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The Impact of Educational Attainment on Labor Market Outcomes

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# The Impact of Educational Attainment on Labor Market Outcomes 

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This paper studies the impact of educational attainment on Labor Market outcomes using data from the Luxembourg Income Study (LIS) for 10 countries over a multi-year period. The 10 countries in this study include USA, Mexico, Germany, Netherlands, Italy, Finland, Spain, Norway, Australia, and Taiwan. We use person level data from the LIS for this study. By including 10 countries in the analysis, we are able to examine the differences in labor market returns in these countries. We are also able to analyze the gender difference in wages across these countries for low, medium, and high levels of educational attainment.

## INTRODUCTION

The LIS is a non-profit cooperative research project with a membership that includes 30 countries on four continents. The LIS project began in 1983 under the joint sponsorship of the government of the Grand Duchy of Luxembourg and the Centre for Population, Poverty and Policy Studies (CEPS). The project is mainly funded by the national science and social science research foundations of its member countries. The LIS database includes Household Income Surveys. These surveys provide income, demographic, labor market and expenditure information on three different levels: household, person and child. This paper examines the impact of educational attainment on Labor Market outcomes using data from the Luxembourg Income Study (LIS) for 10 countries over a multi-year period.

The education systems and levels are defined differently across these 10 countries. When comparing educational levels across countries, it is therefore necessary to carefully look at these variables for each country, and eventually recode them to make them comparable. Each countryspecific educational variable is transformed into a new variable (educ) with three comparable levels (low / medium / high).

The dependent variable in the regression model is the $\log$ of wages. The independent variables include age, age squared, and dummy variables for educational levels (low, medium and high). In order to differentiate between a multi-person household and a single person household, the regression model is weighted by the number of persons in the household. The weight of the household is spread over the household members thus taking into account the differences in household size. The regression models are estimated separately for males and
females to examine the gender gap in wages. The sample includes workers between the ages of 25 and 54, who have worked at least 35 hours per week, and for more than 47 weeks in the year.

By including 10 countries in the analysis, we will be able to examine the differences in labor market returns in these countries. We should also be able to analyze the gender difference in wages across these countries for the three levels of educational attainment. A number of studies have analyzed the relationship between education and wages. We would expect, on average, higher levels of education to be associated with higher wages.

The paper is organized as follows. Section 2 provides an overview of the Luxembourg Income Study. Section 3 provides the theoretical background and previous research investigating the relationship between educational attainment and labor market outcomes. Section 4 describes the data and methodology used in the analysis. Section 5 discusses preliminary study results. Finally, section 6 discusses study limitations and further research.

## THE LUXEMBOURG INCOME STUDY

For over two decades the Luxembourg Income Study (LIS) has been involved in harmonizing national survey data on household incomes and income components (e.g., earnings) with a common conceptual framework. ${ }^{1}$ By improving data comparability, LIS has achieved one of its major objectives: to facilitate cross-country comparisons of inequality, poverty and other distributional issues. While comparative analysis of income distributions was possible prior to the construction of LIS, the results were susceptible to the criticism that the data were insufficiently comparable, and the results from different studies could rarely be compared with any confidence.

The LIS project has reduced these uncertainties by establishing a "lowest common denominator" framework of data consistency, which permits ready comparability of results from analyses that employ the LIS data. By reducing data inconsistencies as an explanation for observed international differences in income distributions, LIS has improved both the confidence one can place in the results and the clarity of discourse about those results. Even when dealing with data series like educational attainment that cannot be readily harmonized, it is possible to isolate the definitional difficulty and clarify its importance.

## LITERATURE REVIEW

It is well established that people with higher education earn more on average than those with less education. Becker introduced the basic idea of human capital investment in 1962. He put forth the idea that human capital and education in particular should be viewed as an investment and as such will have a rate of return associated with it. Mincer's (1974) model of earnings became a cornerstone of empirical economics. The basic framework for returns to schooling is given below:

$$
\ln Y=\beta_{0}+\beta_{1} S+\beta_{2} X+\beta_{3} X^{2}
$$

Where
Y is the wage rate,
$S$ is the amount of schooling, and
X is the work experience.

