Gender and private returns to education : a cross-European analysis

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Abstract

The paper compares private returns to education of men and women for fourteen E.U. countries. Building on de la Fuente (2003), I define the rate of return as the discount rate equalizing marginal costs and benefits of education. I extend his model by estimating separately the values of the relevant parameters for men and women and introducing variables specifically related to maternity leaves and benefits. The main result is that, given the profiles of earning of a man and a woman studying the average numbers of years in each country and working full-time up the end of their active lifes, women's rates of return are higher for most countries.

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1 Introduction

In the economic literature, human capital accumulation has been identified as one of the most relevant engines of economic growth. In the social sciences literature, human capital accumulation and (first of all) the level of formal education have often been seen as one of the most important factors affecting many dimensions of social life, including structure and dynamics of the family and fertility patterns. For instance, the existence of a negative correlation between education and fertility is often claimed.

Recent work by de la Fuente (2003) provides an important reference point to address these issues in economically advanced countries. The report, written on behalf of the European Commission, provides a comparative analysis of private and social returns on education in 14 European countries. The main findings are:

- educational attainment is an important determinant of individual earnings and aggregate productivity;

- human capital is an attractive investment from both the microeconomic and the macroeconomic point of view. At the individual level de la Fuente defines the "private premium" on education taking as reference point a balanced portfolio of corporate shares and government bonds. Comparing the estimated social returns on human capital with the return on physical capital, he derives the "social premium". I report the values of private and social premia on schooling estimated for selected E.U. countries:

Country	**private premium** %	**social premium** %
Belgium	4,36	1,59
Germany	3,98	2,11
Italy	6,06	3,65
Spain	7,56	2,87
Sweden	2,14	2,11
Average of 14 countries	5,72	2,49

With respect to the policy implications, in all countries (but Sweden), the private premium is significantly larger than the social one, suggesting that an increase in general subsidies is not required.

Starting from these results, several papers have developed the analysis focusing on individual countries, see de la Croix and Vanderberghe (2004) for Belgium, Ciccone (2004) for Italy and de la Fuente and Domenech (2003) for Spain.

All these papers provide gender-free estimates. Gender is relevant to this issue in many dimensions:

1. estimates of the Mincerian equations are typically different for men and women;

2. actual rates of participation in the labor force vary dramatically across genders, presumably affecting the social returns on education;

3. the typical working experience varies across genders, also because of the different experiences of maternal/paternal leaves.

The main purpose of this paper is to start addressing some of these issues. My focus will be exclusively on private returns on education and, consequently, I will ignore the second issue mentioned above. Moreover, I will take as given the differences in the parameters of the Mincerian equations and I will focus exclusively on issues related to maternity.

The main purpose of the paper is to compare the returns on education of men and women entering the job market at the end of their formal education and exiting the job market at the average age of retirement. Their life-time experience will differ for several reasons:

1. wage profiles of men and women are different;

2. gender-specific rates of unemployment are different;

3. the length of the active life is different for men and women;

4. unemployment benefits are (more properly, can be) different, due (mostly) to wage differences;

5. public policies related to maternity leaves affect in different ways men and women.

The procedure adopted to compute the gender-specific rates of return on education is identical to the one adopted in de la Fuente (2003) for the case of males. For the case of women, the basic model is modified to take into consideration that the actual female working experience is affected by maternity episodes and, consequently, by maternity leaves and maternity related monetary benefits. Therefore, maternity causes several differences in working life across genders. Potentially, it also has some consequences related to the female specific rates of return. This is because of the correlation that may exist between education and fertility. The (negative) relationship between these two variables is often taken for granted. While there are many studies on this issue (and corroborating this claim) referred to developing countries, there seems to be very little empirical evidence on this issue in economically advanced countries. It suffices to say that, in the literature on this issue, most of the references are to Jones (1982) and, somewhat improperly, to U.N. (1995, a study just referred to developing countries). In this paper, to evaluate the relation education - fertility, I will exploit some more recent evidence based on the U.N.C.E. "Family and Fertility Studies" referred to several European countries. These reports provide (on a comparable basis) information on actual and expected fertility rates, broken down by education levels and, therefore, they provide one of the ingredients for the estimates. It turns out that, indeed, there exists a negative correlation between education and fertility. The quantitative effect on the return to education is however quantitatively fairly small (but of the same order of magnitude of the effect of differences in the rates of unemployment by levels of education).

Public policies have an important role in determining the effect of fertility on rates of returns. These policies differ a lot across countries, even within the E.U.. There is an unavoidable degree of arbitrariness in imputing benefits to a given typology of workers. In the Appendix, I precisely spell out the criteria adopted in selecting and attributing benefits. Generally speaking, the convention adopted may lead to overestimate women private returns on education. Therefore, my estimates provide a sort of upper bound on the set of "reasonable" estimates .

The set up of the paper is the following: The next section presents the model adopted by de la Fuente (2003). Essentially, I adopt his formalization for men. The section also presents and motivates the model I adopt to estimate the returns for women. The third section presents the definition of the main variables and the main results. These are discussed in section four. Technical details on the derivations of the fundamental formulas are in Appendix A. Most details on the computations are in Appendix B.

2 Description of the model

2.1 Private returns on education for men

The approach I will follow in computing the rates of return on education is the one proposed by de la Fuente (2003). In fact, my estimates of the male returns are based exactly on his model. In the estimates for women, the same basic approach will be modified to take into account maternity leaves and benefits.

Let's first consider the basic model. Consider an individual who studies for S years and retires at time U. Let S_0 be the average number of years spent in school.

Earning of a full-time worker with S year of schooling are given by the product of an increasing function $f(S)$ of education and of an exogenous "technical efficiency index", $A_t \equiv A_0 e^{gt}$. Following de la Fuente, I assume that after-tax earnings of a full-time employed individual are given by $[f(S) - T(f(S)]A_t$, i.e., that "tax rates are a function of relative rather than absolute incomes" (page 16).

If unemployed, individuals obtain net benefits that may or may not be related to their previous earnings and to average earnings, $a[f(S) - T(f(s))] + b[f(S_0) - T(f(S_0))]$.

Let $p(S)$ be the probability of being employed for an agent with S years of schooling, an increasing function of S. Then, the discounted life-time earnings of a male, $I_M(S)$, are given by

$$I_M(S) \equiv \int_S^U \left\{ \begin{array}{c} p(t)\left(f(t) - T(f(t)\right) + \\ (1-p(t))\left[a\left(f(t) - T(f\left(t\right))\right) + b\left(f(S_0) - T(f(S_0)\right)\right] \end{array} \right\} A_t e^{-rt} dt$$

Schooling implies direct private costs, denoted by $C_M(S)$ (estimated, per year, as a fixed fraction μ_s of the average earnings of a production worker with S_0 years of schooling). Hence, the (discounted) direct costs of education, $C_M(S)$, are given by

$$C_M(S) \equiv \int_0^S \mu_s f(S_0) A_t e^{-rt} dt.$$

Finally, I assume that, while in school, individuals devote a fixed fraction ϕ of their time to studying and school attendance. Therefore, their labor supply is given by a fraction $(1-\phi)$ of the labor supply of full-time workers. Moreover, I assume that students are not entitled to unemployment benefits and that their probability of being employed is a fixed fraction, η, of the probability of a full-time worker. Hence, the present value of the expected life-time earning while in school, $J_M(S)$, is given by

$$J_M(S) \equiv \int_0^S \eta p(t) \left[(1-\phi) f(t) - T\left((1-\phi) f(t)\right)\right] A_t e^{-rt} dt$$

The present value of the expected net lifetime earnings for men is then

$$V_M(S) = I_M(S) \ + J_M(S) - C_M(S)$$

Observe that, as in de la Fuente (2003), I ignore retirement benefits (for a justification, see his page 17).

I define as private rate of return on education the value of r such that the average level of education S_0 is the optimal solution to the problem of maximizing $V_M(S)$ for the representative (male) agent.

Hence, r is obtained as the value such that $\frac{\partial V_M(S)}{\partial S}|_{S_0} = 0$.

Let's define

$$\begin{array}{lll} p_0 \equiv p(S_0) & \theta \equiv \dfrac{\frac{\partial f(S)}{\partial S}|_{S_0}}{f(S_0)} & \epsilon \equiv \dfrac{\frac{\partial p(S)}{\partial S}|_{S_0}}{p(S_0)} \\ \tau_0 \equiv \dfrac{T(f(S_0))}{f(S_0)} & T^{'} \equiv \dfrac{\partial T(f(S))}{\partial S}|_{S_0} & \tau_s \equiv \dfrac{T((1-\phi)f(S_0))}{(1-\phi)f(S_0)} \end{array}$$

where θ is the Mincerian return to schooling parameter, ϵ measures the curvature of the function $p(S)$ at S_0, normalized by $p(S_0)$, τ_0 and $T\prime$ are the average and the marginal rates of income tax for a full-time worker with education S_0, while τ_s is the average tax rate on the income of a student with education S_0 working part-time.

Finally, let $R \equiv \ (r-g)$ and $H \equiv (U - S_0)$.

Using this notation and by a straightforward manipulation of $\frac{\partial V_M(S)}{\partial S}|_{S_0} = 0$, one obtains equation (9) in de la Fuente (2003, p.17),

$$\frac{R_M}{1-e^{-R_M H_M}} = \frac{\theta\left[\frac{p_0+(1-p_0)a}{p_0+(1-p_0)(a+b)}\right]\left[\frac{1-T'}{1-\tau_0}\right] + \epsilon\left[\frac{(1-a-b)p_0}{p_0+(1-p_0)(a+b)}\right]}{\left[1-\frac{1-\tau_s}{1-\tau_0}\frac{(1-\phi)\eta p_0}{p_0+(1-p_0)(a+b)}\right] + \left[\frac{\mu_s}{(p_0+(1-p_0)(a+b))(1-\tau_0)}\right]} \tag{1}$$

I will use (1) to evaluate the private rates of return on education for males. As made precise in the following section and in Appendix B, I will use values of the parameters referred to the male population to compute R_M. The main departure from de la Fuente (2003) is that he considers a single male with earnings equal to the ones of an Average Production Worker (in the sequel, APW). I consider a couple with two children where the male has earnings equal to 100%APW, while the woman has earning equal to 67%APW. Evidently, marginal and average tax rates (τ_0 and T'), as well as unemployment benefits, need to be changed accordingly.

2.2 Private returns on education for women

For female individuals, I modify the basic function $V(S)$ as follows. Direct private education costs and earnings while in school are determined as above. However, given that female average earnings are estimated at 67%APW, the parameter defining direct private costs of education as a fraction of the female earning is $1.5\mu_s$, so that the actual monetary costs are gender-invariant. Therefore,

$$C_W(S) \equiv \int_0^S 1.5\mu_s f(S_0) A_t e^{-rt} dt$$

and

$$J_W(S) \equiv \int_0^S \eta p(t) \left[(1-\phi) f(t) - T(((1-\phi) f(t)) \right] A_t e^{-rt} dt.$$

The key difference is in the definition of the expected life-time earning after school. I explicitly introduce in the function $I_W(S)$ maternity and parental leaves and child-benefits as follows: let $q(S)$ be the fraction of the (full-time) working life (of length H) when the representative woman does not have maternal leaves. Evidently, $(1-q(S))$ will depend upon the number of children, c, and upon the length of (paid or unpaid) maternity leaves allowed by law, d.

Indeed, $(1-q(S)) \equiv \left(\frac{c}{W}(s)\frac{d}{H}\right)$.

During a fraction $q(S)$ of her active life, a female member of the labor-force will be employed with probability $p(S)$, unemployed with probability $(1-p(S))$. For this fraction of her active life, expected earnings are defined exactly as above.

