

Understanding the Education Wage Gap:
Evidence from the OECD countries

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I. Introduction

Income inequality is perhaps one of the most disturbing socioeconomic issues currently faced by developed nations. This issue has become especially significant over the past 25 years, as developed nations have been faced with increasing inequalities (Atkinson 1999). While such nations enjoy overall economic prosperity and high incomes, the level of income growth realized by individuals in these nations varies based on an assortment of factors (namely, decreasing demand for unskilled labor, collective bargaining, social welfare benefits, and education).

Increasingly, the level of educational attainment has been viewed as one of the key factors linked to income and real-wage growth (Chu 2000; Adsera and Boix 2000; Mehta 2000; and Huang 1999). Gonzalez and McKinley (1997) illustrate that in developed nations, the real-wage growth of lower-income earners is less than that of higher-income earners. Since most employers attempt to pay wages that reflect productivity, and increased education results in increased productivity, individuals with lower educational attainment earn lower incomes than individuals who have attained higher levels of education (Huang 1999). Thus, differences in educational attainment are considered by many to be a key factor contributing to income inequalities in developed nations.

Since the labor force of every nation is comprised of individuals with varying educational backgrounds and diverse occupations, the existence of income inequality might seem natural to many. Not so natural, perhaps, is the fact that the extent of inequalities amongst developed nations differs (often quite drastically). Considerable

research has been performed concerning these differences across developed nations. Atkinson (1999) reviews the dynamics of income inequalities and compares the incongruous changes in inequalities amongst different developed nations over time. Citing Giles et al (1998) Atkinson states, “it is not the case that all OECD countries are following a common pattern (of wage dispersion), despite the fact that the countries were exposed to the same forces of international competition and of technical change” (63). While Atkinson considers the effects of state programs and collective bargaining on such cross-national differences in inequality, he fails to consider educational attainment in his analysis despite its significance in explaining the wage dispersion in some nations. This paper will examine the effects of labor composition, imports, collective bargaining, and GDP on the wage gap based on educational attainment in numerous OECD nations.

II. Background

In the United States, individuals with a bachelor’s degree or higher earn an average of \$43,000, while those having completed only high school receive an average income of \$27,200 (1996 US Census Bureau statistics). This difference in income between different levels of educational attainment (of nearly 40%), is not as drastic in nations such as Austria and Sweden (where such differences are closer to 10%). To say the least, such differences in the levels of inequality due to educational attainment in nations with similar levels of development are perplexing. Often, policymakers advocate increased government spending on education as a solution to diminish economic inequalities. Considering the aforementioned differences between income inequalities due to education in different nations, the question of how effective increased education

will be in reducing such inequalities invariably arises. One must, therefore, consider the influence of education in light of the possibility that certain factors unique to each country (other than educational attainment alone) may aggravate or ameliorate income inequalities.

From the aforementioned information alone, one cannot conclusively determine the effects of educational attainment on income inequality. Not surprisingly, there are alternate views regarding the effects of education on income and income inequality. The human capital school contends that education is the key determinant of income. According to this view, education determines productivity; since earnings are considered a reflection of productivity, education determines earnings (Marias 1994). Alternatively, opponents of the human capital theory argue that education is insignificant in explaining the differences in income earned by individuals. Proponents of this opposing view hold a variety of factors (other than education) responsible for the explaining differences in income—factors such as individual personality traits, willingness to accept more dangerous work, individual talents, personal connections, and even “market luck” (Jencks 1972).

Considering the 40% difference in income in the US between a high school diploma holder and a college graduate, one cannot dismiss the effects of differences in educational level on income. Based on the level of educational attainment, it is possible to determine whether an individual’s real earnings (earnings adjusted for inflation) will experience positive growth, or negative growth. In the US, real-wage earnings for individuals having attained college degrees have experienced growth from 1980 to 1993 (modest growth for those with bachelor’s degrees; drastic growth for those with

postgraduate degrees), while real earnings for those individuals with a high school diploma or less have actually declined during this period. While Portugal, Britain and Hungary exhibit a similar tendency, Finland, Sweden and Denmark do not.

