

**The Premium for Skills:  
Evidence from Mexico**

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# The Premium for Skills: Evidence from Mexico<sup>1</sup>

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During the 1987-1993 period average real urban full time wages and employment in Mexico grew 30 and 22 percent respectively. After controlling for the changing labor force quality, all education-experience skill classes have experienced significant employment and real wage growth. This growth was accompanied by a large increase in wage dispersion within and across skill classes. The relative wage patterns for Mexico mimic those of developed countries: the premium for skills is rising.

Shifts in labor supply are unlikely to explain the changing wage and employment pattern. While a uniform demand shift for all labor classes combined with differences in labor supply elasticities may explain the rising experience premium, such a uniform demand shift can not explain the education premium.

Why then is the demand for educated workers rising disproportionately quickly? We develop a test of whether the observed data by industry is consistent with a production function based upon a constant returns labor class aggregator. We reject this hypothesis which means that some labor is more complementary with capital. The test is most soundly rejected in the industries that are becoming more technologically sophisticated. This suggests that the demand shifts are technologically based and could result from skilled biased technological change.

Because technologically driven demand shifts dominate factor price equalization in Mexico, this suggests that in developed countries like the U.S., where both forces move in the same direction, skilled biased technological change is the force behind the changes in relative wages.

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## Introduction

We study the behavior of urban full time real wages in Mexico from 1987 to 1993, a period characterized by intense reform (throughout we use the word wages to refer to urban full time real wages). We find that while the average wage grew significantly, this was accompanied by a dramatic increase in wage inequality across and within education and experience groups. The wages of more educated and experienced rose relatively faster than those of less educated and inexperienced workers. Although these facts alone are noteworthy, the sources of these changes are not immediately clear. We document both the wage and employment changes and attempt to identify causes of rising within and across group wage dispersion. In particular, we examine whether the changes are the result of simple labor supply changes that have shifted the composition of the work force, or a result of labor demand shocks due to shift in relative demands for final goods, skill biased technological change, a rise in the return to entrepreneurial and managerial capital, or the dissipation of rents accruing to previously protected, regulated or publicly run industries.

Controlling for labor supply changes is critical in Mexico. Together with the 30% average wage increase and the 24% growth in employment, there were significant improvements in labor force quality. The population has become older and more educated. After controlling for changes in labor force composition, we still find that average wage growth would have been 25%. However, as previously mentioned the growth pattern are not distributed equally: more experienced and more educated workers enjoyed wage growth of over 100% during the period, while average real wages for workers with low experience and little education grew only 10%. Relative wages of those with some post-secondary education to those with a highschool education have increased 23%.

Because the compositional effect can explain only a small fraction of the average wage growth, and both the real wage and supply of all worker types has increased, we argue that the rise in average wages is driven by rising labor demand that outstrips the growth in worker supply. Furthermore, we believe that demand is also the cause behind some of the relative wage changes, because we observe a positive correlation between wages and employment across education groups when we hold experience constant. Relative wage changes must be accounted for by changes in the relative demand for labor

because education groups that have experienced the largest wage growth have also increased most in relative size.

We look for demand side causes of the relative wage changes. We find that a complementarity between capital and skilled labor and an increase in the returns to entrepreneurs and managers are much more probable sources of the observed changes than relative shifts in final product demand. We find however that this evidence is strongest for the service sector.

Our findings are especially interesting given the growing wage dispersion in the United States and to a lesser extent in Western Europe since the 1970s<sup>1</sup>. Having rejected changes in the relative supply of skilled and unskilled workers as the cause of growing U.S. wage dispersion, two alternative explanations have emerged within the literature.

On the one hand are those who argue that growing wage dispersion in developed countries is the result of increased internationalization of markets and the resulting shift in relative demands for final goods. Increased trade with countries abundant in low-wage, low-skill workers may have reduced the relative demand for unskilled workers in developed countries (see Leamer 1991, 1994 and Wood 1994) hence lowering their relative wages.

On the other hand are those that claim the impossibility of such patterns (Lawrence and Slaughter (1993) and Saks and Shatz(1994)). They forward the alternative hypothesis that technological change has increased the demand for skilled workers (Davis and Haltiwanger (1991), Bound and Johnson (1992), Berman, Bound and Griliches (1994)). Direct evidence of the importance of technological change is the wage premium paid to workers using computer technology in the workplace found by Krueger (1993) and Berman, Bound and Griliches (1994). The argument of this alternative hypothesis is that as firms adopt new technology they also shift the relative mix of employees towards those with more skills. Direct evidence of this is found by Bartel and Lichtenberg (1987) and Doms, Dunne and Troske (1994).

Hanson and Harrison (1994) argue that developing economies like Mexico can provide important counter-arguments for testing which of these two competing explanations is dominant. If trade is the vehicle for changes in relative wages in developed countries, then in developing countries, we should

<sup>1</sup>A wide range of papers document the patterns in the U.S. See Blackburn et al.(1992), Bound and Johnson (1992), Juhn, Murphy and Pierce (1993), Katz and Murphy (1992). For a cross-section of industrial countries see Davis and Haltwanger (1991) and for Western Europe see Davis (1992).

observe the opposite patterns. Alternatively, if demand changes arise from technical change, then wage patterns in Mexico should mimic those in the U.S. This argument, however, must be made carefully. It may be that relative demand shifts for tradable goods would be changing factor prices, but the service sector is growing so fast that these effects are dominated. In fact, a story of this nature is consistent with our findings: traditional factor price equalization hold but is dominated by skill bias technical change in the service sector.

Besides the well publicized trade liberalization, Mexico went through a series of important changes during this period. These include the privatization of most state owned enterprises; major tax reform; deregulation of industry; the modernization of laws governing economic activity; and the creation of an independent central bank. This poses a third alternative, the intensive reforms alone may have generated the observed relative wage changes. Reforms can induce changes by shifting rents in the economy. For example: when privatizing industry, some of the fat that characterizes government run industries is eliminated through the forces of competition. This could potentially affect low skilled workers disproportionately. Alternatively, in periods of profound change managerial capital accrues rents. If this last hypothesis is behind the wage patterns, we might expect the patterns to reverse themselves in the future.

A number of recent studies use alternative Mexican data sources to study the impact of trade liberalization on the labor market. Feliciano (1993) uses three of the twenty-eight quarters used in our study to measure the impact of trade reform on employment and wages. She also finds a rise in wage inequality in Mexico and a small reduction in wages and employment due to trade. Revenga (1994) uses plant-level data to identify the importance of trade protection on wages and employment. Although her data have almost no individual worker characteristics and only cover large manufacturing firms, she finds that trade protection had small impacts which raised wages and lowered employment. Finally, Hanson and Harrison(1994) use plant level data to find weak evidence consistent with skill-biased technological change being the source of a small portion of the wage change.

Our work differs from the existing literature in that it uses far more comprehensive data which allows us to document the labor market facts, including important changes in the relative supply of worker types. Also we concentrate on the possible causes of the skilled versus unskilled workers

taking into account these supply effects. And finally giving a more unified treatment, we consider each hypothesis simultaneously.

This paper is organized as follows: section 2 describes the data; section 3 describes the changes in the aggregate composition of the labor force and presents the basic aggregated labor market trends; section 4 examines whether changes in the relative supplies of skill groups can account for the aggregate trends; section 5 then examines the nature of the types of demand shifts that are generating the wage and employment patterns; and, finally section 6 concludes.

## **2. The Data**

We use micro-level data from the Encuesta de Empleo Urbano collected by the Instituto Nacional de Estadística Geografía e Informática (INEGI). This data set contains quarterly wage and employment data on nearly one million workers over the last seven years. Similar to the U.S. Current Population Surveys, the data are from household surveys which fully describe family composition, human capital acquisition, and experiences in the labor market. Our data are drawn from 28 consecutive quarterly wage and employment surveys collected by the INEGI over 1/1987 to 4/1993. In person interviews are conducted in five consecutive quarters for each of approximately 50,000 households. Wage and employment data are collected for the week before the survey date. The data are drawn from the 16 largest cities in Mexico.

We utilize the data to document the changing demographics, employment and wages. We monitor changes in the population, the labor force, which we define as all individuals who worked for at least an hour the previous week or have looked for a job in the last month and in full time employment, i.e. those that work over 30 hours each week during the entire year. Wages and hours are computed for full time employed workers. We chose not to incorporate the self-employed and seasonal workers because our interest lies in studying the mainstream labor market. Including the self-employed creates an additional problem in that substantial portions of their income may be reinvested into their business and not picked up in the survey.

The data contains a monthly earnings variable from which we calculate wages by dividing by 4.3\*weekly-hours. Rather than reporting actual monthly earnings some individuals report their wage as being within an in-

terval based upon multiples of the local minimum wage. We assign those individuals the mean wage of the interval. Wages are deflated to the first quarter of 1987 using the same quarterly CPI deflator for all regions.

### **3. Demographic Labor Market Trends**

Average urban labor market trends are impressive (These are documented in table 3.0.1): average wages rose 30% and total full time employment rose around 21%. In our sample of cities, employment growth is 6 percentage points higher than population growth, which was around 15%<sup>2</sup>. The difference can be explained by an increase in the labor force participation rate of around 7.7% and a decrease of the full time employment rate of 1.8%. Employment increases are even higher when we include increased work intensity: total hours worked grew 25% due to both employment growth and an increase from 44.7 to 46 in average weekly hours.

#### **3.1 Population Labor Force Participation**

Changes in the composition of the population and the labor force might account for the aggregate trends mentioned above. We divide the sample into four education categories<sup>3</sup>, and 5 experience groups divided into eight year intervals where experience is calculated by subtracting years of schooling+6 from the age variable. Population and labor force statistics by sex for these groups are reported in tables 3.1.1 and 3.1.2. The population has become relatively more educated, as the least educated group grew in size at a rate of 1% while the two most educated groups growing around had growth rates of 32% and 41% respectively. Also, the number of least experienced individuals shrank 0.5% in contrast to those with more experience growing around 20%. With respect to education, a similar pattern of change can be observed in the labor force except that labor force growth is slightly higher: the least educated group in the labor force grew around 4% while the highschool and post-secondary groups grew around 45%. The growth of experience in the

<sup>2</sup>The population growth in the sampled cities is most likely a function of both population growth and migration. Reported population growth for the whole country during the 87-93 period is about 2% annually or around 15% for the seven years.

<sup>3</sup>We label 0-6 years of schooling as "primary," 7-9 years as "some secondary," 10-12 as "high school," and > 12 years as "post-secondary."

labor force does show a slightly different pattern. Because the labor force participation rates of the least experienced rose, the size of the labor force with less than 8 years of experience grew 20% while the growth in the labor force of those with more than 8 years of experience had the same pattern as the population growth. Like in schooling, the labor force grew faster than the population in all groups. These numbers show that the labor force is growing faster than the population and is becoming both more educated and more experienced.

The 7.7% increase in labor force participation is composed of two effects. The first effect is a mechanical effect: the population is shifting towards more educated and experienced groups who have higher participation. The second effect is a behavioral effect: after controlling for experience and education, the labor force grew faster than the population. To measure the relative magnitude of the behavioral versus the mechanical effect, we divide the population into sex-experience-education cells and calculate the labor force participation rates for each cell in 1987 and 1993. We then calculate what the labor force participation rate would be in 1993 if the per group participation rates had stayed constant at 1987 levels. The mechanical effect accounts for a 3.5% rise while the behavioral effect accounts for the other 4% of the rise in labor force participation<sup>4</sup>. Women's participation rates increased twice as much as men's: 12% and 6% respectively. This could imply that the behavioral effect is arising from women's increased participation. We performed the same accounting by gender and found the women's mechanical effect to be 4% and men's 3%.

Both the changes in the age structure and educational composition of our sample are consistent with demographic variables reported elsewhere. The World Bank reports that schooling attainment in Mexico experienced important advances during the last 30 years. For example primary enrollment in 1965 was less than 90%, while today it is 100% (1989). Secondary school enrollment (7-12 years) increased from 17% in 1965 to 53% in 1989. Finally, the fraction enrolled in some post-secondary education who are between ages 20 and 24 years was 4% in 1965 and 15% in 1989<sup>5</sup>. The aging of the population reflects the slowdown of population growth through reduced birth rates and

<sup>4</sup>We also calculate the rate using 1993 per group rates and applying 1987 population weights and we get a very similar number.

<sup>5</sup>Source World Bank Report 1992 pg 271.

increased longevity. The 1965-1980 average population growth rate was 3% while the average population growth rate for 1980-1990 was 2%. Birth rates in 1965 were 45 births per thousand and in 1990 they were a little more than half that at 27 births. Finally, death rates were 11 per thousand in 1965 and 5 per thousand in 1990.

### 3.2 Wage Dynamics

As mentioned above average, real urban full time wages experienced a 30% increase during the 1987-1993 period. In Mexico, averages are particularly gullible because the wage growth was accompanied by a substantial improvement in the labor force's quality. This alone could be the reason behind the wage growth. Using our previously defined sex-education-experience cells, we again calculate the fraction of wage growth arising from the mechanical effect of aging versus the fraction reflected by changes in the experience wage profile. The weighted average of 1987 wages using 1993 employment weights is only 4% higher than the 1987 average wage. Also the weighted average of 1993 wages using 1987 employment weights is only 5% less than the 1993 average wage. Hence we conclude that the mechanical effect can only explain a 5% increase in the average wage.

To understand the changes in the structure of wages, we create wage-experience profiles by education group. We restrict our sample to men because family responsibilities create significant inaccuracies in our measure of labor market experience for women. To construct the profiles we calculate cell means for each experience-education group in each year and then fit cubic polynomials in experience to minimize measurement error<sup>6</sup>. In Figures 3.1a-3.1d we plot the smoothed profiles for the four education groups, for 1987, 1990 and 1993. Almost all worker types have experienced average wage growth but there are large differences in the degree of wage growth. More educated and more experienced workers have enjoyed the largest increases. Figures 3.2a-3.2d show the wage-earning profiles for median real wages by education group. Median wages have smaller and for many workers negative increases. So while on average workers earn more in 1993 a representative worker appears not to have enjoyed the same kind of wage increase.

<sup>6</sup>We chose to fit a cubic instead of a quadratic, since Murphy and Welch (1990) find that for the US data quadratics underestimate early career growth and overestimate middle career growth, while for cubics much of the problem disappears.

The graphs clearly show that the educated and more experienced enjoyed far greater real wage growth than the less educated and experienced. Tables 3.3.1 and 3.3.2 quantify the size of this wage growth by reporting average wage growth for each experience-education class from 1987 to 1993. While all worker types experienced real wage growth, the growth was extremely varied. The most educated enjoyed much larger wage growth than the rest of the population. In particular those with 24-33 years of experience had average wage growth of 113%. In contrast some groups with 6-9 years of education experienced practically zero average wage growth. Thus, across-group wage dispersion increased by 52% as measured by the ratio of post-secondary to primary school average wages

An important difference in the wage trends for less educated workers is that while the profiles of the three top education levels have become steeper that for the lowest education has flattened out. Table 3.3.3 documents the slope changes in the profiles and the changes to the education premia.

At the same time that across-group wage dispersion is rising, we also find that within-group wage dispersion has increased. Table 3.3.1 and 3.3.2 also report the coefficient of variation (standard deviation/mean) for the wages in each worker class. We chose this as a measure of within class dispersion because it controls for the increase in average wages. Wage dispersion within worker type may be seen as returns to the characteristics which are unobservable to the econometrician, such as ability. Consistent with this interpretation is that with few exceptions within class wage dispersion grows with experience. The difference in the patterns of the coefficients of variation for women and men is probably due to the measurement error associated with women's experience.