During a fraction $(1-q(S))$ of her active life, a female member of the labor-force can, legally, be on maternal leave. Evidently, during this period, she can be either employed (with probability $p(S)$) or unemployed. If employed, I assume that a woman will actually take a leave of the maximum allowed length. In this period, she will receive a fraction γ of her previous earning, plus other benefits related to child-caring and typically independent of personal income and depending instead on average income. This second component will be denoted as $\delta \left[f(S_0) - T((f(S_0))\right]$. If unemployed, obviously, she will not take a maternal leave. Her income will be given by the usual unemployment benefits, $a[f(S) - T(f(s))] + b[f(S_0) - T(f(S_0))]$, plus the maternity related (but employment independent) benefits $\delta\left[f(S_0)-T((f(S_0))\right]$. Hence, I have:

$$\begin{aligned} I_W(S) \equiv & \int_S^U \{q(t)\left[p(t)\left(f(t)-T(f(t))\right)+\right. \\ & +(1-p(t))\left(a\left(f(t)-T(f(t))\right)+b\left(f(S_0)-T(f(S_0))\right)\right)]+ \\ & +(1-q(t))\left[p(t)\left(\gamma\left(f(t)-T(f(t))\right)+\delta(f(S_0)-T(f(S_0)))\right)+\right. \\ & +(1-p(t))\left(a\left(f(t)-T(f(t))\right)+b\left(f(S_0)-T(f(S_0))\right)\right)+ \\ & \left.+\delta\left(f(S_0)-T(f(S_0))\right)\right)]\}A_t e^{-rt}dt \end{aligned}$$

As above, the rate of return on education is the value of r such that S_0 is the optimal solution to the problem maximize $V_W(S)$.

Using the notation introduced above, setting $q_0=q(S_0)$, $\xi=\frac{\frac{\partial q(S)}{\partial S}|_{S_0}}{q_0}$, and

$$k_0=p_0\left(q_0+(1-q_0)\gamma\right)+(1-p_0)(a+b)+(1-q_0)\delta,$$

from $\frac{\partial V_W(S)}{\partial S}|_{S_0}=0$, I obtain (see Appendix A)

$$(2)\qquad \frac{R_W}{1-e^{-R_W H_W}}=$$

$$\frac{\theta\left[\frac{1-T'}{1-\tau_0}\right]\left[\frac{p_0(q_0+(1-q_0)\gamma)+(1-p_0)a}{k_0}\right]+\epsilon\left[\frac{(q_0+(1-q_0)\gamma-(a+b))p_0}{k_0}\right]+\xi\left[\frac{(p_0(1-\gamma)-\delta)q_0}{k_0}\right]}{\left[1-\frac{1-\tau_s}{1-\tau_0}\frac{\eta p_0(1-\phi)}{k_0}\right]+\left[\frac{1.5\mu_s}{k_0}\frac{1}{1-\tau_0}\right]}$$

Clearly, when $q(S)=1$, equation (2) reduces to (1).

Equations (1) and (2) may be given a very similar interpretation: In both eqs., denominators can be seen as the sum of marginal opportunity and direct costs of education (expressed as a share of the instantaneous after-tax earnings at S_0, $(f(S_0)-T(f(S_0))))$.

Similarly, numerators give the marginal effect of education on earnings, once again expressed as a fraction of the after-tax instantaneous earnings at S_0. In (1), this effect can be decomposed into two components: one related to the Mincerian parameter θ and a second one related to the effect of S on the probability of employment. In the case of women, there is a third component, due to the effect of education on fertility, captured by the parameter ξ. The "weight" of ξ can be interpreted as the marginal increase of income (as a share of after-tax expected earnings) due to the change of the fertility rate induced by an increase in the level of education. The "weight" of ϵ measures the marginal (percentage) effect of the increase in education on income due to the change in the probability of employment. Similarly, the "weight" of θ measures the effect on after-tax incomes due to the effects that an increase in education has on the earning function $f(S)$.

As we will see later, the maternity-related policy parameters (γ and δ) are quite different across countries. Therefore, it is natural to ask what is the effect of their changes on female rates of returns. Increases in the values of γ and δ have a *direct effect* on the rate of return R because they decrease the opportunity cost of maternity. There are also *indirect effects,* because changes in γ and δ affect the fertility rate and may influence the values of $q(S_0)$ and $p(S_0)$. Here, I will just consider the (presumably larger) *direct effects.* The indirect effects depend, among other parameters, on the second derivatives of $q(S)$ and $p(S)$. Unfortunately, the available data do not allow for any sensible conjecture on their values.

To compute the effects of changes in (γ, δ) on R$_W$,rewrite (2) as $F(R_W) - G(\gamma, \delta) = 0$. Then, by the implicit function theorem,

$$\frac{\partial R_W}{\partial \gamma} = -\frac{-\frac{\partial G(.)}{\partial \gamma}}{\frac{\partial F(R_W)}{\partial R_W}} \quad and \quad \frac{\partial R_W}{\partial \delta} = -\frac{-\frac{\partial G(.)}{\partial \delta}}{\frac{\partial F(R_W)}{\partial R_W}}.$$

Bear in mind that the two derivatives measure the rates of change of R_W due to changes in γ and δ, under the assumption that the optimal level of schooling is invariant, because, by construction, in this model, the optimal value of S is given (and equal to the country average level) while the rate of discount is treated as an endogenous variable.

By direct computation (reported in Appendix A), I obtain

$$(3) \qquad \frac{\partial R_W}{\partial \gamma} = -p_0 \frac{\frac{q' - (1-q_0)\left[\epsilon + \frac{1-T'}{1-\tau_0}\theta - G(\gamma,\delta)\right]}{k_0 - \left(\frac{1-\tau_s}{1-\tau_0}\right)\eta p_0 (1-\phi) + \frac{1.5\mu_s}{1-\tau_0}}}{\frac{1-(1+R_W H_W)e^{-R_W H_W}}{\left(1-e^{-R_W H_W}\right)^2}}$$

and

$$(4) \qquad \frac{\partial R_W}{\partial \delta} = -\frac{\frac{q' + (1-q_0)G(\gamma,\delta)}{k_0 - \left(\frac{1-\tau_s}{1-\tau_0}\right)\eta p_0 (1-\phi) + \frac{1.5\mu_s}{1-\tau_0}}}{\frac{1-(1+R_W H_W)e^{-R_W H_W}}{\left(1-e^{-R_W H_W}\right)^2}}.$$

Both derivatives have an undefined sign. For the second one, if $q\prime$ is positive (or negative but sufficiently small) the sign is negative, as one would expect, because increases in δ increase the opportunity cost of schooling and, since S_0 is given (individuals can not change the level of education chosen), the rate of return decreases in order to guaranty that S_0 persists as the optimal choice for the individuals. In the sequel, while discussing the estimates, we will see that, for the sample of countries considered here, the estimated values of $\frac{\partial R_w}{\partial \delta}$ are, indeed, always negative.

It turns out that the first derivative is always negative, too. This is somewhat counterintuitive, because one would expect a positive value for it, given that an increase in the value of γ increases the expected future income. However, the opportunity costs of schooling also increases. The impact of a change in γ on the opportunity costs dominates all the others. Numerically, in most of the countries, the values of $q\prime$ and of ϵ are fairly small. This is also possibly due to the postulated time independence of the variables.

The numerical values of the elasticities of R_W with respect to γ and δ, E_γ and E_δ, are reported in section 4.

3 Data and main results

In this section, I present my estimates, by gender, of the private returns on education. Their are computed using equations (1) and (2) above. For each country, I consider a representative married couple with two children. de la Fuente (2003) considers, instead, a single individual with wage equal to 100%APW. It follows that our estimates are not directly comparable. I don't refer to single parents because, in most of the countries considered, most women are married at the time of child-bearing. I assume that male earnings are equal to 100% of APW, while female ones are 67% of APW. This is a fairly realistic assumption, if we take into consideration the actual average earnings in manufacturing for women and men in the European countries (ILO (1995)).

As in de la Fuente, I assume that, after schooling, agents are in the labour force until the average age of retirement. Moreover, I also assume that they want to work 20% of a standard work-year while enrolled in school.

The computations also consider taxes on labour income and unemployment benefits. In particular, for women, I include child cash benefits from general government (while I don't include tax expenditures, i.e., tax allowances and tax credits) and benefits related to maternity and childcare provided to working women.

In the sequel, when convenient, I will use subscript W and M to denote the values of the parameters for women and men, respectively.

Table 1 describes the parameters and variables used. The details of the construction of the variables are in Appendix B.

Table 1: Parameters and variables

For the empirical estimation of the effects of education on earning, I use the Mincerian returns. As show in the figure below (and in Table 8), the values of θ_W are, in general, equal or larger than the ones of θ_M. The average value of θ_W is 8,09%, of θ_M is 7,23%. The only countries where θ_W is significantly lower than θ_M are Denmark and The Netherlands. To the contrary, relevant (and positive) differences are observed in Ireland (+4,7%), Greece (+2,3%), UK (+2,1%) and Germany (+1,9%).

Figure 1: Mincerian coefficients for 14 European countries, by gender

Average ages of retirement (U_M *and* U_W) and lengths of the expected working life, H, do not vary a lot across genders. In average, H_M is 2 years longer than H_W , except for Finland where U (59 year of age) and H (40 years of work) are the same for men and women, (for the computations, see Appendix B).

Figure 2: Length of the working life, by gender

One of the motivations for the study of private returns by gender is given by the large differences in the gender specific rates of unemployment. Indeed, in all the countries, female rates of unemployment are larger. The only exception is U.K.. If we look at the mean value, the difference is about 3%. In Spain and Greece, the differences increase, respectively, to 10,2% and 7,6%. In other countries (Belgium, Italy and France), they are around 4-5%.

Figure 3: Total rates of unemployment, by gender

The negative (positive) relationship between unemployment (employment) and level of education is widely studied in the economic literature. The figures show that, independently of gender, an increase in the level of education has a positive effect on the probability of employment.

Figure 4: Rates of unemployment, by education levels and by gender

As in de la Fuente, and to allow for an easier comparison of the results, in eqs. (1) and (2), the effect of education on the probability of employment is measured by $\epsilon \equiv \frac{p'}{p_0}$. I follow his procedure in computing this parameter. Evidently, $p(S) = (1 - u(S))$, where $u(S)$ is the rate of unemployment for individuals with a level of education S. OECD (2000) provides the gender-specific rates of unemployment in 1996 by three different level of education. It is then possible to approximate the average increase in probability of employment, $p'(S_0)$.

During the years of schooling, the probability of entering the labour market is, in general, lower. In order to consider how this affects the private return of an individual, de la Fuente computes the probability to be employed while in school using a factor of correction η. I evaluate this factor using the unemployment rates, by gender, of the young population in-education and not–in-education. The data are taken from OECD (2000) and refer to 1998.

I postpone further explanations of the data and of the details of the computations to Appendix B.

The tax system is extremely important in this kind of analysis and it affects the private returns on education in many different ways. Given the focus of this paper and given the basic features of family structure in the European countries considered, I introduce two different types of tax-payers in the analysis. I assume that, while in school, individuals are taxed as single. After school, they are taxed as members of a two working parents- two children family. Consequently, my result are not directly comparable to the ones by de la Fuente (2003). Indeed, in most countries (but Denmark, Portugal and UK), marginal tax rates are different for the two types of tax-payers. In all the countries, the average income tax (τ_0) rates are lower for a family with 2 children than for a single. The data refer to 2000 (OECD (2002)). I use them in the computation of the private returns independently of gender (however, tax rates may be different across gender because the individual incomes of men and women are different, by assumption).

Concerning benefits, the analysis is more complicated. In the model, I consider two different categories of benefits: the first one refers to unemployment. The second kind of benefits are related to maternity and, mostly, gender specific.

Unemployment benefits are computed as the sum of two components. One captures the benefits related to previous net earnings (a), while the second captures benefits that are assumed to be related to average net earnings (b). The net (after tax) replacement rates ($a + b$) are different for different types of family (single, married, couple with 2 children, lone parent with 2 children), so that the values I obtain differ (also for men) from the ones used in de la Fuente.

Table 2: Tax rates and unemployment benefits, by gender
Figure 5: Net replacement rates, by component and by gender

The net replacement rates, showed in the table, vary a lot across countries and are best seen as just an approximation of the actual benefit system. This is confirmed for Belgium. In this country, a more detailed analysis (see, de la Croix and Vanderberghe (2004)) estimates a net replacement rate of 34%. Compared to de la Fuente (66%) and to the value I consider, this is much lower. The absence of comparable data for the 14 UE countries and the complexity of the analysis forced me to use the data from OECD (1999). For the criteria used to assign the values, see Appendix B.

