Experience	Education	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.38347	0.48649	0.030	.54
<15 Yrs.	HS Graduate	0.46318	0.49878	-0.059	1.72
<15 Yrs.	College	0.46505	0.49911	-0.046	1.28
≥15 Yrs.	HS Dropout	0.42167	0.49395	0.018	0.61
≥15 Yrs.	HS Graduate	0.41132	0.49219	-0.037	1.30
≥15 Yrs.	College	0.46463	0.49922	0.008	0.16
Males		Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.40241	0.49088	-0.039	0.49
<15 Yrs.	HS Graduate	0.47619	0.49972	-0.021	0.46
<15 Yrs.	College	0.43607	0.49646	-0.017	0.35
≥15 Yrs.	HS Dropout	0.41186	0.49238	-0.040	1.08
≥15 Yrs.	HS Graduate	0.40175	0.49049	0.011	0.33
≥15 Yrs.	College	0.44848	0.49809	0.020	0.31
Females		Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.36242	0.48124	0.114	1.41
<15 Yrs.	HS Graduate	0.45161	0.49790	-0.110	2.05
<15 Yrs.	College	0.50654	0.50078	-0.101	1.60
≥15 Yrs.	HS Dropout	0.43529	0.49609	0.086	1.67
≥15 Yrs.	HS Graduate	0.42033	0.49384	-0.094	1.99
≥15 Yrs.	College	0.49223	0.50124	0.005	0.06

Appendix A.18

YR88, YR89

Dummy Variables For 1988 And 1989

Cohort (All)		1988				1989			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.17956	0.38399	0.032	0.42	0.18222	0.38620	-0.015	0.20
<15 Yrs.	HS Graduate	0.17348	0.37871	0.019	0.57	0.17616	0.38100	-0.051	1.49
<15 Yrs.	College	0.16720	0.37331	-0.011	0.18	0.15434	0.36142	0.026	0.41
≥15 Yrs.	HS Dropout	0.16651	0.37271	0.0077	1.33	0.16372	0.37019	0.034	0.59
≥15 Yrs.	HS Graduate	0.15350	0.36050	0.012	0.48	0.16068	0.36727	0.003	0.12
≥15 Yrs.	College	0.14635	0.35355	-0.011	0.25	0.14635	0.35355	-0.029	0.69
MALES		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.17045	0.37634	0.036	0.37	0.18831	0.39128	-0.073	0.78
<15 Yrs.	HS Graduate	0.17430	0.37947	0.008	0.17	0.17483	0.37992	-0.593	1.28
<15 Yrs.	College	0.16279	0.36946	0.055	0.82	0.14574	0.35312	0.063	0.91
≥15 Yrs.	HS Dropout	0.18367	0.38755	0.126	1.77	0.16837	0.37451	0.085	1.19
≥15 Yrs.	HS Graduate	0.14785	0.35502	0.027	0.79	0.16205	0.36856	0.039	1.18
≥15 Yrs.	College	0.14991	0.35714	0.007	0.13	0.14225	0.34945	-0.007	0.13
FEMALES		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.19057	0.39314	0.008	0.07	0.17485	0.38021	0.049	0.40
<15 Yrs.	HS Graduate	0.17264	0.37804	-.0004	0.007	0.17752	0.38222	-0.079	1.54
<15 Yrs.	College	0.17195	0.37766	-0.082	0.79	0.16361	0.37023	-0.038	0.37
≥15 Yrs.	HS Dropout	0.14579	0.35326	0.071	0.73	0.15811	0.36522	0.012	0.13
≥15 Yrs.	HS Graduate	0.15876	0.36551	0.017	0.47	0.15941	0.36611	-0.015	0.42
≥15 Yrs.	College	0.14154	0.34878	-0.032	0.47	0.15190	0.35913	-0.034	0.51

Appendix A.19

YR90, YR91

Dummy Variables For 1990 And 1991

Cohort (All)		1990				1991			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.18044	0.38473	-0.033	0.43	0.18667	0.38982	Omitted Variable	
<15 Yrs.	HS Graduate	0.16520	0.37141	-0.034	0.99	0.16680	0.37285		
<15 Yrs.	College	0.17685	0.38169	-0.019	0.32	0.19051	0.39286		
≥15 Yrs.	HS Dropout	0.17674	0.38163	0.002	0.03	0.19907	0.39949		
≥15 Yrs.	HS Graduate	0.17254	0.37788	0.021	0.90	0.16836	0.37422		
≥15 Yrs.	College	0.15419	0.36121	-0.031	0.74	0.17181	0.37730		
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.18831	0.39128	-0.019	0.20	0.18831	0.39128	Omitted Variable	
<15 Yrs.	HS Graduate	0.16324	0.36969	-0.030	0.64	0.16482	0.37112		
<15 Yrs.	College	0.18760	0.39069	-0.20	0.31	0.18605	0.38945		
≥15 Yrs.	HS Dropout	0.17517	0.38044	-0.022	0.31	0.20578	0.40462		
≥15 Yrs.	HS Graduate	0.17105	0.37662	0.044	1.34	0.16967	0.37541		
≥15 Yrs.	College	0.15588	0.36289	-0.086	1.58	0.18313	0.38694		
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.17092	0.37681	-0.101	0.84	0.18468	0.38842	Omitted Variable	
<15 Yrs.	HS Graduate	0.16721	0.37326	-0.066	1.28	0.16884	0.37471		
<15 Yrs.	College	0.16528	0.37174	-0.019	0.19	0.19533	0.39678		
≥15 Yrs.	HS Dropout	0.17864	0.38345	0.030	0.33	0.19097	0.39347		
≥15 Yrs.	HS Graduate	0.17393	0.37911	0.018	0.50	0.16715	0.37317		
≥15 Yrs.	College	0.15190	0.35913	0.025	0.39	0.15650	0.36354		

Appendix A.20

YR92, YR93

Dummy Variables For 1992 And 1993

Cohort (All)		1992				1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.14844	0.35570	0.043	0.54	0.12267	0.32820	0.074	0.89
<15 Yrs.	HS Graduate	0.16306	0.36947	0.014	0.39	0.15531	0.36224	-0.013	0.36
<15 Yrs.	College	0.15836	0.36523	0.004	0.06	0.15273	0.35987	-0.032	0.50
≥15 Yrs.	HS Dropout	0.15256	0.35973	-0.038	0.63	0.14140	0.34859	0.105	1.75
≥15 Yrs.	HS Graduate	0.16001	0.36665	0.005	0.21	0.18490	0.38825	0.025	1.08
≥15 Yrs.	College	0.16936	0.37516	0.031	0.77	0.21194	0.40878	0.059	1.53
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.13799	0.34517	0.072	0.70	0.12662	0.33282	0.108	0.72
<15 Yrs.	HS Graduate	0.16693	0.37301	0.025	0.54	0.15587	0.36283	-0.030	0.62
<15 Yrs.	College	0.16744	0.37366	0.096	1.42	0.15039	0.35773	0.128	1.86
≥15 Yrs.	HS Dropout	0.14116	0.34848	-0.111	1.47	0.12585	0.33196	0.154	1.97
≥15 Yrs.	HS Graduate	0.16032	0.36696	0.045	1.35	0.18906	0.39162	0.019	0.58
≥15 Yrs.	College	0.16525	0.37156	-0.002	0.04	0.20358	0.40283	0.027	0.51
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.16110	0.36799	0.036	0.29	0.11788	0.32278	0.048	0.36
<15 Yrs.	HS Graduate	0.15907	0.36584	-0.028	0.53	0.15472	0.36174	-0.019	0.37
<15 Yrs.	College	0.14858	0.35597	-0.088	0.82	0.15526	0.36245	-0.231	2.16
≥15 Yrs.	HS Dropout	0.16632	0.37275	0.037	0.40	0.16016	0.36714	0.081	0.86
≥15 Yrs.	HS Graduate	0.15973	0.36641	-0.025	0.70	0.18103	0.38510	0.039	1.12
≥15 Yrs.	College	0.17491	0.38011	0.062	0.98	0.22325	0.41666	0.076	1.25

Appendix A.21

OCC1

Six Cohort Analysis

(1977-1981): Occupational Dummy For Professional, Technical And Kindred

(1988-1993): Professional Specialty Occupations, And Technicians And Related Support Occupations

Twelve Cohort Analysis:

(1977-1981): Professional, Technical And Kindred; Managers And Administrators, Except Farm