In summary, in the last 7 years average wages have increased but only significantly for the more educated and experienced. Increasing returns to experience (steeper profiles) only occurred for those who at least had some secondary-school education and in fact the least educated saw the return to experience decline. Given the difference between the medians and the means, the wage gains accrue to those in the upper half of the wage distribution. Thus, for every education group except the least educated, the increase in average wages is accompanied with a more than proportional growth in within class wage dispersion.

## 4. Can these changes be supply driven?

Equilibrium prices and quantities are a function of both labor supply and demand. In this section we investigate whether the observed dynamics could have been driven only by supply side considerations, either through differences in supply elasticities or in shifts in supply. As we mentioned above simply the compositional effects are not enough to explain the observed wage growth. Moreover for every class of worker, average real wages increased and for only two classes did total hours and employment decline. Even if we control for experience levels by dividing workers into education-experience cells in each year, we see that wages increase in all but a few cells as does the employment in each cell. Under standard assumptions about supply and demand, a rise in both price and output could only arise if the demand curves for each type of labor were shifting out.

Growing wage dispersion within wage experience cells also provides evidence that factor demands are rising. If wage dispersion simply reflected measurement error, then over time there is little reason to see dispersion rise, moreover if it represents skills unobserved to the econometrician there is no reason to think that the relative supply of these skills within a particular wage-experience cell has changed. Thus a fanning out of wages in only the upper half of the wage distribution (remember median wages by education-experience rose only slowly) probably reflects increasing returns to skills unobserved to the econometrician. Also supporting this view is the fact that growth in wage dispersion has been highest for the most educated and experienced workers.

### 4.1 Uniform Additive Demand Shifts

Above we argued that increases in labor demand must be a part of the story explaining the wage and employment patterns. In this subsection we investigate whether the changes in relative wages are consistent with growing labor demand that shifts uniformly across labor types. That is, we wish to see if the observed changes can be solely explained by differences in labor supply elasticities and labor supply shifts. While we consider identical additive shifts in this section in the next section we consider identical proportional shifts. Also for this test to make sense the labor demand curves across worker types must have very similar slopes otherwise identical shifts can cause very

different price changes on the same supply curve.

Consider figure 4.1: two different supply curves are drawn, and both are exposed to the same additive demand shift. It is immediate from the diagram that the markets with large changes in price have smaller changes in quantity and vice-versa. Alternatively if changes in relative wages are driven by differences in supply shifts and not elasticities, still with uniform demand shifts, the same pattern would emerge. This is illustrated in figure 4.2. To identify these patterns in the data we constructed scatter-plots of wages and employment by education group. The plots are reported in figures 4.3-4.6. Across experience groups holding education constant, for education groups 2,3 and 4, we see that greater dispersion in price is accompanied with greater dispersion in employment. The only exception is experience category 1 in education group 4. These seems to indicate that the relative wage changes across experience groups are consistent with the neutral demand shift story.

The observed changes seem to imply what one would expect about the supply elasticity of the different groups. Labor supply becomes more inelastic with increasing skills whether they are measured by education or experience.

In the other direction, varying across education and holding experience constant we see that education group 4 has larger wage dispersion and larger employment dispersion, suggesting that the changes in relative wages across education groups are not consistent with the uniform additive demand shift hypothesis. Table 4.2.1 reports the correlations confirming the visual suggestions of the figures.

The previous test found that the variation in the data was not consistent with an identical additive shift to each demand curve where all demands had the same slope. We now develop an alternative test where we assume that all demand curves have the same elasticity and all face an equivalent proportional shift.

## **5. Demand.**

The previous section presented evidence that the employment and relative wage patterns are not consistent with either a hypothesis of stable demand or a hypothesis of a neutral demand shift. This implies that shifts in relative demands must be at least partially responsible for the relative wage shifts. In this section and the rest of the paper we attempt to determine both the

nature and potential causes of the relative demand shifts.

## 5.1 Alternative theories

As mentioned in the introduction this is the same problem faced by other authors in trying to explain similar wage shifts in other countries. Here we consider four competing theories that try to explain the rise in the college premium. All of which have been considered by other authors<sup>7</sup>.

**THEORY A** *The changes are driven by shifts in the relative demand for products with different factor intensities.* The most talked about change of this kind is trade theory's standard factor price equalization. However other sources of demand shifts are possible such as tastes or government spending (defense for example).

**THEORY B** *The changes are driven by a complementarity between capital and skilled labor.* If the price of capital goes down and capital is a complement of skilled labor then the relative demand for skilled labor increases. Technological change might be modeled as a reduction in the price of capital, the creation of more productive capital..

**THEORY C** *The changes are driven by the dissipation of rents that affects unskilled labor disproportionately.* When protection is reduced or monopoly dissolved rents accrued to the formerly protected sector are reduced. Labor unions may end up being big losers.

**THEORY D** *The changes are driven by an increase in the productivity of skilled labor that is related not to technology.* Institutional change can create new opportunities for entrepreneurs and force firms to restructure. Managers and entrepreneurs people who can catalyze change receive rents during periods of transformation. This reason is conceptually very similar to B, except that the increased productivity is caused by the need to adjust to the environment and is probably temporary<sup>8</sup>.

Most likely all of the above factors are relevant. Murphy and Welch (1990) find that trade flows are an important component of the demand shift in the U.S. Krueger (1993) finds that in the U.S. the use of a computer increases wages significantly. Feliciano (1993) and Revenga (1994) using Mexican data

<sup>7</sup>The list is certainly not exhaustive.

<sup>8</sup>This idea of bussiness or regulatory environment can be found elsewhere in the literature. For example Parente and Prescott (1993) talk about how differences in bussiness environments can potentially explain differences in growth rates.

find evidence that reduced protection lowers industry relative wages, and Hanson and Harrison (1994) using Mexican plant level data find evidence for the capital related story.

## 5.2 Discriminating between theories

Finding the actual cause of the relative wage changes is a very difficult task. Even though these theories have different predictions the best we can do is say whether these are consistent with the data. Unfortunately this is a strong statement only when a rejection is reached.

Observationally theory A is very different to the other three. If this alone is the motive behind the change, one would have to observe industries with larger shares of skilled workers growing faster, in output or employment. Also it would be likely that the within industry share of skilled labor decrease, since skilled labor is becoming more expensive.

The other three theories B,D,C would require that the economy wide share of skilled labor increase and that the increase have a within industry component, i.e. it can not be fully explained by differentials in industry growth. An increase of within industry skilled labor shares is consistent with the three alternatives. The consistency with theories B and D is obvious, to see that it is consistent with theory C consider the following example: suppose labor unions loose power in a particular industry and allow firms to layoff unskilled workers which were earning more than their marginal product. All else equal this would increase the industry's skilled-worker-hours share.

Economy wide the share of skilled worker hours, defined as having some college, went up from 15% in 1987 to 18% in 1993. We calculate the share of skilled workers in each industry group for each of the 22 industry groups identified in the sample for 1987 and 1993 (Appendix B lists the 22 industry groups and their composition), and then calculate the compositional effect (how much would the 87 economy wide share change using the 93 weights on 87 shares. We found that the share is practically unchanged, (a very slight decline). Moreover for 19 of the 22 industry groups the share of skilled workers increased. This is strong evidence against the hypothesis that theory A alone is driving this changes.

### 5.3 Technology test

The previous section showed evidence against final good demand shifts being behind the observed changes. To discriminate further among our candidate theories in this section we make the assumption that each industry can be aggregated and behaves like a single representative firm, and test whether a production function in which capital has the same relationship with all types of labor is consistent with the data. Rejecting this hypothesis would be evidence in favor of theory B.

We observed that for the 1987-1993 period for most industries the proportion of skilled workers grew, even though the relative wages for these workers increased. This kind of behavior would be impossible for a cost minimizing firm whose only two inputs were skilled and unskilled labor. Still when many more inputs exist this behavior need not be contradictory to cost minimization. Also our definition of skilled labor is arbitrary, there are more than two types of labor and permitting any relationship across labor types could potentially generate almost any wage and hours pattern. Consider first an example of a production function with three inputs that is not consistent with the data. Let  $Y(L_1, L_2, k) = L_1^a L_2^b k^{1-a-b}$ . The first order conditions for profit maximization imply that  $\frac{L_1}{L_2} = \frac{bp_2}{ap_1}$ . Hence if  $L_2$  becomes more expensive,  $\frac{L_1}{L_2}$  should increase. This is contrary to what we observe in the data. Now consider a production function that could potentially account for the changes in the data. Let

$$Y(L_1, L_2, L_3, L_4, k) = [L_1^a L_4^b + L_3^a L_2^b]^{\alpha/ab} k^{1-\alpha}.$$

Then consider the profit maximizing first order condition with respect to the first and third types of labor:

$$L_1 : \frac{\alpha}{ab} [L_1^a L_4^b + L_3^a L_2^b]^{\alpha/ab-1} k^{1-\alpha} a L_1^{a-1} L_4^b k^{1-\alpha} = \lambda p_1$$

$$L_3 : \frac{\alpha}{ab} [L_1^a L_4^b + L_3^a L_2^b]^{\alpha/ab-1} k^{1-\alpha} a L_3^{a-1} L_2^b k^{1-\alpha} = \lambda p_3$$

Consider the ratio of the two equations:

$$\frac{L_1^{a-1} L_4^b}{L_3^{a-1} L_2^b} = \frac{p_1}{p_3}$$

It is clear from the above ratio that it is possible for both  $\frac{p_1}{p_3}$  and  $\frac{L_1}{L_3}$  to increase.

These examples can be generalized. Assume that industry  $i$  has the following production function:  $Y(\mathbf{L}, k) = f_i(\mathbf{L})^\alpha k^{1-\alpha}$  where  $f_i(\cdot)$  is homogeneous of degree one for all  $i$  (notice that the example above is a particular instance of this production function). Then cost minimization imposes restrictions on the choice of  $\mathbf{L}$  we can observe given the prices for labor. Suppose that  $\mathbf{w}_i^{87}$  and  $\mathbf{w}_i^{93}$  are wage vectors and that  $\mathbf{L}_i^{87}$  and  $\mathbf{L}_i^{93}$  labor input vectors for industry  $i$  for the corresponding years. Then if the firm is cost minimizing in 93 it must be that

$$\mathbf{w}^{93} \cdot \left( \frac{\mathbf{L}^{93}}{f_i(\mathbf{L}^{93})} - \frac{\mathbf{L}^{87}}{f_i(\mathbf{L}^{87})} \right) < 0$$

The inequality says that the unit labor vector (remember that the labor aggregator are HD(1) ) in 1993 must cost less in 1993 prices than the unit labor vector of 87. If this were not true by choosing labor inputs in the proportions of 1987 one could reduce costs in 1993.

The problem we face in testing this relationship is that the quantity  $f_i(\mathbf{L})$  is not observed for either year. But using the first order conditions of the industry representative firm we can show that optimizing behavior implies that  $\frac{f_i(\mathbf{L}^{93})}{f_i(\mathbf{L}^{87})} < \frac{y^{93}}{y^{87}} \left( \frac{p_l^{87}}{p_l^{93}} \frac{p_k^{93}}{p_k^{87}} \right)^{1-\alpha}$ . Where  $p_l^{87}, p_l^{93}$  are aggregate prices of labor<sup>9</sup> and  $p_k^{93}, p_k^{87}$  are the prices of capital. But  $p_l^{87} < p_l^{93}$  since the wage of every labor type increased. Measuring the price of physical capital is much harder. Real interest rates measured by the difference between Cetes (treasury bills) and inflation were slightly higher in 93 than in 87 but much of the physical capital is imported and the reduction in tariffs and import permits together with the real appreciation of the peso against the US dollar, probably lowered the price of physical capital. Also for many firms borrowing in dollars during this period of real appreciation was extremely cheap. We argue that at worst the price of physical capital remained the same, implying that:  $\frac{f_i(\mathbf{L}^{93})}{f_i(\mathbf{L}^{87})} < \frac{y^{93}}{y^{87}}$ .

<sup>9</sup>Since  $f$  is homogeneous of degree one we can speak of a unit labor vector and of a price of a unit of aggregate labor.

Plugging in above we get<sup>10</sup>

$$\mathbf{w}^{93} \cdot \left( \frac{\mathbf{L}^{93}}{y^{93}} - \frac{\mathbf{L}^{87}}{y^{87}} \right) < 0$$

The above test is a very weak one implying that a rejection of the null hypothesis would hardly be evidence in favor of the assumed technology. In contrast a rejection using such a weak test would be a strong statement about the inconsistency of the assumed technology and the observed changes. We generate a test statistic for the above restriction and its computed values are reported in table 5.2. We get very strong rejections for 13 of the 22 industry groups. Some of the statistics are very high because we have a large number of observations so the variance of our price variables is very low. Also while we reject the technology for only four of 5 manufacturing industries<sup>11</sup> we reject it for six of the seven service industries<sup>12</sup>. This may be evidence of increased use of computers and their complementarity with skilled labor.

## 6. Conclusion

Over the 1987-1993 period, average real urban wages and urban employment have grown dramatically. After controlling for the labor force becoming more skilled through aging and increased education, we found that in all education and experience classes, there was impressive employment and real wage growth during the 1987-1993 period. However, this growth was accompanied with a large increase in wage dispersion both within and across skill classes. The returns to both education and experience grew over this period, while at the same time within an education-experience- group, the wage distribution became more disperse.

<sup>10</sup>It must be emphasized that the validity of the test depends on the assumption on the price of physical capital, if this price went up, the test is only valid if the rise is less than the rise of the price of the unit vector of labor.

<sup>11</sup>Manufacturing industries are Food,beverage and tobacco, Textiles, Clothing, Leather & shoes, Wood and Paper, Chemicals plastics & cement, Petroleum refining & petrochemicals, Industrial metals raw, Metal processing.

<sup>12</sup>Service industries are: Commerce, Restaurant and Hotels, Transportation, Communication, Financial real estata & professional services, Education, Other services and Government.

What are the sources of change? Some of the across skill group wage dispersion can be explained through labor supply curves becoming more inelastic with higher levels of skills and there being uniformly rising demand shifts for all skill groups.

However, the patterns of wage and employment growth across skill groups suggest that labor demand must be rising differentially across skill groups. It appears that demand for more experienced workers and workers with at some post-secondary education is rising much more rapidly than for other skill groups. Two facts provide convincing evidence for this statement. First, while employment growth has been large in all skill groups, only for the most educated and experienced has this been accompanied by massive wage growth. Second, within skill classes we found a fanning-out of the upper half of the wage distribution: median wages grew much slower than means, and the coefficient of variation grew for almost all skill classes. We conjecture that this fanning-out represents increasing returns to skills unobserved to the econometrician and not measurement error. Moreover we believe the supply of unobserved skills across cohorts is stable which implies that returns are rising due to an increase in the demand for unobserved skills.

What is the nature of these demand shifts? We find evidence against shifts in relative demands for finished products and evidence in favor of the view that skilled labor is more complementarity with capital. We find this complementarity is higher in the service sector than in the manufacturing sector.

Although these findings are of interest to both scholars and policy makers studying the Mexican economy, they are also important to distinguishing whether growing across skill group and within skill group wage dispersion in the U.S. is due to growing internationalization or skill-biased technological change. Given that the trends in Mexican wages mirror those of the U.S. and some other developed economics, our findings may be taken as evidence that factor price equalization is dominated by skill biased technological change generated by a rapidly expanding service sector. However, we believe that much work must be done before this conclusion is strengthened.