The second kind of benefits I consider in the model is related to maternity. In this case, we must keep into account the position of the individual woman in the labour market. In all the European countries, in order to reconcile women's family-life and work, the law establishes, for a working-woman, the right to leave her job for a period of time for maternity and child-care. A fraction of this period is paid (by the firms or by the public insurance system, this difference is irrelevant for the aim of this paper). I consider the money amounts that women receive during this time (i.e. maternity, childcare and parental leaves due to maternity) as a "benefit" (γ) that they can obtain if they work and have a child. Moreover, for all the women having a child, independently of their position in the labour market, usually the government pays a cash benefits (δ). The child benefit programs, as we can see from the figure, differ dramatically in the 14 countries. These policies have a relevant impact on the labor market. In general, it is shown that the first kind of benefits increase the participation rate for women, while the second one has a negative effect on it, because it increases the opportunity cost of work and, therefore, the reservation wage of women. All my calculations and the source, referred to both kinds of benefits, are explicitly described in Appendix B.

Figure 6: Child benefits, by component

As explained above, the negative relationship between fertility rates and education is an important component of my analysis. The figures show that the (presumed) negative relation is confirmed for most countries, with average fertility rates of 1.56% ,1.28% and 1.09%, respectively, for low, medium and high levels of education.

Figure 7: Fertility rate by education levels in 14 UE countries

To evaluate "if" and "how" this affect the private returns on education of women, I introduce a new variable $q(S)$, defined as the fraction of the (full-time) working life when the representative woman does not have maternal leaves. Then, $(1-q(S))$ is the fraction of her active life which can be spent on maternal leaves (we can think of this as the time immediately before and after the birth of her children). This variable, $q(S)$, is an increasing function of S and equal to:

$$q(S) = \left(1 - \frac{c}{w}(S)\frac{d}{H}\right)$$

where the fertility rate $\frac{c}{w}(S)$ (c is the number of children, w is the number of women in fertility age) is a decreasing function of schooling. I multiply the average number of children per woman by the fraction of working life a woman can spend caring (full time) for each child to measure the time women spend off-work in average in each country for maternity-related reasons.

The marginal effect of education on fertility is captured by the parameter $\xi = \frac{q'}{q_0}$. To estimate it, I use the same methodology used to estimate the sensitivity of the probability of employment (see Appendix B). The most recent and comparable data I found to compute it are in U.N.C.E (different years) and refer to women aged 20-49 (for some countries the age groups are different, see Table 14). For Denmark and UK, these data are unavailable and I use a different source which provides fertility rates by education in 1979 (Jones (1982)). Considering the European countries (Finland, France, Italy and Spain) for which fertility rates by education are available from both sources, one can see that they decreased of about 33% during the last two decades. To keep into account the general tendency of fertility rates to decrease during this period, I weight the value of 1979 by 2/3 in order to correct the original estimates. For Ireland, I simply assume the same value as of UK.

Table 3: Fertility rates, by education levels, and their sensitivity to education

Direct private education costs are determined as above. Following de la Fuente, I define the direct private costs of schooling μ_s as a fraction of APW gross earnings. It's computed as the weighted average of secondary and tertiary levels by 2/3 and 1/3 respectively. The costs are net of direct public subsidies to student and, therefore, μ_s has a negative value when these subsidies exceed tuition and other direct costs. For men, I use the data from de la Fuente (2003). For women, given that female average earnings are estimated at 67%APW, the parameter defining direct private costs of education as a fraction of the female earning is $1.5\mu_s$, so that the actual monetary costs are the same.

Figure 8: Direct private costs of schooling, by gender

Table 4: Direct private costs of schooling, by gender

4 Comparing private returns

My aim is to estimate and compare the private returns on education of men and women. Once I have obtained the values of the right-hand sides of equations (1) and (2), the values of r_W and r_M can be estimated (by numerical methods).

Figure 9 shows my estimates of r_W and r_M for the fourteen European countries.

Figure 9: Private rates of return on education in UE, by gender

We can immediately see that for most (to be precise, 10 out of 14) of the countries, r_W is larger than r_M.

For men, private returns range, for most countries, between 6,5% and 11%, with an average of 8,71%. The minimum value, 5,53%, is in Sweden, while the estimated values exceed 12% in Portugal and UK and are over 10% in France and Ireland.

Let's first focus on men.

Table 5: Private rates of return on education, by component, men

The table displays the numerical values of the rates of return for men and the four components of costs and benefits. To interpret the table, remember that

$$(1) \qquad \frac{R_M}{1-e^{-R_M H_M}} = \frac{\theta\left[\frac{p_0+(1-p_0)a}{p_0+(1-p_0)(a+b)}\right]\left[\frac{1-T'}{1-\tau_0}\right]+\epsilon\left[\frac{(1-a-b)p_0}{p_0+(1-p_0)(a+b)}\right]}{\left[1-\frac{1-\tau_s}{1-\tau_0}\frac{(1-\phi)\eta p_0}{p_0+(1-p_0)(a+b)}\right]+\left[\frac{\mu_s}{(p_0+(1-p_0)(a+b))(1-\tau_0)}\right]}$$

The numerator represents the marginal gain due to an increase in schooling, while the denominator measures the marginal net costs.

In general, the key component of marginal costs are opportunity costs. Just in two countries (France and Spain) direct cost exceeds 2% of instantaneous net earnings. Given that a negative value of direct costs implies government subsidies in excess of private costs, in some countries, like Denmark and Sweden, subsidies are particularly generous. On the other hand, opportunity costs are (at the margin) always above 74% of net earnings.

Similarly, if we consider the composition of the numerator, we can say that the main component of the payoffs depends on the coefficient of the Mincerian equation, rather that on the effects of education on the probability of employment.

Let's now consider women. For most of the countries, the private returns of women lie between 7% and 12%, with an average of 9,50%. They are much lower than the average in Sweden (5,70%) and in Netherlands (5,36%). For Ireland, Portugal and UK, the rates are much higher than the average: 15,55%, 12,44% and 13,85%, respectively.

Table 6: Private rate of returns on education, by component, women

Remember the equation determining the rates of return for women,

$$(2) \qquad \frac{R_W}{1-e^{-R_W H_W}} =$$

$$\frac{\theta\left[\frac{1-T'}{1-\tau_0}\right]\left[\frac{p_0(q_0+(1-q_0)\gamma)+(1-p_0)a}{k_0}\right]+\epsilon\left[\frac{(q_0+(1-q_0)\gamma-(a+b))p_0}{k_0}\right]+\xi\left[\frac{(p_0(1-\gamma)-\delta)q_0}{k_0}\right]}{\left[1-\frac{1-\tau_s}{1-\tau_0}\frac{\eta p_0(1-\phi)}{k_0}\right]+\left[\frac{1.5\mu_s}{k_0}\frac{1}{1-\tau_0}\right]}$$

where $k_0 = p_0\left(q_0 + (1-q_0)\gamma\right) + (1-p_0)(a+b) + (1-q_0)\delta$.

Its interpretation does not differ substantially from the one of the equation for men as explained in section 2. As in the case of men, by large, the most important component of costs are opportunity costs (even if, due to the lower net earnings, direct costs are somewhat more relevant).

Here, the variables affecting marginal benefits (i.e., the numerator) are three rather than two: θ measures the effect that an increase in education has on the earning function $f(S)$, ϵ captures the effect of the increase in education on the probability of employment, while the new variable ξ measures the change of the fertility rate induced by an increase in the level of education. Comparing the weights of the components of the numerator, we can observe that the effects of ϵ and ξ are quite low. The most important component of the numerator is, as before, related to the coefficient of the Mincerian equation. This is made clear in the next table.

Table 7: Contributions of Mincerian, employment and fertility effects of education to R_W

The three columns report the part of R_W which is due to the effects of education on earnings (Mincerian effect), on the probability of employment and on fertility (for instance, the first column is obtained from table 6, as $(\theta \times (weight\ of\ \theta)/NUM)\, R_W)$.

The effects of education on probability of employment and fertility together contributes at most 0.6% to the value of R_W. The values of the effects vary a lot across countries, depending also on the policy parameters. While usually smaller, the fertility effect is of the same order as the employment effect.

To understand what is the effect of both kinds of child benefits on the private returns, I numerically compute the elasticities of R_W with respect to γ and δ, E_γ and E_δ, for the 14 countries. As shown in table 6, in all the countries, the numerical values of the elasticities of R_W with respect to γ and δ, E_γ and E_δ, for the 14 countries are negative but not so high. Hence, an increase in both δ and γ from the government implies a weak decrease in women's private returns.

5 Conclusion

My aim was to compare the returns to education of men and women.

My results confirm that education is an important determinant of individual earning for both genders. Somewhat surprisingly, in most countries, women returns are higher than male returns. The key fact explaining this difference is that the coefficients of the Mincerian equations used in this paper are larger for women. This more than compensates the negative effects on women rates of return caused by their higher rates of unemployment and by the effects of maternity related leaves (always paid less than the full wage).

I also estimate the effects on the female rates of returns of the policy parameters related to maternity.

As mentioned in the introduction, my estimates are best seen as an upper bound on the actual values of the returns. This is because of several reasons, related both to the structure of the model and to the values of the parameters used in the paper.

With respect to the second issue, I used OCDE (1999) estimates of replacement rates for unemployed individuals. As mentioned above, independent estimates for Belgium (de la Croix and Vanderberghe (2004)) suggest that, for this country, actual replacement rates are substantially lower. Given that unemployment rates for women are higher, overestimates of replacement rates would have a larger effect on the values of r_W than on the ones of r_M. Also, in my estimates I ignore the time-dependence of maternity and unemployment benefits and this probably induces a larger overestimate for women.

Also, I impute only to women the share of maternity benefits which are not employment related (measured above by δ). Given that these benefits are given to families and not just to women members of the labor force, the way I treated them could have caused some additional overestimate of female returns as compared to men returns.

There are two additional possible sources of overestimate of the differences in the gender specific rates of return. As in de la Fuente (2003), I consider expected lifetime returns. Given that women's rates of unemployment are higher than men's ones, female incomes are probably more variable over time. This has no effect on my estimate of R, but could have important effects on actual well-being of (risk-averse) individuals.

Finally, I do not take into account that the rates of participation to the labor force are much lower for women, because I consider the profile of earning of an individual retiring at the average age.

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7 Appendix A: Derivation of equations (2), (3), and (4)

For convenience, in this appendix, I will omit the subscript W.