(1988-1993): Executive, Administrative And Managerial Occupations; Professional Specialty Occupations; Technicians And Related Support Occupations

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.02966	0.16974	0.113	0.68	0.01778	0.13220	0.041	0.21
<15 Yrs.	HS Graduate	0.07044	0.25595	0.161	0.192	0.07993	0.27121	0.005	0.11
<15 Yrs.	College	0.54435	0.49836	-0.005	0.07	0.50723	0.50015	0.174	1.98
≥15 Yrs.	HS Dropout	0.09754	0.29676	0.401	5.55	0.02884	0.16743	0.131	0.97
≥15 Yrs.	HS Graduate	0.09104	0.28773	0.184	2.77	0.09304	0.29051	0.229	6.58
≥15 Yrs.	College	0.60612	0.48908	0.144	1.26	0.53744	0.49872	0.179	2.87
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.03219	0.17669	0.342	1.34	0.02760	0.16395	-0.183	0.80
<15 Yrs.	HS Graduate	0.15079	0.35805	0.086	0.92	0.11374	0.31758	-0.075	1.25
<15 Yrs.	College	0.72374	0.44766	-0.056	0.68	0.67907	0.46720	-0.094	1.19
≥15 Yrs.	HS Dropout	0.18051	0.38477	0.244	3.02	0.04252	0.20194	0.272	1.55
≥15 Yrs.	HS Graduate	0.25778	0.43763	0.090	1.36	0.18006	0.38430	0.179	4.30
≥15 Yrs.	College	0.79697	0.40287	0.096	0.82	0.75383	0.43096	0.280	3.82
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.046980	0.21183	-0.094	0.48	0.02947	0.16928	0.267	1.15
<15 Yrs.	HS Graduate	0.13508	0.34198	0.086	0.78	0.18187	0.38584	0.067	1.21
<15 Yrs.	College	0.68627	0.46477	0.304	1.85	0.71285	0.45281	0.590	3.82
≥15 Yrs.	HS Dropout	0.16353	0.37007	0.444	4.24	0.10883	0.31175	0.004	0.03
≥15 Yrs.	HS Graduate	0.20604	0.40465	0.204	2.20	0.24976	0.43294	0.261	6.49
≥15 Yrs.	College	0.77202	0.42062	0.628	2.07	0.74684	0.43507	0.140	1.43

Appendix A.22

OCC2

Six Cohort Analysis

(1977-1981): Managers And Administrators, Except Farm.
(1988-1993): Executive, Administrative, And Managerial Occupations

Twelve Cohort Analysis

(1977-1981): Sales Workers
(1988-1993): Sales Occupations

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.00953	0.09723	-0.395	1.57	0.01067	0.10277	-0.097	0.42
<15 Yrs.	HS Graduate	0.07204	0.25862	0.029	0.38	0.06736	0.25068	-0.021	0.43
<15 Yrs.	College	0.16398	0.37051	0.024	0.32	0.18810	0.39095	0.141	1.63
≥15 Yrs.	HS Dropout	0.07586	0.26484	0.290	4.18	0.04372	0.20457	0.150	1.31
≥15 Yrs.	HS Graduate	0.14009	0.34717	0.114	1.94	0.12310	0.32858	0.158	5.06
≥15 Yrs.	College	0.18164	0.38592	0.148	1.31	0.21341	0.40982	0.221	3.58
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.03421	0.18194	Omitted Variable		0.04546	0.20847	Omitted Variable	
<15 Yrs.	HS Graduate	0.05896	0.23568			0.12112	0.32635		
<15 Yrs.	College	0.07763	0.26789			0.10078	0.30126		
≥15 Yrs.	HS Dropout	0.05170	0.22150			0.02721	0.16284		
≥15 Yrs.	HS Graduate	0.05350	0.22514			0.12223	0.32761		
≥15 Yrs.	College	0.06667	0.24982			0.08092	0.27283		
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.09843	0.29823	Omitted Variable		0.17092	0.37681	Omitted Variable	
<15 Yrs.	HS Graduate	0.06552	0.24757			0.16287	0.36934		
<15 Yrs.	College	0.03268	0.17809			0.06845	0.25272		
≥15 Yrs.	HS Dropout	0.06941	0.25430			0.10062	0.30113		
≥15 Yrs.	HS Graduate	0.06593	0.24828			0.11778	0.32240		
≥15 Yrs.	College	0.02073	0.14283			0.04948	0.21700		

Appendix A.23

OCC3

Six Cohort Analysis
(1977-1981): Sales Workers
(1988-1993): Sales Occupations

Twelve Cohort Analysis
(1977-1981): Clerical And Kindred Workers; Private Household Workers; Other Service Workers
(1988-1993): Administrative Support Occupations, Including Clerical Service; Private Household, Protective Service And Other Service Occupations; Farming, Forestry And Fishing

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.06462	0.24598	Omitted Variable		0.10222	0.30308	Omitted Variable	
<15 Yrs.	HS Graduate	0.06243	0.24201			0.14167	0.34876		
<15 Yrs.	College	0.05914	0.23604			0.08521	0.27930		
≥15 Yrs.	HS Dropout	0.05911	0.23589			0.06047	0.23846		
≥15 Yrs.	HS Graduate	0.05991	0.23737			0.11993	0.32490		
≥15 Yrs.	College	0.04971	0.21756			0.06755	0.25103		
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.30382	0.46037	0.069	0.38	0.28247	0.45057	-0.151	1.01
<15 Yrs.	HS Graduate	0.13152	0.33816	0.078	0.78	0.18852	0.39123	-0.310	5.73
<15 Yrs.	College	0.08219	0.27497	-0.291	2.81	0.11783	0.32266	-0.282	3.10
≥15 Yrs.	HS Dropout	0.12881	0.33514	0.005	0.06	0.14456	0.35195	-0.145	0.96
≥15 Yrs.	HS Graduate	0.13716	0.34418	-0.122	1.68	0.14439	0.35155	-0.100	2.28
≥15 Yrs.	College	0.06364	0.24447	0.012	0.08	0.07751	0.26752	-0.071	0.81
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.66443	0.47272	-0.137	1.16	0.57957	0.49411	-0.211	2.04
<15 Yrs.	HS Graduate	0.65927	0.47419	-0.058	0.61	0.53529	0.49889	-0.057	1.26
<15 Yrs.	College	0.25490	0.43652	0.065	0.41	0.18698	0.39022	0.107	0.69
≥15 Yrs.	HS Dropout	0.55647	0.49709	0.116	1.29	0.46817	0.49950	-0.213	2.06
≥15 Yrs.	HS Graduate	0.62271	0.48493	0.060	0.70	0.52307	0.49955	0.017	0.46
≥15 Yrs.	College	0.19171	0.39467	0.091	0.30	0.18182	0.38592	-0.186	1.91

Appendix A.24

OCC4

Six Cohort Analysis
(1977-1981): Clerical And Kindred Workers
(1988-1993): Administrative Support Occupations, Including Clerical Service Occupations

Twelve Cohort Analysis
(1977-1981): Craft And Kindred Workers; Operatives And Transport Equipment Operatives
(1988-1993): Craft And Repair Occupations; Machine Operators, Assemblers And Inspectors; Transportation And Material Moving Occupations

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.10911	0.31194	-0.024	0.20	0.07111	0.25712	-0.175	1.49
<15 Yrs.	HS Graduate	0.24386	0.42953	0.058	0.85	0.17268	0.37802	-0.077	1.87
<15 Yrs.	College	0.09946	0.29948	-0.216	2.58	0.10048	0.30076	-0.177	1.87
≥15 Yrs.	HS Dropout	0.14975	0.35692	0.177	2.75	0.05767	0.23324	-0.044	0.42
≥15 Yrs.	HS Graduate	0.26226	0.43997	0.059	1.05	0.21697	0.41222	0.004	0.13
≥15 Yrs.	College	0.07266	0.25982	-0.081	0.63	0.08664	0.28137	-0.134	1.95
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.25151	0.43432	0.337	1.77	0.22565	0.41835	0.102	0.65
<15 Yrs.	HS Graduate	0.50113	0.50028	0.197	2.21	0.36967	0.48284	-0.045	0.86
<15 Yrs.	College	0.06850	0.25288	-0.083	0.77	0.06512	0.24692	-0.350	3.30
≥15 Yrs.	HS Dropout	0.49661	0.50020	0.131	1.69	0.53741	0.49902	-0.018	0.13
≥15 Yrs.	HS Graduate	0.49027	0.50015	0.037	0.56	0.45291	0.49786	-0.022	0.57
≥15 Yrs.	College	0.05455	0.22744	-0.045	0.28	0.05622	0.23044	-0.162	1.68
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.08277	0.27585	-0.170	0.95	0.08056	0.27241	0.079	0.44
<15 Yrs.	HS Graduate	0.09980	0.29988	-0.295	2.35	0.07112	0.25709	-0.094	1.23
<15 Yrs.	College	0.01634	0.12699	0.066	0.26	0.01336	0.11489	0.307	1.01
≥15 Yrs.	HS Dropout	0.16471	0.37113	0.017	0.15	0.22587	0.41859	-0.002	0.01
≥15 Yrs.	HS Graduate	0.08882	0.28463	0.089	0.82	0.07519	0.26373	-0.137	2.57
≥15 Yrs.	College	0.01036	0.10153	-0.199	0.43	0.01841	0.13451	-0.510	3.09

