

# Human Capital Growth for University Education Evaluation

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**Summary.** In this paper, we propose a method for the evaluation of relative and impact external efficiency of university studies as effects of education on the long-term income of graduates. In order to evaluate the “*ceteris paribus*” levels and growth we applied a multilevel longitudinal model with random effects. The variables used in our analysis refer to Human Capital studies. The Bank of Italy has collected the data used for the analysis in the years 1998, 2000 and 2002.

**Keywords:** External efficiency, Human capital, Multilevel growth model.

## 1. The external efficiency of university studies

The organizations that distribute services of public utility, as managers of collective resources, must account for their performances to the funding authorities, the community, and the customers (Hanushek, 1997).

Guidelines are being delineated, at national and international levels, for the accreditation of university education and research programmes, and services for the students. The university accreditation processes should not only meet the *ex-ante* requirements, but also verify the results.

To evaluate an educational institution, we adopt the outline put forward by Lockheed & Hanushek's (1994). The inputs of the system determine whether the terms “efficiency” or “effectiveness” should be used. The outputs of the system determine whether the descriptors “internal” or “external” are to be applied to efficiency and effectiveness (Table 1).

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**Table 1.** Criteria of evaluation for university education

	<b>Internal</b>	<b>External</b>
<b>Effectiveness</b>	INTERNAL EFFECTIVENESS: University/type of bachelor programme effect on the student achievement	EXTERNAL EFFECTIVENESS: University/type of bachelor programme effect on employment Short term Human Capital
<b>Efficiency</b>	INTERNAL EFFICIENCY: Costs-benefit analysis of the investment in higher education	EXTERNAL EFFICIENCY: University/type of bachelor programme effect on the returns of investment in higher education Long term Human Capital

The internal effectiveness and efficiency can be used to self-evaluation of universities, while the external ones may be the most proper way for evaluating the universities' performances (Elias, 2002). As of today, there are very few studies of the analysis of external efficiency of education based on the evaluation of the earned income of graduates in the vital cycle. In the following, we will define and apply the criteria for the evaluation of organizations that distribute public utility services.

The investment in higher education may be evaluated in terms of the graduates' earned income. In other words, we can evaluate the so-called Human Capital (HC) of an individual in terms of his or her expected earned income related to the competences achieved through education (Becker, 1964).

In the following, the evaluation of the university education does not coincide with the estimation of HC, but with the following aims: to evaluate "*ceteris paribus*" the universities' investment in HC with returns in terms of earned income (relative efficiency), and if and how the university education is a real advantage in monetary terms (impact of efficiency).

## 2. Gain score, added value, and multilevel growth model

In order to overcome the problem of "selection bias" (Garen, 1984) due to lack of randomization of the individuals between treatments, the effectiveness and efficiency must be evaluated *ceteris paribus*, i.e. adjusting the outcome for the different individual characteristics, university resources, and local job markets (Fitz-Gibbon, 1997; Scheerens & Bosker, 1997).

To this aim, even if a linear model may be applied, the nature of the dependent variable suggests non-linear approaches. To this purpose, we introduce the concepts of initial performance or pre-test ( $y_1$ ), final status or post-test ( $y_2$ ), as well as the concept of improvement or gain ( $y_2 - y_1$ ).