The point of departure is given by the first order condition of the optimization problem of the representative female agent:

$$(A.1)\quad \frac{\partial V(S)}{\partial S}|_{S_0} = \frac{\partial I(S)}{\partial S}|_{S_0} - \frac{\partial C(S)}{\partial S}|_{S_0} + \frac{\partial J(S)}{\partial S}|_{S_0} = 0.$$

Define

$$\begin{aligned} k(S) \;\equiv\;& q(S)\left\{ \begin{array}{c} p(S)\left[f(S) - T(f(S))\right] + \\ (1-p(S))\left[\begin{array}{c} a\left(f(S) - T(f(S))\right) + \\ b\left(f(S_0) - T(f(S_0))\right) \end{array} \right] \end{array} \right\} + \\ & (1-q(S))\left\{ \begin{array}{c} p(S)\left[\begin{array}{c} \gamma\left(f(S) - T(f(S))\right) + \\ \delta\left(f(S_0) - T(f(S_0))\right) \end{array} \right] \\ +(1-p(S))\left[\begin{array}{c} a\left(f(S) - T(f(S))\right) + \\ b\left(f(S_0) - T(f(S_0))\right) + \\ \delta\left(f(S_0) - T(f(S_0))\right) \end{array} \right] \end{array} \right\}. \end{aligned}$$

Then,

$$\frac{\partial I(S)}{\partial S}|_{S_0} = -\left[k(S_0)A_0 e^{-RS_0}\right] + \frac{\partial k(S)}{\partial S}|_{S_0} A_0 \frac{\left[e^{-RU} - e^{-RS_0}\right]}{-R}$$

where, setting $q_0 = q(S_0)$ and $q' \equiv \frac{\partial q(S)}{\partial S}|_{S_0}$,

$$\begin{aligned} \frac{\partial k(S)}{\partial S}|_{S_0} \;=\;& q^{'}\left\{ \begin{array}{c} \left[(p_0 + (1-p_0)(a+b)\right] - \\ \left[p_0(\gamma+\delta) + (1-p_0)(a+b+\delta)\right] \end{array} \right\}\left(f(S_0) - T(f(S_0))\right) + \\ & p^{'}\left\{ \begin{array}{c} q_0\left[1-(a+b)\right] + \\ (1-q_0)\left[(\gamma+\delta) - (a+b+\delta)\right] \end{array} \right\}\left(f(S_0) - T(f(S_0))\right) + \\ & q_0\left(p_0 + (1-p_0)a\right)\left(f^{'}(S_0) - T^{'}(f(S_0))\, f^{'}((S_0))\right). \end{aligned}$$

Moreover,

$$\frac{\partial J(S)}{\partial S}|_{S_0} = \left[\eta p_0\left[(1-\phi)f(S_0) - T((1-\phi)f(S_0))\right]A_0 e^{-RS_0}\right]$$

and

$$\frac{\partial C(S)}{\partial S}|_{S_0} = \left[1.5\mu_S f(S_0)A_0 e^{-RS_0}\right].$$

Dividing (A.1) by $A_0 e^{-RS_0}$ and rearranging terms, I obtain

$$\begin{aligned} (A.2)\quad \frac{R}{1-e^{-RH}} \;=\;& \frac{\frac{\partial k(S)}{\partial S}|_{S_0}}{k(S_0) + 1.5\mu_s f(S_0) - \eta p_0\left[(1-\phi)f(S_0) - T((1-\phi)f(S_0))\right]} \\ \equiv\;& \frac{NUM}{DENOM}. \end{aligned}$$

Simplifying and collecting terms, I can rewrite NUM and DENOM in (A.2) as follows:

$$\begin{aligned} NUM &\equiv \left\{ \frac{q^{'}}{q_0} \left[p_0 \left(1-\gamma\right) - \delta \right] q_0 + \frac{p^{'}}{p_0} \left[q_0 \left(1-\gamma\right) + \gamma - (a+b) \right] p_0 \right\} \left(f\left(S_0\right) - T\left(f\left(S_0\right)\right) \right) \\ &\quad + \left[q_0 + (1-q_0)\gamma + (1-p_0)\, a \right] \left(f^{'}\left(S_0\right) - T^{'}\left(f\left(S_0\right)\right) f^{'}\left(S_0\right) \right) \end{aligned}$$

and

$$\begin{aligned} DENOM &\equiv -\eta p_0 \left[(1-\phi) f\left(S_0\right) - T\left((1-\phi) f\left(S_0\right)\right) \right] + \mu_0 f\left(S_0\right) + \\ &\quad \left\{ q_0 \left[p_0 \left(1-\gamma\right) \right] + p\gamma + (1-p_0)(a+b) + (1-q_0)\delta \right\} \left(f\left(S_0\right) - T\left(f\left(S_0\right)\right) \right). \end{aligned}$$

Dividing both terms by $k(S_0) \equiv k_0$, and observing that

$$\frac{f^{'}\left(S_0\right) - T^{'}\left(f\left(S_0\right)\right) f^{'}\left(S_0\right)}{f\left(S_0\right) - T\left(f\left(S_0\right)\right)} = \frac{f^{'}\left(S_0\right)}{f\left(S_0\right)} \frac{1 - \frac{T^{'}(f(S_0))}{f^{'}(S_0)}}{1 - \frac{T(f(S_0))}{T(f(S_0))}} \equiv \theta \frac{1-T'}{1-\tau_0},$$

$$\frac{(1-\phi) f\left(S_0\right) - T\left((1-\phi) f\left(S_0\right)\right)}{f\left(S_0\right) - T\left(f\left(S_0\right)\right)} = (1-\phi) \frac{1 - \frac{T((1-\phi) f(S_0))}{(1-\phi) f(S_0)}}{1 - \frac{T(f(S_0))}{f(S_0)}} \equiv (1-\phi) \frac{1-\tau_s}{1-\tau_0},$$

and

$$\frac{f(S_0)}{f\left(S_0\right) - T\left(f\left(S_0\right)\right)} = \frac{1}{1-\tau_0},$$

I obtain

$$(2) \quad \frac{R}{1-e^{-RH}} =$$

$$\frac{\theta \left[\frac{1-T'}{1-\tau_0}\right] \left[\frac{p_0(q_0+(1-q_0)\gamma)+(1-p_0)a}{k_0}\right] + \epsilon \left[\frac{(q_0+(1-q_0)\gamma-(a+b))p_0}{k_0}\right] + \xi \left[\frac{(p_0(1-\gamma)-\delta)q_0}{k_0}\right]}{1 - \left(\frac{1-\tau_s}{1-\tau_0}\right) \left[\frac{\eta p_0(1-\phi)}{k_0}\right] + \left[\frac{1.5\mu_s}{k_0}\right]}.$$

Now, let me compute the effects of changes in the policy parameters (γ, δ) on the rate of return R. Let

$$F(R) \equiv \frac{R}{1-e^{-RH}}$$

and

$$G(\gamma, \delta) \equiv \frac{NUM}{DENOM}.$$

Rewrite (2) as

$$F(R) - G\left(\gamma, \delta\right) = 0$$

By the implicit function theorem,

$$\frac{\partial R}{\partial \gamma} = -\frac{-\frac{\partial G(.)}{\partial \gamma}}{\frac{\partial F(R)}{\partial R}} \quad and \quad \frac{\partial R}{\partial \delta} = -\frac{-\frac{\partial G(.)}{\partial \delta}}{\frac{\partial F(R)}{\partial R}}.$$

Clearly,

$$\frac{\partial F(R)}{\partial R} = \frac{1-(1+RH)e^{-RH}}{(1-e^{-RH})^2} \geq 0,$$

because its numerator is equal to 0 when $R = 0$ and it is easily checked to be an increasing function of R (clearly, the denominator is always non-negative).

On the other hand, by direct computation

$$\begin{aligned}\frac{\partial G(.)}{\partial \gamma} &= -p_0 \frac{\left[q' - (1-q_0)\left(\epsilon + \theta\frac{1-T'}{1-\tau_0}\right)\right] DENOM + (1-q_0)NUM}{DENOM^2} \\ &= -p_0 \frac{q' - (1-q_0)\left(\epsilon + \theta\frac{1-T'}{1-\tau_0} - G(\gamma,\delta)\right)}{DENOM^2}\end{aligned}$$

and

$$\begin{aligned}\frac{\partial G(.)}{\partial \delta} &= -\frac{q' DENOM + (1-q_0)NUM}{DENOM^2} \\ &= -\frac{q' + (1-q_0)G(.)}{DENOM^2}\end{aligned}$$

where

$$\frac{DENOM}{f(S_0) - T(f(S_0))} = k_0 - \left(\frac{1-\tau_s}{1-\tau_0}\right)\eta p_0(1-\phi) + 1.5\mu_s.$$

8 Appendix B: Definition and sources of data

8.1 Mincerian wage equation

The instruments that I use to evaluate the effects on earning of one additional year of schooling (θ_M *and* θ_W) are the microeconomic Mincerian wage equations. They measure the average log increase in gross wages, before income taxes and employee social security contributions. In order to assign a value to θ for 1995, I use the results in Harmon, Walker and Westergaard-Nielsen (2001). They analyze, for both men and women, the evolution in time of the Mincer equations for most of the European countries using an OLS model. I use their values for all countries, except for Belgium. For this country, the only available estimate of the Mincer parameters is in de la Croix and Vanderberghe (2004).

Table 8: Mincerian coefficients θ, by gender

8.2 Age of retirement and working life

To compute the expected length of the working life for men and women in each county (H_M and H_W), I subtract from the average ages of retirement (U_M and U_W) the maximum values between the average years of schooling (S_{0M} and S_{0W}) plus six (the age when an individual start schooling) and 14, the minimal legal age for entering the labour market.

For the average ages of retirement, I use the values estimated, for 1995, in Blondal and Scarpetta (1999). The paper provides data for both men and women.

The average years of schooling refer to 2002 and are taken from OECD (2002).

Figure 10: Average age of retirement in 14 European countries, by gender

Table 9: Data used to compute the length of the working life

8.3 Probability of employment

The probability to be employed, conditional on participation in the labour force, $p(S)$, is calculated as $(1 - u(S))$, where $u(S)$ is the rate of unemployment. This probability typically changes with the level of education. The data on total and by education rates of unemployment for men and women refer to the population between 25 and 64 years of age in 1996 (OECD(2000)).

First, I consider the marginal increment of the probability for each level of education divided by the cumulate years of schooling associated with the attainment levels $S_{(n)}$ (see, de la Fuente and Domemech (2002)), using the following equation for $n = 1, 2$:

$$d_{(n)} = \frac{p_{(n+1)} - p_{(n)}}{S_{(n+1)} - S_{(n)}}$$

where 1 denotes below upper secondary education, 2 upper secondary education and 3 tertiary education. Then, I compute $p'(S)$ as the weighted average of the two increments with weighs of 2/3 for $d_{(1)}$ and 1/3 for $d_{(2)}$. Finally, ϵ is obtained as $\frac{2}{3}\frac{p'(S)}{p(S)}$. The correction factor, 2/3, is used to capture the fact that the probability of employment depends on many other factors, different from education.

Table 10: Data used to compute the sensitivity to education of the probability of employment , by gender

To calculate the correction factor η, I use the data on education and work status for men and women reported in OECD (2000). This study refers to individuals in the 20-24 age group in 1998. For both sexes, η is obtain dividing the probabilities of employment of young people in school by the employment probabilities of young people out of school. When the obtained value is larger than 1, I assign the value 1. Since data for Austria and Ireland are not available I assign to these countries the values obtained for Germany and UK, respectively.

Table 11: Data used to compute η

8.4 Taxes and unemployment benefits

Average (τ_0) and marginal taxes (T'), refer to a married couple with two children (4-12 years of age) and are taken from OECD (2002), assuming that men earn 100% of APW and women 67% of APW. I use the same source of de la Fuente to make easier the comparison between the tax rates for the two different levels of income and types of households. To evaluate the marginal tax for students (τ_s), I use the data from de la Fuente (2003). Bear in mind that OECD data define the marginal tax rate as the rate applied to an increase in the income of the main earner, here, by assumption, the husband. Evidently, the actual marginal tax rates on women's wage may be lower (because we are assuming that their wages are lower). This may induce an underestimation of the actual returns to education for women.

Unemployment benefits vary a lot across the EU countries considered. In some, there are only benefits proportional to previous earning (PW, this implies that $b = 0$), in other countries they are fixed (FR, $a = 0$) and in some others they are mixed: part of the unemployed have a fix subsidy, while the remaining part of population has benefits related to the previous earning (MIX, $a \neq 0, b \neq 0$). To determine the appropriate values of a and b, I assume that the percentages of people in the various groups discussed above are the same as estimated by de la Fuente. Hence, I assume that the distribution is gender-independent. The values of a and b for men and women are different because of the assumption of different earnings as a percentage of APW. Table 12 describes how I compute the values of a and b, by gender.

Table 12: Derivation of unemployment benefits, by gender

8.5 Maternity, parental and childcare leaves and child cash benefits

The benefits related to maternity include two different components. The first one (γ) is assigned only to employed women. I measure it as a % of the previous earnings and I compute this variable dividing the paid maternity, childcare and parental leaves (I do not include leaves reserved to the father) in years by the (max) total number of years that they can have, by law, as paid and unpaid leaves. I report in Table 13 the variables used for the computation, that refer to 1999 (Jaumotte (2003)).

