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METHODS

Reconciling sustainability and discounting in Cost–Benefit Analysis: A methodological proposal

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ABSTRACT

The incorporation of the intergenerational equity objective has rendered the traditional Cost–Benefit Analysis (CBA) approach obsolete for the evaluation of projects presenting an important number of environmental externalities and for those whose impacts extend throughout a long period of time.

Based on the assumption that applying a discount rate rewards current consumption and, therefore, that it is only possible to introduce a certain intergenerational equity in a Cost–Benefit Analysis, in this work we propose an approach to discounting based on a different rationale for tangible and intangible effects. We designed two indicators of environmental profitability: a) the Intergenerational Transfer Amount (ITA), which quantifies in monetary units what the current generation is willing to pass on future generations when an environmental restoration project is carried out, and b) the Critical Environmental Rate (CER), measures the implicit environmental profitability.

These concepts were tested through an empirical case study pertaining to the assessment of an Erosion Control Project in the southeast of Spain. The results yield traditional profitability indicators that are higher — and probably closer — to the real values set by the contemporary society. The information provided by the environmental profitability indicators proposed renders more transparency to the quantification of the levels of intergenerational equity applied, thereby facilitating the difficult reconciliation of the CBA technique with the objective of sustainability.

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1. Introduction

The incorporation of the intergenerational equity objective has turned the traditional Cost–Benefit Analysis (CBA) approach into an obsolete tool for the evaluation of certain types of projects, particularly those exhibiting many environmental externalities and those whose effects extend throughout a long period of time. A series of changes in the CBA is being proposed in the literature, in order to adapt the analytical

context to the demand for sustainability, resulting in what is alternatively denominated Extended or Environmental Costs Benefits Analysis (ECBA).

From an analytical point of view, changes in the CBA are taking place in a twofold way: Firstly, by developing new tools for the economic valuation of environmental externalities that were traditionally left out of the analysis. Secondly, through an in-depth revision of the theoretical foundations underlying the traditional approaches to discounting, since

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the repercussions of decisions that are presently being debated will extend to a distant future (in some cases for centuries), whereas in the classical CBA we deal with few decades at best. Therefore, many authors are stressing the need for a modification of the Social Discount Rate (SDR) by questioning the assumptions that are traditionally taken for granted and applied in its calculation.

The present work begins with some reflections on the discounting problem drawn from a review of the different approaches found in the literature. Subsequently, we propose a number of methodological approaches and report on their application for the economic valuation of an environmental improvement project designed to stop the desertification processes in an area of south eastern Spain: The Watershed Restoration and Control Erosion Project of Lubrín (Almería, Spain).

2. Discounting in Cost–Benefit Analysis: background

Discounting has traditionally been a controversial subject. In the seventies, after the great oil crisis of 1973 that took place in the USA, this country and many others faced the need to invest in research for alternative energy sources. It was at that time that the subject of discounting began to arouse great interest among a small group of researchers, since they were dealing with investments whose benefits were not to take place until many years later. Thus in 1977, Resources For the Future (RFF) made a call for a conference to discuss the adequate discount rate for public investments in energy and other technologies, the seminal ideas of which took form in the well-known book “Discounting for Time and Risk in Energy Policy”, published by Robert C. Lind (1982), which was an outstanding contribution, and the basis, during the following fifteen years, of a widespread consensus on the subject of discounting.

However, by the mid-nineties, the apparent consensus on discounting starts to evaporate. In 1995, a report appears on the economic and social consequences of the climatic change and the policies to pursue (IPCC, 1995), in which one chapter is dedicated to subjects related to discounting and intergenerational equity (Arrow et al., 1996). Although there are frequent references to Lind's book (and to others), a general agreement on discounting is no longer envisioned and the different approaches to discounting could justify discount rates within a wide range of possibilities.

Under these circumstances, RFF once again organised an encounter in 1996. Climatic change was the example that motivated the discussion, although the conclusions in relation to discounting were meant to be generalised to all decision-making processes of intergenerational nature. Some of the questions openly put forward on that occasion that are central to the current debate and upon which we will focus our attention are the following: (1st) Should projects whose effects spread over hundreds of years be dealt simply as “extended versions” of projects whose main effects do not last more than 30 or 40 years? (2nd) If the answer to the previous question is yes, what is the appropriate discount rate to be applied? and, (3rd) If projects with significant intergenerational effects are to be valued in a different way, how should it be done?

3. Assessing discounting approaches

Many are the ethical, philosophical and economic arguments in favour of discounting future costs and benefits¹ (Pearce and Turner, 1990; Broome, 1992; Lind, 1982); however, for some authors, (see, for instance, Pearce and Turner, 1990) the use of a positive Social Discount Rate is incompatible with the intergenerational equity objective. The present debate on discounting environmental benefits and costs is centred on the inconsistency of discounting with the philosophy of sustainability. In other words, discounting is paramount to undervaluing the future, which means that future generations' preferences count less than our own present ones. As we shall see further down, any discussion on discounting will be closely related to the discussions on the various theoretical conceptions of sustainability.

The conclusions drawn from the previously mentioned RFF 1996 conference, which have been gathered by Portney and Weyant (1999), evidence once again the differences in opinion in relation to discounting in the scientific community and the various ethical positions held. The authors make two clear-cut case distinctions in the subject under debate: short to mid-term projects (40 years and under) and projects of a lengthier time span. One issue all the authors in the book agree on, with one exception, is that of considering it appropriate — even essential — to discount future benefits and costs with some positive discounting. Regarding the short to mid-term time span (40 years and under), most authors believe that failing to discount future benefits and costs would be damaging to future generations, and that the appropriate discount rate in this case is the capital's opportunity cost. Other experts, albeit a minority, are in favour of lower discount rates in this case also. It is in regard to longer time spans than these that the authors most clearly disagree.

Generally speaking, in the environmental discounting² literature, where projects carrying an intergenerational impact receive special attention, the different authors tend to favour one of the following options:

- To question the appropriateness of the Economic Welfare Theory, and consequently of the CBA technique, as the right approach in the decision making process when dealing with climate change policies, and in general with other problems bearing significant intergenerational consequences.³

¹ Some of the main arguments used to justify the use of a positive social discount rate, specifically of the so-called social time preference rate (STPR), are: a) the argument based on the psychological discount caused by the individuals' short-sightedness in looking into the future, whereby any future satisfaction seems less important than that in the present; b) the decreasing social consumption marginal utility argument over time; and c) the uncertainty argument.

² We use this denomination to refer to discounting associated with projects involving important intergenerational repercussions, usually because they have a long term impact on the environment.

³ Some of the authors that question the use of ECBA are Sagoff, 1988; Bromley, 1990; Vatn and Bromley, 1994; Munda, 1996; Goulder and Kennedy, 1997; Joubert et al., 1997; Goulder and Kennedy, 1997; Prato, 1999; Neumayer, 1999b; Martínez-Alier and Roca-Jusmet, 2000. Researchers that favour the use of ECBA are, among others, Navrud (1992) and Hanemann (1994).

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