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**Table 3.0.1. Aggregate changes 1987-1993**

	<b>1987</b>	<b>1993</b>	<b>% Change</b>
<b>Total Population</b>	19,113,698	22,017,621	0.15
<b>Labor Force Participation</b>	0.45	0.48	0.08
<b>Labor force</b>	8,583,199	10,662,530	0.24
<b>Full time workers</b>	6,168,881	7,498,095	0.22
<b>Total hours worked</b>	276,145,664	344,983,258	0.25
<b>Average wage</b>	0.65	0.85	0.30
<b>Coefficient of variation (Wage)</b>	0.58	0.72	0.25

**Table 3.1.2. Men population and labor force changes between 1987-1993 by Education and experience groups.**

Men	Total Population			Labor force			Labor Force Participation		
	1987	1993	Var. %	1987	1993	Var. %	1987	1993	Var. %
<b>E.d. group 1</b>	<b>3,723,474</b>	<b>3,796,327</b>	<b>0.02</b>	<b>0.44</b>	<b>0.37</b>	<b>-0.16</b>	<b>0.69</b>	<b>0.69</b>	<b>0.00</b>
exp 1	934,206	899,891	-0.04	0.04	0.04	-0.02	0.25	0.31	0.24
exp 2	437,078	398,105	-0.09	0.07	0.05	-0.28	0.89	0.85	-0.04
exp 3	514,710	481,115	-0.07	0.08	0.06	-0.25	0.92	0.91	-0.02
exp 4	512,244	541,866	0.06	0.08	0.07	-0.15	0.93	0.91	-0.02
exp 5	1,325,237	1,475,350	0.11	0.17	0.15	-0.11	0.76	0.71	-0.08
<b>E.d. group 2</b>	<b>2,535,963</b>	<b>3,012,403</b>	<b>0.19</b>	<b>0.24</b>	<b>0.26</b>	<b>0.10</b>	<b>0.56</b>	<b>0.63</b>	<b>0.13</b>
exp 1	1,524,747	1,577,327	0.03	0.09	0.09	0.00	0.34	0.40	0.18
exp 2	408,083	605,469	0.48	0.06	0.08	0.22	0.90	0.90	0.00
exp 3	258,220	370,063	0.43	0.04	0.05	0.16	0.92	0.91	-0.01
exp 4	153,711	224,916	0.46	0.02	0.03	0.21	0.91	0.93	0.01
exp 5	191,203	234,628	0.23	0.02	0.02	0.00	0.74	0.74	0.00
<b>E.d. group 3</b>	<b>1,442,065</b>	<b>1,895,182</b>	<b>0.31</b>	<b>0.15</b>	<b>0.18</b>	<b>0.18</b>	<b>0.61</b>	<b>0.67</b>	<b>0.10</b>
exp 1	859,982	1,034,658	0.20	0.06	0.07	0.13	0.44	0.50	0.14
exp 2	274,456	416,531	0.52	0.04	0.05	0.26	0.89	0.90	0.01
exp 3	136,045	197,917	0.45	0.02	0.02	0.18	0.90	0.90	-0.01
exp 4	84,392	118,723	0.41	0.01	0.01	0.14	0.89	0.89	-0.01
exp 5	87,190	127,354	0.46	0.01	0.01	0.29	0.65	0.70	0.08
<b>E.d. group 4</b>	<b>1,433,100</b>	<b>1,858,580</b>	<b>0.30</b>	<b>0.17</b>	<b>0.19</b>	<b>0.11</b>	<b>0.71</b>	<b>0.75</b>	<b>0.05</b>
exp 1	671,929	747,467	0.11	0.06	0.06	-0.07	0.56	0.57	0.02
exp 2	345,095	481,474	0.40	0.05	0.06	0.15	0.88	0.89	0.01
exp 3	292,968	335,757	0.65	0.03	0.01	0.39	0.88	0.90	0.03
exp 4	104,243	167,388	0.61	0.02	0.02	0.34	0.87	0.89	0.02
exp 5	108,866	126,494	0.16	0.01	0.01	-0.07	0.68	0.67	-0.02
<b>All men</b>	<b>9,134,602</b>	<b>10,562,492</b>	<b>0.16</b>	<b>5,887,433</b>	<b>7,193,296</b>	<b>0.22</b>	<b>0.64</b>	<b>0.68</b>	<b>0.06</b>

Table 3.2.1. Men major employment changes by education and experience groups.

Men	Full time workers		Total hours worked		Average weekly hours		Fulltime employment rate	
	1987	1993	1987	1993	1987	1993	1987	1993
<b>E.d. group 1</b>	<b>1,708,433</b>	<b>1,664,377</b>	<b>79,907,965</b>	<b>80,000,000</b>	<b>46.7</b>	<b>48.1</b>	<b>0.68</b>	<b>0.65</b>
exp 1	185,942	227,989	8,507,965	10,700,000	45.8	46.9	0.79	0.81
exp 2	311,607	267,096	14,400,000	12,900,000	46.2	48.3	0.80	0.79
exp 3	353,717	303,687	16,700,000	14,800,000	47.2	48.7	0.74	0.70
exp 4	318,982	320,740	15,000,000	15,600,000	47.0	48.6	0.67	0.65
exp 5	538,186	544,866	25,200,000	26,000,000	46.8	47.7	0.54	0.50
<b>E.d. group 2</b>	<b>1,074,070</b>	<b>1,434,417</b>	<b>49,166,310</b>	<b>68,201,654</b>	<b>45.8</b>	<b>47.5</b>	<b>0.77</b>	<b>0.75</b>
exp 1	429,097	527,201	19,600,000	24,700,000	45.7	46.9	0.82	0.83
exp 2	289,230	430,470	13,300,000	20,700,000	46.0	48.1	0.79	0.79
exp 3	174,252	240,177	7,966,716	11,500,000	45.7	47.9	0.73	0.71
exp 4	98,716	135,303	4,534,526	6,527,896	45.9	48.2	0.70	0.65
exp 5	82,775	101,267	3,765,068	4,773,758	45.5	47.1	0.58	0.58
<b>E.d. group 3</b>	<b>672,428</b>	<b>937,804</b>	<b>29,877,140</b>	<b>43,438,838</b>	<b>44.4</b>	<b>46.3</b>	<b>0.77</b>	<b>0.75</b>
exp 1	301,055	417,498	13,300,000	19,200,000	44.2	46.0	0.80	0.80
exp 2	192,703	279,928	8,565,163	13,000,000	44.4	46.4	0.79	0.75
exp 3	92,369	120,298	4,113,748	5,702,578	44.5	47.4	0.75	0.68
exp 4	52,451	67,146	2,391,651	3,098,060	44.5	46.1	0.70	0.64
exp 5	33,850	52,935	1,506,578	2,438,200	44.5	46.1	0.59	0.59
<b>E.d. group 4</b>	<b>732,667</b>	<b>967,118</b>	<b>32,733,747</b>	<b>44,260,805</b>	<b>43.5</b>	<b>45.8</b>	<b>0.74</b>	<b>0.70</b>
exp 1	297,098	327,165	12,800,000	14,600,000	43.1	44.6	0.79	0.77
exp 2	232,827	304,088	10,200,000	14,100,000	43.8	46.4	0.77	0.71
exp 3	125,517	194,829	5,558,501	9,043,505	44.3	46.4	0.71	0.65
exp 4	57,123	94,580	2,491,039	4,454,515	43.6	47.1	0.63	0.64
exp 5	40,103	46,456	1,684,207	2,062,785	42.0	44.4	0.54	0.55
<b>All men</b>	<b>4,207,598</b>	<b>5,003,715</b>	<b>191,585,162</b>	<b>235,901,297</b>	<b>45.5</b>	<b>47.1</b>	<b>0.73</b>	<b>0.71</b>

**Table 3.2.2. Women major employment changes by education and experience groups.**

Women	Full time workers			Total hours worked			Average weekly hours			Fulltime employment rate		
	1987	1993	Var. %	1987	1993	Var. %	45.1	45.8	0.02	0.66	0.64	-0.03
<b>Ed. group 1</b>	<b>691,862</b>	<b>725,035</b>	<b>0.05</b>	<b>31,186,644</b>	<b>33,224,520</b>	<b>0.07</b>	45.0	46.4	0.03	0.86	0.88	0.03
exp 1	132,787	132,822	0.00	5,979,920	6,161,056	0.03	45.0	46.4	0.03	0.81	0.80	-0.02
exp 2	154,744	124,044	-0.20	7,047,931	5,832,812	-0.17	45.5	47.0	0.03	0.65	0.65	0.01
exp 3	130,043	139,795	0.07	5,928,387	6,422,335	0.08	45.0	45.9	0.01	0.58	0.55	-0.04
exp 4	118,012	134,612	0.14	5,311,473	6,088,931	0.15	44.3	45.0	0.02	0.43	0.43	0.01
exp 5	156,277	193,761	0.24	6,918,933	8,719,386	0.26	44.2	44.4	0.00	0.79	0.78	-0.01
<b>Ed. group 2</b>	<b>462,912</b>	<b>576,624</b>	<b>0.25</b>	<b>20,478,339</b>	<b>25,608,941</b>	<b>0.25</b>	45.7	45.5	0.00	0.82	0.86	0.05
exp 1	201,950	259,471	0.28	9,227,254	11,800,000	0.28	43.6	41.5	0.02	0.82	0.77	-0.06
exp 2	125,035	135,731	0.09	5,453,727	6,043,577	0.11	43.3	43.4	0.00	0.73	0.72	-0.02
exp 3	71,514	93,698	0.31	3,095,219	4,068,282	0.31	42.5	42.7	0.01	0.74	0.66	-0.11
exp 4	40,342	56,696	0.41	1,713,693	2,422,695	0.41	41.1	41.1	0.00	0.57	0.55	-0.05
exp 5	24,070	31,029	0.29	988,446	1,274,387	0.29	41.1	41.1	0.00	0.83	0.81	-0.02
<b>Ed. group 3</b>	<b>576,398</b>	<b>793,787</b>	<b>0.38</b>	<b>23,686,880</b>	<b>33,796,827</b>	<b>0.43</b>	43.8	43.8	0.04	0.81	0.83	0.02
exp 1	288,649	371,999	0.29	12,200,000	16,300,000	0.34	40.4	41.8	0.03	0.88	0.82	-0.07
exp 2	157,255	207,813	0.32	6,360,046	8,682,047	0.37	39.6	41.2	0.04	0.84	0.78	-0.07
exp 3	81,438	123,205	0.51	3,221,971	5,077,049	0.58	39.2	41.7	0.06	0.77	0.78	0.01
exp 4	33,074	63,154	0.91	1,297,223	2,636,463	1.03	38.0	39.9	0.05	0.73	0.68	-0.07
exp 5	15,983	27,616	0.73	607,640	1,101,277	0.81	40.0	41.2	0.03	0.80	0.77	-0.04
<b>Ed. group 4</b>	<b>230,111</b>	<b>398,935</b>	<b>0.73</b>	<b>9,208,640</b>	<b>16,451,673</b>	<b>0.79</b>	40.4	41.8	0.04	0.78	0.80	0.02
exp 1	135,740	209,459	0.54	5,488,375	8,765,778	0.60	39.3	40.6	0.03	0.82	0.74	-0.10
exp 2	55,168	114,670	1.08	2,169,270	4,653,614	1.15	41.1	41.1	0.05	0.89	0.74	-0.17
exp 3	24,661	47,888	0.94	966,683	1,968,239	1.04	41.0	39.1	-0.05	0.79	0.77	-0.03
exp 4	10,936	18,958	0.73	448,019	741,206	0.65	37.8	40.6	0.07	0.67	0.56	-0.16
exp 5	3,607	7,960	1.21	136,293	322,837	1.37	43.1	43.7	0.01	0.76	0.75	-0.01
<b>All Women</b>	<b>1,961,283</b>	<b>2,494,380</b>	<b>0.27</b>	<b>84,560,502</b>	<b>109,081,961</b>	<b>0.29</b>						

**Table 3.1.3 Women population and labor force changes between 1987-1993 by Education and experience groups.**

Women	Total Population			Labor force			Labor Force Participation		
	1987	1993	Var. %	1987	1993	Var. %	1987	1993	Var. %
<b>Ed. group 1</b>	<b>4,746,803</b>	<b>4,783,013</b>	<b>0.01</b>	<b>0.36</b>	<b>0.31</b>	<b>-0.14</b>	<b>0.24</b>	<b>0.25</b>	<b>0.08</b>
exp 1	951,653	872,872	-0.08	0.06	0.04	-0.24	0.16	0.17	0.06
exp 2	608,446	495,949	-0.18	0.07	0.04	-0.37	0.31	0.31	0.00
exp 3	701,155	699,510	0.00	0.07	0.06	-0.17	0.29	0.31	0.07
exp 4	674,226	725,507	0.08	0.08	0.07	-0.08	0.30	0.34	0.10
exp 5	1,811,324	1,989,175	0.10	0.14	0.13	-0.05	0.20	0.23	0.12
<b>Ed. group 2</b>	<b>2,504,788</b>	<b>2,838,873</b>	<b>0.13</b>	<b>0.22</b>	<b>0.22</b>	<b>-0.01</b>	<b>0.24</b>	<b>0.26</b>	<b>0.12</b>
exp 1	1,426,537	1,453,548	0.02	0.09	0.09	-0.05	0.17	0.21	0.20
exp 2	424,512	542,342	0.28	0.06	0.05	-0.10	0.36	0.33	-0.09
exp 3	277,333	345,657	0.25	0.04	0.04	0.04	0.35	0.38	0.08
exp 4	159,426	221,426	0.39	0.02	0.02	0.22	0.34	0.39	0.13
exp 5	216,981	275,901	0.27	0.02	0.02	0.05	0.19	0.21	0.07
<b>Ed. group 3</b>	<b>1,981,172</b>	<b>2,614,895</b>	<b>0.32</b>	<b>0.26</b>	<b>0.28</b>	<b>0.10</b>	<b>0.35</b>	<b>0.38</b>	<b>0.07</b>
exp 1	1,072,192	1,256,141	0.17	0.13	0.13	-0.02	0.33	0.36	0.08
exp 2	398,742	610,046	0.53	0.07	0.07	0.10	0.45	0.41	-0.07
exp 3	263,929	363,067	0.38	0.04	0.05	0.27	0.37	0.44	0.19
exp 4	125,134	194,403	0.55	0.02	0.02	0.47	0.34	0.41	0.21
exp 5	121,175	191,239	0.58	0.01	0.01	0.44	0.18	0.21	0.17
<b>Ed. group 4</b>	<b>746,332</b>	<b>1,218,347</b>	<b>0.63</b>	<b>0.11</b>	<b>0.15</b>	<b>0.41</b>	<b>0.39</b>	<b>0.43</b>	<b>0.11</b>
exp 1	479,281	680,230	0.42	0.06	0.08	0.18	0.36	0.39	0.07
exp 2	149,312	307,264	1.06	0.02	0.04	0.79	0.45	0.50	0.12
exp 3	63,269	128,948	1.04	0.01	0.02	0.82	0.44	0.50	0.15
exp 4	33,438	54,301	0.62	0.01	0.01	0.39	0.41	0.45	0.10
exp 5	21,032	47,604	1.26	0.00	0.00	1.04	0.26	0.30	0.16
<b>All women</b>	<b>9,979,096</b>	<b>11,455,129</b>	<b>0.15</b>	<b>2,695,766</b>	<b>3,469,234</b>	<b>0.29</b>	<b>0.27</b>	<b>0.30</b>	<b>0.12</b>