Appendix A.25

OCC5

Six Cohort Analysis
(1977-1981): Craft And Kindred, Operatives And Transport Equipment Operatives
(1988-1993): Craft And Repair Occupations; Machine Operators, Assemblers And Inspectors; Transportation And Material Moving Occupations

Twelve Cohort Analysis
(1977-1981): Nonfarm Laborers; Farmers And Farm Managers; Farm Laborers And Supervisors
(1988-1993): Farming, Forestry And Fishing Occupations; Handlers, Equipment Cleaners, Helpers And Laborers; Armed Forces, Currently Civilian

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.17161	0.37724	0.032	0.28	0.16000	0.36677	0.055	0.52
<15 Yrs.	HS Graduate	0.28869	0.45327	0.044	0.62	0.22267	0.41609	-0.065	1.58
<15 Yrs.	College	0.04704	0.21187	-0.055	0.56	0.04019	0.19649	-0.121	1.01
≥15 Yrs.	HS Dropout	0.35764	0.47942	0.130	2.13	0.39628	0.48935	-0.023	0.25
≥15 Yrs.	HS Graduate	0.28349	0.45080	0.091	1.57	0.25739	0.43723	-0.029	1.01
≥15 Yrs.	College	0.03824	0.19196	-0.112	0.74	0.04014	0.19633	-0.276	3.36
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.37827	0.48544	0.074	0.39	0.41883	0.49377	-0.108	0.72
<15 Yrs.	HS Graduate	0.15760	0.36457	-0.082	0.82	0.20695	0.40523	-0.320	5.72
<15 Yrs.	College	0.04795	0.21389	-0.418	3.28	0.03721	0.18942	-0.330	2.57
≥15 Yrs.	HS Dropout	0.14237	0.34958	-0.209	2.45	0.24830	0.43239	-0.474	3.16
≥15 Yrs.	HS Graduate	0.06128	0.23997	-0.290	3.48	0.10042	0.30061	-0.334	7.12
≥15 Yrs.	College	0.01818	0.13381	-0.445	1.97	0.03152	0.17478	-0.362	3.15
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.10738	0.30995	-0.303	1.60	0.13949	0.34680	0.029	0.19
<15 Yrs.	HS Graduate	0.04032	0.19681	-0.572	3.59	0.04886	0.21563	-0.190	2.27
<15 Yrs.	College	0.00980	0.09869	-0.019	0.06	0.01836	0.13438	-0.125	0.45
≥15 Yrs.	HS Dropout	0.04588	0.20935	0.151	0.99	0.09651	0.29559	-0.102	0.67
≥15 Yrs.	HS Graduate	0.01648	0.12738	0.073	0.42	0.03421	0.18178	-0.138	2.09
≥15 Yrs.	College	0.00518	0.07198	-0.337	0.43	0.00345	0.05869	-0.711	2.14

Appendix A.26

OCC6

(1977-1981): Private Household Workers
(1988-1993): Private Household Occupations

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.06780	0.25153	-0.529	3.16	0.02667	0.16118	-0.632	3.39
<15 Yrs.	HS Graduate	0.01174	0.10774	-1.590	9.56	0.00748	0.08620	-0.499	3.86
<15 Yrs.	College	0.00672	0.08176	-1.875	7.19	0.00161	0.04008	-0.905	1.84
≥15 Yrs.	HS Dropout	0.00985	0.09880	-0.557	3.51	0.01395	0.11735	-0.628	3.41
≥15 Yrs.	HS Graduate	0.00708	0.08384	-1.356	8.28	0.00585	0.07624	-0.470	4.55
≥15 Yrs.	College	0.00574	0.07559	-2.329	6.09	0.00245	0.04942	-0.795	2.92

Appendix A.27

OCC7

(1977-1981): Nonfarm Laborers, Other Service Workers, Farmers And Farm Managers, Farm Laborers And Supervisors
(1988-1993): Protective Service Occupations; Other Service Occupations; Farming, Forestry And Fishing Occupations; Handlers, Equipment Cleaners, Helpers And Laborers; Armed Forces, Currently Civilian

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.25000	0.43324	-0.099	1.00	0.61156	0.48761	-0.161	2.00
<15 Yrs.	HS Graduate	0.09552	0.29401	-0.079	1.15	0.30821	0.46181	-0.231	6.60
<15 Yrs.	College	0.03226	0.17680	-0.313	3.53	0.07717	0.26697	-0.156	1.55
≥15 Yrs.	HS Dropout	0.10197	0.30268	-0.041	0.67	0.39907	0.48994	-0.254	3.08
≥15 Yrs.	HS Graduate	0.03821	0.19174	-0.179	2.99	0.18373	0.38730	-0.195	6.73
≥15 Yrs.	College	0.01338	0.11502	-0.418	2.88	0.05237	0.22283	-0.348	4.53

Appendix A.28

IND1

Six Cohort Analysis
Industry Dummy For Agriculture, Forestry And Fisheries

Twelve Cohort Analysis
Agriculture, Forestry And Fisheries Industries; Mining; Constuction

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.12288	0.32847	-0.277	3.53	0.13067	0.33719	-0.063	0.79
<15 Yrs.	HS Graduate	0.05176	0.22160	-0.268	3.70	0.04651	0.21062	-0.188	3.57
<15 Yrs.	College	0.03763	0.19044	0.063	0.64	0.02251	0.14839	0.026	0.18
≥15 Yrs.	HS Dropout	0.05271	0.22351	-0.074	1.14	0.10326	0.30443	-0.163	2.11
≥15 Yrs.	HS Graduate	0.02783	0.16452	0.108	1.42	0.03090	0.17306	-0.164	3.62
≥15 Yrs.	College	0.03442	0.18247	0.180	1.16	0.02888	0.16751	0.155	1.68
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.25352	0.43546	-0.179	1.83	0.27435	0.44655	-0.044	0.52
<15 Yrs.	HS Graduate	0.20635	0.40491	-0.048	0.78	0.16956	0.37535	0.017	0.37
<15 Yrs.	College	0.09589	0.29478	-0.043	0.50	0.08062	0.27246	0.084	0.91
≥15 Yrs.	HS Dropout	0.17288	0.37831	0.131	2.39	0.27381	0.44629	0.174	2.32
≥15 Yrs.	HS Graduate	0.16537	0.37169	0.126	2.64	0.14716	0.35433	-0.027	0.72
≥15 Yrs.	College	0.10303	0.30446	0.009	0.08	0.06814	0.25210	0.047	0.57
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.09843	0.29823	0.018	0.11	0.07662	0.26625	-0.001	0.008
<15 Yrs.	HS Graduate	0.05343	0.22500	0.260	2.20	0.04180	0.20019	0.115	1.40
<15 Yrs.	College	0.01634	0.12699	0.161	0.74	0.02337	0.15121	-0.074	0.31
≥15 Yrs.	HS Dropout	0.04706	0.21189	0.031	0.24	0.05750	0.23303	-0.256	1.67
≥15 Yrs.	HS Graduate	0.05037	0.21880	0.176	1.83	0.04098	0.19828	-0.037	0.66
≥15 Yrs.	College	0.01036	0.10153	-0.129	0.24	0.02071	0.14251	-0.159	1.10

Appendix A.29

IND2

Six Cohort Analysis
Dummy Variable For The Mining Industry

Twelve Cohort Analysis
Durable Goods; Nondurable Goods; Transportation, Communications And Public Utilities