[^1]The model assumes that the only cost of schooling is the earnings forgone and that the length of one's life is independent of one's schooling. Some critics of Mincer's earnings approach say that ability, school quality and selectivity should not be ignored. People with higher abilities get a better education. Card and Krueger (1992) show that people who attend better schools obtain better education. In both these cases, there would be a biased upward effect on the coefficients that would be similar. People who choose more education are different from people who choose less education. Therefore, estimating one model for both sets of individuals would be limited.

There have been a few studies that have examined the changes in the rate of return to education over time. Psacharopoulos (1989) found that the private rate of return to education is around 10 to 15 percent in developed countries. The changes in the rate of return over time have been disputed since some countries show increasing trends while other show decreasing or even mixed trends.

Smeeding and Sullivan (1997) investigated the relationship between educational attainment and earnings inequality in eight nations using the LIS database. They concluded that among advanced economies there is no obvious relationship between the degree of earnings inequality and the percentage of the labor force attaining higher levels of education. Their second conclusion was that there is a clear positive correlation between the earnings differentials associated with greater educational attainment and the extent of earnings inequality.

Hartog et al. (2004) investigated the return to educational attainment and the risk of education for men in nine nations using the LIS database. They concluded that there was no obvious relationship between the earnings differentials and schooling attendance whereas it seemed that higher levels of educational attainment were associated with high levels of overall inequality. They found no unequivocal trend in the rates of return to education over time and that the residual variance might increase, decrease or have no relation at all with education or experience.

This paper aims to add to this literature by conducting a cross-national analysis using some of the same countries used by the Smeeding and Sullivan (1997), and Hartog et al. (2004) papers, but uses more recent data and some new countries. In addition, I examine the impact of educational attainment on wages for both men and women.

## DATA AND METHODOLOGY

The data for this research come from the Luxembourg Income Study (LIS), a collection of national micro-level surveys on household income. All of the data sets that are part of LIS were collected within the respective countries, often by government agencies. When they are added to LIS, however, the data are "harmonized" in order to facilitate cross-national comparisons. ${ }^{2}$

The LIS database contains datasets from 30 nations; new datasets are added regularly (see Appendix 1). From these I have selected ten different nations with a wide range of institutional features. Nine of the countries included are members of the Organisation for Economic Cooperation and Development (OECD): Australia, Finland, Germany, Italy, Mexico, Netherlands, Norway, Spain, and the United States. I have also included one Asian member: the Republic of China (Taiwan). I chose these ten countries from among the longer list of possibilities because they all provide recent (2000) data including good measures of earnings, full-time work status and educational attainment (see Appendix 2).

[^2]In order to compare earnings distributions across nations we need to decide how to define the population, and how to measure earnings. Population and earnings data have been "harmonized" by LIS to ensure the highest feasible level of comparability. Similarly, we need to have some common definitions applied to disparate educational systems for a comparative analysis based on educational attainment. This section summarizes some of those decisions.

The LIS Surveys are typically household surveys, which report household income from a variety of sources, including earnings from wages and salaries, self-employment income, property income, private and public pensions, and means-tested transfers. Looking at persons rather than households, the surveys typically report for each earner a measure of annual earnings gross of taxes, including any employee's share of social insurance contributions. The exceptions among the ten countries in this study are Italy, Spain and Mexico, which use a net earnings concept.

In order to address the problem that annual earnings differentials involve differences in both wages and hours, I limited the population of interest to workers who worked full time (generally 35 hours or more) during the survey period and reported full-time employment during 47 or more weeks. By doing so, I eliminated those who had substantial spells of unemployment or part-time employment. Because young workers are often still in training, while older workers are a self-selected group from among those who may be eligible for retirement, I have restricted the sample to persons aged between 25 and 54. After imposing the restrictions described below to isolate the full-year, full-time, prime-age labor participants, the samples sizes range from 93 (Spain) to 21264 (United States). Statistical results weight each sample observation with weights determined by the sampling frames of the original surveys. Results are reported separately by gender.

From the educational attainment data we distinguish three levels, which are coded as Low, Medium and High attainment. For the United States, the break between Low and Medium is the completion of high school, and that for the break between Medium and High is the completion of college. The descriptions of the education variable and subsequent coding into low, medium and high for all the countries in this study are given in Appendix 2.

## PRELIMINARY RESULTS

I first examined data for the United States. Table 1 shows the composition of total and wage earning population by level of education. Over time, we can see that a larger percentage of the wage earning population is getting a higher education. The absolute returns to the higher levels of education are substantial and have increased over time. Figure 1 shows the average wages by level of education.