The amount of cash benefits (δ) refers to 2000 (OECD (2002)) and to a representative family with two children (the case of twins is excluded). In most of the UE countries there is a fix transfer for each child and the amount does not change with previous earning. The exception is Italy, where it decreases with earning. To fit in the model, the monetary amount is converted into a percentage of the average earnings of women population in each countries.

Table 13: Cash transfers and derivation of childcare benefits

8.6 Sensitivity of fertility to education

The marginal effect of education on fertility affects the parameter $\xi = \frac{q'}{q_0}$, where $q\prime$ is the increment of $q(S)$ due to an increase in schooling (hence, in general, to a decrease in fertility). I use the data of total and by education fertility rates and I follow the same methodology used to approximate the sensitivity of probability of employment (ϵ).

First, I consider the marginal increase of the fertility rate for each level of education divided by the cumulate years of schooling associated with the attainment levels $S_{(n)}$ using the following equation for $n = 1, 2$:

$$c_{(n)} = \frac{q_{(n+1)} - q_{(n)}}{S_{(n+1)} - S_{(n)}}$$

where 1 denotes below upper secondary education, 2 upper secondary education and 3 tertiary education. Then, I compute $q'(S)$ as the weighted average of the two increments with weighs of 2/3 for $c_{(1)}$ and 1/3 for $c_{(2)}$. Finally, ξ is obtained as $\frac{2}{3}\frac{q'(S)}{q(S)}$. The correction factor, 2/3, is used to capture the fact that the fertility rate depends on many other factors, different from education.

Table 14: Data used to compute the sensitivity of fertility to education,ξ

9 Tables and figures

Table 1: Parameters and variables used to compute of private rates of return to schooling, by gender

	Parameters
g=	1,5%, rate of exogenous productivity growth
φ=	0,8 is the fraction of time taken up by full-time school attendance
$1-\varphi$=	0,2 is the potential labour supply of students
	Variables
U_M=	average retirement age in 1995, for men
U_W=	average retirement age in 1995, for women
S_{0M}=	average years of schooling of men in 2002
S_{0W}=	average years of schooling of women in 2002
H_M=	U-Max (S_{0M}+6, 14)= estimated length of the working life of men
H_W=	U-Max (S_{0W}+6, 14)= estimated length of the working life of women
θ_M=	microeconomic Mincerian returns to schooling for men in 1995. It measures the average increase in gross wage due to an additional year of schooling
θ_W=	microeconomic Mincerian returns to schooling for women in 1995
μ_s=	direct private (net) costs of scholing for men, measured as a fraction of APW gross earning
$1.5\mu_s$=	direct private (net) costs of scholing for women, measured as a fraction of APW gross earning
p_{0M}=	probability of employment after school for men, conditional on participation in the labour force
p_{0W}=	probability of employment after school for women, conditional on participation in the labour force
p_{SM}=	$\eta_M p_{0M}$= probability of employment for a students (men), conditional on participation in the labour force
p_{SW}=	$\eta_W p_{0W}$= probability of employment for a students (women), conditional on participation in the labour force
η_M=	correction factor for students, calculated as the ratio between the probability of employment of young (men) active population in education and not in education
η_W=	correction factor for students, calculated as the ratio between the probability of employment of young (women) active population in education and not in education
e_M=	Captures the effect of the increase in education on the probability of employment, for men
e_W=	Captures the effect of the increase in education on the probability of employment, for women
τ_0=	average tax rate
τ_S=	average tax rate applied to a worker earning 20% of APW
T'=	marginal tax rate
a_M=	component of net remplacement rate of men linked to previus earnings
a_W=	component of net remplacement rate of women linked to previus earnings
b_M=	component of net remplacement rate of men not linked to previus earnings
b_W=	component of net remplacement rate of women not linked to previus earnings
γ=	maternity, childcare and parential leave benefits for women as a % of previus earning
δ=	Childacare related cash benefits from government
q_0=	1-c/w*d/H= fraction of the (full-time) working life when the representative woman does not have maternal leaves, (1- q_0) is the fraction of her active life which can be spent on maternal leaves
c/w=	fertility rate of women, a decreasing function of education
ξ=	measures the change of the fertility rate of women induced by an increase in the level of education

Table 2: Tax rates and unemployment benefits, by gender

Country	Tax rates[1] Average			Unemployment benefits[2] MEN		Women	
	Average	Student	Marginal	MEN		Women	
	τ_o	T_s[3]	T'	a_M	b_M	a_W	a_W
AUSTRIA	25,30%	18,20%	42,90%	73%	0	79%	0
BELGIUM	39,00%	13,07%	55,90%	0	60%	0%	75%
DENMARK	42,80%	20,04%	50,70%	0	77%	0%	95%
FINLAND	31,10%	23,20%	48,00%	43%	41%	49%	45%
FRANCE	22,90%	18,01%	25,80%	74%	0	86%	0
GERMANY	32,60%	20,50%	54,80%	73%	1%	73%	1%
GREECE	17,40%	15,90%	28,50%	46%	0	48%	0
IRELAND	16,40%	2,00%	28,50%	0	62%	0%	73%
ITALY	25,50%	9,19%	40,40%	51%	3%	49%	3%
NETHERLANDS	34,20%	10,52%	53,10%	80%	5%	86%	4%
PORTUGAL	15,20%	11,00%	25,00%	77%	0	86%	0
SPAIN	13,70%	6,35%	28,80%	74%	0	78%	0
SWEDEN	32,00%	24,21%	35,20%	0	84%	0%	90%
UK	21,90%	0,00%	32,00%	0	64%	0%	83%
AVERAGE Coun.	26,43%	13,73%	39,26%	42%	28%	45%	33%

1. Source OECD (2002).
2. Source OECD (1999).
3. de la Fuente (2003).

Table 3: Fertility rates, by education levels, and their sensitivity to education

Country	Age group	Total fertility rate by education Low	Medium	High	Sensitivity ξ
AUSTRIA	20-39	1,10	1,10	1,10	0.0000
BELGIUM	21-39	1,39	1,08	1,09	0,0013
DENMARK*	25-49	1,47	1,47	1,24	0,0021
FINLAND	25-49	1,97	1,64	1,35	0,0016
FRANCE	20-49	1,88	1,38	1,10	0,0077
GERMANY	20-39	1,25	1,05	1,07	0,0025
GREECE	20-49	1,87	1,37	1,01	0,0012
IRELAND*	25-49	1,43	1,43	1,18	0,0002
ITALY	20-49	1,52	1,07	0,88	0,0015
NETHERLANDS	20-42	1,38	1,17	0,76	0,0010
PORTUGAL	20-49	1,71	1,07	1,11	0,0037
SPAIN	20-49	1,65	1,16	1	0,0050
SWEDEN	20-49	1,80	1,46	1,26	0,0025
UK*	25-49	1,43	1,43	1,18	0,0001
AVERAGE Coun.		1,56	1,28	1,09	0,0022

Source: U.N.C.E..
*Jones (1982).

Table 4: Direct private costs of schooling, by gender

Country	Direct private costs	
	Men	Women*
AUSTRIA	-1,40%	-2,10%
BELGIUM	0,32%	0,48%
DENMARK	-4,44%	-6,66%
FINLAND	-1,84%	-2,76%
FRANCE	1,94%	2,91%
GERMANY	0,00%	0,00%
GREECE	0,98%	1,47%
IRELAND	0,73%	1,09%
ITALY	0,74%	1,11%
NETHERLANDS	-1,34%	-2,01%
PORTUGAL	-0,33%	-0,49%
SPAIN	4,05%	6,07%
SWEDEN	-5,80%	-7,62%
UK	0,94%	1,41%
AVERAGE Coun.	-0,39%	-0,51%

Source: de la Fuente (2003).
*Multiplay by 1.5.

Table 5: Private rates of return on education, by components, men

Country	r_M(%)	R_M (%)	DENOM	Opp. costs	Direct costs
AUSTRIA	8,02	6,52	0,7681	0,7870	-0,0189
BELGIUM	6,43	4,93	0,7651	0,7597	0,0054
DENMARK	9,27	7,77	0,6751	0,7539	-0,0789
FINLAND	8,51	7,01	0,8379	0,8653	-0,0274
FRANCE	10,29	8,79	0,8279	0,8021	0,0258
GERMANY	8,29	6,79	0,7784	0,7784	0
GREECE	7,34	5,84	0,8660	0,8538	0,0122
IRELAND	11,29	9,79	0,7903	0,7811	0,0091
ITALY	6,62	5,12	0,8895	0,8792	0,0102
NETHERLANDS	7,13	5,63	0,7232	0,7437	-0,0248
PORTUGAL	12,12	10,62	0,8082	0,8122	-0,0039
SPAIN	7,88	6,38	0,9098	0,8611	0,0487
SWEDEN	5,53	4,03	0,7645	0,8510	-0,0866
UK	12,06	1,06	0,7703	0,7579	0,0124
AVERAGE Coun.	8,71	7,21	0,8057	0,8089	-0,0054
	NUM	Є	weight Є	θ	weigh θ
AUSTRIA	0,0538	0,004035	0,2626	0,069	0,7644
BELGIUM	0,0437	0,010728	0,3841	0,057	0,6942
DENMARK	0,0544	0,009789	0,2189	0,064	0,8161
FINLAND	0,0623	0,011388	0,1390	0,086	0,7063
FRANCE	0,0746	0,010140	0,2419	0,075	0,9629
GERMANY	0,0564	0,014137	0,2443	0,079	0,6701
GREECE	0,0544	-0,000245	0,5282	0,063	0,8656
IRELAND	0,0783	0,018303	0,3546	0,090	0,7981
ITALY	0,0506	0,002493	0,4442	0,062	0,7985
NETHERLANDS	0,0457	0,006375	0,1452	0,063	0,7114
PORTUGAL	0,0862	0,001860	0,2205	0,097	0,8844
SPAIN	0,0615	0,009115	0,2319	0,072	0,8250
SWEDEN	0,0368	0,005049	0,1475	0,041	0,8786
UK	0,0824	0,014851	0,3404	0,094	0,8232
AVERAGE Coun.	0,0607	0,00843	0,2829	0,072	0,8068

Table 6: Private rates of return on education, by components, women

Country	rw%	R_w %	DENOM	Direct costs	Opp. costs	NUM
AUSTRIA	7,64	6,14	0,7563	-0,0288	0,7851	0,0509
BELGIUM	6,64	5,14	0,7778	0,0082	0,7696	0,0470
DENMARK	6,88	5,38	0,6402	-0,1175	0,7577	0,0390
FINLAND	8,30	6,80	0,8249	-0,0430	0,8679	0,0599
FRANCE	10,92	9,42	0,8409	0,0405	0,8004	0,0808
GERMANY	10,16	8,66	0,7649	0.0000	0,7649	0,0685
GREECE	9,92	8,42	0,8764	0,0190	0,8572	0,0757
IRELAND	15,55	14,05	0,7933	0,0137	0,7857	0,1126
ITALY	7,95	6,45	0,9389	0,0160	0,9230	0,0649
NETHERLANDS	5.36	3,86	0,7220	-0,0310	0,7530	0,0371
PORTUGAL	12,44	10,94	0,8025	-0,0063	0,8088	0,0883
SPAIN	9,03	7,53	0,9525	0,0794	0,8731	0,0747
SWEDEN	5,70	4,20	0,6936	-0,1320	0,8256	0,0347
UK	13,85	12,35	0,7753	0,0185	0,7568	0,0964
AVERAGE Coun.	9,50	8,00	0,8038	-0,0084	0,8122	0,0681

	Є	Weight Є	ξ	Weight ξ	θ	Weight θ	E_Y	$E_δ$
AUSTRIA	0,003406	0,1736	0.0000	0,2446	0,067	0,7514	- 0.0082	- 0.0301
BELGIUM	0,019656	0,2061	0,0013	0,3256	0,065	0,6541	- 0.0204	- 0.0252
DENMARK	0,009614	0,0364	0,0021	0,0975	0,049	0,7839	- 0.0859	- 0.0211
FINLAND	0,018491	-0,0305	0,0016	0,3863	0,088	0,6804	- 0.0022	- 0.0380
FRANCE	0,015531	0,0659	0,0077	0,3649	0,081	0,9505	- 0.0589	- 0.0290
GERMANY	0,006163	0,1837	0,0025	0,6870	0,098	0,6691	- 0.0198	- 0.0193*
GREECE	0,000863	0,4816	0,0012	0,6751	0,086	0,8656	- 0.0076	- 0.0043*
IRELAND	0,020719	0,2374	0,0002	0,5125	0,137	0,7856	- 0.0012	- 0.0025
ITALY	0,006538	0,4392	0,0015	0,4709	0,077	0,7963	- 0.0184	- 0.0021
NETHERLANDS	0,007332	0,0849	0,0010	0,3233	0,051	0,7093	- 0.0448	- 0.0130
PORTUGAL	0,001651	0,0793	0,0037	0,7197	0,097	0,8795	- 0.0111	- 0.0121
SPAIN	0,016061	0,1205	0,0050	0,7023	0,084	0,8250	- 0.0075	- 0.0180*
SWEDEN	0,010019	0,0624	0,0025	0,3419	0,038	0,8743	- 0.0734	- 0.0407
UK	0,006739	0,1472	0,0001	0,5957	0,115	0,8286	- 0.0017	- 0.0038
AVERAGE Coun.	0,010413	0,1712	0,0022	0,4597	0,080	0,7905	- 0.0206	- 0.0133

*This is the derivative. $E_δ$ is 0 because δ=0.

