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(doi: 10.1410/106303)

Rivista di storia economica (ISSN 0393-3415)

Fascicolo 1, aprile 2023

**Ente di afferenza:**

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# The use of composite indices in economic history: A long-standing, not silly debate

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**Keywords:** Human development index, economic wellbeing, composite indices, living standards, social welfare functions, Italy

**JEL codes:** N01, N3, O15

In the lively debate on the use of the Human Development Index (HDI) in economic history hosted by this journal, our work has been quoted several times. First, Jan Luiten van Zanden (2023) referred to our 2018 paper (Amendola, Gabbuti and Vecchi 2018), in support of his criticism of the subjective nature of the HDI. In his reply, Leandro Prados de la Escosura (2023) referred to our 2017 paper (Amendola, Gabbuti and Vecchi 2017), arguing that it provided a sort of sensitivity analysis of his results related to Kakwani's (1993) transformation. In the following, we aim to contribute to this debate.

Prados de la Escosura (2023) correctly defined our first contribution as constructive. In our 2017 contribution, we focused on Italy between 1861 and 2011, and explored the use of the HDI when political and civil rights are included among its dimensions. Furthermore, we investigated how the convex (Kakwani's) or concave (original HDI proposers') transformation affects 1) the dynamics of the HDI and, 2) the marginal rates of substitution (MRS) among its components (the troubling trade-offs identified by Ravallion 2012). We concluded that «the HDI largely reflects the preferences of its creators. If the person who uses it is a historian, then the HDI will largely reflect his/her own judgment of history» (Amendola Gabbuti and Vecchi 2017, p. 485). Within this framework, and after calculating Prados de la Escosura HDI's implicit MRS, we advised against convex transformations. This argument is in line with van Zanden's (2023).

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In contrast with Prados de la Escosura's (2023) claim, the paper by Amendola, Gabbuti and Vecchi (2018) is not «a revised version of the chapter», but it does contain new arguments with respect to 2017 chapter. In fact, the 2018 paper focuses on the interpretative limitations of the HDI in economic history (see also Amendola, Gabbuti and Vecchi 2021). The main point of the paper is that the HDI can be interpreted not only as a social welfare function (SWF), as already observed by economists such as Fleurbaey (2018), but as a *paternalistic* SWF (Graaf 1957). We conclude that «technically, the HDI is a social welfare function that does not satisfy the *non-paternalism* property, which prescribes that “in the expression of social preferences only the individual preferences matter. The planner does not have direct preferences on the final alternatives” (Mas-Colell, Whinston and Green 1995, p. 825)» (Amendola, Gabbuti and Vecchi 2021, p. 26).

Far from being a technical crux, this point has two main implications for the adoption of HDI by economic historians. First, the choice of indicators (GDP, life expectancy at birth, educational variables) and the aggregation rule (which formula should be used for the HDI) is the analyst's purely subjective decision. This is uncontroversial; it was mentioned by van Zanden (2023) and acknowledged by Prados de la Escosura (2023). However, we believe that this point has not been sufficiently recognized. As discussed in Amendola, Gabbuti and Vecchi (2021), HDI was used in the economic history literature precisely to address the heated debates, such as the evolution of living standards during the British Industrial Revolution (Taylor 1975), the US Ante-bellum puzzle (Steckel and Floud 1997), or the «missed-opportunities» of interwar Europe (Gallardo-Albarrán 2019). In the absence of a consensus on a specific HDI formula, the use of a composite index is not a significant improvement over the more traditional, «qualitative» debates between historians.

The second implication is more subtle and goes way beyond the arbitrariness of the choice of the variables and the weighting system. Establishing that the HDI is a paternalistic SWF implies that it is a welfare measure disconnected from individual preferences. In other words, the HDI cannot be derived by aggregating individuals' utilities (or well-being measures), unless one imposes the exact preferences of the analyst on individuals (Foster and Shneyerov 2000). This is another way of saying that the HDI is a paternalistic SWF that induces an arbitrary ordering over a set of social indicators.

To clarify this point further, we introduce a formula for the HDI based on a constant elasticity of scale (CES) function. As is well known, the CES function is governed by a single parameter that determines the extent to which different variables (here, the HDI dimensions) can be substituted by each another. In the present context, the CES function is applied to the HDI (or to any of its «augmented» versions) and the elasticity parameter controls the extent to which GDP and life expectancy, say, are substitutes. This applies to any pair of its dimensions (education, political and civil rights, etc.). This CES parameter has nothing to do with the traditional arguments recurring in the methodological debate on composite indices, most notably the initial choice of dimensions introduced in the

formula, nor does it relate to the selection of the weight that is eventually assigned to each dimension included in the indicator. The choice of the elasticity of substitution uniquely determines the specific formula of the HDI and is driven – simply and solely – by the ethical system of the historian. In this sense, the choice of CES parameter (i.e., of the specific HDI) tells you about the *pater* of the HDI; that is, it reveals their preferences in relation to the trade-offs derived from including different standard of living indicators within a single measure.

The flexibility of the CES function enabled us to come up with an all-encompassing formula that embeds all the HDI formulae proposed in the literature. We show that if the elasticity of substitution is assumed to be infinite (i.e., the variables defining the HDI are perfect substitutes), then we obtain the HDI initially proposed by the United Nations Development Programme. If the elasticity of substitution is set equal to 1 (imperfect substitution), then we get the so-called «hybrid HDI» (Felice and Vasta 2015). And so on. Finally, we use Italy as a case study to illustrate the ultimate consequence of the paternalistic nature of the HDI. By changing the elasticity of the substitution parameter (but not the weighting system or any other choice underlying the calculation of the HDI), very different temporal trajectories for the HDI are possible. In short, with the HDI, anything goes.

Prados de la Escosura (2023) observes that the risk of adopting a «dashboard approach» is represented by «the high probability of getting opposite results when using alternative indicators, so a composite index provides a solution as a latent and elusive concept such as human development is better captured by a combination of dimensions than by each of them considered individually». In this perspective, the case of Italy is paradigmatic. During the Fascist *Ventennio*, civil and political rights were in direct contrast with the other indicators. The *pars construens* of our paper can be summarized as follows: the use of HDI in economic history is a solution (in the sense indicated by Prados de la Escosura) if, and only if, we can pick a specific value (or a subset of values) for the elasticity of substitution, and agree to stick to it. How do economic historians support their preference for zero elasticity versus infinite elasticity, or any value in between? Can they convince other scholars regarding the use of convex transformations? Perhaps. Not in the short term, as far as we can judge from the current academic debate, however it should still not be ruled out.

We argue that the real question in this debate is whether it is preferable, in historical analyses, to talk about restricting a parametric space (which value should we use for the elasticity of substitution of the HDI components?), or deal with the complex, non-ergodic, often conflicting relationship between well-being dimensions using a more traditional approach where multidimensionality is not limited to a scalar in a paternalistic way. All this makes the debate initiated by Van Zanden (2023) an extremely important and welcome one for our discipline.

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