I conducted a similar analysis for Germany, The Netherlands, Italy and Spain. Tables 2 through 5 show these results. For Germany and the Netherlands, the increase in wage-earning population attaining higher levels of education is greater than for Italy and Spain. The returns to higher education are greater in Germany and Spain as compared to the Netherlands and Italy. The 1989 data for Germany refers to the former "West-Germany" only; 1994 and 2000 however refer to the reunified West and East Germany.

TABLE 1

## COMPOSITION OF TOTAL AND WAGE EARNING POPULATION BY LEVEL OF EDUCATION FOR THE US

|  |  | US86 | US91 | US94 | US97 | US00 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Composition of total | low | $27.63 \%$ | $24.76 \%$ | $23.14 \%$ | $22.75 \%$ | $21.19 \%$ |
| population by level of | medium | $51.69 \%$ | $51.46 \%$ | $50.50 \%$ | $49.74 \%$ | $49.12 \%$ |
| education | high | $20.68 \%$ | $23.78 \%$ | $26.36 \%$ | $27.51 \%$ | $29.69 \%$ |
| Composition of wage | low | $17.90 \%$ | $15.63 \%$ | $14.65 \%$ | $14.79 \%$ | 13.81 |
| earning population | medium | $56.48 \%$ | $55.30 \%$ | $53.36 \%$ | $52.05 \%$ | 51.06 |
| by level of education | high | $25.62 \%$ | $29.07 \%$ | $31.99 \%$ | $33.16 \%$ | 35.12 |
| Average wage by level | low | 9566 | 10533 | 11206 | 12960 | 14,209 |
| of education | medium | $15729(+64 \%)$ | $18470(+75 \%)$ | $20282(+81 \%)$ | $23303(+80 \%)$ | $26,804(+89 \%)$ |
|  | high | $26604(+69 \%)$ | $32126(+74 \%)$ | $36757(+81 \%)$ | $42895(+84 \%)$ | $50,361(+88 \%)$ |

FIGURE 1
AVERAGE WAGES BY LEVEL OF EDUCATION FOR USA - 1986 TO 2000


TABLE 2
COMPOSITION OF TOTAL AND WAGE EARNING POPULATION
BY LEVEL OF EDUCATION FOR GERMANY

|  |  | GE89 | GE94 | GE00 |
| :--- | :--- | :--- | :--- | :--- |
| Composition of total | low | $27.48 \%$ | $22.20 \%$ | $17.51 \%$ |
| population by level of | medium | $52.66 \%$ | $53.70 \%$ | $51.63 \%$ |
| education | high | $16.47 \%$ | $19.76 \%$ | $22.49 \%$ |
| Composition of wage | low | $21.89 \%$ | $15.55 \%$ | $13.11 \%$ |
| earning population by | medium | $56.85 \%$ | $58.22 \%$ | $55.36 \%$ |
| level of education | high | $19.92 \%$ | $24.76 \%$ | $27.02 \%$ |
| Average wage by level | low | 21326 | 25652 | 27108 |
| of education | medium | $34124(+60 \%)$ | $37926(+48 \%)$ | $40770(+50 \%)$ |
|  | high | $59065(+73 \%)$ | $61394(+62 \%)$ | $67975(+67 \%)$ |

TABLE 3
COMPOSITION OF TOTAL AND WAGE EARNING POPULATION BY LEVEL OF EDUCATION FOR THE NETHERLANDS

|  |  | NL91 | NL94 | NL99 |
| :--- | :--- | :--- | :--- | :--- |
| Composition of total | low | $44.48 \%$ | $40.64 \%$ | $27.16 \%$ |
| population by level of | medium | $33.14 \%$ | $34.55 \%$ | $38.97 \%$ |
| education | high | $13.29 \%$ | $14.81 \%$ | $21.97 \%$ |
| Composition of wage | low | $30.82 \%$ | $32.85 \%$ | $20.54 \%$ |
| earning population by | medium | $39.47 \%$ | $43.91 \%$ | $48.10 \%$ |
| level of education | high | $18.77 \%$ | $20.81 \%$ | $30.30 \%$ |
| Average wage by level | low | 28989 | 30223 | 30990 |
| of education | medium | $39916(+38 \%)$ | $42314(+40 \%)$ | $46629(+50 \%)$ |
|  | high | $59049(+48 \%)$ | $62410(+48 \%)$ | $64365(+38 \%)$ |

