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A good career or a good marriage: The returns of higher education in France

Pierre Courtioux [a,*], Vincent Lignon [b]

[a] EDHEC Business School, EDHEC, Paris Campus, 16–18 rue du 4 Septembre, 75002 Paris, France
[b] CNAF and Centre d'Economie de la Sorbonne, Université Paris 1 Panthéon Sorbonne, Caisse Nationale des Allocations Familiales, 32 Avenue de la Sibelle, 75685 Paris Cedex 14, France

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ABSTRACT

Following human capital theory, investment in education generates two kinds of returns: labour market returns and marriage market returns. Based on a dynamic microsimulation model, this article proposes a decomposition of these two effects for France and discusses the financial incentives of enrolling in higher education. Results show that the incentives stemming from the marriage market are negligible for men. By contrast, for women, the marriage market effect corresponds to almost 1/3 of the median return of higher education. Moreover, the marriage market does play an insurance role concerning the returns on tertiary education. It increases the risk of not capitalizing on higher education for both men and women, because marriage adds the uncertainty of the partner's career to the uncertainty of an individual's career. However, the risks relating to the value of this education investment remain higher for women. Overall, the results in this paper provide evidence for the fact that a family-oriented public policy may affect the educational choices for women.

1. Introduction

In economics, education choices are generally analysed as the result of a maximization programme taking into account the financial returns of education over the course of a life time (Becker, 1964). Focusing on the labour market returns, several empirical studies (OECD, 2008; Psacharopoulos and Patrinos, 2004) have shown that due to better job opportunities and higher wages, education is a rather profitable investment: the mean private rate of return on tertiary education is higher than the interest rate in all developed countries. This literature also exhibits significant gender differences in the higher education returns (OECD, 2008; Courtioux et al., 2014) suggesting that the incentives to pursue education at a tertiary level are lower for women than for men. At a first sight, this last result seems at odds with the general trend of increasing participation by women in higher education and in the labour market. Demographic economics complements the analysis of education incentives: education also produces returns on the marriage market. From a theoretical point of view, it is generally argued that it raises the prospects of marriage with an educated partner, thus raising household income within the marriage (Chiappori et al., 2009). Moreover, it seems that national institutional features like divorce law affect the inter-temporal behaviour of married couples (Voena, 2015). As the theoretical implications of this analysis seem well identified, there are very few empirical results on the financial returns of education within the marriage market. This lack of empirical results contrasts with the literature on the choice of partner (Pencavel, 1998; Blossfeld, 2009) which shows up positive "assorted mating", based on characteristics such as educational level (also known as educational endogamy).

The contribution of this article consists in identifying the marriage market effect on tertiary education returns for France and it documents gender differences from this point of view. The empirical literature on education returns has recently been extended in order to take into account the fact that the returns on a particular degree are uncertain, and risk-adverse students or students from low-income families may be reluctant to enrol (Martins and Pereira, 2002; Harmon et al., 2003; Cunha and Heckman, 2007; Courtioux et al., 2014). Our contribution belongs to this growing and prolific literature on the distribution of returns to education: see Dickson and Harmon (2011) for a review. The marriage market effect is estimated by introducing a specific demographic module in a dynamic microsimulation model as developed in Courtioux et al. (2014). This module permits the observed degree of educational endogamy in the marriage market to be modelled, along with the heterogeneity in the union and separation timelines, across genders and diploma. In order to facilitate the comparability of results with this article, we also calibrate our analysis for the cohort born in 1970.

The paper is organised as follows: in Section 2, we introduce and discuss the internal rate of return framework and how to take into account

* Corresponding author.

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the potential partner. Section 3 details the original demographic module that is used for the simulation. In Section 4 we present and discuss the results, and Section 5 concludes.

2. A distribution perspective on higher education returns

In education economics, following the human capital approach, the choice of pursuing education is analysed based on the financial incentives. Since Becker (1964) the internal rate of return (IRR) has been a key indicator and is obtained by equating the present value of a stream of income when a person invests in human capital to the present value when he/she does not invest. If Y is the stream of income when an agent pursues his/her education and therefore enters the job market later and X is the stream of income when he/she does not pursue higher education and enters the job market directly, then the internal rate of return of this individual (r) solves the following equation:

$$\sum_{t=0}^{M} \frac{Y_t - X_t}{(1+r)^t} = 0 \tag{1}$$

where t is a time period index and M is the total number of time-period units lived by the individual. The effect of the partner can be analysed by including in the overall stream of income Y_t and X_t, both the income of the reference individual i ($Y_{i,t}$, $X_{i,t}$) and the income of the partner p ($Y_{p,t}$, $X_{p,t}$).