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.00106	0.03255	0.819	1.18	0.00356	0.05955	0.584	1.50
<15 Yrs.	HS Graduate	0.01334	0.11476	0.352	2.74	0.00642	0.07985	0.582	4.58
<15 Yrs.	College	0.00941	0.00966	0.381	2.30	0.00563	0.07483	0.222	0.86
≥15 Yrs.	HS Dropout	0.01576	0.12459	0.371	3.47	0.01023	0.10068	0.475	2.61
≥15 Yrs.	HS Graduate	0.01085	0.10362	0.139	1.20	0.00702	0.08347	0.489	5.73
≥15 Yrs.	College	0.00382	0.06178	0.627	1.79	0.00245	0.04942	0.737	3.01
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.14688	0.35434	0.297	2.73	0.17208	0.37775	0.139	1.41
<15 Yrs.	HS Graduate	0.38662	0.48725	0.173	3.19	0.27962	0.44893	0.228	5.59
<15 Yrs.	College	0.19406	0.39593	0.163	2.51	0.20930	0.40713	0.285	4.10
≥15 Yrs.	HS Dropout	0.41949	0.49369	0.207	4.56	0.42687	0.49504	0.277	3.94
≥15 Yrs.	HS Graduate	0.45817	0.49849	0.154	3.96	0.42798	0.49487	0.223	7.31
≥15 Yrs.	College	0.24242	0.42920	0.161	1.73	0.23850	0.42635	0.113	1.79
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.09172	0.28896	0.394	2.64	0.08644	0.28130	0.162	1.01
<15 Yrs.	HS Graduate	0.18952	0.39212	0.269	3.75	0.14604	0.35324	0.194	3.69
<15 Yrs.	College	0.10458	0.30651	0.471	4.32	0.12521	0.33123	-0.023	0.17
≥15 Yrs.	HS Dropout	0.17529	0.38044	0.224	2.90	0.22587	0.41859	0.178	1.83
≥15 Yrs.	HS Graduate	0.15476	0.36184	0.208	3.14	0.16683	0.37288	0.280	8.02
≥15 Yrs.	College	0.03627	0.18745	0.313	1.26	0.07020	0.25562	0.157	1.68

Appendix A.30

IND3

Six Cohort Analysis
Dummy Variable For The Construction Trade

Twelve Cohort Analysis
Wholesale Trade; Retail Trade; Finance, Insurance And Real Estate

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.05614	0.23032	0.212	1.98	0.05067	0.21941	0.165	1.39
<15 Yrs.	HS Graduate	0.06030	0.23810	0.153	2.20	0.05373	0.22551	0.250	4.86
<15 Yrs.	College	0.01613	0.12606	0.347	2.67	0.02492	0.15594	0.185	1.33
≥15 Yrs.	HS Dropout	0.05172	0.22152	0.292	4.42	0.06233	0.24186	0.202	2.21
≥15 Yrs.	HS Graduate	0.06745	0.25086	0.222	3.90	0.05428	0.22660	0.122	3.25
≥15 Yrs.	College	0.03059	0.17238	0.132	.083	0.01664	0.12796	0.241	2.21
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.38229	0.48644	Omitted Variable		0.37013	0.48323	Omitted Variable	
<15 Yrs.	HS Graduate	0.24717	0.43161			0.31174	0.46333		
<15 Yrs.	College	0.21689	0.41260			0.18295	0.38692		
≥15 Yrs.	HS Dropout	0.21186	0.40880			0.16156	0.36836		
≥15 Yrs.	HS Graduate	0.19942	0.39976			0.22057	0.41470		
≥15 Yrs.	College	0.15455	0.36202			0.13458	0.34142		
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.39374	0.48912	Omitted Variable		0.50688	0.50044	Omitted Variable	
<15 Yrs.	HS Graduate	0.37399	0.48411			0.42671	0.49473		
<15 Yrs.	College	0.14706	0.35474			0.14190	0.34924		
≥15 Yrs.	HS Dropout	0.30706	0.46155			0.35113	0.47781		
≥15 Yrs.	HS Graduate	0.32234	0.46759			0.29719	0.45710		
≥15 Yrs.	College	0.08290	0.27645			0.10587	0.30785		

Appendix A.31

IND4

Six Cohort Analysis
Dummy Variable For The Durable Goods Industry

Twelve Cohort Analysis
Business And Repair Services; Personal Services, Including Private Household; Entertainment And Recreation Services

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.04767	0.21318	0.403	3.35	0.04800	0.21386	0.214	1.68
<15 Yrs.	HS Graduate	0.11900	0.32387	0.195	3.43	0.09329	0.29088	0.254	5.81
<15 Yrs.	College	0.06720	0.25054	0.418	5.17	0.08199	0.27447	0.348	3.41
≥15 Yrs.	HS Dropout	0.14138	0.34850	0.289	5.69	0.13302	0.33976	0.276	3.60
≥15 Yrs.	HS Graduate	0.12736	0.33345	0.247	5.15	0.11542	0.31955	0.264	8.59
≥15 Yrs.	College	0.10134	0.30207	0.419	3.37	0.07440	0.26249	0.408	5.45
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.12475	0.33077	-0.068	0.64	0.10714	0.30955	-0.039	0.37
<15 Yrs.	HS Graduate	0.06122	0.23988	-0.067	0.79	0.09110	0.28783	-0.069	1.30
<15 Yrs.	College	0.02511	0.15665	-0.066	0.49	0.09302	0.29069	0.082	0.96
≥15 Yrs.	HS Dropout	0.04830	0.21450	-0.019	0.24	0.05952	0.23680	-0.266	2.48
≥15 Yrs.	HS Graduate	0.03404	0.18144	-0.050	0.63	0.05609	0.23014	-0.180	3.77
≥15 Yrs.	College	0.03636	0.18748	0.116	0.75	0.05451	0.22713	0.019	0.22
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.22595	0.41868	-0.356	3.94	0.19253	0.39468	-0.319	3.25
<15 Yrs.	HS Graduate	0.09476	0.29303	-0.379	4.60	0.11835	0.32311	-0.161	3.19
<15 Yrs.	College	0.04248	0.20202	-0.646	4.51	0.06678	0.24985	-0.201	1.29
≥15 Yrs.	HS Dropout	0.09529	0.29379	-0.108	1.34	0.14990	0.35734	-0.079	0.87
≥15 Yrs.	HS Graduate	0.07967	0.27091	-0.374	4.71	0.08551	0.27969	-0.232	5.72
≥15 Yrs.	College	0.06218	0.24210	-0.263	1.24	0.04373	0.20461	-0.095	0.89

Appendix A.32

IND5

Six Cohort Analysis
Industry Dummy For Nondurable Goods

Twelve Cohort Analysis
Professional And Related Services; Public Administration

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.05085	0.21980	0.218	1.92	0.06044	0.23841	0.152	1.36
<15 Yrs.	HS Graduate	0.06830	0.25233	0.032	0.48	0.06736	0.25068	0.223	4.73
<15 Yrs.	College	0.04167	0.19996	0.368	4.03	0.03698	0.18878	0.336	2.86
≥15 Yrs.	HS Dropout	0.08030	0.27182	0.160	2.77	0.13953	0.34667	0.158	2.14
≥15 Yrs.	HS Graduate	0.06274	0.24254	0.112	1.97	0.06063	0.23867	0.234	6.54
≥15 Yrs.	College	0.02295	0.14987	-0.081	0.48	0.03377	0.18069	0.225	2.61
Males		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.09256	0.29010	-0.042	0.35	0.07630	0.26569	0.014	0.12
<15 Yrs.	HS Graduate	0.09864	0.29835	-0.018	0.23	0.14797	0.35517	0.084	1.78
<15 Yrs.	College	0.46804	0.49955	-0.120	2.04	0.43411	0.49602	0.030	0.44
≥15 Yrs.	HS Dropout	0.14746	0.35471	0.057	1.03	0.07823	0.26876	0.195	1.90
≥15 Yrs.	HS Graduate	0.14300	0.35024	0.077	1.58	0.14820	0.35536	-0.052	1.38
≥15 Yrs.	College	0.46364	0.49943	-0.136	1.55	0.50426	0.50019	-0.164	2.66
Females		Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.19016	0.39286	0.022	0.23	0.13752	0.34474	0.091	0.79
<15 Yrs.	HS Graduate	0.28831	0.45320	0.049	0.83	0.26710	0.44257	0.057	1.40
<15 Yrs.	College	0.68954	0.46344	0.179	2.01	0.64274	0.47959	-0.235	2.01
≥15 Yrs.	HS Dropout	0.37529	0.48448	0.079	1.41	0.21561	0.41166	0.149	1.77
≥15 Yrs.	HS Graduate	0.39286	0.48861	0.049	0.98	0.40949	0.49182	-0.013	0.47
≥15 Yrs.	College	0.80829	0.39467	0.270	1.69	0.75949	0.42764	-0.003	0.04

Appendix A.33

IND6

Transportation, Communications And Public Utilities.

