

Toward a Human Capital Accounting that incorporates Individual Growth Trajectories

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Abstract

The aim of the paper is twofold. First, we propose a new approach to account the value of the investments in formal education at the university level: assuming as measure of the University' Human Capital (UHC) the accumulation of knowledge trough the attendance of university courses, we provide a novel definition and measurement using individual latent growth curves.

Second, we propose an extension and a new specification of a Social Accounting Matrix (SAM) that values human capital at different stages of the formation, distribution, redistribution and expenditure of income trough an economic system.

Since Mincer's (1958), Solow's (1956) and Becker's (1962) seminal studies, literature has provide a plethora of approaches in order to define and measure human capital and its contribution to individual income and to economic growth. Effort has been also made in defining its relationship with economic capital as an input in the production and the features of a HC account within the official national accounting system. Nevertheless, inserting a HC account (HCA) has never acquired a full consideration in the UN SNA, either 1993 nor in the recent 2008. Only very recently, there have been many applications proposing an extension of the accounting systems in order to consider both market and non-market components, like for example HC and formation. Our paper contributes to this literature in two ways. We first analyzed the two different approaches in trying to construct a systematic accounting of the HC. For the approach A), that is based on input costs, we have take in account, in particular, the estimation of university education's value added proposed by ISTAT' researchers Malizia, 1998, 1999, Collesi, 1999, Versace, 2009). The second one, approach B), instead is that based on education's returns as in the Jorgenson and Fraumeni "Lifetime Labour Income" approach.

These approaches share the "value" of university education in HCA, then we introduce University Human Capital, seen as the sum of two terms: HC already owned plus knowledge accumulated during the attendance of university courses. The terms are weighted for φ and $i\varphi$ in order to consider the difference among students. In details, the accumulated knowledge (uhc) is a relative measure of the product between marks and credits. In our proposal UHC can be estimated through a **Latent Curve Model (LCM)** (Tucker 1958, Rao 1958). LCM, used for representing the structure in repeated measures data, is, at its core, a factor analysis model. In this case we assume that UHC follows Gompertz curve then we include it through modelling the matrix of factor loadings

Referring to approach A), we propose to replace the quality adjustments introduced by ISTAT researchers with the estimated mean *UHC* of faculty and/or group of homogenous faculties *F*, at the end of each enrolled year. Referring to approach B), instead, we propose to introduce in JF formula a "*learning under use rate*".

Finally, we extend our analysis using the accounting framework based on the construction of a Social Accounting Matrix (SAM) which can be modeled in order to evaluate the contribution of education and HC/UHC to production and formation of income. The SAM including HC should be extended introducing a Satellite set of accounts for HC Stocks and Flows in Real/Physical Units.