$$Y_t = Y_{i,t} + Y_{p,t} \tag{1.1}$$

$$X_t = X_{i,t} + X_{p,t} \tag{1.2}$$

At a given point in time (t), if an individual is single then the income of the partner is equal to zero. As far as pursuing higher education tends to postpone the date of union, there is a gap between $Y_{p,t}$ and $X_{p,t}$ in favour of $X_{p,t}$ at the beginning of the lifecycle. However, as far as higher education may provide access to a pool of potential better-educated partners (because of educational endogamy) with higher incomes, the difference between $Y_{p,t}$ and $X_{p,t}$ may change later in the lifecycle. Moreover, we break down each stream of income I_t (*i.e.* $Y_{i,t}$, $Y_{p,t}$, $X_{i,t}$ and $X_{p,t}$) into five components as follows:

$$I_t = W_t + U_t + R_t + T_t. \tag{2}$$

Where W_t is the individual net wage at period t, U_t the unemployment benefit, R_t the retirement pension and T_t the individual income tax. For a given point in time, some of these elements may be equal to zero. For instance, if the reference individual or his/her partner is employed in t, the unemployment benefit U_t is equal to zero. If the individual is active in period t, the retirement pension R_t is equal to zero.

To produce a distribution of r, we use a stylized birth cohort obtained by dynamic microsimulation. It documents an individual's type of degree; the annual net wage for each age; and the wage of the partner, if the person has a partner. Our methodology differs from that of Deaton (1985): see for instance Cardoso and Gardes (1996) for such an analysis on French data. We do not compute a synthetic cohort based on the observations of a given population for several points in time. Instead, we compute a cohort based on individual datasets, which makes it possible to analyse short-term individual transitions and simulate these implications for the whole lifecycle (see Section 3).

To compute our distribution, we work on the assumption that the counterfactual stream of income obtained when not pursuing tertiary education (X) can be estimated by the average earnings by age (t), for individuals who did not obtain a higher education degree: this approach is common and is used, for instance, by the OECD (2008). We also added a specific treatment to take into account the opportunity costs for higher education training which vary with the curriculum followed by an individual. In our view, this is consistent with our non-sequential analytical framework of higher educational choice. For instance, some students may follow a tertiary education curriculum for only two years and then enter the labour market, whereas others may choose to follow a longer curriculum and therefore face higher opportunity costs. Moreover, some individuals may fail their exams; they then enter the labour force older with higher opportunity costs than the average for individuals with the same level of qualification. To capture this variety in higher education investment that has an impact on the level of returns, we adapt the computation of X_t during the education period of the lifetime to each level of tertiary education (e) already attained by each person. Here, e stands for the degree level and can be ordered from 0 to E.

$$X_{e,t} = \overline{X}_{0,t} \qquad \text{if } t \geq L \tag{3.1}$$

$$X_{e,t} = MAX\{X_{0,t}, X_{1,t}, \ldots, X_{E,t}\} \qquad \text{if } t < L \tag{3.2}$$

where L is the date when the individual in our simulated cohort enters the labour force. In this framework, two individuals with the same diploma entering the labour force at different ages (L) face different opportunity costs. The one who enters the labour force later incurs an additional cost due to the delay period. Opportunity cost estimation depends on the levels of education that could have been attained by a person of the same age: see Eq. (3.2). This means that opportunity costs are increasing with age (t): they take into account the experience premium on wages of persons who enter the labour force earlier, and the education premium of those who have got their degree and are on the labour market – whatever their position – at the given age t.

In this framework, a negative individual internal rate of return on education remains possible for educated people: it means that the individual gains associated with a person's highest degree are not sufficient to cover the losses associated with the number of years training, so that the present value of the individual's stream of income remains less than that of the average career of those who do not complete a tertiary diploma.

According to Cunha and Heckman (2007), two components should be distinguished in the distribution of returns to education: (i) variability that refers to factors that are unobservable to the econometrician but observable to the agent, and (ii) uncertainty that refers to the share of the distribution which is unpredictable for the econometrician and the agent (luck, unanticipated events, *etc.*). On this basis, Cunha and Heckman (2007) make a distinction between *ex post* returns (corresponding to the dispersion of realized returns incorporating both variability and uncertainty) and *ex ante* returns (referring to dispersion incorporating uncertainty). In other words, *ex post* returns describe how economies reward schooling, whereas *ex ante* returns correspond to the distribution observed by the agents, when making their schooling decisions.

Following the arguments developed in Courtioux et al. (2014), it is possible to interpret our results as *ex ante* returns. In order to do this, five assumptions are necessary.

1) There is uncertainty about future earnings an individual will obtain from a wage career distribution; this distribution is conditional on the diploma obtained, (1.1). This uncertainty about future earnings also concerns the potential partner (1.2).
2) 2.1) The student is not aware of his/her own talent/preferences to study and work (2.1.1). Moreover, he/she is not aware of the talent/preferences to work of the potential partner (2.1.2), but knows that these are conditioned by his/her talent/preferences that will be revealed in the future with the diploma obtained (see also assumption 5).
   2.2) However, a student thinks that he/she is able to succeed in obtaining a higher education diploma even if the student does not know the level of the higher degree he/she will obtain or the relative quality of the higher education institution attended.
3) The education decision does not concern a marginal year of schooling, but an education track which leads to a diploma.