Men		Average wage		Coefficient of variation (Wage)	
		1987	1993	1987	1993
Ed. group 1		<b>0.53</b>	<b>0.58</b>	<b>0.53</b>	<b>0.57</b>
	exp 1	0.39	0.43	0.51	0.46
	exp 2	0.51	0.55	0.48	0.52
	exp 3	0.55	0.61	0.50	0.53
	exp 4	0.58	0.63	0.53	0.58
Ed. group 2	exp 5	0.55	0.62	0.59	0.66
		<b>0.58</b>	<b>0.62</b>	<b>0.56</b>	<b>0.60</b>
	exp 1	0.46	0.49	0.48	0.48
	exp 2	0.61	0.61	0.57	0.58
	exp 3	0.67	0.72	0.59	0.69
Ed. group 3	exp 4	0.71	0.81	0.66	0.84
	exp 5	0.75	0.88	0.73	1.19
		<b>0.73</b>	<b>0.86</b>	<b>0.62</b>	<b>0.87</b>
	exp 1	0.61	0.67	0.59	0.86
	exp 2	0.78	0.87	0.62	0.82
Ed. group 4	exp 3	0.83	1.12	0.63	1.10
	exp 4	0.86	1.27	0.68	0.83
	exp 5	0.95	1.23	0.73	0.99
		<b>1.10</b>	<b>1.84</b>	<b>0.64</b>	<b>1.00</b>
	exp 1	0.93	1.31	0.66	1.06
All Women	exp 2	1.19	1.89	0.61	0.96
	exp 3	1.29	2.23	0.65	0.96
	exp 4	1.21	2.59	0.66	1.14
	exp 5	1.17	2.22	0.65	1.31
		<b>0.68</b>	<b>0.89</b>	<b>0.57</b>	<b>0.74</b>
					<b>0.31</b>
					<b>0.28</b>

**Table 3.3.2 Women major wage changes**

Women	Average wage		Var. %	Coefficient of variation (Wage)	
	1987	1993		1987	1993
					Var. %
<b>E.d. group 1</b>	<b>0.40</b>	<b>0.46</b>	<b>0.17</b>	<b>0.49</b>	<b>0.46</b>
exp 1	0.30	0.39	0.29	0.64	0.49
exp 2	0.39	0.45	0.17	0.56	0.59
exp 3	0.44	0.48	0.10	0.56	0.45
exp 4	0.44	0.50	0.14	0.55	0.72
exp 5	0.42	0.48	0.14	0.75	0.54
<b>E.d. group 2</b>	<b>0.55</b>	<b>0.57</b>	<b>0.03</b>	<b>0.56</b>	<b>0.61</b>
exp 1	0.44	0.45	0.03	0.51	0.56
exp 2	0.56	0.55	-0.02	0.53	0.56
exp 3	0.66	0.64	-0.04	0.68	0.76
exp 4	0.69	0.78	0.14	0.58	0.70
exp 5	0.81	0.97	0.19	0.71	1.16
<b>E.d. group 3</b>	<b>0.72</b>	<b>0.84</b>	<b>0.17</b>	<b>0.55</b>	<b>0.73</b>
exp 1	0.63	0.65	0.04	0.52	0.70
exp 2	0.78	0.90	0.15	0.54	0.72
exp 3	0.86	1.05	0.23	0.57	0.72
exp 4	0.83	1.23	0.47	0.63	0.93
exp 5	0.90	1.12	0.24	0.75	0.80
<b>E.d. group 4</b>	<b>0.98</b>	<b>1.48</b>	<b>0.50</b>	<b>0.62</b>	<b>0.91</b>
exp 1	0.88	1.22	0.38	0.63	0.83
exp 2	1.10	1.64	0.48	0.62	0.94
exp 3	1.13	1.88	0.66	0.58	1.27
exp 4	1.17	2.27	0.94	0.55	0.72
exp 5	1.14	1.50	0.32	0.53	0.87
<b>All Women</b>	<b>0.60</b>	<b>0.77</b>	<b>0.29</b>	<b>0.58</b>	<b>0.69</b>

**Table 3.3.3. Changes in experience & wage premiums 1987-1993**

	Women			Men		
	1987	1993	% Change	1987	1993	% Change
<b>Ed. group 1</b> exp4/exp1	1.44	1.27	-0.12	1.50	1.47	-0.02
<b>Ed. group 2</b> exp4/exp1	1.57	1.73	0.10	1.54	1.66	0.08
<b>Ed. group 3</b> exp4/exp1	1.32	1.88	0.42	1.39	1.89	0.36
<b>Ed. group 4</b> exp4/exp1	1.33	1.86	0.40	1.31	1.98	0.51
<b>All (Ed 4 / Ed 1)</b>	2.47	3.18	0.29	2.08	3.17	0.53
<b>All (Ed 4 / Ed 3)</b>	1.36	1.75	0.29	1.52	2.15	0.41

**Table 4.2.1.**

Correlation coefficient between change in wages and changes in:		
	Full time employment	Total hours worked
All	-0.0164	-0.0434
Ed. group 1	-0.0146	0.0633
Ed. group 2	-0.4315	-0.4105
Ed. group 3	-0.8211	0.8101
Ed. group 4	-0.2139	-0.1721
Exp. level 1	-0.2727	-0.2832
Exp. level 2	0.2208	0.1896
Exp. level 3	0.4031	0.3863
Exp. level 4	0.2561	0.1763
Exp. level 5	-0.3959	-0.4512

Regression of % change of quantity on % change of wage			
Total hours worked		Quantity	
Constant	Slope coeff.	Constant	Slope coeff.
0.2545	0.5436	0.2185	0.5036
<i>3.616</i>	<i>3.002</i>	<i>3.33</i>	<i>2.983</i>
0.0493	-0.0247	0.0229	-0.0095
<i>0.411</i>	<i>-0.03</i>	<i>0.186</i>	<i>-0.011</i>
0.3246	0.1769	0.2046	0.1601
<i>5.546</i>	<i>0.323</i>	<i>5.659</i>	<i>0.328</i>
0.3995	0.5661	0.3477	0.5179
<i>2.813</i>	<i>1.136</i>	<i>2.731</i>	<i>1.16</i>
0.9037	0.3175	0.8023	-0.2675
<i>2.523</i>	<i>-0.621</i>	<i>2.365</i>	<i>-0.552</i>
0.3059	-0.0757	0.2784	-0.1198
<i>2.99</i>	<i>-0.171</i>	<i>2.868</i>	<i>-0.284</i>
0.176	0.8939	0.1356	0.8392
<i>0.912</i>	<i>1.323</i>	<i>0.722</i>	<i>1.277</i>
0.174	0.8926	0.1463	0.80006
<i>1.278</i>	<i>2.487</i>	<i>1.123</i>	<i>2.329</i>
0.2432	0.5319	0.2112	0.5159
<i>1.628</i>	<i>2.056</i>	<i>1.58</i>	<i>2.229</i>
0.4792	0.0166	0.4402	-0.0422
<i>1.798</i>	<i>0.024</i>	<i>1.843</i>	<i>-0.067</i>

\* Note : The numbers in italic format are the T-Statistic

**Table 5.1 Proportion of skilled (college educated) hours by industry**

Industry	Shares		Change
	1987	1993	
Agriculture, forestry & fishing	0.06	0.07	0.01
Petroleum	0.46	0.47	0.01
Mining	0.27	0.22	-0.05
Food, beverage & tobacco	0.10	0.13	0.03
Textiles excluding clothing	0.09	0.12	0.03
Clothing	0.03	0.06	0.03
Leather & shoes	0.03	0.04	0.01
Wood & paper	0.10	0.12	0.02
Chemicals, plastics & cement	0.15	0.18	0.04
Petroleum refining & petrochemicals	0.19	0.30	0.11
Industrial metals, raw	0.20	0.24	0.04
Metal processing	0.14	0.17	0.04
Construction	0.13	0.15	0.02
Electrical	0.30	0.33	0.03
Commercial	0.10	0.13	0.03
Restaurants & hotels	0.07	0.08	0.01
Transportation	0.11	0.10	-0.01
Communication	0.25	0.24	-0.01
Financial, real state & professional services	0.37	0.41	0.04
Education	0.30	0.34	0.04
Other services	0.03	0.04	0.01
Government	0.26	0.31	0.06
Economy (using 87 total industry hours as weights) :	0.151	0.178	0.027
Economy (using 93 total industry hours as weights) :	0.149	0.175	0.027

**Table 5.2 Labor-Capital complementary tests**

Industry	Rank	Test
1 Agriculture, forestry & fishing	9	9.72
2 Petroleum	18	-19.22
3 Mining	16	14.93
4 Food, beverage & tobacco	13	0.25
5 Textiles excluding clothing	11	8.66
6 Clothing	12	7.84
7 Leather & shoes	4	85.89
8 Wood & paper	7	46.52
9 Chemicals, plastics & cement	17	-8.99
10 Petroleum refining & petrochemicals	21	-40.64
11 Industrial metals, raw	15	-2.94
12 Metal processing	22	-126.14
13 Construction	14	-0.625
14 Electrical	20	-23.52
15 Commercial	2	108.95
16 Restaurants & hotels	10	10.47
17 Transportation	8	37.47
18 Communication	19	-32.49
19 Financial, real state & professional services	5	34.76
20 Education	1	123.87
21 Other services	3	57.01
22 Government	6	15.65