Table 7: Contribution of the Mincerian, employment and fertility effects to R_W

Country	Minceriam effect	Employment effect	Fertility effect	R_w
AUSTRIA	0.06067	0,00071	0.00000	0.06138
BELGIUM	0.04650	0.00443	0.00046	0.05139
DENMARK	0.05302	0.00048	0.00028	0.53278
FINLAND	0.06794	-0.00064	0.00071	0.06801
FRANCE	0.08974	0.00119	0.00336	0.09419
GERMANY	0.08297	0.00143	0.00217	0.08657
GREECE	0.08286	0.00046	0.00092	0.08424
IRELAND	0.13424	0.00614	0.00012	0.14050
ITALY	0.06096	0.00285	0.00070	0.06451
NETHERLANDS	0.03763	0.00065	0.00035	0.03863
PORTUGAL	0.10566	0.00046	0.00331	0.10943
SPAIN	0.06982	0.00195	0.00353	0.07530
SWEDEN	0.04018	0.00076	0.00102	0.04196
UK	0.12213	0.00127	0.00011	0.12351
AVERAGE coun.	0.07668	0.00213	0.00119	0.08000

Table 8: Mincerian coefficients, by gender

Country	Mincerian	
	Θ_M	Θ_w
AUSTRIA	0,069	0,067
BELGIUM*	0,057	0,065
DENMARK	0,064	0,049
FINLAND	0,086	0,088
FRANCE	0,075	0,081
GERMANY	0,079	0,098
GREECE	0,063	0,086
IRELAND	0,090	0,137
ITALY	0,062	0,077
NETHERLANDS	0,063	0,051
PORTUGAL	0,097	0,097
SPAIN	0,072	0,084
SWEDEN	0,041	0,038
UK	0,094	0,115
AVERAGE Coun.	0,072286	0,080929

Source: Harmon, Walker and Westergaard-Nielsen (2001).
*Data from de la Croix and Vanderberghe (2004).

Table 9: Data used to compute the length of the working life

			Men		
Country	U_M[1]	S_{0M}[2]	$S_{0M}+6$	$\text{Max}(S_{0M}+6,14)$	H_M
AUSTRIA	58,6	11,5	17,5	17,5	41,1
BELGIUM	57,6	11,2	17,2	17,2	40,4
DENMARK	62,7	13,3	19,3	19,3	43,4
FINLAND	59	12,3	18,3	18,3	40,7
FRANCE	59,2	11	17	17	42,2
GERMANY	60,5	13,6	19,6	19,6	40,9
GREECE	62,3	10,7	16,7	16,7	45,6
IRELAND	63,4	12,6	18,6	18,6	44,8
ITALY	60,6	9,6	15,6	15,6	45
NETHERLANDS	58,8	13,7	19,7	19,7	39,1
PORTUGAL	63,6	7,9	13,9	14	49,6
SPAIN	61,4	10,4	16,4	16,4	45
SWEDEN	63,3	12,2	18,2	18,2	45,1
UK	62,7	12,7	18,7	18,7	44
AVERAGE Coun.	60,9	11,6			43,4
			Women		
	U_W[1]	S_{0W}[2]	$S_{0W}+6$	$\text{Max}(S_{0W}+6,14)$	H_W
AUSTRIA	56,5	11	17	17	39,5
BELGIUM	54,1	11,1	17,1	17,1	37
DENMARK	59,4	13,4	19,4	19,4	40
FINLAND	58,9	12,5	18,5	18,5	40,4
FRANCE	58,3	10,7	16,7	16,7	41,6
GERMANY	58,4	13,1	19,1	19,1	39,3
GREECE	60,3	10,3	16,3	16,3	44
IRELAND	60,1	12,8	18,8	18,8	41,3
ITALY	57,2	9,2	15,2	15,2	42
NETHERLANDS	55,3	13,3	19,3	19,3	36
PORTUGAL	60,8	8,1	14,1	14,1	46,7
SPAIN	58,9	10,3	16,3	16,3	42,6
SWEDEN	62,1	12,6	18,6	18,6	43,5
UK	59,7	12,6	18,6	18,6	41,1
AVERAGE Coun.	58,6	11,5			41,1

1. Source: Blondal and Scarpetta (1999).
2. Source: OECD (2004).

Table 10: Data used to compute the sensitivity of the probability of employment to education, by gender

MEN

Country	u(s) low	u(s) medium	u(s) high	Total unempl	(1-u(S)) low	(1-u(S)) med.	(1-u(S)) high	p(s)	p'(s)%	p'/p %	$Є_M$
AUSTRIA	0,0629	0,0337	0,0222	0,0373	0,9371	0,9663	0,9778	0,96273	0,5827	0,6053	0,004035
BELGIUM	0,1042	0,0427	0,0260	0,0645	0,8958	0,9573	0,9739	0,93548	1,5054	1,6092	0,010728
DENMARK	0,1053	0,0636	0,0434	0,0679	0,8947	0,9364	0,9566	0,93215	1,3687	1,4683	0,009789
FINLAND	0,2053	0,1662	0,0796	0,1528	0,7947	0,8339	0,9205	0,84725	1,4473	1,7082	0,011388
FRANCE	0,1338	0,0808	0,0562	0,0918	0,8662	0,9192	0,9438	0,90826	1,3815	1,5210	0,010140
GERMANY	0,1571	0,0808	0,05	0,0801	0,8429	0,9192	0,95	0,91988	1,9506	2,1205	0,014137
GREECE	0,0459	0,0481	0,0464	0,0462	0,9542	0,9519	0,9536	0,95376	-0,035	-0,0367	-0,000245
IRELAND	0,1621	0,0605	0,0360	0,1036	0,8379	0,9395	0,9639	0,89645	2,4611	2,7454	0,018303
ITALY	0,0742	0,0456	0,0501	0,0617	0,9258	0,9544	0,9499	0,93831	0,3509	0,3740	0,002493
NETHERLANDS	0,0576	0,0302	0,0292	0,0374	0,9424	0,9698	0,9708	0,96262	0,9205	0,9562	0,006375
PORTUGAL	0,0562	0,0533	0,0275	0,0529	0,9438	0,9468	0,9725	0,94706	0,2642	0,2790	0,001860
SPAIN	0,1667	0,1047	0,0833	0,1407	0,8333	0,8954	0,9167	0,85928	1,1748	1,3672	0,009115
SWEDEN	0,1138	0,0994	0,0551	0,0914	0,8862	0,9006	0,9449	0,90857	0,6881	0,7573	0,005049
UK	0,1583	0,0809	0,0419	0,0826	0,8418	0,9191	0,9581	0,9174	2,0436	2,2276	0,014851
AVERAGE Coun.	0,1145	0,0708	0,0462	0,0793	0,8855	0,9293	0,9538	0,9207	1,1503	1,2645	0,8429

WOMEN

Country	u(s) low	u(s) medium	u(s) high	Total unempl	(1-u(S)) low	(1-u(S)) med.	(1-u(S)) high	p(s)	p'(s)%	p'/p %	$Є_W$
AUSTRIA	0,0577	0,0367	0,0199	0,04237	0,9423	0,9633	0,9801	0,95763	0,4893	0,5109	0,003406
BELGIUM	0,2	0,1078	0,0390	0,11059	0,8	0,8922	0,9609	0,88941	2,6223	2,9484	0,019656
DENMARK	0,1412	0,0875	0,0374	0,0894	0,8588	0,9125	0,9626	0,9106	1,3132	1,4421	0,009614
FINLAND	0,2372	0,1596	0,0689	0,16	0,7628	0,8404	0,9311	0,84	2,3299	2,7737	0,018491
FRANCE	0,1853	0,1111	0,0643	0,12453	0,8147	0,8889	0,9357	0,87547	2,0396	2,3297	0,015531
GERMANY	0,1256	0,1011	0,0663	0,09653	0,8744	0,8989	0,9338	0,90347	0,8353	0,9245	0,006163
GREECE	0,1279	0,1429	0,0896	0,12183	0,8721	0,8571	0,9105	0,87817	0,1136	0,1294	0,000863
IRELAND	0,1929	0,0825	0,0429	0,10471	0,8071	0,9175	0,9571	0,89529	2,7825	3,1079	0,020719
ITALY	0,1469	0,0833	0,0803	0,11561	0,8532	0,9167	0,9197	0,88439	0,8673	0,9807	0,006538
NETHERLANDS	0,0877	0,0628	0,0379	0,06364	0,9123	0,9372	0,9621	0,93636	1,0298	1,0998	0,007332
PORTUGAL	0,0766	0,0532	0,0272	0,06538	0,9234	0,9468	0,9728	0,93462	0,652	0,6976	0,001651
SPAIN	0,2919	0,2128	0,1373	0,24339	0,7081	0,7872	0,8628	0,75661	1,8228	2,4092	0,016061
SWEDEN	0,1306	0,0841	0,0420	0,07927	0,8694	0,9159	0,9579	0,92073	1,3838	1,5029	0,010019
UK	0,0826	0,0512	0,0279	0,05376	0,9174	0,9488	0,9721	0,94624	0,9566	1,0109	0,006739
AVERAGE Coun.	0,1489	0,0983	0,0558	0,05576	0,8511	0,9017	0,9442	0,89493	1,3741	1,5619	0,010413

Table 11: Data used to compute η

Countries	Prob. Emplo. Popul. 20-24, MEN							Final
	in education		not in education		ratio in/out		Correction	value
	total	active	total	active	total	active	η	$p_{st}= \eta p_0$
AUSTRIA*	n.a	n.a	n.a	n.a	n.a	n.a	1	0,9627
BELGIUM	0,1051	0,7455	0,7754	0,8492	0,1355	0,8779	0,8779	0,8213
DENMARK	0,6737	0,8649	0,8	0,9306	0,8421	0,9294	0,9294	0,8664
FINLAND	0,2815	0,5507	0,6471	0,7938	0,435	0,6938	0,6938	0,5879
FRANCE	0,1034	0,9796	0,6884	0,764	0,152	1,2822	1	0,9083
GERMANY	0,4784	0,9881	0,807	0,8625	0,5928	1,1456	1	0,9199
GREECE	0,0456	0,5833	0,7431	0,7948	0,0614	0,7339	0,7339	0,7
IRELAND*	n.a	n.a	n.a	n.a	n.a	n.a	1	0,8965
ITALY	0,0108	0,375	0,6033	0,7311	0,0179	0,5129	0,5129	0,4813
NETHERLANDS	0,5585	0,9197	0,8983	0,9447	0,6217	0,9735	0,9735	0,9371
PORTUGAL	0,2071	0,8649	0,877	0,9266	0,2361	0,9334	0,9334	0,884
SPAIN	0,099	0,5333	0,7047	0,7434	0,1405	0,7174	0,7174	0,6165
SWEDEN	0,1725	0,6038	0,7297	0,833	0,2364	0,7248	0,7248	0,6586
UK	0,4399	0,8951	0,8406	0,8804	0,5233	1,0167	1	0,9174
AVERAGE Coun.	0,2646	0,7419	0,7596	0,8378	0,3329	0,8785	0,8785	0,8641