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.02225	0.14756	0.433	2.70	0.02489	0.15586	0.254	1.67
<15 Yrs.	HS Graduate	0.09498	0.29327	0.345	5.93	0.05319	0.22445	0.320	6.36
<15 Yrs.	College	0.04839	0.21473	0.274	2.98	0.04984	0.21770	0.251	2.29
≥15 Yrs.	HS Dropout	0.09557	0.29407	0.252	4.67	0.06326	0.24354	0.204	2.32
≥15 Yrs.	HS Graduate	0.11179	0.31519	0.229	4.73	0.11675	0.32115	0.410	13.5
≥15 Yrs.	College	0.04207	0.20093	0.405	2.82	0.05874	0.23519	0.339	4.39

Appendix A.34

IND7

Wholesale Trade

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.01377	0.11660	0.235	1.18	0.02756	0.16377	-0.125	0.87
<15 Yrs.	HS Graduate	0.04002	0.19606	0.085	1.10	0.04758	0.21291	0.104	2.04
<15 Yrs.	College	0.04167	0.19996	0.192	2.38	0.02492	0.15594	0.288	2.16
≥15 Yrs.	HS Dropout	0.04828	0.21440	0.122	1.87	0.05581	0.22967	0.063	0.72
≥15 Yrs.	HS Graduate	0.04717	0.21205	0.112	1.83	0.04794	0.21365	0.167	4.56
≥15 Yrs.	College	0.03251	0.17751	0.251	1.65	0.02203	0.14681	0.225	2.29

Appendix A.35

IND8

Retail Trade

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.35487	0.47873	Omitted Variable		0.39111	0.48822	Omitted Variable	
<15 Yrs.	HS Graduate	0.21932	0.41389			0.26624	0.44205		
<15 Yrs.	College	0.08065	0.27247			0.08039	0.27200		
≥15 Yrs.	HS Dropout	0.16059	0.36724			0.17023	0.37601		
≥15 Yrs.	HS Graduate	0.16085	0.36748			0.14966	0.35677		
≥15 Yrs.	College	0.04398	0.20524			0.04699	0.21167		

Appendix A.36

IND9

Finance, Insurance And Real Estate

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.01907	0.13684	0.151	0.89	0.01333	0.11475	0.112	0.55
<15 Yrs.	HS Graduate	0.05496	0.22797	-0.016	0.23	0.05453	0.22709	0.179	3.54
<15 Yrs.	College	0.06586	0.24820	0.192	2.38	0.05788	0.23361	0.268	2.60
≥15 Yrs.	HS Dropout	0.04286	0.20258	0.118	1.72	0.02140	0.14477	-0.321	2.44
≥15 Yrs.	HS Graduate	0.05472	0.22748	0.107	1.84	0.06264	0.24233	0.200	5.79
≥15 Yrs.	College	0.05163	0.22148	0.129	0.95	0.05335	0.22479	0.324	4.26

Appendix A.37

IND10

Business And Repair Services

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.04025	0.19666	-0.034	0.29	0.03556	0.18526	-0.303	2.38
<15 Yrs.	HS Graduate	0.03415	0.18167	0.040	0.48	0.04464	0.20654	0.077	1.45
<15 Yrs.	College	0.01613	0.12606	0.340	2.62	0.05225	0.22262	0.207	1.87
≥15 Yrs.	HS Dropout	0.02709	0.16240	0.178	2.17	0.03349	0.17999	-0.152	1.44
≥15 Yrs.	HS Graduate	0.01934	0.13775	0.076	0.87	0.03274	0.17796	0.043	0.99
≥15 Yrs.	College	0.02868	0.16707	0.289	1.83	0.03182	0.17555	0.358	4.03

Appendix A.38

IND11

Personal Services, Including Private Households

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.11229	0.31589	-0.133	1.16	0.07911	0.27003	-0.079	0.73
<15 Yrs.	HS Graduate	0.04056	0.19731	0.004	0.04	0.04411	0.20536	-0.156	2.77
<15 Yrs.	College	0.01479	0.12077	-0.230	1.30	0.01286	0.11272	-0.156	0.84
≥15 Yrs.	HS Dropout	0.03202	0.17610	-0.061	0.69	0.05861	0.23499	-0.047	0.49
≥15 Yrs.	HS Graduate	0.03113	0.17372	-0.207	2.56	0.03007	0.17078	-0.214	4.39
≥15 Yrs.	College	0.01338	0.11502	-0.086	0.33	0.01175	0.10777	-0.064	0.47

Appendix A.39

IND12
Entertainment And Recreation Services

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.02013	0.14051	0.228	1.37	0.03111	0.17370	-0.075	0.55
<15 Yrs.	HS Graduate	0.00427	0.06522	-0.245	1.13	0.01577	0.12461	-0.079	0.97
<15 Yrs.	College	0.00134	0.03666	-0.292	0.71	0.01527	0.12269	0.112	0.69
≥15 Yrs.	HS Dropout	0.00887	0.09377	0.129	0.96	0.00837	0.09116	-0.292	1.48
≥15 Yrs.	HS Graduate	0.00708	0.08384	0.272	1.95	0.00852	0.09191	-0.022	0.29
≥15 Yrs.	College	0.00382	0.06178	0.058	0.17	0.00636	0.07954	-0.054	0.34

Appendix A.40

IND13
Professional And Related Services

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.11335	0.31719	-0.025	0.31	0.08356	0.27684	0.021	0.23
<15 Yrs.	HS Graduate	0.14995	0.35711	0.005	0.09	0.14408	0.35122	0.078	2.10
<15 Yrs.	College	0.45699	0.49848	0.097	1.45	0.43248	0.49562	0.048	0.56
≥15 Yrs.	HS Dropout	0.17882	0.38329	0.059	1.24	0.11721	0.32182	0.113	1.60
≥15 Yrs.	HS Graduate	0.17123	0.37680	0.052	1.21	0.21046	0.40767	0.033	1.23
≥15 Yrs.	College	0.50860	0.50040	0.106	0.98	0.50710	0.50007	0.066	1.02

Appendix A.41

IND14
Public Administration

Cohort (All)		1977-1981				1988-1993			
Experience	Education	Mean	Std Dev	Coef	t-value	Mean	Std Dev	Coef	t-value
<15 Yrs.	HS Dropout	0.02542	0.15749	0.062	0.42	0.02044	0.14158	0.134	0.80
<15 Yrs.	HS Graduate	0.04909	0.21612	0.150	2.04	0.06255	0.24218	0.181	3.80
<15 Yrs.	College	0.10215	0.30305	0.287	3.81	0.10209	0.30289	0.198	2.08
≥15 Yrs.	HS Dropout	0.06404	0.24488	0.202	3.32	0.02326	0.15079	0.170	1.30
≥15 Yrs.	HS Graduate	0.10047	0.30070	0.187	3.83	0.07299	0.26014	0.193	5.69
≥15 Yrs.	College	0.08222	0.27496	0.281	2.22	0.10573	0.30756	0.238	3.38