TABLE 4
COMPOSITION OF TOTAL AND WAGE EARNING POPULATION BY LEVEL OF EDUCATION FOR ITALY

|  |  | IT87 | IT91 | IT95 | IT00 |
| :--- | :--- | ---: | ---: | ---: | :--- |
| Composition of | low | $47.38 \%$ | $66.80 \%$ | $64.62 \%$ | $61.22 \%$ |
| total population by | medium | $13.86 \%$ | $27.45 \%$ | $29.41 \%$ | $31.12 \%$ |
| level of education | high | $4.31 \%$ | $5.75 \%$ | $5.97 \%$ | $7.66 \%$ |
| Composition of | low | $58.08 \%$ | $50.34 \%$ | $46.68 \%$ | $41.81 \%$ |
| wage earning | medium | $31.97 \%$ | $38.96 \%$ | $42.49 \%$ | $44.93 \%$ |
| population by level <br> of education | high | $9.85 \%$ | $10.70 \%$ | $10.83 \%$ | $13.26 \%$ |
| Average wage by | low | 13409 | 17111 | 18654 | 21,318 |
| level of education | medium | $16588(+24 \%)$ | $20705(+21 \%)$ | $23128(+24 \%)$ | $25,730(+21 \%)$ |
|  | high | $20672(+25 \%)$ | $25295(+22 \%)$ | $31072(+34 \%)$ | $33,659(+31 \%)$ |

TABLE 5
COMPOSITION OF TOTAL AND WAGE EARNING POPULATION BY LEVEL OF EDUCATION FOR SPAIN

|  |  | ES90 | ES95 | ES00 |
| :--- | :--- | :--- | :--- | :--- |
| Composition of total | low | $74.83 \%$ | $64.84 \%$ | $63.75 \%$ |
| population by level of | medium | $14.58 \%$ | $21.25 \%$ | $21.77 \%$ |
| education | high | $10.59 \%$ | $9.63 \%$ | $13.02 \%$ |
| Composition of wage | low | $63.21 \%$ | $53.06 \%$ | $47.58 \%$ |
| earning population by | medium | $16.94 \%$ | $27.84 \%$ | $31.54 \%$ |
| level of education | high | $19.85 \%$ | $17.77 \%$ | $20.81 \%$ |
| Average wage by level | low | 973323 | 1350678 | 1602727 |
| of education | medium | $1193594(+23 \%)$ | $1672187(+24 \%)$ | $1966005(+23 \%)$ |
|  | high | $1766695(+48 \%)$ | $2958779(+77 \%)$ | $3157207(+61 \%)$ |

Figure 2 depicts the composition of the wage earning population by level of education for year 2000 for nine of the countries. We can see that in USA, Taiwan, and European countries like Germany, Finland, Netherlands, and Norway, about two-thirds of the population have a medium or high level of educational attainment. This percentage is lower in Italy and Spain, but lowest in Mexico. Figure 3 plots average wages by level of education for Mexico. It is evident that the short supply of highly qualified individuals leads to a much larger return for the additional education.

FIGURE 2
COMPOSITION OF WAGE EARNING POPULATION BY LEVEL OF EDUCATION FOR THE YEAR 2000


FIGURE 3
AVERAGE WAGES BY LEVEL OF EDUCATION FOR MEXICO - 1984 TO 2002


Next, I estimated a regression model where the dependent variable was the log of wages and the independent variables were age, age_squared, and dummy variables for medium and high levels of education. The omitted category is low level of education. This model was initially estimated for USA, Germany, the Netherlands, Italy and Spain. I would like to remind the readers that for Italy and Spain, net earnings are used. Table 6 shows these results.

As a whole, the returns to age and education explain better male rather than female wages as can be seen with the larger R squares. As expected, age has a positive effect on the wage rate. By estimating a quadratic equation in age, one allows for the effect of age to be nonlinear: it is positive but decreasing for both males and females (negative marginal effect). Again as expected, medium and high education have also a positive effect on wage rates with respect to low education for both males and females, with high education having a much stronger effect than medium.