Figure 3.1a  
Average Wages For Education Group One  
Primary School

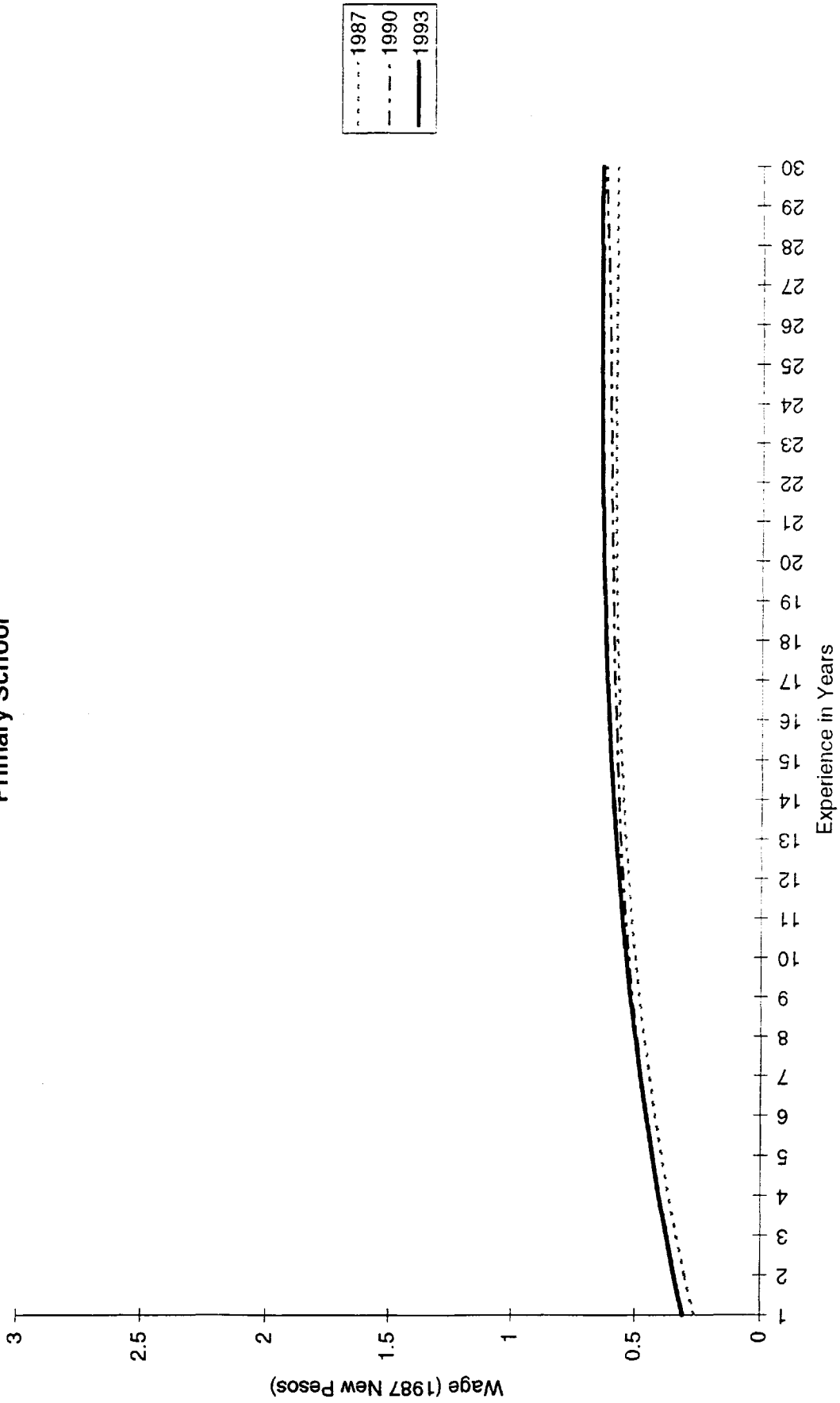


Figure 3.1b  
Average Wages For Education Group Two  
Some Secondary School

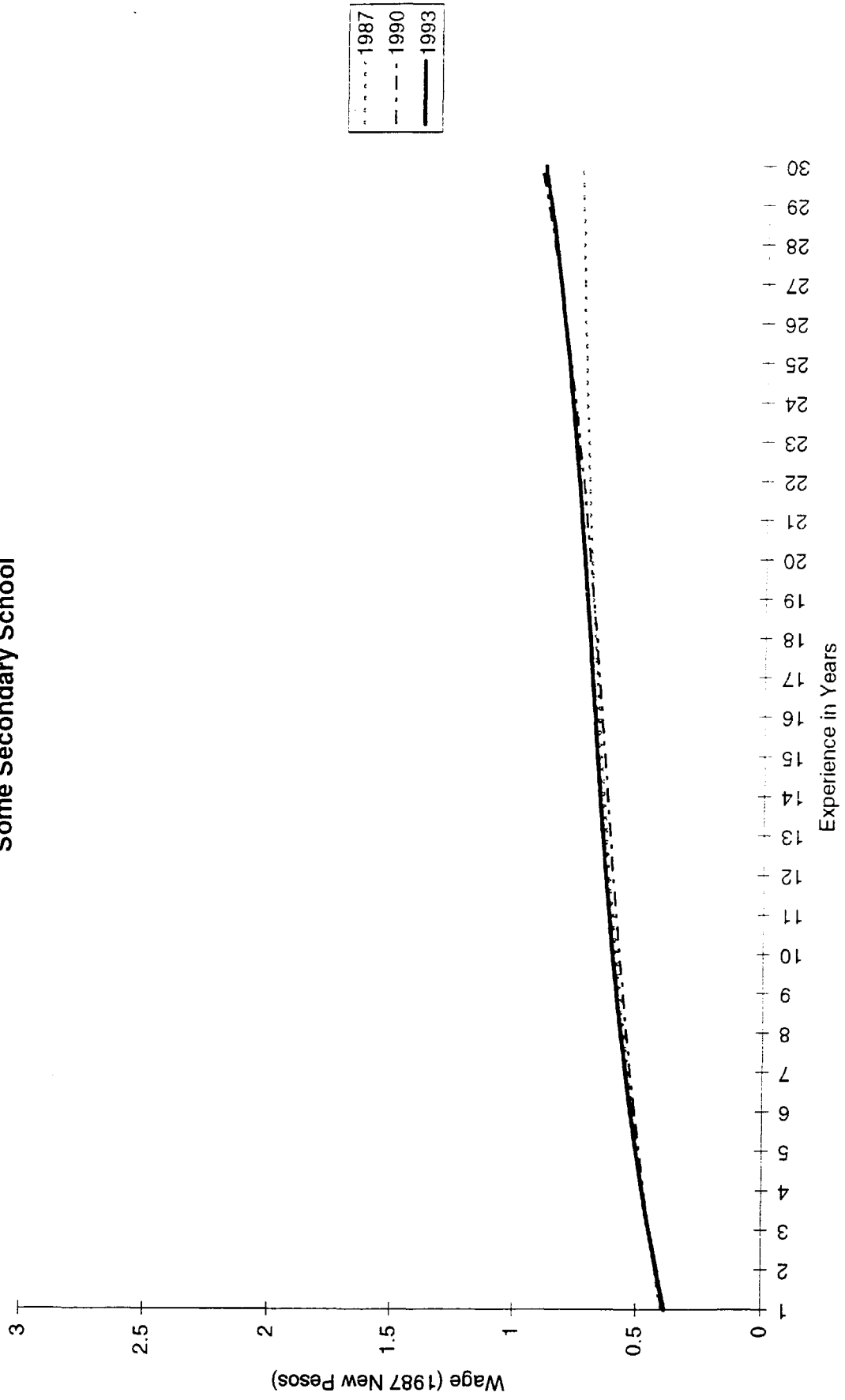


Figure 3.1c  
Average Wages For Education Group Three  
High School

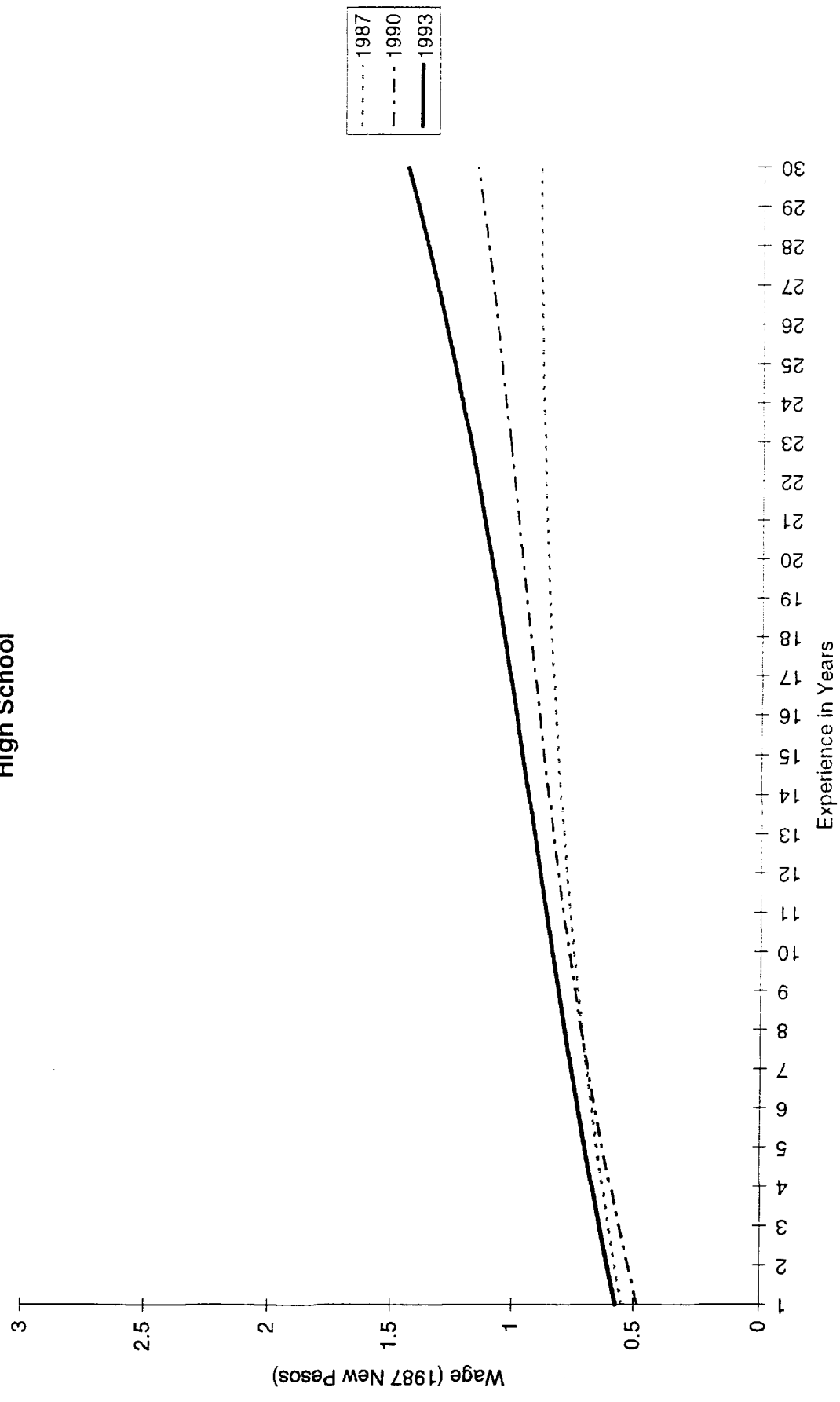


Figure 3.1d  
Average Wages For Education Group Four  
Post-Secondary

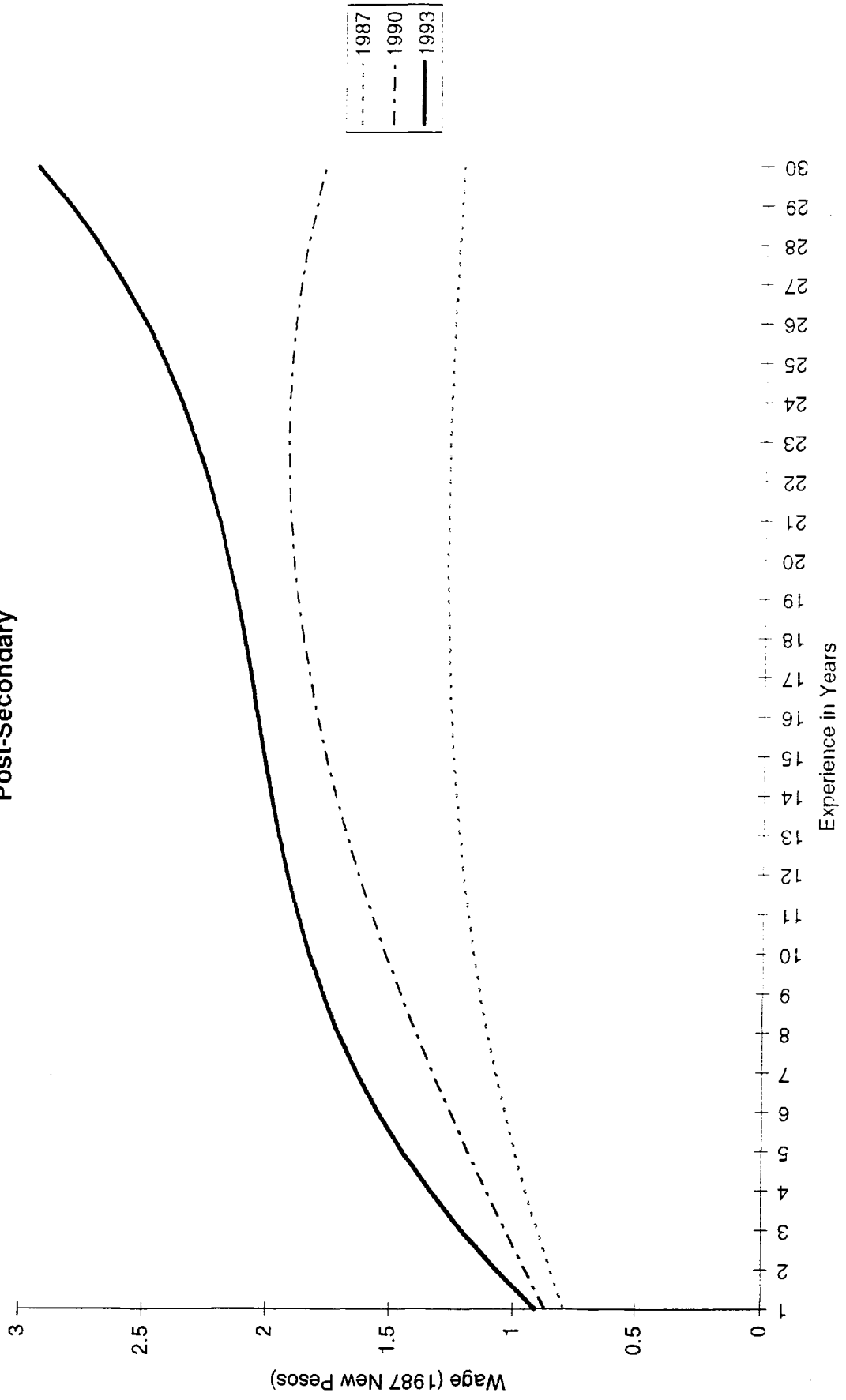


Figure 3.2a  
Median Wages For Education Group One  
Primary School

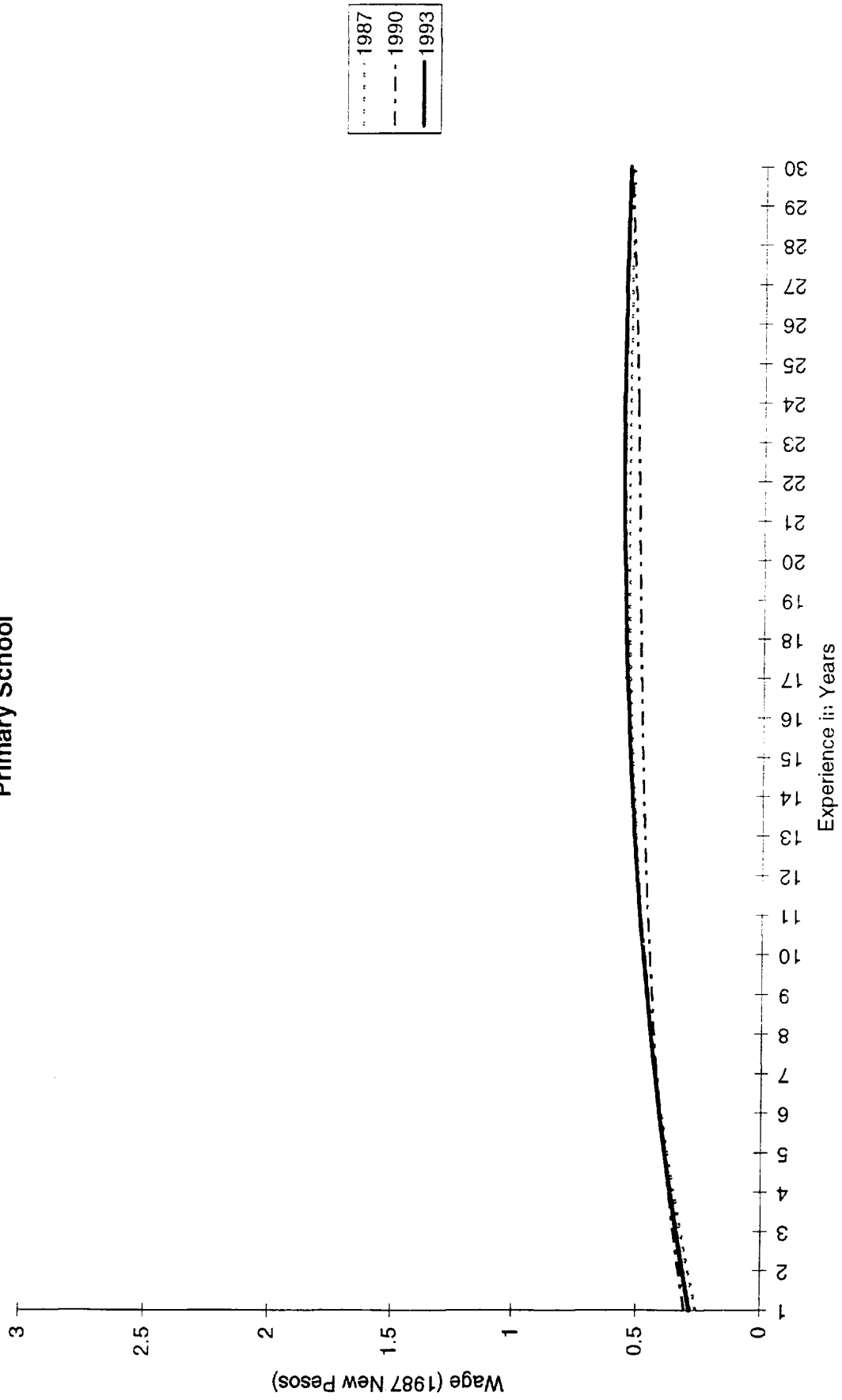


Figure 3.2b  
Median Wages For Education Group Two  
Some Secondary School

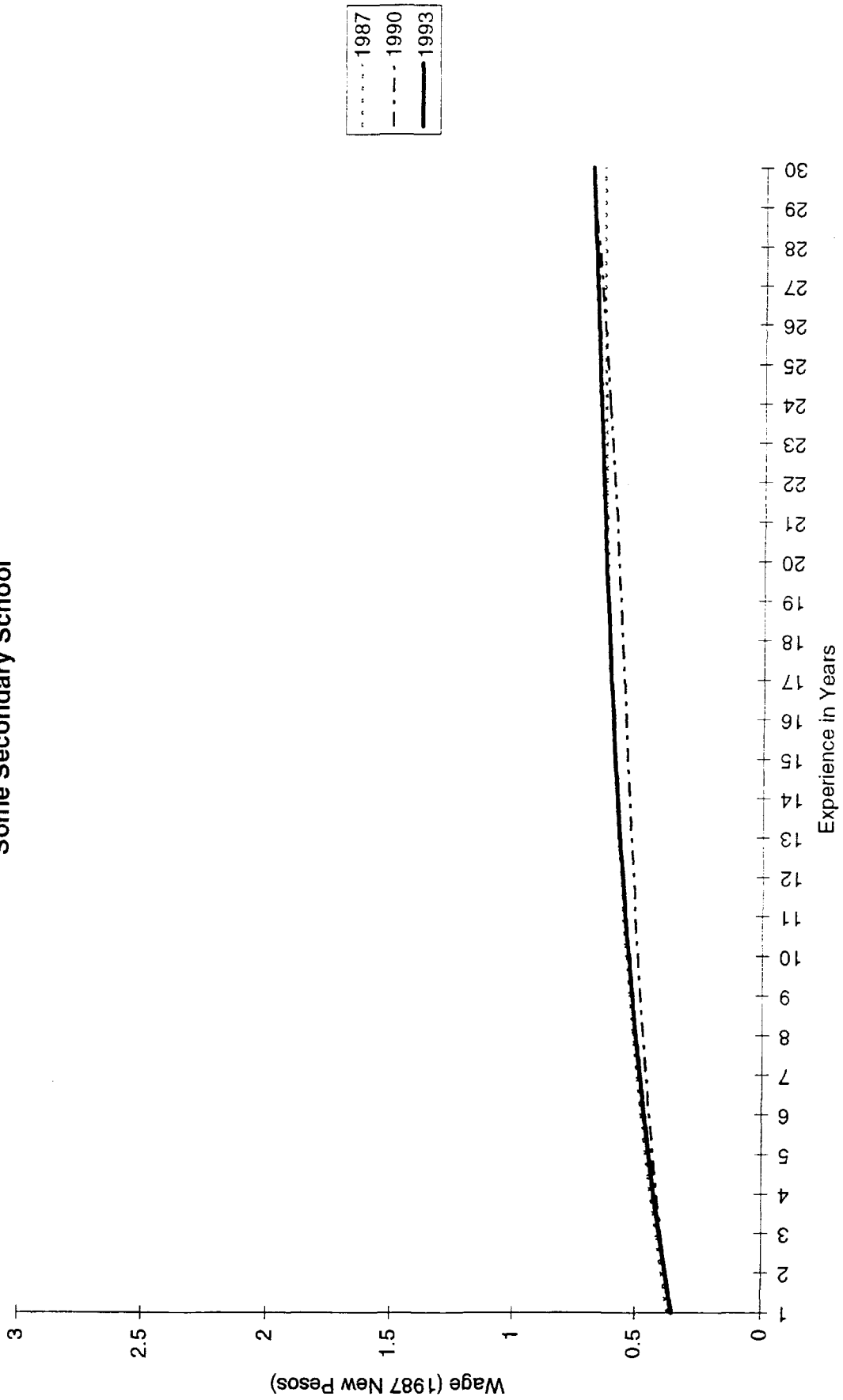


Figure 3.2c  
Median Wages For Education Group Three  
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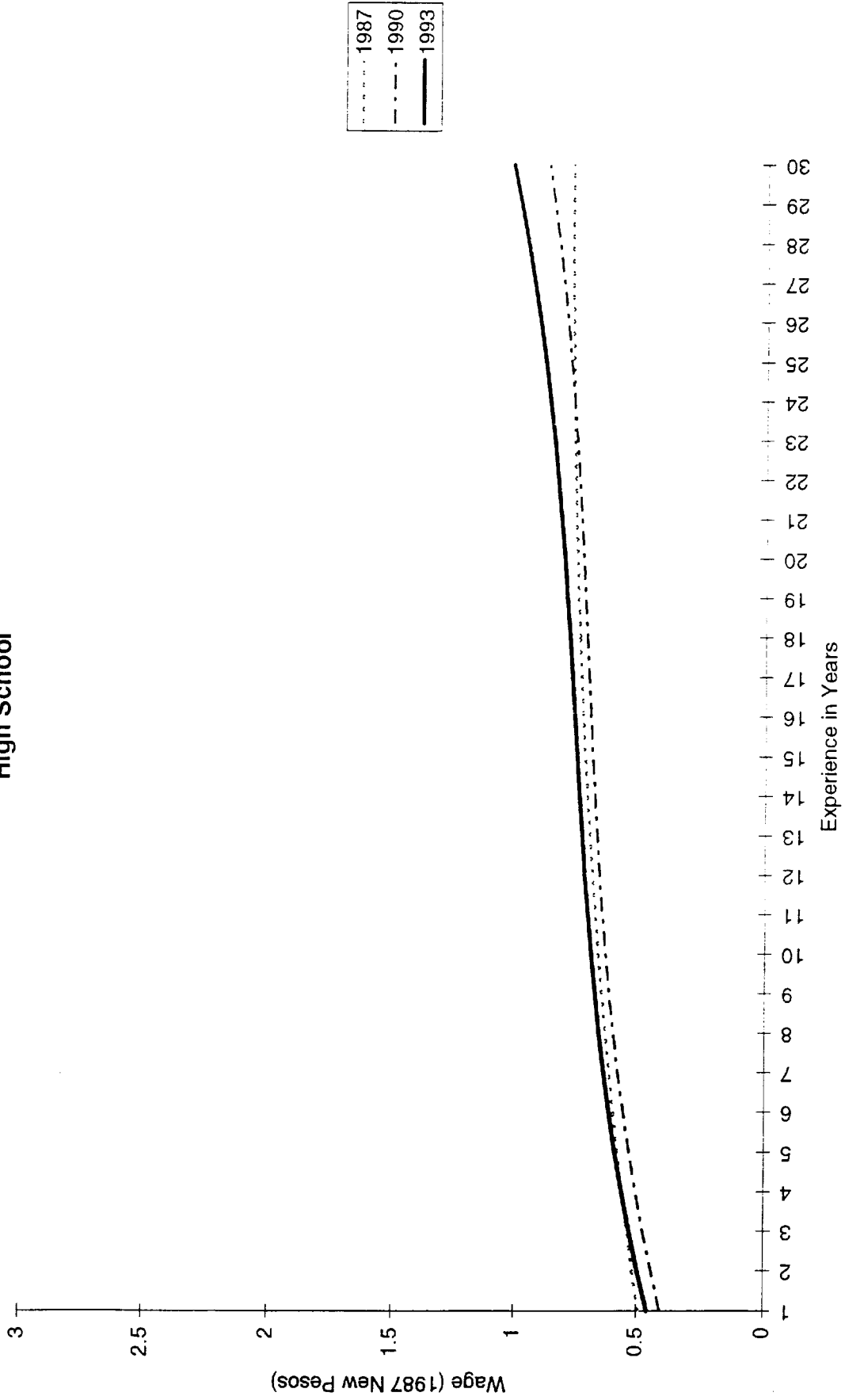