	Prob. Emplo. Popul. 20-24, WOMEN							Final
	in education		not in education		ratio in/out		Correction	value
	total	active	total	active	total	active	η	$p_{st}= \eta p_0$
AUSTRIA*	n.a	n.a	n.a	n.a	n.a	n.a	1	0,9576
BELGIUM	0,0827	0,7	0,6522	0,8065	0,1268	0,8679	0,8679	0,7719
DENMARK	0,6456	0,8498	0,682	0,9011	0,9466	0,9431	0,9431	0,8588
FINLAND	0,2645	0,5432	0,657	0,8267	0,4026	0,6571	0,6571	0,5520
FRANCE	0,1016	1	0,5531	0,6804	0,1837	1,4697	1	0,8755
GERMANY	0,4684	0,9834	0,7177	0,89	0,6526	1,1049	1	0,9035
GREECE	0,0455	0,4545	0,4687	0,6145	0,097	0,7396	0,7396	0,6495
IRELAND*	n.a	n.a	n.a	n.a	n.a	n.a	0,9798	0,8772
ITALY	0,0108	0,2222	0,4968	0,6688	0,0217	0,3322	0,3322	0,2938
NETHERLANDS	0,576	0,9191	0,84	0,9613	0,6857	0,9561	0,9561	0,8953
PORTUGAL	0,2081	0,8191	0,7841	0,9015	0,2654	0,9086	0,9086	0,8492
SPAIN	0,0974	0,4261	0,5453	0,6216	0,1786	0,6855	0,6855	0,5186
SWEDEN	0,223	0,7174	0,705	0,8711	0,3163	0,8236	0,8236	0,7583
UK	0,4653	0,9038	0,7159	0,9224	0,65	0,9798	0,9798	0,9271
AVERAGE Coun.	0,2657	0,71155	0,6515	0,805492	0,3773	0,8723	0,8481	0,759

*I assign to Austria the same value of Germany, to Ireland the same value of UK.

Table 12: Derivation of unemployment benefits, by gender

Country	Net remplacement rates-after tax MEN			
	(a+b)	Benefits System	a (link. to prev.earns)	b (not so link.)
AUSTRIA	73%	PW	73%	0
BELGIUM	60%	FR	0	60%
DENMARK	77%	FR	0	77%
FINLAND	84%	MIX	43%	41%
FRANCE	74%	PW	74%	0
GERMANY	74%	PW	73%	1%
GREECE	46%	PW	46%	0
IRELAND	62%	FR	0	62%
ITALY	54%	PW	51%	3%
NETHERLANDS	85%	PW	80%	5%
PORTUGAL	77%	PW	77%	0
SPAIN	74%	PW	74%	0
SWEDEN	84%	FR	0	84%
UK	64%	FR	0	64%
AVERAGE Coun.	71%		42%	28%
	Net remplacement rates-after tax WOMEN			
	(a+b)	Benefits System	a (link. to prev.earns)	b (not so link.)
AUSTRIA	79%	PW	79%	0
BELGIUM	75%	FR	0%	75%
DENMARK	95%	FR	0%	95%
FINLAND	94%	MIX	49%	45%
FRANCE	86%	PW	86%	0
GERMANY	74%	PW	73%	1%
GREECE	48%	PW	48%	0
IRELAND	73%	FR	0%	73%
ITALY	52%	PW	49%	3%
NETHERLANDS	90%	PW	86%	4%
PORTUGAL	86%	PW	86%	0
SPAIN	78%	PW	78%	0
SWEDEN	90%	FR	0%	90%
UK	83%	FR	0%	83%
AVERAGE Coun.	79%		45%	33%

Source: OECD (2002).

Table 13: Cash trasfers and derivation of childcare benefits

Country	Materniry, childcare and parent leave[1]		Mat. leave % APW women[2]	Cash benefits[3]
	d paid	d total	γ	δ
AUSTRIA	0,73	1,65	44,20%	28,06%
BELGIUM	0,59	1,28	46,30%	14,91%
DENMARK	0,81	1,04	77,80%	10,08%
FINLAND	1,05	3,15	33,50%	13,97%
FRANCE	1,40	3,11	45,10%	9,06%
GERMANY	0,73	3,11	23,50%	0%
GREECE	0,15	0,56	27,60%	0%
IRELAND	0,19	0,54	35,70%	7,17%
ITALY	0,58	1,25	46,20%	2,26%
NETHERLANDS	0,31	0,56	55,20%	9,30%
PORTUGAL	0,33	2,32	14,10%	7,54%
SPAIN	0,31	3,15	9,80%	0%
SWEDEN	0,77	1,63	47,10%	13,28%
UK	0,15	0,59	25,80%	10,60%
AVERAGE Coun.	0,58	1,71	37,99%	9,02%

1.Measured in years. Source: Jaumotte (2003).
2.Recall that women earns 67% of APW.
3.Source: OECD (2002).

Table 14: Data used to compute the sensitivity of q(S) to education

Country	d total	H_W	TFR	q(S)	TFR by education			q'(S)	ξ
					low	medium	high		
AUSTRIA	1,65	39,5	1,42	0,9407	1,1	1,1	1,1	0	0
BELGIUM	1,28	37	1,55	0,9464	1,39	1,08	1,09	0,001817	0,001280
DENMARK	1,04	40	1,8	0,9532	1,47	1,47	1,24	0,002933	0,002052
FINLAND	3,15	40,4	1,81	0,8589	1,97	1,64	1,35	0,002078	0,001629
FRANCE	3,11	41,6	1,7	0,8729	1,88	1,38	1,1	0,010036	0,007665
GERMANY	3,11	39,3	1,25	0,9011	1,25	1,05	1,07	0,003378	0,002499
GREECE	0,56	44	1,32	0,9832	1,87	1,37	1,01	0,001797	0,001218
IRELAND	0,54	41,3	1,84	0,9759	1,43	1,43	1,18	0,000275	0,000188
ITALY	1,25	42	1,18	0,9649	1,52	1,07	0,88	0,002160	0,001492
NETHERLANDS	0,56	36	1,53	0,9762	1,38	1,17	0,76	0,001527	0,001043
PORTUGAL	2,32	46,7	1,41	0,9299	1,71	1,07	1,11	0,005173	0,003709
SPAIN	3,15	42,6	1,18	0,9127	1,65	1,16	1	0,006827	0,004982
SWEDEN	1,63	43,5	1,73	0,9352	1,8	1,46	1,26	0,003447	0,002457
UK	0,59	41,1	1,71	0,9755	1,43	1,43	1,18	0,000217	0,000148
AVERAGE Coun.	1,71	41,1	1,53	0,9376	1,56	1,28	1,09	0,002976	0,002169