APPENDIX B

ESTIMATED EMPLOYMENT PROPORTIONS AND WAGE PREMIA BY INDUSTRY, 1977-81 AND 1988-93

Industry	Proportional Employment		Change in Employment	Estimated Wage Premia (M_j's)		Change in Premia, ΔM_j
	1977-81	1988-93	1977-93	1977-81	1988-93	1977-93
Agriculture, forestry and fisheries	0.052	0.046	-0.005	-0.189	-0.195	-0.006
Mining	0.011	0.006	-0.005	+0.304	+0.386	+0.082
Construction	0.054	0.047	-0.007	+0.082	+0.066	-0.016
Durable goods	0.113	0.098	-0.015	+0.184	+0.166	-0.018
Nondurable goods	0.063	0.062	-0.0002	-0.010	+0.093	+0.102
Transportation, communication and utilities	0.084	0.077	-0.006	+0.192	+0.168	-0.024
Wholesale trade	0.041	0.042	+0.001	+0.035	-0.008	-0.043
Retail Trade	0.182	0.178	-0.003	-0.145	-0.128	+0.016
Finance, insurance and real estate	0.049	0.052	+0.004	-0.031	-0.002	+0.029
Business and repair services	0.027	0.037	+0.010	+0.004	-0.090	-0.094
Personal services, including private households	0.040	0.035	-0.005	-0.263	-0.248	+0.016
Entertainment and recreation services	0.008	0.012	+0.005	-0.119	-0.197	-0.078
Professional and related services	0.209	0.236	+0.027	-0.095	-0.069	+0.027
Public administration	0.070	0.070	-0.0004	+0.050	+0.057	+0.007

APPENDIX C

INDUSTRIAL STRUCTURE OF EMPLOYMENT BY COHORT

Appendix C.1

Six Cohort Analysis, Low Experience Cohorts

	Low Experience (< 15 years)								
	Dropouts			High School Graduates			College Graduates		
Industry	1977-81	1988-93	Change	1977-81	1988-93	Change	1977-81	1988-93	Change
Agriculture, Forestry and Fisheries	0.123	0.131	+0.008	0.052	0.047	-0.005	0.038	0.023	-0.015
Mining	0.001	0.004	+0.003	0.013	0.006	-0.007	0.009	0.006	-0.003
Construction	0.056	0.051	-0.005	0.060	0.054	-0.006	0.016	0.025	+0.009
Durable goods	0.048	0.048	0.000	0.119	0.093	-0.026	0.067	0.082	+0.015
Nondurable goods	0.051	0.060	+0.009	0.068	0.067	-0.001	0.042	0.037	-0.005
Transportation, communication and utilities	0.022	0.025	+0.003	0.095	0.053	-0.042	0.048	0.050	+0.002
Wholesale trade	0.014	0.028	+0.014	0.040	0.048	+0.008	0.042	0.025	-0.017
Retail Trade	0.355	0.391	+0.036	0.219	0.266	+0.047	0.081	0.080	-0.001
Finance, insurance and real estate	0.019	0.013	-0.006	0.055	0.055	0.000	0.066	0.058	-0.008
Business and repair services	0.040	0.036	-0.004	0.034	0.045	+0.011	0.016	0.052	+0.036
Personal services, including private households	0.112	0.079	-0.033	0.040	0.044	+0.004	0.015	0.013	-0.002
Entertainment and recreation services	0.020	0.031	+0.011	0.004	0.016	+0.012	0.001	0.015	+0.014
Professional and related services	0.113	0.084	-0.029	0.150	0.144	-0.006	0.457	0.432	-0.025
Public administration	0.025	0.020	-0.005	0.049	0.063	+0.014	0.102	0.102	0.000

Appendix C.2

Six Cohort Analysis, High Experience Cohorts

	High Experience (≥ 15 years)								
	Dropouts			High School Graduates			College Graduates		
Industry	1977-81	1988-93	Change	1977-81	1988-93	Change	1977-81	1988-93	Change
Agriculture, Forestry and Fisheries	0.053	0.103	+0.050	0.028	0.031	+0,003	0.034	0.029	-0.005
Mining	0.016	0.010	-0.006	0.011	0.007	-0.004	0.004	0.002	-0.002
Construction	0.052	0.062	+0.010	0.067	0.054	-0.013	0.031	0.017	-0.014
Durable goods	0.141	0.133	-0.008	0.127	0.115	-0.012	0.101	0.074	-0.027
Nondurable goods	0.080	0.140	+0.060	0.063	0.060	-0.003	0.023	0.034	+0.011
Transportation, communication and utilities	0.096	0.063	-0.033	0.112	0.117	+0.005	0.042	0.059	+0.017
Wholesale trade	0.048	0.056	+0.008	0.047	0.048	+0.001	0.033	0.022	-0.011
Retail Trade	0.161	0.170	+0.009	0.161	0.150	-0.011	0.044	0.047	+0.003
Finance, insurance and real estate	0.043	0.021	-0.022	0.055	0.063	+0.008	0.052	0.053	+0.001
Business and repair services	0.027	0.033	+0.006	0.019	0.033	+0.014	0.029	0.032	+0.003
0.01175	0.032	0.059	+0.027	0.031	0.030	-0.001	0.013	0.012	-0.001
Entertainment and recreation services	0.009	0.008	-0.001	0.007	0.009	+0.002	0.004	0.006	+0.002
Professional and related services	0.179	0.117	-0.062	0.171	0.210	+0.039	0.509	0.507	-0.002
Public administration	0.064	0.023	-0.041	0.100	0.073	-0.027	0.082	0.106	+0.024

Appendix C.3

Twelve Cohort Analysis, Male Cohorts

MALES	Low Experience (< 15 years)								
	Dropouts			High School Graduates			College Graduates		
Industry	1977-81	1988-93	Change	1977-81	1988-93	Change	1977-81	1988-93	Change
Agriculture, Forestry, Fisheries, Mining; Construction	0.254	0.274	+0.020	0.206	0.170	-0.036	0.096	0.080	-0.016
Durable Goods, Nondurable Goods, Transportation, Communications And Public Utilities	0.147	0.172	+0.025	0.387	0.280	-0.107	0.194	0.209	+0.015
Wholesale Trade, Retail Trade, Finance, Insurance And Real Estate	0.382	0.370	-0.012	0.247	0.312	+0.065	0.217	0.183	-0.034
Business And Repair Services; PersonalServices, Including Private Household;Entertainment And Recreation Services	0.125	0.107	-0.018	0.061	0.091	+0.030	0.025	0.093	+0.068
Professional And Related Services; Public Administration	0.093	0.076	-0.017	0.099	0.148	+0.049	0.468	0.434	-0.034
	High Experience (≥ 15 years)								
Agriculture, Forestry, Fisheries, Mining; Construction	0.173	0.273	+0.100	0.165	0.147	-0.018	0.103	0.069	-0.034
Durable Goods, Nondurable Goods, Transportation, Communications And Public Utilities	0.419	0.427	+0.008	0.458	0.428	-0.030	0.242	0.239	-0.003
Wholesale Trade, Retail Trade, Finance, Insurance And Real Estate	0.212	0.162	-0.050	0.199	0.221	+0.022	0.155	0.135	-0.020
Business And Repair Services; PersonalServices, Including Private Household;Entertainment And Recreation Services	0.048	0.060	+0.012	0.034	0.056	+0.022	0.036	0.055	+0.019
Professional And Related Services; Public Administration	0.147	0.078	-0.069	0.143	0.148	+0.005	0.464	0.504	+0.040

Appendix C.4

12 Cohort Analysis, Female Cohorts

FEMALES	Low Experience (< 15 years)								
	Dropouts			High School Graduates			College Graduates		
Industry	1977-81	1988-93	Change	1977-81	1988-93	Change	1977-81	1988-93	Change
Agriculture, Forestry, Fisheries, Mining; Construction	0.098	0.077	-0.021	0.053	0.042	-0.011	0.016	0.023	+0.007
Durable Goods, Nondurable Goods, Transportation, Communications And Public Utilities	0.092	0.086	-0.006	0.190	0.146	-0.044	0.105	0.125	+0.020
Wholesale Trade, Retail Trade, Finance, Insurance And Real Estate	0.394	0.507	+.113	0.374	0.427	+0.053	0.147	0.142	-0.005
Business And Repair Services; PersonalServices, Including Private Household;Entertainment And Recreation Services	0.223	0.193	-0.030	0.095	0.118	+0.023	0.042	0.067	+0.025
Professional And Related Services; Public Administration	0.190	0.138	-0.052	0.288	0.267	-0.021	0.690	0.643	-0.047
	High Experience (≥ 15 years)								
Agriculture, Forestry, Fisheries, Mining; Construction	0.047	0.058	+0.011	0.050	0.041	-0.009	0.010	0.021	+0.011
Durable Goods, Nondurable Goods, Transportation, Communications And Public Utilities	0.175	0.226	+0.051	0.155	0.167	+0.012	0.036	0.070	+0.034
Wholesale Trade, Retail Trade, Finance, Insurance And Real Estate	0.307	0.351	+0.044	0.322	0.297	-0.025	0.083	0.106	+0.023
Business And Repair Services; PersonalServices, Including Private Household;Entertainment And Recreation Services	0.095	0.150	+0.055	0.080	0.086	+0.006	0.062	0.044	-0.018
Professional And Related Services; Public Administration	0.375	0.216	-0.159	0.393	0.409	+0.016	0.808	0.759	-0.049