As to the gender difference, we can see that age is more important for males, while education is more important for females in explaining their wage rates. As a result, the educational returns seem to be higher for females than for males.

One should note, however, that education is not truly independent in this simple setting. Highly motivated individuals will choose to pursue more education than others. By the same token, highly motivated individuals might do things that, on average, lead them to have higher wages. If so, does a positive coefficient for high education that suggests an association between wages and education really measure the effect of high education on wages, or does it reflect the effect of some underlying effect on both variables that we have not included in this regression model?

## LIMITATIONS AND FURTHER RESEARCH

As mentioned earlier, these results are preliminary. I need to conduct the analyses for all 10 countries. For countries that have number of years of education rather than level attained, the data need to be recoded to match one of the three categories of low, medium or high. In addition, I would like to add a rural/urban indicator to see if there are any geographic effects. I also plan to compute the gender wage gap. I would like to estimate the regression models again using experience and experience_squared instead of age, along with education levels, using Mincer's approach.

TABLE 6
IMPACT OF EDUCATIONAL ATTAINMENT ON WAGES BY GENDER (PARAMETERS BY COUNTRY AND YEAR) DEPENDENT VARIABLE: LOG WAGES

| Country \& Year | Constant |  | Age |  | Age_Squared |  | Medium level of education |  | High level of education |  | Observations | R-square |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Coeff | t-stat | Coeff | t-stat | Coeff | t-stat | Coeff | t-stat | Coeff | t-stat |  |  |
| MALES |  |  |  |  |  |  |  |  |  |  |  |  |
| US86 | 0.0611 | 0.28 | 0.0861 | 6.89 | -0.0009 | -5.45 | 0.3441 | 8.06 | 0.6064 | 13.44 | 3611 | 0.1828 |
| US91 | 0.2426 | 2.39 | 0.0820 | 15.25 | -0.0008 | -11.95 | 0.3527 | 23.94 | 0.6773 | 44.49 | 19567 | 0.2213 |
| US94 | 0.3967 | 4.15 | 0.0759 | 15.10 | -0.0007 | -11.47 | 0.3377 | 24.49 | 0.6981 | 48.41 | 21264 | 0.2175 |
| US97 | 0.6544 | 5.96 | 0.0672 | 11.62 | -0.0007 | -8.81 | 0.3745 | 21.24 | 0.7316 | 40.09 | 17776 | 0.1951 |
| US00 | 0.8544 | 7.76 | 0.0634 | 11.00 | -0.0006 | -8.66 | 0.3849 | 25.11 | 0.7950 | 48.78 | 18622 | 0.2001 |
| GE89 | 1.8517 | 6.49 | 0.0443 | 2.83 | -0.0004 | -2.10 | 0.1486 | 6.35 | 0.3543 | 8.63 | 1993 | 0.1411 |
| GE94 | 2.5058 | 8.18 | 0.0201 | 1.28 | -0.0001 | -0.63 | 0.0109 | 0.39 | 0.2965 | 8.41 | 2513 | 0.1198 |
| GE00 | 2.3231 | 9.69 | 0.0363 | 2.92 | -0.0003 | -2.24 | 0.0449 | 1.29 | 0.3222 | 8.12 | 3773 | 0.1124 |