Figure 3.2d  
Median Wages For Education Group Four  
Post Secondary

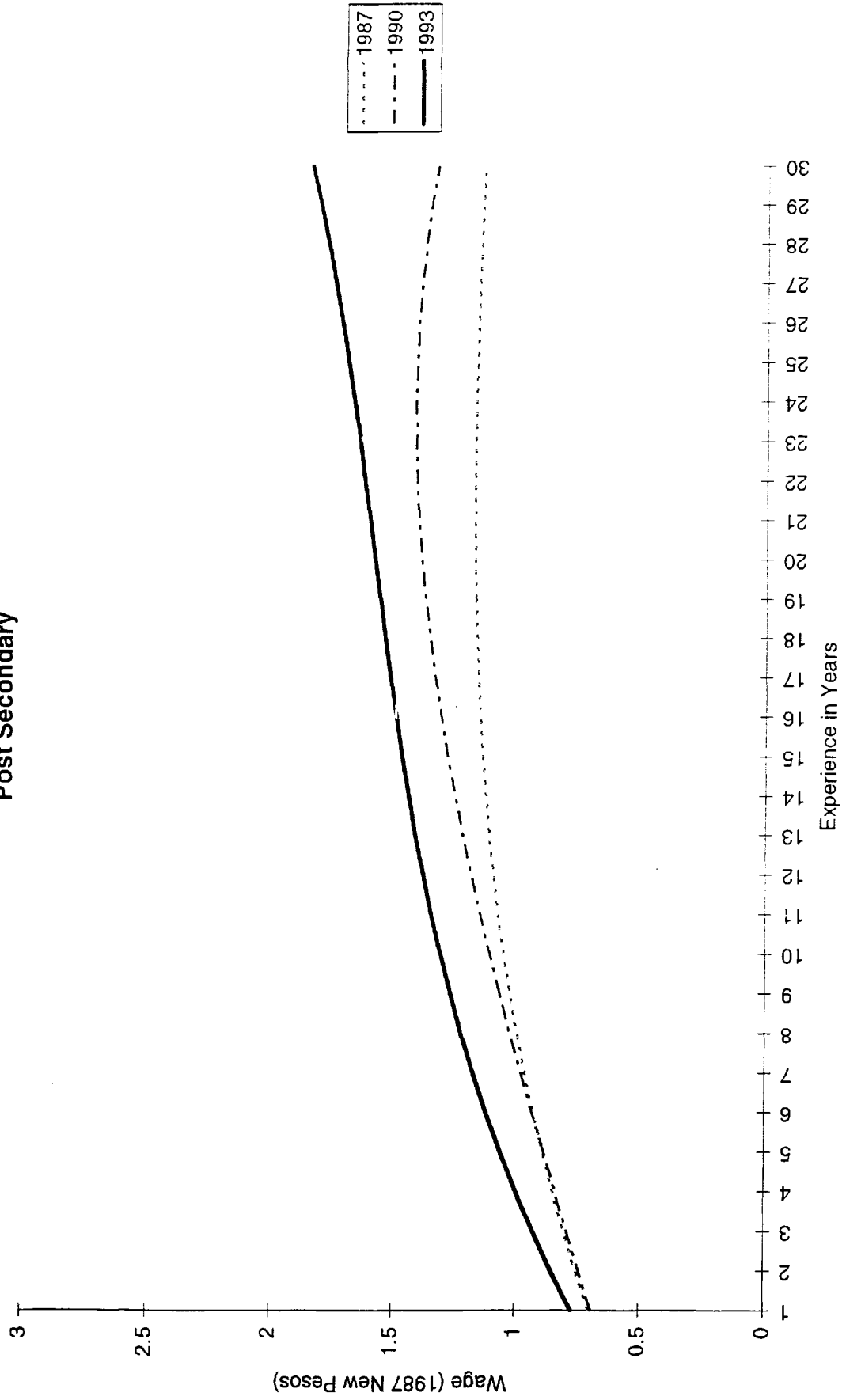


Figure 3.3a  
1987 Average Wages, All Education Groups

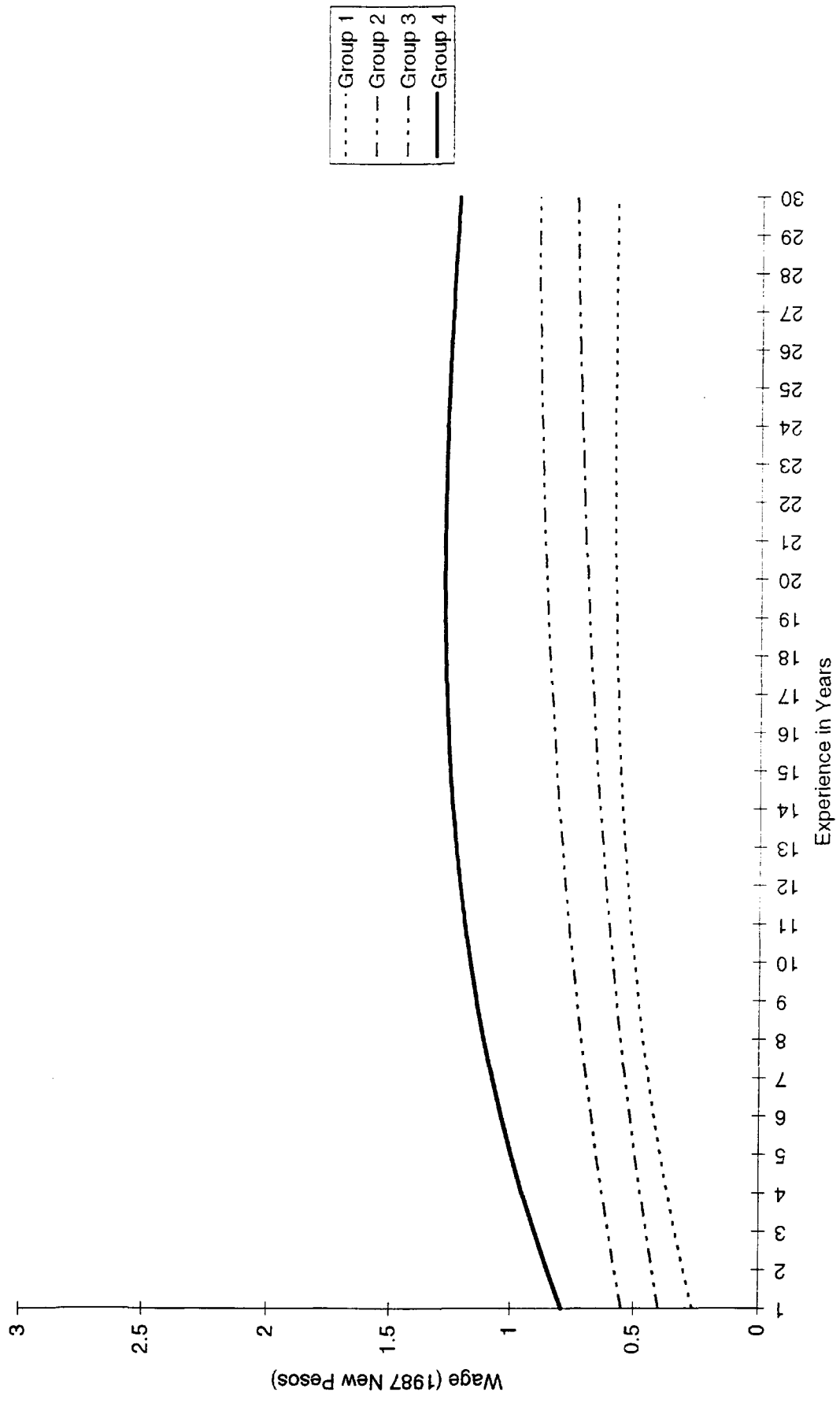


Figure 3.3b  
1993 Average Wages, All Education Groups

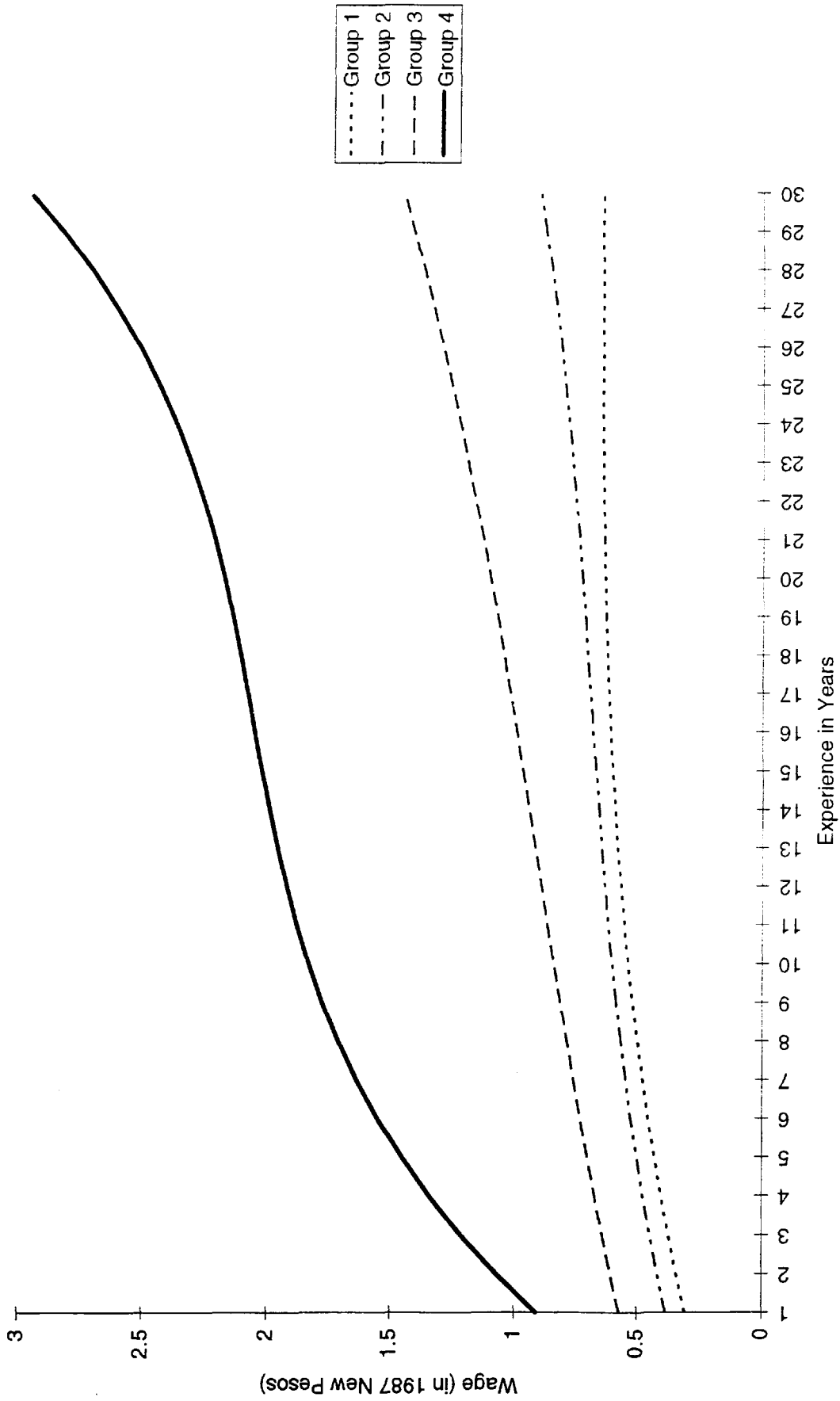


Figure 3.3c  
1987 Median Wages, All Education Groups

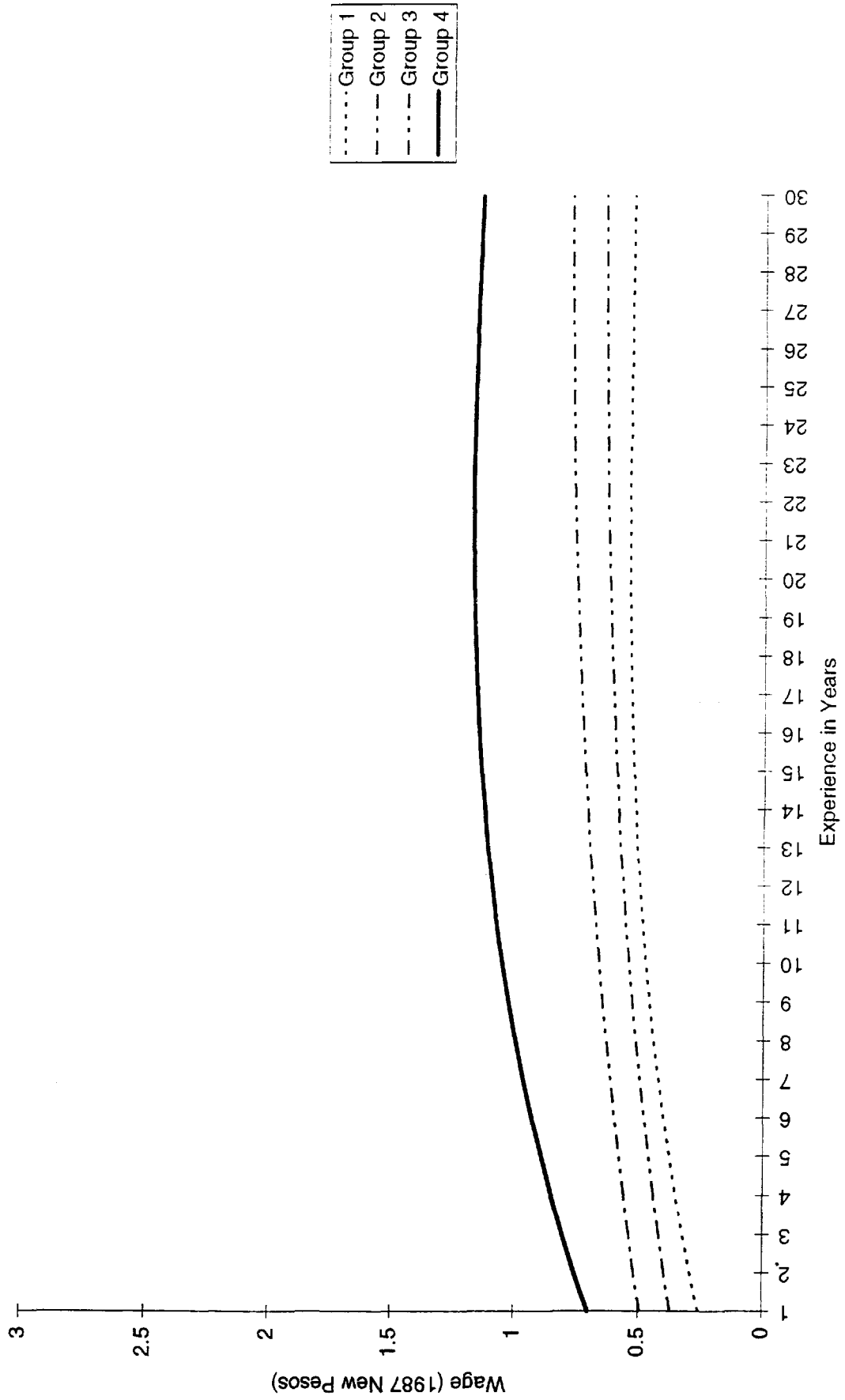