APPENDIX D

WAGE PREMIA BY INDUSTRY

12 COHORT ANALYSIS

Industry	Industry Wage Premium		
	1977-81	1988-93	Change
Agriculture, Forestry, Fisheries, Mining; Construction	0.0324	0.0021	-0.0303
Durable Goods, Nondurable Goods, Transportation, Communications And Public Utilities	0.2424	0.2000	-0.0424
Wholesale Trade, Retail Trade, Finance, Insurance And Real Estate	-0.0104	0.0155	+0.0259
Business And Repair Services; PersonalServices, Including Private Household;Entertainment And Recreation Services	-0.2003	-0.1129	+0.0874
Professional And Related Services; Public Administration	-0.0642	-0.1048	-0.0406

APPENDIX E

INFORMATION ON WAGE REGRESSIONS:

NUMBER OF OBSERVATIONS, R^2 AND ADJUSTED R^2

Cohort (All)		1977-1981			1988-1993		
Experience	Education	Observations	R^2	Adj. R^2	Observations	R^2	Adj. R^2
<15 Yrs.	HS Dropout	944	0.2072	0.1803	1125	0.1956	0.1698
<15 Yrs.	HS Graduate	1874	0.3061	0.2944	3741	0.2435	0.2363
<15 Yrs.	College	744	0.3920	0.3655	1244	0.1999	0.1767
≥15 Yrs.	HS Dropout	2030	0.3227	0.3122	1075	0.3002	0.2766
≥15 Yrs.	HS Graduate	2120	0.3725	0.3632	5987	0.3181	0.3141
≥15 Yrs.	College	523	0.4590	0.4249	2043	0.2585	0.2456
Males		Observations	R^2	Adj. R^2	Observations	R^2	Adj. R^2
<15 Yrs.	HS Dropout	497	0.1715	0.1403	616	0.2604	0.2329
<15 Yrs.	HS Graduate	882	0.2305	0.2145	1899	0.2478	0.2390
<15 Yrs.	College	438	0.2325	0.1995	645	0.2593	0.2331
≥15 Yrs.	HS Dropout	1180	0.1985	0.1860	588	0.2813	0.2533
≥15 Yrs.	HS Graduate	1028	0.1156	0.0998	2888	0.1816	0.1753
≥15 Yrs.	College	330	0.2463	0.2027	1174	0.1664	0.1505
Females		Observations	R^2	Adj. R^2	Observations	R^2	Adj. R^2
<15 Yrs.	HS Dropout	447	0.1509	0.1152	509	0.1255	0.0859
<15 Yrs.	HS Graduate	992	0.1234	0.1072	1842	0.1506	0.1404
<15 Yrs.	College	306	0.3384	0.2969	599	0.1452	0.1125
≥15 Yrs.	HS Dropout	850	0.0903	0.0706	487	0.1116	0.0695
≥15 Yrs.	HS Graduate	1092	0.0843	0.0689	3099	0.1771	0.1712
≥15 Yrs.	College	193	0.3600	0.2938	869	0.1916	0.1706

