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Contrasting Values in the Sustainability Debate: Limitations of Economic Valuations and their Role in Decision-making

Abstract

This paper explores some of the more controversial conceptual issues surrounding ecosystem valuations in monetary terms along with their role in the greater decision-making process. I argue that there is an urgent need to be explicit about the underlying social goals being pursued by any given policy/action and that the degree in which a given policy makes trade-offs between achieving each goal should also be transparent. In the context of the sustainability debate, economic valuations of ecosystems can provide missing information necessary for achieving the goal of allocative efficiency, but they must be accompanied by a similar 'conversion' of how much economic activity 'contributes' to the goal of ecological sustainability.

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1.0 Introduction

The past few decades have witnessed a growing body of literature concerned with analyzing different notions of value and proposing methodologies for valuation relevant to decision-making on the human uses of ecosystem services (Farber et al., 2002; de Groot et al., 2010). When it comes to the monetary valuation of ecosystems, the issue is often controversial because of formidable challenges related to valuing and then aggregating many ecosystem components – both marketed and non-marketed – to arrive at a single price that convincingly reflects (economic) value (Rothman et al., 2003). Monetary valuations of non-market ecosystem services are usually undertaken using the argument that a common metric allowing for their comparison with economic services and manufactured capital is needed in order to inform policy decisions (Costanza et al., 1997a). Meanwhile, critics of monetary valuations abound on both conceptual and methodological grounds. Among others, a major argument against ecosystem valuations is that there is a non-trivial loss of information through the process of reducing multifaceted ecosystem characteristics to a single, monetary, metric (Vatn and Bromley, 1994).

The purpose of this paper is to explore reasons for the lack of consensus on how best to account for the ecosystem services that nature provides to society (often for 'free'). Why is it so hard to agree on what is, or is not, sustainable? In order to get a handle on the fundamental concerns at stake, I explore some of the more controversial conceptual issues surrounding ecosystem valuations in monetary terms and their role in decision-making. The remainder of the paper is structured as follows. Section 2 discusses notions of value and the utilitarian underpinnings of neoclassical economics. Section 3 explores some of the conceptual limitations identified with respect to the economic valuation of ecosystems. Section 4 describes a two-tiered decision structure useful for framing the role of monetary valuations in the greater decision-making process and stresses the need for multiple criteria in evaluating policies. Section 5 concludes.

2.0 Notions of Value, Utilitarianism and Neoclassical Economics

Beginning with Plato and Aristotle, the history of western philosophy is filled with attempts to establish the role of values in questions surrounding ethics and moral judgements, such as what is morally right or wrong, good or bad, responsible or just (Zimmerman, 2010). Without delving too deeply into nearly 2,500 years of philosophical debate, value will be defined here using the widely cited definition from Costanza (2000) as "the contribution of an item to meeting a specific goal or objective". The specific goals or objectives that give rise to an item's value - whether that item is a football player, a coastal lagoon or a night's stay in a 5-star hotel – ultimately originate in societal norms and institutions – or value systems – that guide human judgements and action (Farber et al., 2002). Valuation can therefore be seen as the practice of expressing a value for a given action or thing, thus allowing for observation, measurement and some degree of comparison with other valued actions or things (ibid).

There are two important points to note from the above: i) something only has 'value' if it is contributing to a specific social goal; and ii) in the presence of multiple social goals, the same item can have more or less value depending on which goal is being pursued. When expressing economic value using conventional monetary valuation methods, it's important first to be clear about the underlying goal of neoclassical economics[1] in comparison to other social goals that (logically) each have their own values.

1 The terms 'neoclassical', 'conventional' and 'mainstream' are used interchangeably throughout the text.

2.1 Utilitarianism and Neoclassical Economics

Mainstream economics is grounded in the philosophy of utilitarianism arguing that the morally right action is the action that produces the most good for the greatest number of people (Goulder and Kennedy, 1997). Utility is understood to be a measure of relative satisfaction or pleasure leading many utilitarians to call for society to be organized so that total individual utilities are maximized (Driver, 2009). Using the definition of 'value' from the previous paragraph: *a good or service's economic value can be seen as its contribution to the goal of individual utility maximization* (Costanza, 2000). An important point to note is that economic value is profoundly *instrumental*: things are only economically valuable as instruments towards the ultimate satisfaction of the *intrinsic* good of human pleasure or utility (Goulder and Kennedy, 1997).

