LABOUR MARKETS UNDER SIGNALLING – EXTENDED ABSTRACT

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Introduction and background

This paper deals with the problem of asymmetric information in the labour market. The starting point of the research is the seminal work of Michael Spence and his notion of signalling. Following research in this field has been aimed either at the employers' side (theory of screening) or at the side of prospective employees and their demand for education as the determinative signal. My work engages in both these directions and merges them in one. The common ground and the target area are eventually the labour market and balancing of labour demand and labour supply in the situation of asymmetric information and under the assumption of different education levels.

In the paper, I draw inspiration and use as background the theory of human capital and its derivations focused on education theory. The dispute between human capital theory and signalling theory shows that there are many views on the role of education and on the relationship between employers and employees. However, it is necessary to make a better use of the connection of these theories and formal methods. I will be more specific about the methodology in a separate paragraph.

I also interconnect two (traditionally distinct) theories. First, I deal with the theory of education with its ways how to value education, how to model education demand and supply and how to find the optimal ways of financing. Second, I employ the theory and economics of information, where my main interest lies in the problem of costs of asymmetric information and ways how to divest of this asymmetry. Both these theories have very much to contribute to the theory of labour market in general.

Outline of the paper

In the first part of the paper, I focus on the employees' side of the market. One of the purposes is to model the demand for education with the necessary respect to the informational characteristic of education. I start with a simple model combining basic motives to invest in education and expected results of that decision. The model is employed to demonstrate the demand for education and is combined with the utility function of education in one's lifetime. Finding the way how people decide about the amount of education they want to receive shows me the way to two basic theories of education. At least allusively, I touch the problem of education costs, because this point of view is necessary for modelling the demand.

Under the paradigm of human capital, where education is a way how to raise one's ability level we come to a specific function of demand for education. This demand is expressed in measure of time devoted to education as following function:

$$S = f (A, H_t, \beta_{t+1}/\beta_t, \rho_t, \gamma_t, E_t)$$

where S is the amount of time devoted to education, A is person's ability, H level of human capital, β_{t+1}/β_t expresses the change of productivity in time, E stands for external resources and ρ and γ are coefficients.

On the other hand, if we accept that there is a strong influence of the signalling effects in the labour market, the demand for education changes and the function will then look differently. One of the possibilities is demand dependent on following variables:

$S = f(A, \rho_t, \gamma_t, E_t, r_t, L)$

where we have two new variables, L expressing the impact of signals and r expressing the impact of repeating games.

Thus, different theories have different explanatory tools, but if we accept that signalling theory has some level of accountability, we have to change our view of the labour market, especially the situation of hiring new employees and negotiating the wage schemes.

In the second part of the paper, I turn to the employers' side of the game. The main aim here is to model the demand for labour force. Again, the specific point is the existence of signalling. The research question is, whether there are important changes in labour demand under signalling and, if so, how important they are.

In this part of the paper, I start with a temporal model of company production function, supplemented with a producer's loss function. This loss results from the fact that the signalled productivity does not necessarily match the real and observed productivity in later phases of employment. Producer's loss depends on signalled productivity, real productivity in next period and education level. The demand for labour force can be then described as following function:

$N = f(P, S(P), \sigma)$

where P is productivity, S(P) is signalled productivity and σ is education level. The specific demand function is derived with help of the dynamic programming model, because we have to accept and include the inter-temporal character of signalling. This results from the fact that employers firstly receive signals about employee's productivities (period t) and only after some time they are able to observe the real productivity (period t+1).

Methodology

As far as methodology is concerned, I use a couple of methods. Throughout the paper I deal with problems that have inter-temporal character and this character substantially affects the outcomes of the models. I employ the dynamic optimization model in those parts where I deal with one subject (employees, firms). The dynamic programming method allows me to derive the inter-temporalconditions of optimal solution in form of the Euler equation. This equation compares marginal effects of signalling productivity in two periods. Throughout the paper, I derive various forms of the Euler equation accordingly to specific situations. In the situation of market equilibrium, I find the conditions of a steady state.

In one part of the paper I also get close to the game theory, therefore some methods from this area are applied. I especially focus on repeated games and specifics resulting from different games played in several rounds. This method leads to gradual smoothing of differences between employers' expectations (expressed through wage schemes) and prospective employees' "productivity offer".

The presented paper is a theoretical model and leads to general aim of my research, that is to offer a testable hypothesis. However, the data base for testing any hypothesis in this field is very scarce and we don't have time series long enough to derive strong causal or empirically substantiated relationships.

Main resources

Birchler, Bütler 2007: Birchler, U., Bütler. M., *Information economics*.Routledge, Oxon 2007.ISBN 978-0-415-37345-6.

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