APPENDIX F

SHAZAM PROGRAM FOR LOG WAGE REGRESSIONS AND GENERATION OF MEAN LOG WAGES BY COHORT AND INDUSTRY FOR LOW EXPERIENCE HIGH SCHOOL DROPOUTS AND GRADUATES, SIX COHORT ANALYSIS, 1988-1993

```
*READ DATA FILE

read(x893d.dif) / names dif

*GENERATE VARIABLES FROM RAW DATA

if((year.eq.88).or.(year.eq.89).or.(year.eq.90).or.(year.eq.91)) edat2=edat
if(((year.eq.92).or.(year.eq.93)).and.(edat.eq.31)) edat2=1
if(((year.eq.92).or.(year.eq.93)).and.(edat.eq.32)) edat2=4
if(((year.eq.92).or.(year.eq.93)).and.(edat.eq.33)) edat2=6
if(((year.eq.92).or.(year.eq.93)).and.(edat.eq.34)) edat2=8
if(((year.eq.92).or.(year.eq.93)).and.(edat.eq.35)) edat2=9
if(((year.eq.92).or.(year.eq.93)).and.(edat.eq.36)) edat2=10
if(((year.eq.92).or.(year.eq.93)).and.(edat.eq.37)) edat2=11
if(((year.eq.92).or.(year.eq.93)).and.(edat.eq.38)) edat2=11
if(((year.eq.92).or.(year.eq.93)).and.(edat.eq.39)) edat2=12
if(((year.eq.92).or.(year.eq.93)).and.(edat.eq.40)) edat2=14
if(((year.eq.92).or.(year.eq.93)).and.(edat.eq.41)) edat2=14
if(((year.eq.92).or.(year.eq.93)).and.(edat.eq.42)) edat2=14
if(((year.eq.92).or.(year.eq.93)).and.(edat.eq.43)) edat2=16
if(((year.eq.92).or.(year.eq.93)).and.(edat.eq.44)) edat2=17
if(((year.eq.92).or.(year.eq.93)).and.(edat.eq.45)) edat2=18
if(((year.eq.92).or.(year.eq.93)).and.(edat.eq.46)) edat2=18
stat edat2

if(((year.eq.88).or.(year.eq.89).or.(year.eq.90).or.(year.eq.91))&
  .and.(grdcomp.eq.1)) edat3=edat2
if(((year.eq.88).or.(year.eq.89).or.(year.eq.90).or.(year.eq.91))&
  .and.(grdcomp.eq.2)) edat3=(edat2-1)
if(grdcomp.eq.0) edat3=edat2


genr exp=age-edat3-5
stat exp

genr prttime=(hrcheck.eq.1)

genr race2=(race.eq.4)
genr race3=(race.eq.2).or.(race.eq.3).or.(race.eq.5)

genr margen1=(sex.eq.1).and.(marstat.le.3)
genr margen2=(sex.eq.2).and.(marstat.le.3)
genr margen3=(sex.eq.2).and.(marstat.gt.3)

genr stid=(state.eq.2)
genr stor=(state.eq.3)
genr stwa=(state.eq.4)

genr drpout=(edat3.lt.12)
genr hsgrad=(edat3.ge.12).and.(edat3.lt.16)
```

```
genr x1=(exp.le.15)

genr yr88=(year.eq.88)
genr yr89=(year.eq.89)
genr yr90=(year.eq.90)
genr yr92=(year.eq.92)
genr yr93=(year.eq.93)

genr occ1=(majocc.eq.2).or.(majocc.eq.3)
genr occ2=(majocc.eq.1)
genr occ4=(majocc.eq.5)
genr occ5=(majocc.eq.10).or.(majocc.eq.11).or.(majocc.eq.12)
genr occ6=(majocc.eq.6)
genr occ7=(majocc.ge.7).and.(majocc.le.9).or.(majocc.eq.13).or.(majocc.eq.14)

genr ind1=(majind.eq.1)
genr ind2=(majind.eq.2)
genr ind3=(majind.eq.3)
genr ind4=(majind.eq.4)
genr ind5=(majind.eq.5)
genr ind6=(majind.eq.6)
genr ind7=(majind.eq.7)
genr ind9=(majind.eq.9)
genr ind10=(majind.eq.10)
genr ind11=(majind.eq.11)
genr ind12=(majind.eq.12)
genr ind13=(majind.eq.13)
genr ind14=(majind.eq.14)

*GENERATE COHORT DUMMIES

genr d11=(x1.eq.1).and.(drpout.eq.1)
genr d12=(x1.eq.1).and.(hsgrad.eq.1)

*GENERATE LOG WAGE VARIABLES

genr d11wg=(d11*lnawg)
genr d12wg=(d12*lnawg)

stat d11wg
stat d12wg

set nowarnskip
skipif (d11wg.eq.0)

*FIRST LOG WAGE REGRESSION, LOW EXPERIENCE DROPOUTS

ols d11wg exp edat3 prttime race2 race3 margen1 margen2 margen3 stid stor &
stwa yr88 yr89 yr90 yr92 yr93 occ1 occ2 occ4 occ5 occ6 occ7 ind1 ind2 &
ind3 ind4 ind5 ind6 ind7 ind9 ind10 ind11 ind12 ind13 ind14 / coef=B

*CALCULATION OF COHORT MEAN LOG WAGE

genr mwg11=(6*B:1+10*B:2+.0807*B:6+.0855*B:7+.3765*B:8+.2842*B:9+.2296*B:10 &
+.2349*B:11+.1796*B:12+.1822*B:13+.1804*B:14+.1484*B:15+.1227*B:16+.0232*B:17 &
+.0102*B:18+.0884*B:19+.1653*B:20+.0454*B:21+.4466*B:22+.1271*B:23+.0024*B:24 &
+.0532*B:25+.0478*B:26+.0561*B:27+.0237*B:28+.0213*B:29+.0160*B:30+.0377*B:31 &
+.0942*B:32+.0261*B:33+.0971*B:34+.0227*B:35+B:36)

stat mwg11 / mean=y1

*CALCULATION OF COHORT GEOMETRIC MEAN WAGE

genr w11=exp(y1)
stat w11 / mean=w1

*CALCULATION OF COHORT MEAN LOG WAGE, NET OF INDUSTRY

genr mwg11j=(6*B:1+10*B:2+.0807*B:6+.0855*B:7+.3765*B:8+.2842*B:9+.2296*B:10 &
+.2349*B:11+.1796*B:12+.1822*B:13+.1804*B:14+.1484*B:15+.1227*B:16+.0232*B:17 &
+.0102*B:18+.0884*B:19+.1653*B:20+.0454*B:21+.4466*B:22+B:36)

stat mwg11j / mean=y1j
```

```
*CALCULATION OF COHORT/INDUSTRY MEAN LOG WAGES (Y_IJ's)

genr mg11j=(y1j+B:23)
genr mg12j=(y1j+B:24)
genr mg13j=(y1j+B:25)
genr mg14j=(y1j+B:26)
genr mg15j=(y1j+B:27)
genr mg16j=(y1j+B:28)
genr mg17j=(y1j+B:29)
genr mg18j=(y1j)
genr mg19j=(y1j+B:30)
genr mg110j=(y1j+B:31)
genr mg111j=(y1j+B:32)
genr mg112j=(y1j+B:33)
genr mg113j=(y1j+B:34)
genr mg114j=(y1j+B:35)

stat mg11j / mean=y11j
stat mg12j / mean=y12j
stat mg13j / mean=y13j
stat mg14j / mean=y14j
stat mg15j / mean=y15j
stat mg16j / mean=y16j
stat mg17j / mean=y17j
stat mg18j / mean=y18j
stat mg19j / mean=y19j
stat mg110j / mean=y110j
stat mg111j / mean=y111j
stat mg112j / mean=y112j
stat mg113j / mean=y113j
stat mg114j / mean=y114j

delete skip$
compress
set nowarnskip
skipif (d12wg.eq.0)

*REPEAT SAME PROCEDURE FOR LOW EXPERIENCE HIGH SCHOOL GRADUATES

ols d12wg exp edat3 prttime race2 race3 margen1 margen2 margen3 stid stor &
stwa yr88 yr89 yr90 yr92 yr93 occ1 occ2 occ4 occ5 occ6 occ7 ind1 ind2 &
ind3 ind4 ind5 ind6 ind7 ind9 ind10 ind11 ind12 ind13 ind14 / coef=B

genr mwg12=(6*B:1+12*B:2+.2440*B:6+.2846*B:7+.2201*B:8+.2557*B:9+.2246*B:10 &
+.2652*B:11+.1735*B:12+.1762*B:13+.1652*B:14+.1631*B:15+.1553*B:16+.0768*B:17 &
+.0689*B:18+.1964*B:19+.2447*B:20+.0089*B:21+.2372*B:22+.0483*B:23+.0087*B:24 &
+.0559*B:25+.1019*B:26+.0677*B:27+.0671*B:28+.0451*B:29+.0547*B:30+.0411*B:31 &
+.0429*B:32+.0119*B:33+.1460*B:34+.0581*B:35+B:36)

stat mwg12 / mean=y2

genr w12=exp(y2)
stat w12 / mean=w2

genr mwg12j=(6*B:1+12*B:2+.2440*B:6+.2846*B:7+.2201*B:8+.2557*B:9+.2246*B:10 &
+.2652*B:11+.1735*B:12+.1762*B:13+.1652*B:14+.1631*B:15+.1553*B:16 &
+.0768*B:17+.0689*B:18+.1964*B:19+.2447*B:20+.0089*B:21+.2372*B:22+B:36)

stat mwg12j / mean=y2j

genr mg21j=(y2j+B:23)
genr mg22j=(y2j+B:24)
genr mg23j=(y2j+B:25)
genr mg24j=(y2j+B:26)
genr mg25j=(y2j+B:27)
genr mg26j=(y2j+B:28)
genr mg27j=(y2j+B:29)
genr mg28j=(y2j)
genr mg29j=(y2j+B:30)
```

```
genr mg210j=(y2j+B:31)
genr mg211j=(y2j+B:32)
genr mg212j=(y2j+B:33)
genr mg213j=(y2j+B:34)
genr mg214j=(y2j+B:35)

stat mg21j / mean=y21j
stat mg22j / mean=y22j
stat mg23j / mean=y23j
stat mg24j / mean=y24j
stat mg25j / mean=y25j
stat mg26j / mean=y26j
stat mg27j / mean=y27j
stat mg28j / mean=y28j
stat mg29j / mean=y29j
stat mg210j / mean=y210j
stat mg211j / mean=y211j
stat mg212j / mean=y212j
stat mg213j / mean=y213j
stat mg214j / mean=y214j

delete skip$
compress

*PRINT COHORT MEAN LOG WAGES AND COHORT GEOMETRIC MEAN WAGES

print y1 y2 w1 w2

*PRINT COHORT/INDUSTRY MEAN LOG WAGES

print y11j y12j y13j y14j y15j y16j y17j y18j y19j y110j y111j y112j &
y113j y114j y21j y22j y23j y24j y25j y26j y27j y28j y29j y210j y211j &
y212j y213j y214j

stop
```

APPENDIX G

SHAZAM PROGRAM

FOR REGRESSION OF COHORT/INDUSTRY MEAN LOG WAGES

UPON INDICATOR VARIABLES FOR COHORT AND INDUSTRY

IN ORDER TO FIND INDUSTRY PREMIA,

SIX COHORT ANALYSIS, 1988-1993

***READ DATA FILE**

```
read(a149.dif) / names dif
```

***REGRESSION OF COHORT/INDUSTRY MEAN LOG WAGES (Y_{ij}'s) UPON DUMMIES FOR COHORT AND INDUSTRY**

```
ols yij d12 d13 d21 d22 d23 ind2 ind3 ind4 ind5 ind6 ind7 ind8 &
ind9 ind10 ind11 ind12 ind13 ind14 / coef=B
```

***CALCULATION OF MEAN INDUSTRY EFFECT**

```
genr dumean1=((B:6+B:7+B:8+B:9+B:10+B:11+B:12+B:13+B:14+B:15+B:16 &
+B:17+B:18)/14)

stat dumean1 / mean=mean1
```

***CALCULATION OF INDUSTRY PREMIA**

```
genr dif1=(0-mean1)
stat dif1 / mean=m1

genr dif2=(B:6-mean1)
stat dif2 / mean=m2

genr dif3=(B:7-mean1)
stat dif3 / mean=m3

genr dif4=(B:8-mean1)
stat dif4 / mean=m4

genr dif5=(B:9-mean1)
stat dif5 / mean=m5
```

```
genr dif6=(B:10-mean1)
stat dif6 / mean=m6

genr dif7=(B:11-mean1)
stat dif7 / mean=m7

genr dif8=(B:12-mean1)
stat dif8 / mean=m8

genr dif9=(B:13-mean1)
stat dif9 / mean=m9

genr dif10=(B:14-mean1)
stat dif10 / mean=m10

genr dif11=(B:15-mean1)
stat dif11 / mean=m11

genr dif12=(B:16-mean1)
stat dif12 / mean=m12

genr dif13=(B:17-mean1)
stat dif13 / mean=m13

genr dif14=(B:18-mean1)
stat dif14 / mean=m14
```

***PRINT INDUSTRY PREMIA**

```
print m1 m2 m3 m4 m5 m6 m7 m8 m9 m10 m11 m12 m13 m14

stop
```

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