Figure 1: Mincerian coefficients, by gender

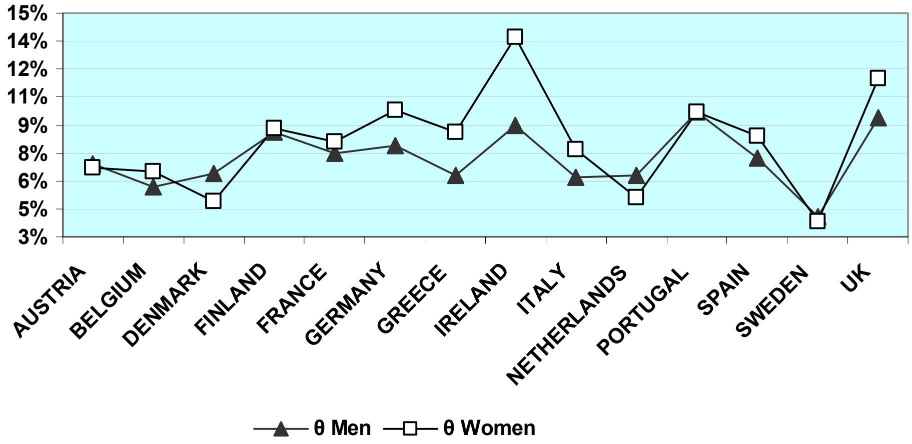


Figure 2: Working life, by gender

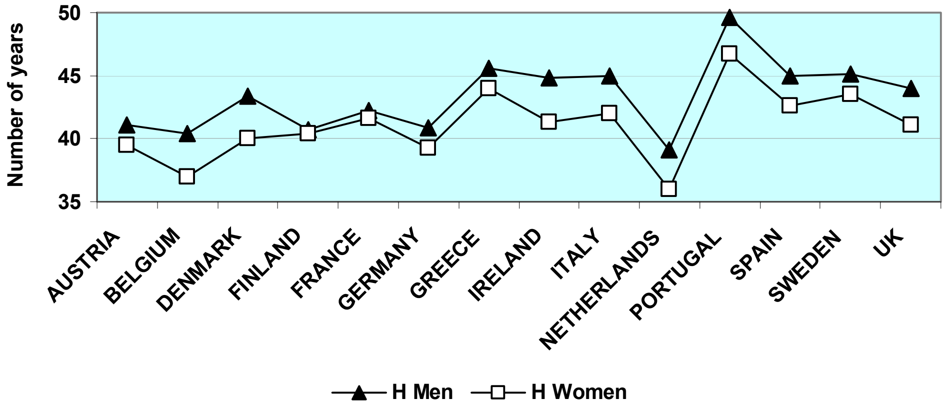


Figure 3: Unemployment rates, by gender

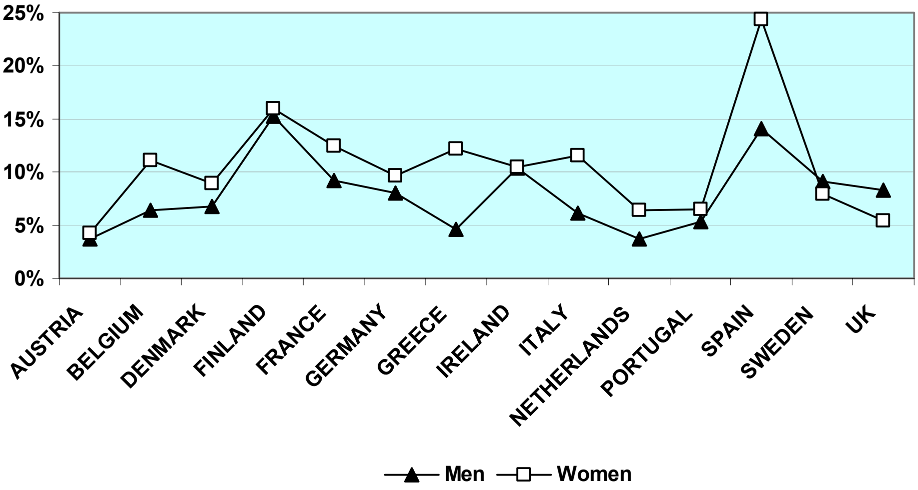


Figure 4: Unemployment rate by education
Men

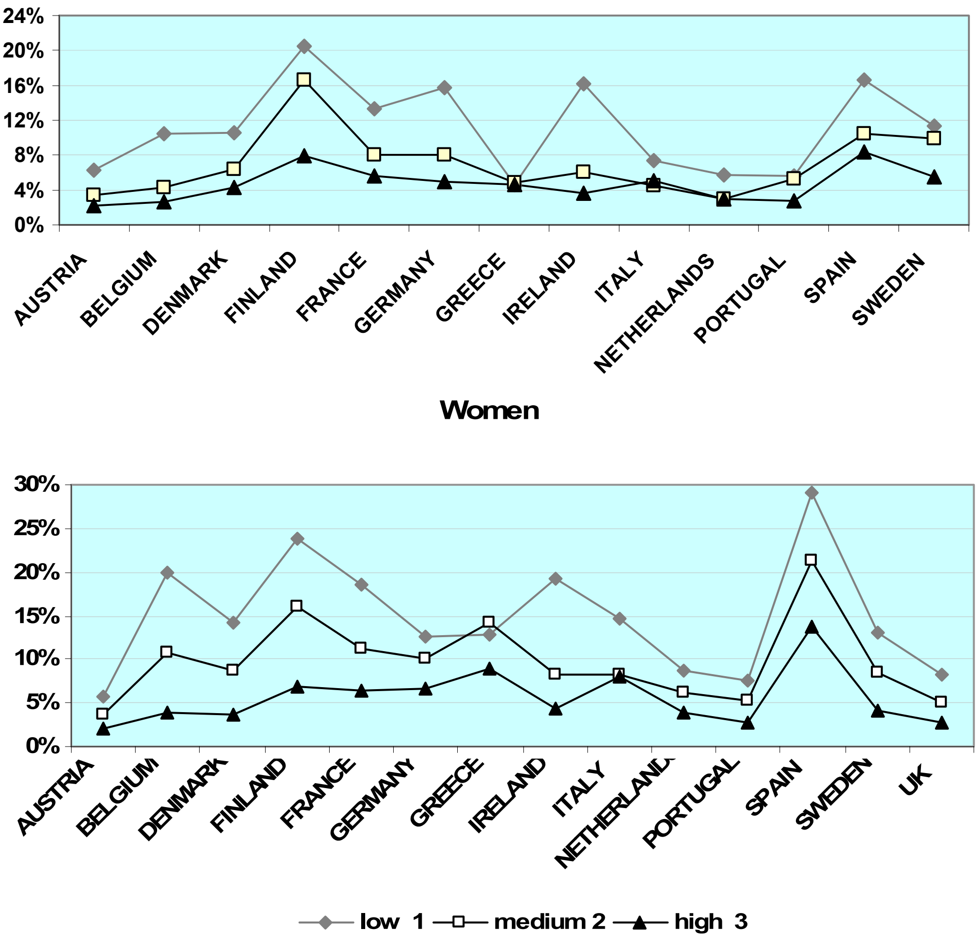
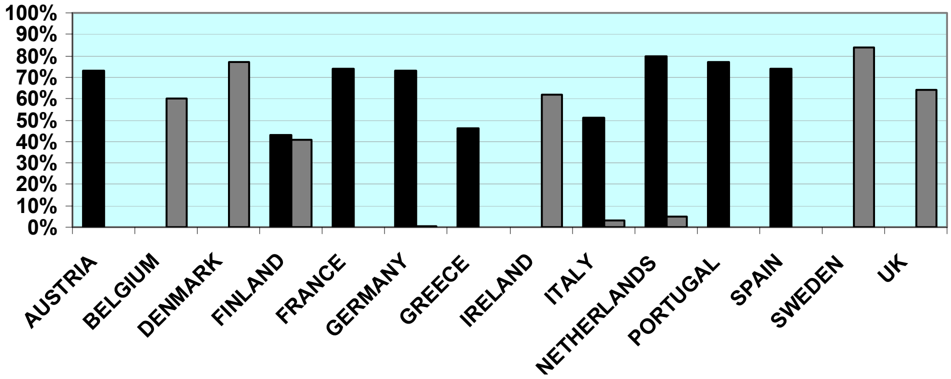


Figure 5: Net remplacement rate by component
men



women

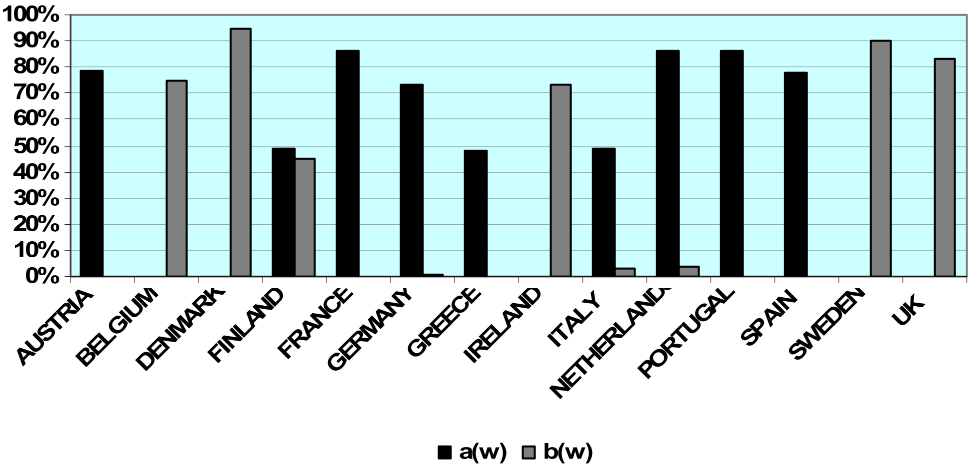


Figure 6: Child benefits by component

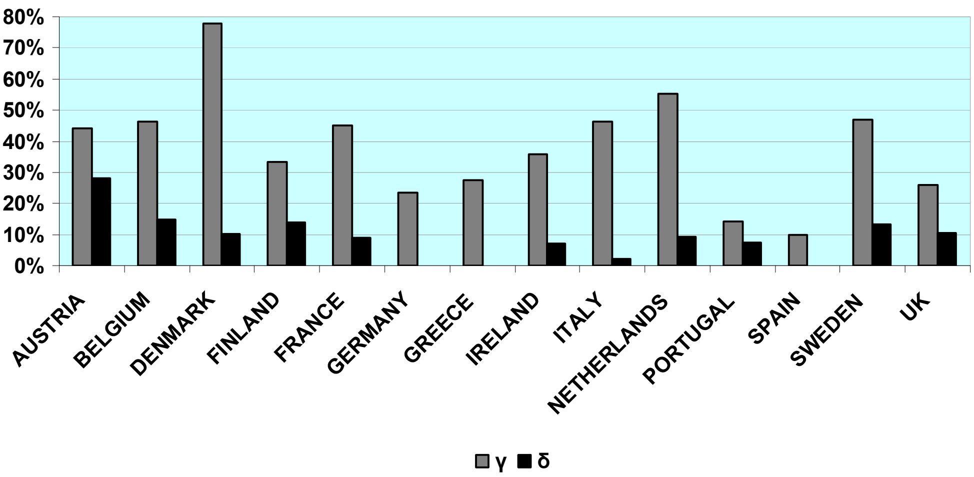


Figure 7: Fertility rates by education levels (%)

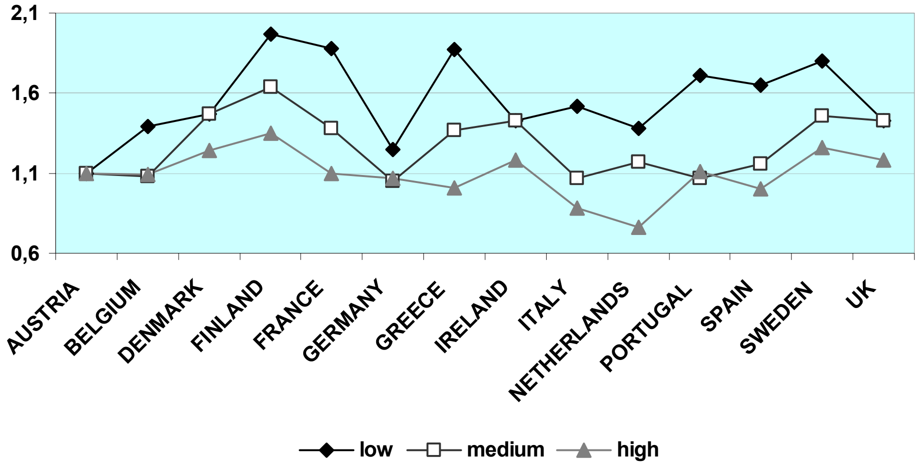


Figure 8: Direct private costs for education, by gender

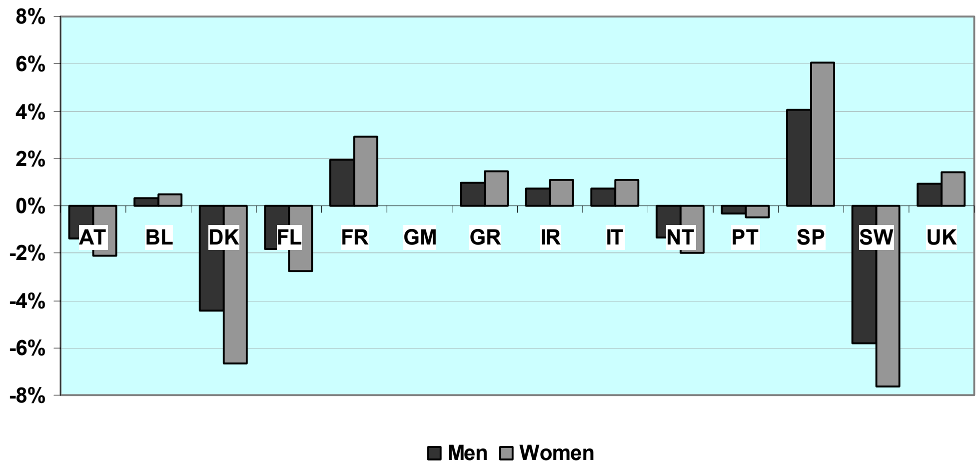


Figure 9: Private returns on education, by gender (%)

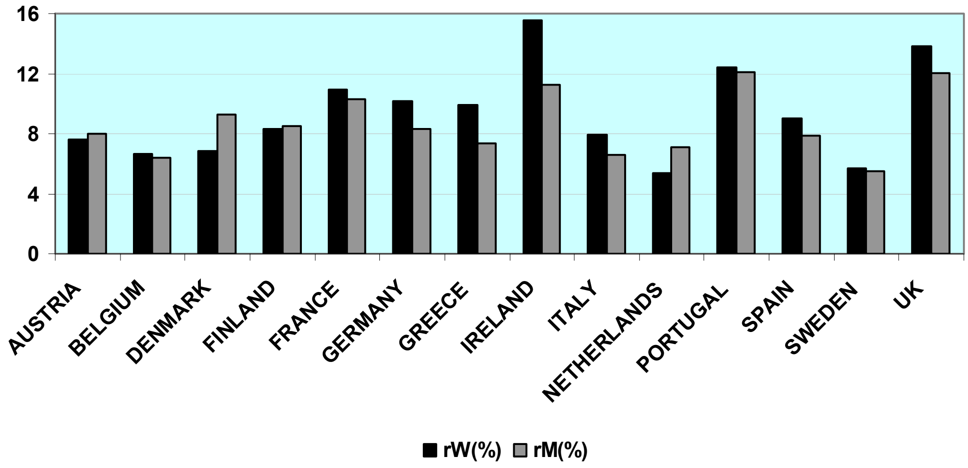
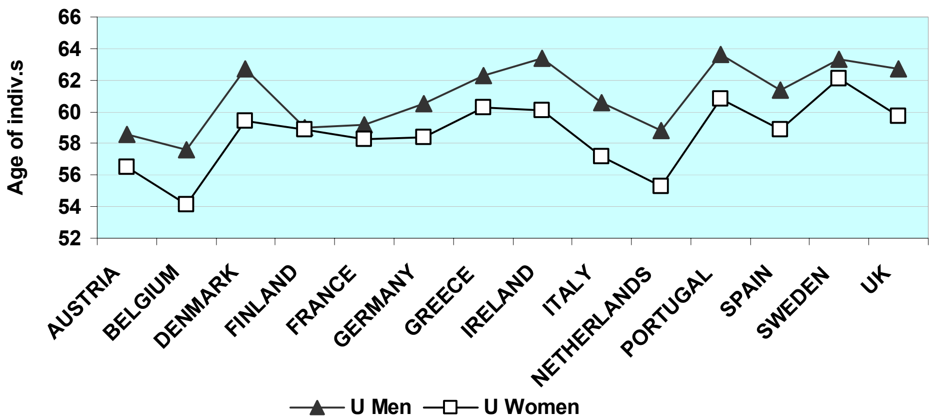


Figure 10: Average ge of retirment, by gender



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