Figure 3.3d  
1993 Median Wages, All Education Groups

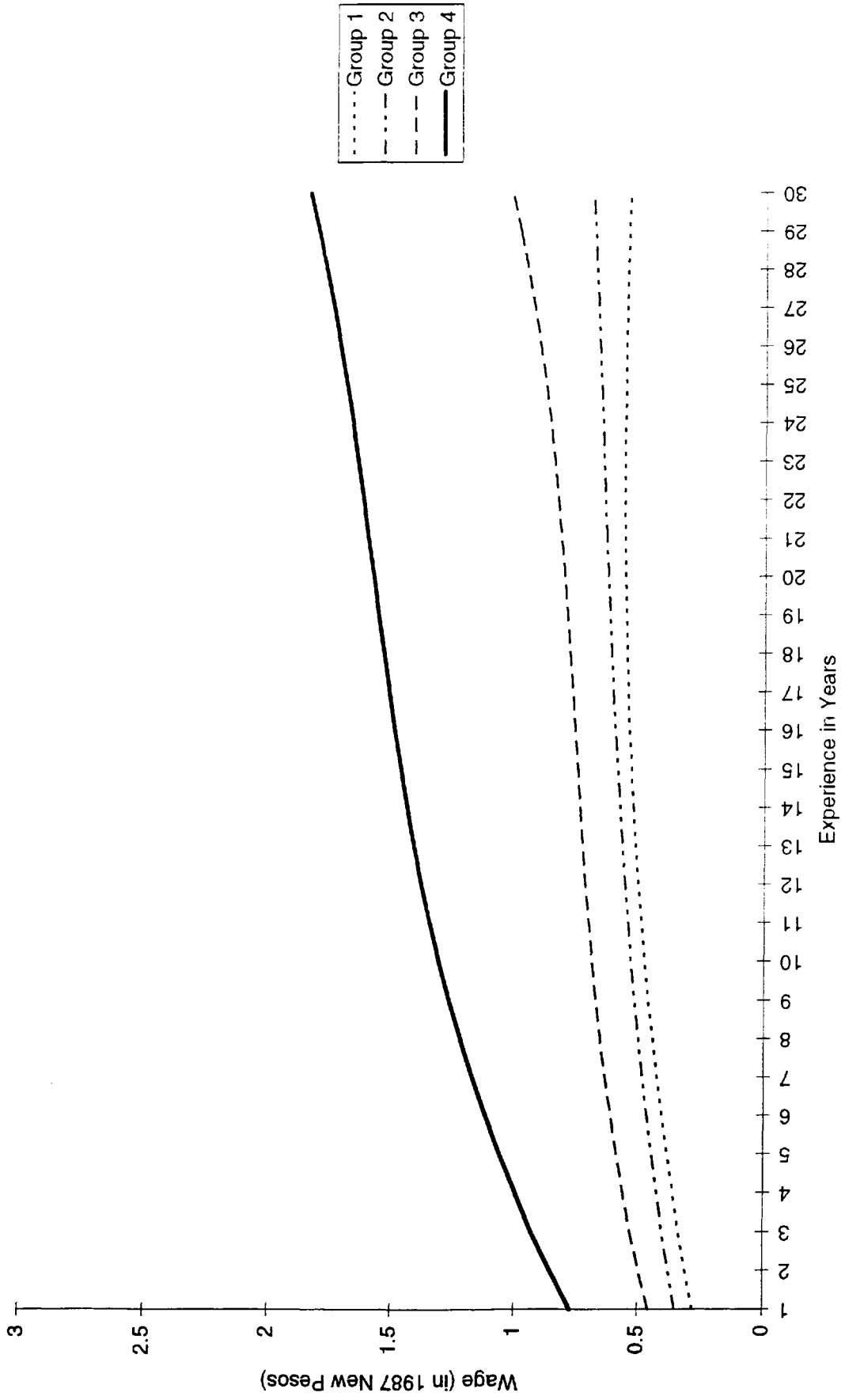


Figure 4.1 Uniform Demand Shift with Differential Supply Elasticities

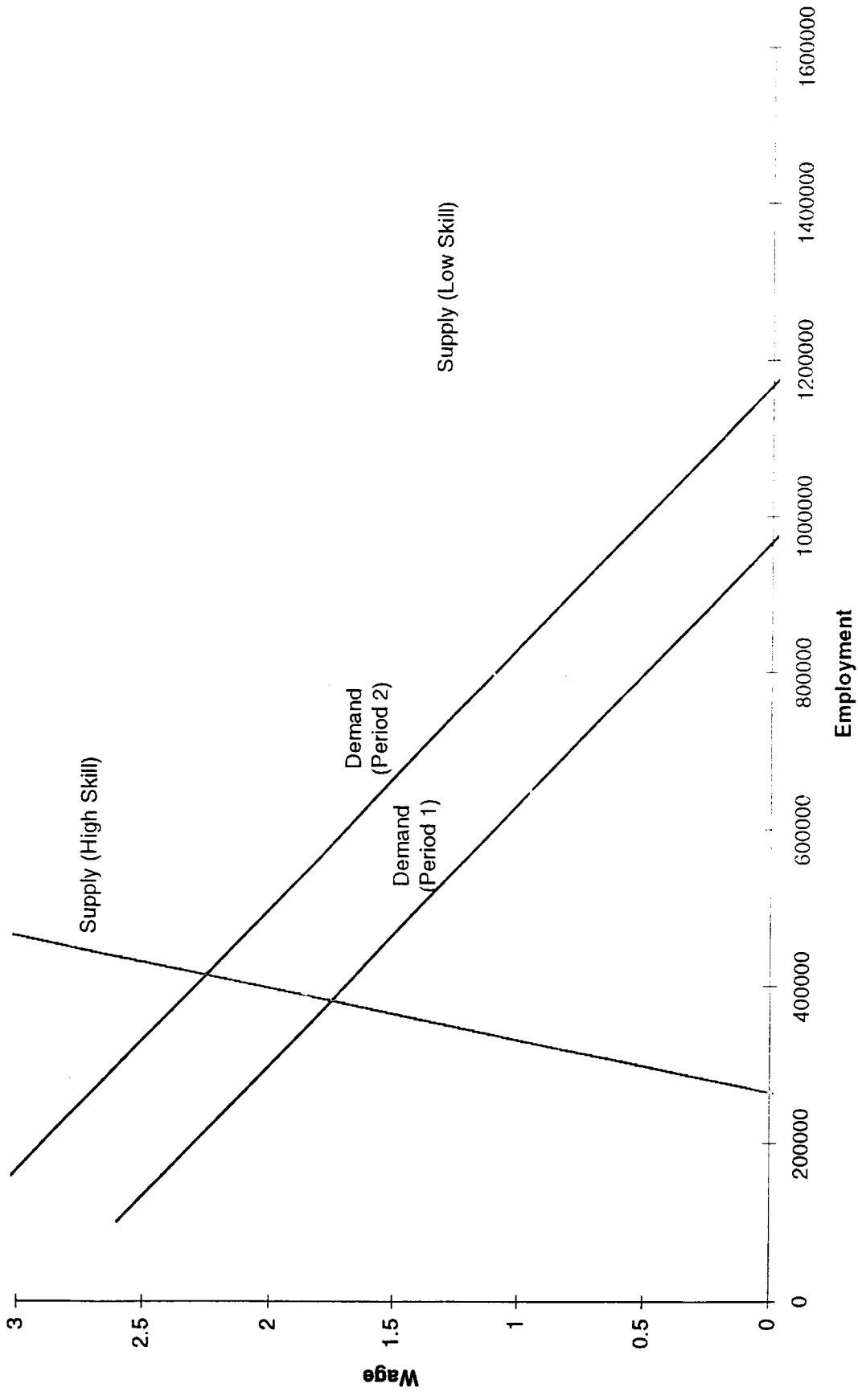


Figure 4.2 Uniform Demand Shift, Differential Supply Shifts

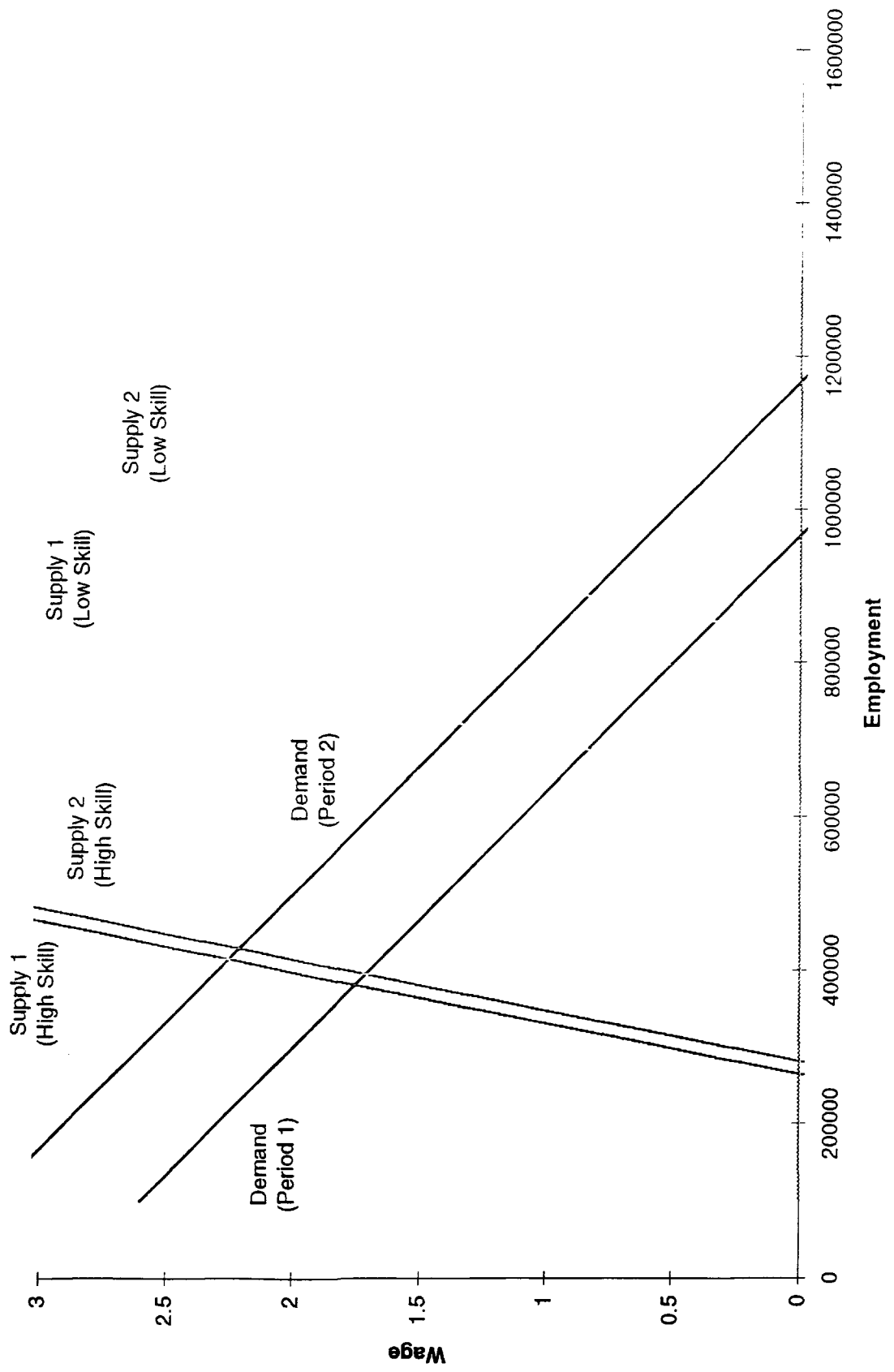


Figure 4.3 - Average Wage and Employment by Year  
Education Group One - Primary School