Clearly, the extent to which differences in educational attainment is responsible for income inequality varies across countries; it is impossible based on these observations to completely debunk or validate the human capital theory or its alternatives.

While there is an observable difference in income levels based on level of educational attainment in every developed nation, the extent to which these differences vary suggests that other factors must also influence such income inequalities. Comparing labor market institutions and other factors of nations with high educational wage gaps to similar factors in nations with lower educational wage gaps, it is possible to ascertain which factors are influential.

Denmark, Sweden and Finland exhibit the smallest difference in earnings based on differences in educational attainment (Economist.com), while the United States and Portugal illustrate significant differences in earnings based on education. A possible explanation for the variation in the education wage gap in the different countries is collective bargaining (Atkinson 1999). In nations where labor unions have greater bargaining power, wages are higher. Such is the case in countries such as Italy and Denmark, where associations of employers bargain with representatives from unions to determine wages in each industry (Hout and Lucas 1996). In countries like the United States, however, employers generally negotiate wage contracts on an individual basis with each potential candidate. Thus, the collective bargaining power is significantly

reduced (except in certain professions), and employees with lower levels of education are not able to demand higher wages.

Clearly, one must conduct a further investigation into the social and political conditions affecting income before postulating the reasons for the variance in income inequalities due to educational differences. Observations involving the selected developed nations absolutely verify neither the human capital theory (stating education as a key determinant of income) nor its alternatives (which view education as an insignificant factor in determining income). One must investigate other complex and country-specific factors to explain why there are such variances in income inequalities based on different levels of educational attainment. The purpose of this study is to examine characteristics of domestic labor markets (such as unionization or service sector employment) along with the size of the trade sectors and overall levels of development as they contribute to the educational wage gap and thus, explain the variance in such a gap across different OECD nations.

III. Model

$$Y = \beta_0 + \beta_1 \text{Trade unions} + \beta_2 \text{Service Sector} + \beta_3 \text{Imports} + \beta_4 \text{Time} + \beta_5 \text{GDP per capita in constant dollars}$$

The model was developed to test for the significance of trade unions, imports, and employment in the service sector in contributing to the wage gap between employees with secondary and post-secondary education in select OECD nations. Data values were gathered from a variety of OECD publications. The data includes observations for 20 OECD nations in the late 1990s and 12 OECD nations in the early 1990s; in both time periods, data was collected for male and female earners.

The independent variables include trade union membership, imports as a percentage of GDP, percentage of the labor force employed in the service sector and per capita GDP in constant dollar terms. The dependant variable in this model is the percentage difference in income between individuals with only a secondary education and those with university degrees. Because the incomes of employees had been indexed (with the income of an individual who completed secondary education taken to be 100), the dependant variable is normalized on a scale of 100.

Trade unions are considered to have a significant effect on wage determination as they have historically been responsible for maintaining higher wages for members (Adsera and Boix 2000; Atkinson 1999). Trade union membership is not universal, and generally requires some standard of skill and education. However, one would expect trade unions to decrease the educational wage gap in developed nations.

Opponents to free trade and liberalization have cited increasing imports as a cause of low wage growth for unskilled workers. That is, workers in developed nations are unable to compete with the inexpensive low-skilled workers in less developed countries. Unskilled work leaves developed nations (where the necessary labor is more expensive), reducing the demand for unskilled workers in developed countries.

In the service sector, there has typically been a higher premium on skilled labor than in any of the other sectors. Thus, one would expect higher wage growth for skilled (educated) labor in developed nations where there is greater employment in the service sector.

Earnings by education level are represented in relation to the earnings of individuals with secondary education in each nation. Since these secondary earnings

vary widely from one nation to another, GDP per capita in constant dollars was included in this study to account for such differences. A time dummy was included which was assigned a value of zero for data from earlier years.