| NL91 | 1.9554 | 7.70 | 0.0463 | 3.40 | -0.0004 | -2.30 | 0.1319 | 5.09 | 0.4067 | 16.39 | 1561 | 0.1700 |
| NL94 | 1.4670 | 6.55 | 0.0750 | 6.31 | -0.0008 | -5.02 | 0.1209 | 6.27 | 0.3671 | 16.65 | 1953 | 0.2915 |
| NL99 | 1.3353 | 6.22 | 0.0816 | 7.42 | -0.0008 | -5.89 | 0.1484 | 7.10 | 0.3862 | 16.31 | 1921 | 0.3053 |
| IT95 | 1.0554 | 5.00 | 0.0524 | 4.68 | -0.0005 | -3.38 | 0.2153 | 11.73 | 0.4578 | 10.00 | 2603 | 0.2273 |
| IT00 | 0.8310 | 2.80 | 0.0697 | 4.61 | -0.0007 | -3.70 | 0.1788 | 7.29 | 0.3420 | 7.32 | 2676 | 0.1348 |
| ES95 | 6.2577 | 7.01 | -0.0056 | -0.11 | 0.0003 | 0.46 | 0.2431 | 2.88 | 0.6136 | 5.27 | 243 | 0.1955 |
| ES00 | 5.7788 | 18.77 | 0.0356 | 2.14 | -0.0002 | -1.01 | 0.2691 | 9.27 | 0.5987 | 18.48 | 1762 | 0.2300 |
| FEMALES |  |  |  |  |  |  |  |  |  |  |  |  |
| US86 | 0.8640 | 3.86 | 0.0393 | 3.26 | -0.0004 | -2.75 | 0.2812 | 7.86 | 0.6369 | 16.62 | 2316 | 0.1582 |
| US91 | 0.7427 | 7.16 | 0.0496 | 9.16 | -0.0005 | -7.81 | 0.3696 | 19.67 | 0.7284 | 37.52 | 14538 | 0.1805 |
| US94 | 0.5664 | 5.22 | 0.0569 | 10.05 | -0.0006 | -8.36 | 0.4281 | 20.55 | 0.8204 | 38.66 | 15889 | 0.1887 |
| US97 | 0.8260 | 7.20 | 0.0495 | 8.31 | -0.0005 | -6.85 | 0.3957 | 20.62 | 0.7952 | 40.30 | 13424 | 0.1850 |
| US00 | 1.1353 | 8.97 | 0.0375 | 5.79 | -0.0004 | -4.64 | 0.4252 | 19.96 | 0.8417 | 39.60 | 14001 | 0.1889 |
| GE89 | 1.9791 | 5.83 | 0.0324 | 1.84 | 0.0004 | -1.60 | 0.1896 | 3.60 | 0.4106 | 6.74 | 712 | 0.1394 |
| GE94 | 2.8170 | 9.01 | -0.0027 | -0.16 | 0.0001 | 0.61 | 0.0778 | 1.67 | 0.1630 | 2.28 | 1153 | 0.0381 |
| GE00 | 2.6973 | 7.66 | 0.0044 | 0.24 | 0.0000 | 0.13 | 0.1840 | 3.82 | 0.3907 | 7.94 | 1651 | 0.0783 |
| NL91 | 1.8243 | 2.55 | 0.0472 | 1.21 | -0.0004 | -0.83 | 0.0161 | 0.23 | 0.2771 | 4.84 | 302 | 0.0931 |
| NL94 | 1.4164 | 3.96 | 0.0804 | 4.02 | -0.0009 | -3.55 | 0.1291 | 2.90 | 0.2998 | 6.68 | 483 | 0.1969 |
| NL99 | 1.3383 | 2.92 | 0.0739 | 2.93 | -0.0008 | -2.39 | 0.3033 | 3.67 | 0.4593 | 5.62 | 506 | 0.1900 |
| IT95 | 1.3951 | 4.71 | 0.0282 | 1.79 | -0.0002 | -0.96 | 0.2517 | 9.32 | 0.3748 | 6.17 | 1181 | 0.1684 |
| IT00 | 0.9222 | 3.34 | 0.0629 | 4.39 | -0.0007 | -3.60 | 0.1831 | 7.71 | 0.3263 | 5.58 | 1326 | 0.1596 |
| ES95 | 5.2748 | 4.55 | 0.0403 | 0.62 | -0.0004 | -0.47 | 0.4728 | 3.50 | 0.7580 | 5.35 | 93 | 0.2608 |
| ES00 | 5.2101 | 13.99 | 0.0546 | 2.73 | -0.0005 | -1.86 | 0.3405 | 7.78 | 0.6721 | 15.08 | 834 | 0.3222 |

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## APPENDIX 1

## LIS Members

Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland France,
Germany, Greece, Hungary, Ireland, Israel, Italy, Luxembourg, Mexico, Netherlands, Norway, OECD, Poland, ROC Taiwan, Romania, Russia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States.