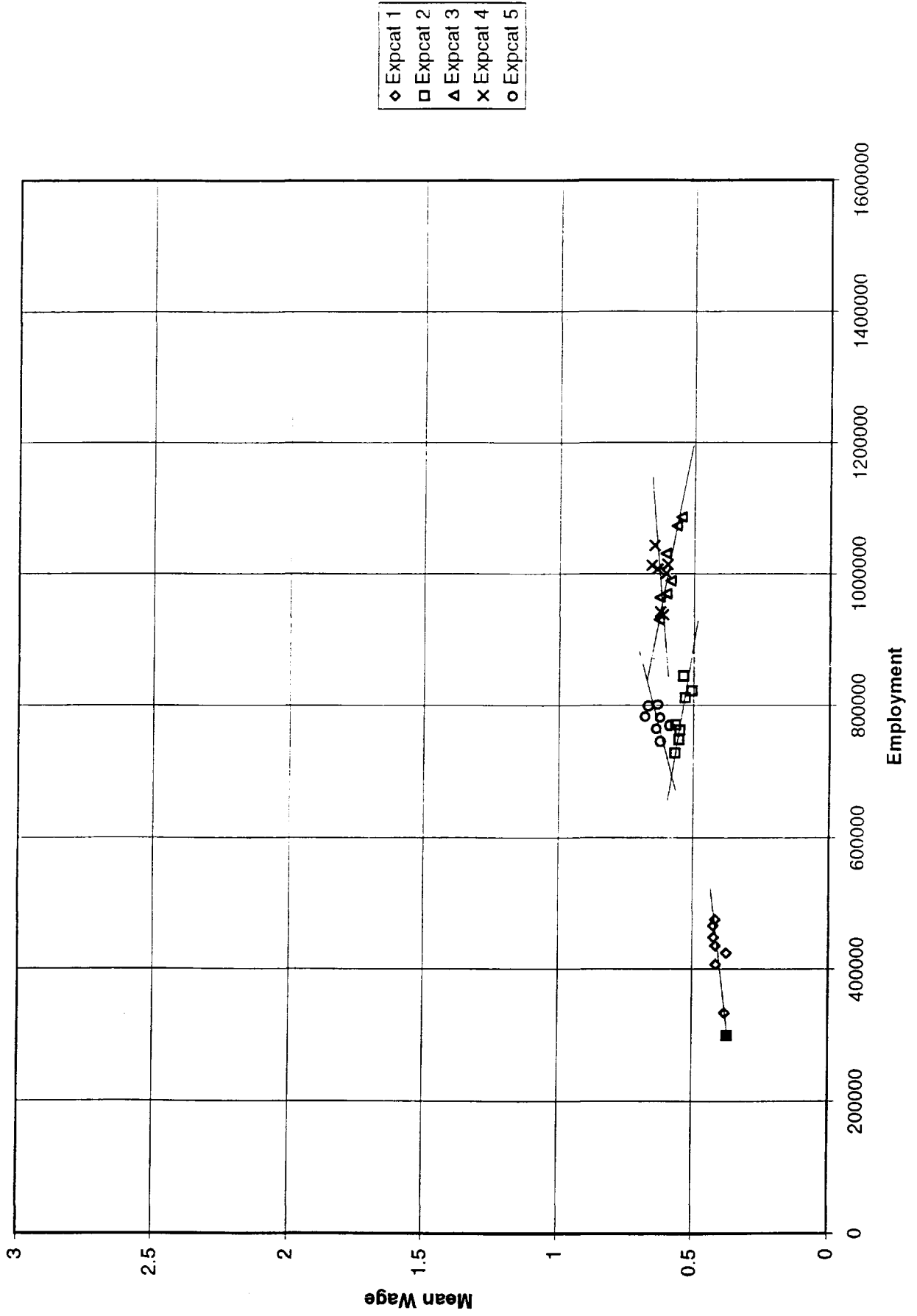


Figure 4.4 - Average Wage and Employment by Year  
 Education Group Two - Some Secondary Schooling

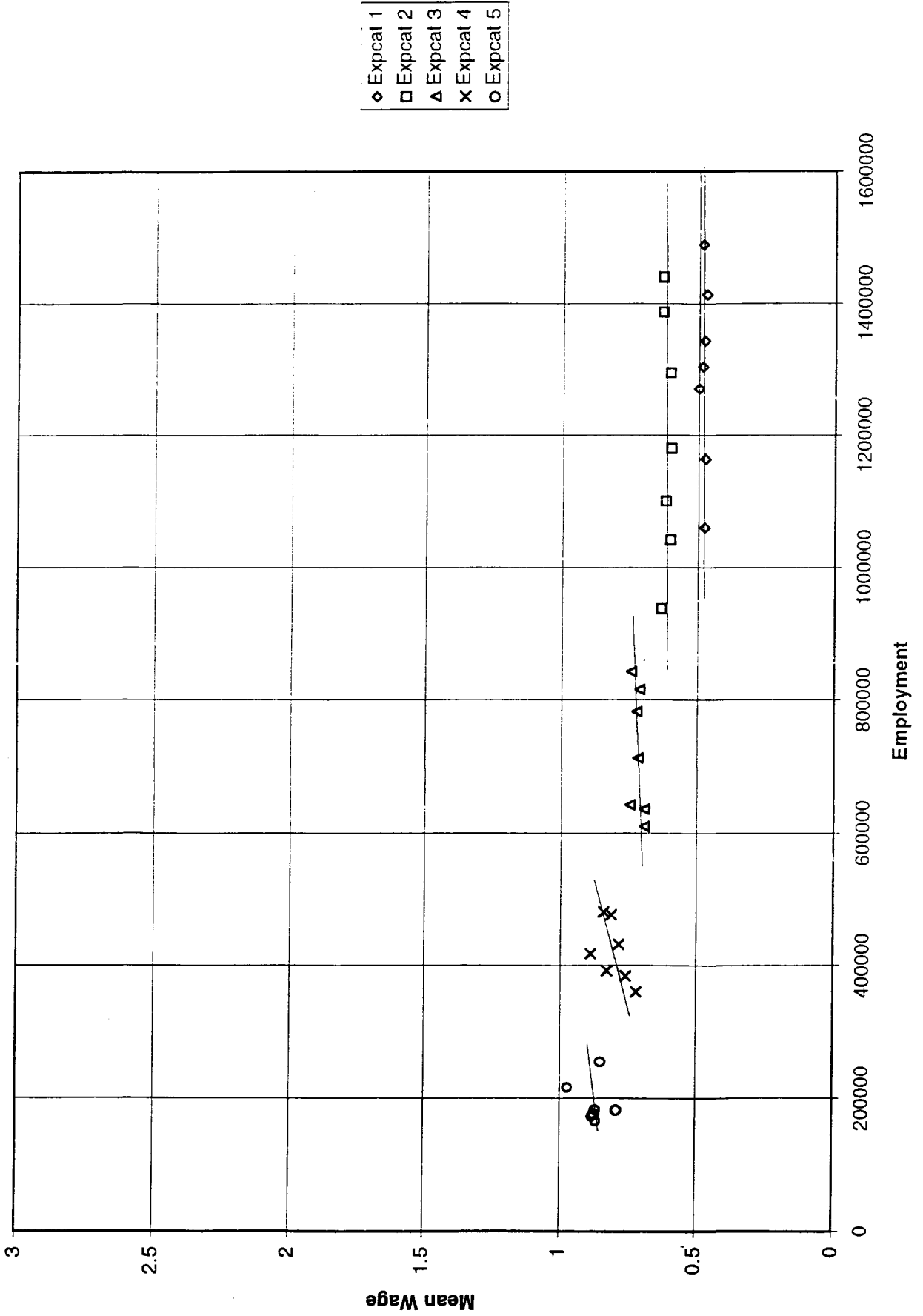


Figure 4.5 - Average Wages and Employment by Years  
 Education Group Three - High School

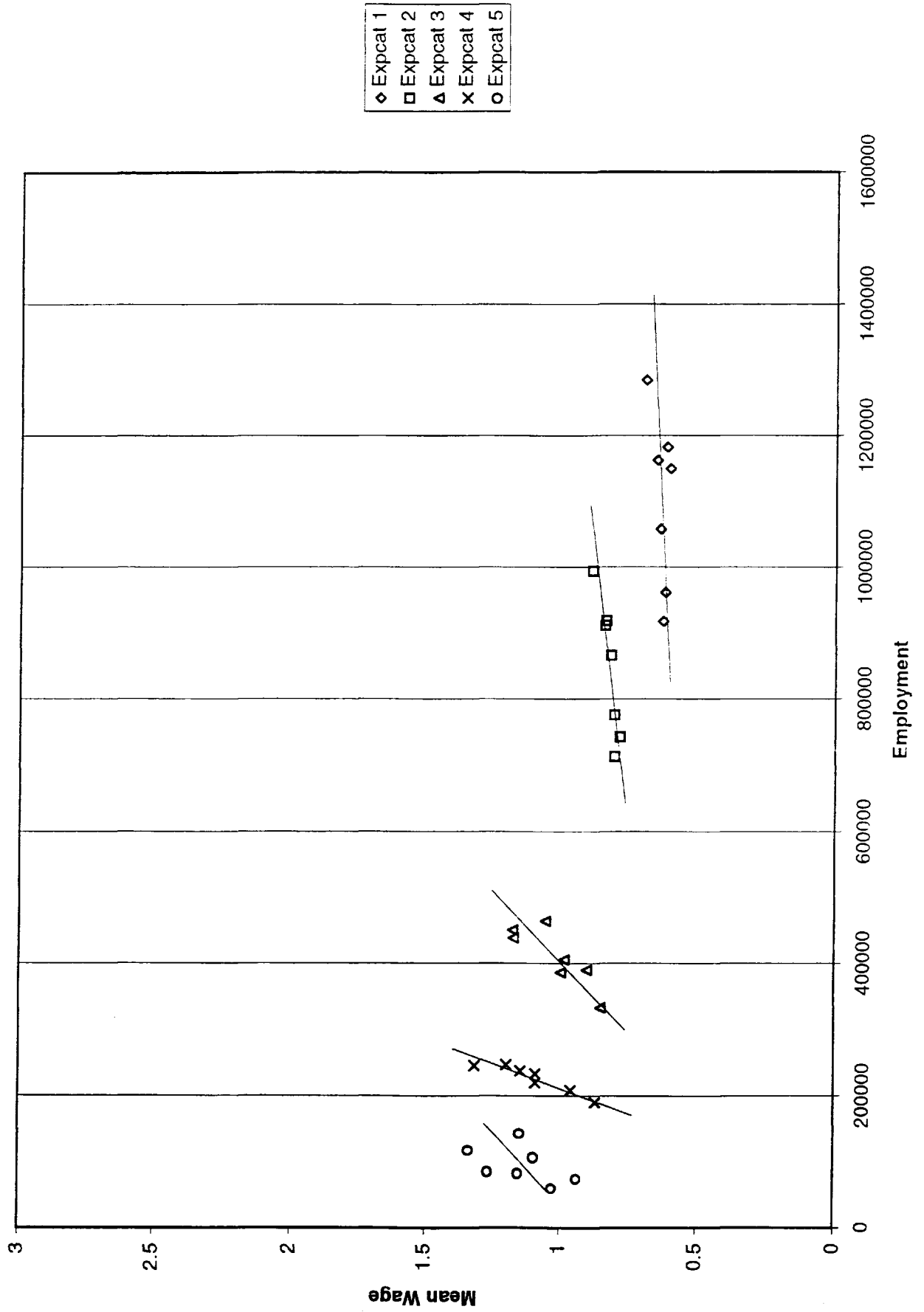
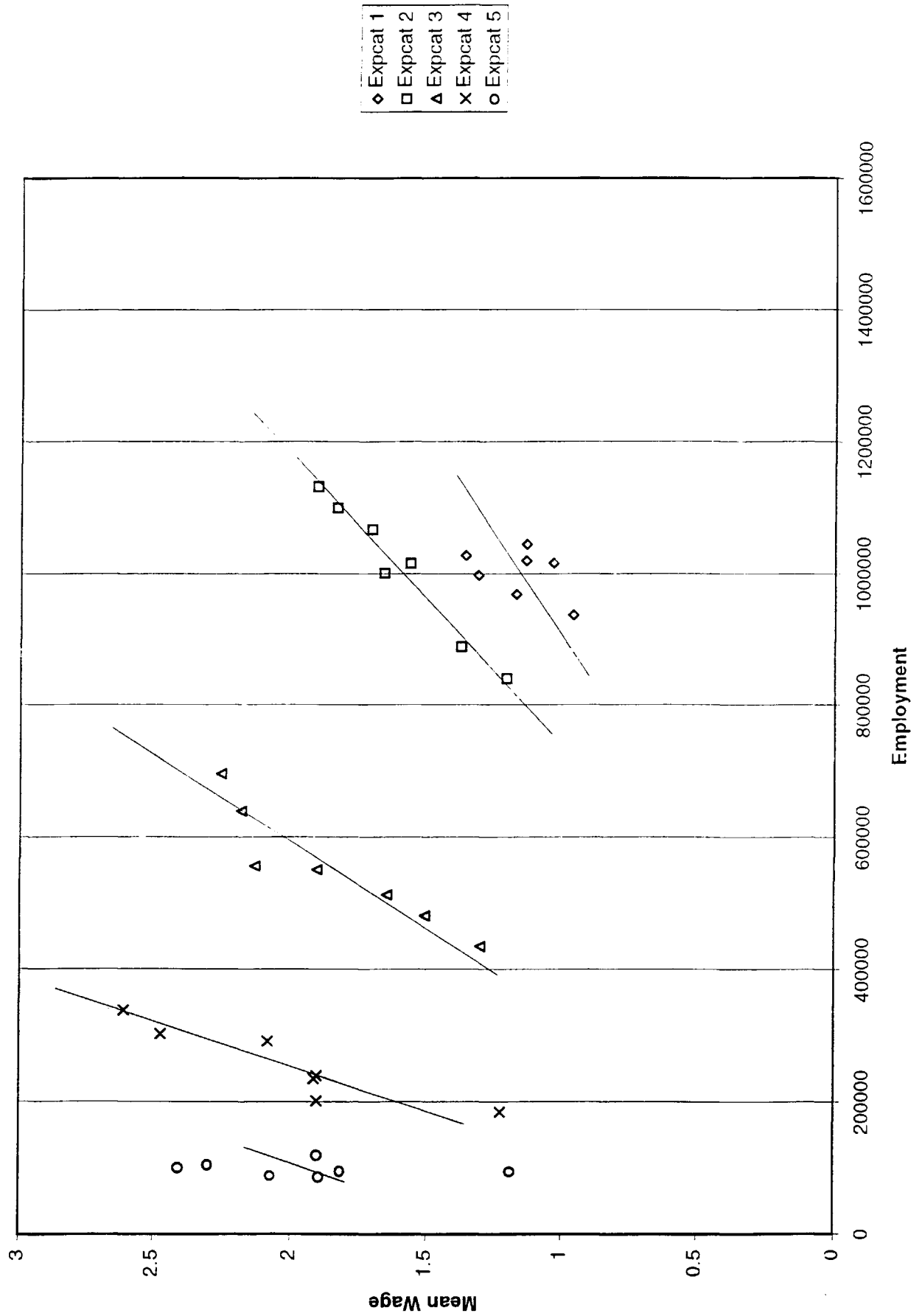


Figure 4.6 - Average Wages and Employment by Year  
Education Group Four - Post Secondary



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