

# Estimating University Human Capital through Growth Models

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**Summary.** Our paper focuses on the law of growth of the human capital deriving from the evaluation of undergraduates' human capital due to university education. For this purpose, we introduce the definition of University Human Capital (UHC), a kind of human capital that sums up to the other kinds of human capital and that acts, for the concerned companies, as a detector of competences owned by graduates. It follows that UHC can be interpreted also as a component of the “intellectual capital” that characterizes the different kinds of enterprises. UHC individual growth trajectories are to be established by means of two-level growth models. We attempt to synthesise the law of individual UHC growth through both a logistic and a Gompertz function.

**Keywords:** Latent growth curves; Human capital; Specific competences; Multilevel models; Gompertz function.

## 1. Introduction

All the theories on Human Capital (HC) share a macroeconomics approach that raises questions about the suitability of the analysis of HC. Indeed, at a macroeconomics level, the focus of such an analysis is on assessing the general relevance in establishing the contribution to the national wealth. At a microeconomics level, instead, the focus is on quantifying the internal companies' HC. A microeconomics approach brings about the need to determine the capital identifying the company market value, the so-called *Intellectual Capital* (IC) (Lev, 2000).

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The rapidly changing job market requires graduates to hold a good post-graduate degree and the ability of being flexible for an effortless and a rapid vocational rehabilitation. University education and flexibility are not only two aspects of company IC, but also the value added by universities to their graduates. Therefore, identifying the HC that can be offered by university is crucial if an analysis and a quantification of the level of competence required by companies are being carried out.

In this perspective, a microeconomics approach to determine and measure UHC – that is the HC increase in terms of competencies for work by university – is a three-phase process. In the first phase, HC is assessed according to a university perspective. For each graduate the HC increase is quantified assessing the competence acquired by graduation.

In the second, HC is analysed according to a company's perspective, which implies that the required HC typologies are identified.

In the last phase, a feedback is dealt with: procedures and strategies developed by university to adapt higher education to market demand are analysed.

## 2. From Human Capital to Intellectual Capital

In order to adopt a microeconomics perspective to quantify UHC, an agreement on terminology is required to identify the common terms shared by universities and companies. To start with, while companies consider IC an intangible asset, universities regard it as the increase in graduates' knowledge by way of the learning process, which essentially transforms a secondary school graduate into a university graduate.

From the university viewpoint, UHC can be defined as the difference between students' HC when entering university and the HC held at graduation. In other words, UHC represents the improvement of knowledge, skills and attitudes attained thanks to the educational activities, use of didactic structures, exams passed and social interaction with fellow students. Measuring this improvement can be an aid to assess university ability to produce competences, depending on the variety of students' HC at university enrolment.

A first simplified representation of the higher education process can involve only two actors: users of education (students) and providers of education (university). A more realistic approach needs to take into consideration the existing relations between students' HC (family background, social background, and educational background), the education provider and companies in the job market. Obviously, the choices about education made by family, as well as all interactions with the social environment, crucially contribute to identify students' HC typology at the enrolment time (human capital at time  $t_0$ :  $HC_0$ ).

During the time spent at the university, the initial  $HC_0$  changes: it modifies and specializes according to the education received, the experiences, and the