## APPENDIX 2

|  | APPENDIX 2 |  |
| :---: | :---: | :---: |
| Narrative Descriptions and Coding of Educational Attainment |  |  |
| Country | Description | Level of Education coded as |
| United States | No schooling | Low |
|  | Elementary school | Low |
|  | Some high school | Low |
|  | High school diploma | Medium |
|  | Some college | Medium |
|  | Associates Degree | Medium |
|  | Bachelors Degree | High |
|  | Masters Degree | High |
|  | Doctorate | High |
| Germany | No degree | Low |
|  | Other degree | Low |
|  | Other degree with technical | Low |
|  | Secondary | Low |
|  | Secondary with technical | Medium |
|  | Nonclass secondary | Low |
|  | Nonclass secondary with technical | Medium |
|  | Technical school degree | Medium |
|  | Technical school with technical | Medium |
|  | High school degree | Medium |
|  | High school with technical | Medium |
|  | Technical college | High |
|  | University | High |
| The Netherlands | Pre-primary | Low |
|  | Primary | Low |
|  | Secondary lower | Low |
|  | Secondary Higher | Medium |
|  | Tertiary lower | High |
|  | Post-graduate or old masters | High |
| Italy | None | Low |
|  | Elementary school | Low |
|  | Middle school | Low |
|  | Secondary profession | Medium |
|  | High school (5yrs) | Medium |
|  | Associates degree / short | High |
|  | Bachelors degree | High |
|  | Post graduate qualification | High |

## APPENDIX 2 Continued

## Narrative Descriptions and Coding of Educational Attainment

| Country | Description | Level of Education coded as |
| :---: | :---: | :---: |
| Spain | Illiterate | Low |
|  | Without formal education | Low |
|  | Basic education | Low |
|  | Primary education | Low |
|  | Secondary education | Medium |
|  | University preparation | Medium |
|  | Basic technical education | Medium |
|  | Adv. technical education | High |
|  | Basic university | High |
|  | Advanced university | High |
| Republic of China (Taiwan) | Illiterate | Low |
|  | Supplementary schooling | Low |
|  | Primary school | Low |
|  | Junior vocational | Low |
|  | Junior high | Low |
|  | Senior vocational (part) | Low |
|  | Senior vocational (grad) | Medium |
|  | Senior high (part) | Low |
|  | Senior high (grad) | Medium |
|  | Junior college (part) | Medium |
|  | Junior college (grad) | Medium |
|  | College/University (part) | Medium |
|  | College/University (grad) | High |
|  | Grad school (part) | High |
|  | Grad school (grad) | High |
| Australia | Never went to school | Low |
|  | Less than secondary | Low |
|  | Completed secondary | Medium |
|  | Trade Certificate | Medium |
|  | Other Certificate | Medium |
|  | Bachelor or Higher | High |
|  | Other | Medium |

## APPENDIX 2 Continued

## Narrative Descriptions and Coding of Educational Attainment

| Country | Description | Level of Education coded as |
| :---: | :---: | :---: |
| Finland | No Education/Unknown/<9 Years | Low |
|  | 10-11 Years | Medium |
|  | 12 Years | Medium |
|  | 13-14 Years | High |
|  | 15 Years | High |
|  | 16 Years | High |
|  | Post-Graduate Education | High |
| Norway | Unknown | Low |
|  | None, preschool | Low |
|  | 1-6 years | Low |
|  | 7-9 years | Low |
|  | 10 years | Medium |
|  | 11-12 years | Medium |
|  | 13-14 years | High |
|  | 15-16 years | High |
|  | 17-18 years | High |
|  | Over 18 years | High |
| Mexico | No education | Low |
|  | Preprimary | Low |
|  | $1^{\circ}$ primary | Low |
|  | $2^{\circ}$ primary | Low |
|  | $3^{\circ}$ primary | Low |
|  | $4^{\circ}$ primary | Low |
|  | $5^{\circ}$ primary | Low |
|  | $6^{\circ}$ primary | Low |
|  | $1^{\circ}$ secondary | Low |
|  | $2^{\circ}$ secondary | Low |
|  | $3^{\circ}$ secondary | Low |
|  | Preparatory, vocational or normal incomplete | Medium |
|  | Preparatory, vocational or normal complete | Medium |
|  | Superior incomplete | Medium |
|  | Superior complete | High |
|  | Postgraduate | High |


[^0]:    Luxembourg Income Study (LIS), asbl

[^1]:    ${ }^{1}$ More information can be found at www.lisproject.org

[^2]:    ${ }^{2}$ A "harmonized" LIS variable is a variable that exists (or may exist, depending on its actual presence in the original dataset) for each country, but whose coding differs in principle across countries. The harmonized variables are typically all the country-specific variables; the original classification is usually preserved.