IV. Results

Table 1: Variable Means Results:

<u>Variable</u>	<u>Mean</u>	<u>Std Deviation</u>	<u>Min.</u>	<u>Max.</u>
Union Membership	40.615	22.318	9	83
Service Sector	67.631	6.981	50	80
Imports	30.06	13.380	10.9	69.4
GDP per capita	18339.6	3537.64	10852	27331
Male wage gap	101.891	43.868	56.47	208.19
Female wage gap	110.180	43.556	29.21	206.45

Table 2: Male Model

<u>Variable</u>	<u>Coefficient</u>	<u>Standard Error</u>
Constant	314.2917	73.10143 **
Trade unions	-0.3407	0.3076
Service sector	-2.84432	1.2007 **
Imports	-0.91512	0.49581 *
Time	20.5473	14.0232
GDP per cap. (constant)	0.00054151	0.00213

R – square value : 0.3592

Table 3: Female Model

<u>Variable</u>	<u>Coefficient</u>	<u>Standard Error</u>
Constant	231.93879	81.60428 **
Trade unions	-1.04736	0.34347 **
Service sector	-1.44243	1.34042
Imports	0.29474	0.55348
Time dummy	2.84739	16.20143
GDP per cap. (constant)	0.00036914	0.00237

R – square value : 0.3348

*** indicates significance at 5% level, * indicates significance at 10% level*

From the R-square values, it is evident that both models are useful in estimating the percentage differences in wage on the basis of education. However, the variables found to be significant in the male regression differ from those significant to the female regression model. In the male regression model, the percentage of the labor force employed in the service sector and imports as a percentage of GDP proved to be significant. In the female regression model, only unionization rate was significant.

The regressions show that the effect of international trade is significant for males in reducing the education-wage gap. Such findings run contrary to the commonly held notion that imports actually worsen the inequalities in developed nations, thus reducing the validity of many arguments against free trade. Consistent with the claim that unions restrain competition among workers and reduce wage inequality, the female regression shows some evidence that trade unions decrease the education-wage gap.

Interestingly, increases in the relative size of service sector decrease the education-wage gap. This is encouraging evidence. The relative size of the service sector has been increasing in OECD countries. Frank and Cook (1995) have argued the service sector jobs are often characterized by tournament-style payment schemes and the tournament payments lead to greater inequality. The regressions above do not support this claim.

Finally, the overall level of development, measured by per capita GDP, seems to have no effect on the education wage gap. This suggests that new methods of production don't necessarily increase the relative demand for high-skilled labor or labor market

institutions like unions are effective in restraining the effects of new methods on the education wage gap.

II. Conclusion

While education has a positive effect on earnings for both males and females in OECD nations, understanding the variance amongst different nations in the wage gap between different levels of educational attainment requires analysis of other variables. Analyzing other aspects of the labor markets in these nations, one can conclude that the variance in the education wage gap across OECD nations is largely due to differences in the relative size of the service sector, foreign trade, and the prevalence of unionization.

Unionization can partially explain the variation in such wage gaps amongst the developed nations. Unions enjoy differing levels of importance and significance in wage determination in different nations. While unions are extremely strong in some nations, such as Denmark, they are relatively insignificant in others (such as the United States). Thus, the extent to which unions reduce wage disparity differs from one nation to another.

The relative size of the service sector also affects the education-wage gap within nations, as it proved to be a significant variable in the regression model for males. While over half of the labor force in all of the OECD nations are employed in the service sector, in some nations (such as Switzerland) the percentage is as high as 80%, while in others it is just around 54% (the Czech Republic, for example). As illustrated by the regression model for males, employment in the service sector is a significant variable in reducing the education wage gap. Considering the vast differences just mentioned, it is reasonable

to attribute some of the variance in education wage gap between different nations to differing levels of employment in the service sector.

International trade proved to be significant in reducing the education wage gap for males, although its effects on the female education wage gap were insignificant. In nations with a high percentage of imports (such as Belgium, where imports were 69.4% of GDP), trade appears to assuage the educational wage gap for males.

Thus, developed nations facing similar economic environments and similar opportunities exhibit incongruous education wage gaps due to differences in domestic labor structure, foreign trade, and unionization.

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