A long-standing challenge with the utilitarian line of reasoning as a practical means to organize society is that relative utility (human pleasure) cannot be meaningfully measured and compared directly across people (Marshall, 1920). For example, there is no way to quantify the pleasure I experience from spending a sunny day at the beach that permits a direct comparison with the pleasure you experience from that same sunny day. The economists' solution has been to measure utility indirectly using a specific set of assumptions regarding the preferences revealed when individuals are observed making choices for one good or service over another at market prices, in the presence of constraints (Farber et al., 2002). Using the example of my sunny day at the beach, economists assume that my utility *is* higher than yours if I, given my limited time and money, am willing to pay more than you both directly (e.g. transport and user fees) and/or indirectly through the opportunity cost of time spent at the beach not spent doing something else (e.g. working).

Neoclassical economic theory seeks to determine the optimal price of a given good in a market through the equilibrium quantity of demand and supply governed by the circular flow of exchange between households (consumers, labour) and firms (producers, employers) (Weintraub, 2007). It is based upon three central assumptions: i) people have rational preferences among outcomes; ii) individuals maximize utility and firms maximize profits; and iii) people act in their own self-interest on the basis of complete information (ibid).

Contemporary branches of mainstream economic thought concerning consumers, producers, welfare, labour, the environment, etc. are built upon these three central assumptions. When it comes to reasons why an individual with limited resources chooses good *x* over good *y* in a market, mainstream economists have had a fair degree of success. However, when it comes to society-level decisions that compromise the sustainability of ecosystem services, conventional economic models have been heavily criticized due to the simplistic behaviour of neoclassical *Homo economicus* (Persky, 1995).

3.0 Conceptual Limitations of Economic Valuations

Critiques of the assumptions of economics are not new. Indeed, Persky (1995) provides a historical account of critiques of *Homo economicus* dating back to the early 19th century. This section identifies four broad limitations from the literature related to the economic valuation of ecosystems: i) intrinsic values; ii) different forms of utilitarianism; iii) equity issues; and iv) sustainability issues.

3.1 Intrinsic Values

Some people feel that protecting the environment and/or other species from harm has a value beyond the utilitarian contribution to pleasure it gives to the person or society doing the protecting. Rather, it is argued that an ecosystem or species has an intrinsic right to a

healthy and prosperous condition that ought to be protected on moral grounds independent of whether or not humans derive satisfaction from it (Farber et al., 2002). In this view, a different social goal is sought whereby the value in protecting an ecosystem would be measured by the contribution of that protection towards the goal of *ecological sustainability*, not utility maximization. Most importantly, the two goals discussed so far – ecological sustainability and utility maximization – generate different, and possibly conflicting, concepts of what policy or action would be considered 'valuable' even when dealing with the same ecosystem. In fact, the argument for recognizing the intrinsic rights of ecosystems on par with, for example, human rights moves beyond adding up ecosystem 'values' altogether and would instead base the decision-making process on whether or not such rights would be violated by various policy alternatives (Goulder and Kennedy, 1997). In this sense, similar to decisions concerning human rights violations, conventional economic analysis would have little to offer decision-makers.

3.2 Strong and Weak Forms of Utilitarianism

Many ecologists and economists can agree on a utilitarian notion of value if one defines the concept of utility broadly enough to allow ecosystem services to contribute to individual satisfaction through three broad uses: i) directly (e.g. consumption, recreation); ii) indirectly (e.g. flood protection, erosion control); and iii) non-uses (simply knowing something exists) (de Groot et al., 2010). Goulder and Kennedy (1997) refer to this as a 'weak' form of utilitarianism. The authors distinguish between 'weak' and 'strong' forms of utilitarianism in order to help explain the uneasiness many ecologists feel with respect to monetary valuation of ecosystems in economic cost/benefit analyses (CBA). Essentially, the strong form of utilitarianism makes the additional assertion that the value of an ecosystem service to *society* can be obtained by adding up *individual* utility values. This strong form of utilitarianism is inherent in CBA and convenient as a means to rank aggregate net benefits across alternative policy options. However, it makes many ecologists nervous when it comes to poorly understood ecosystem services because it accords equal weight to all individual preferences in society when aggregating those net benefits (Goulder and Kennedy, 1997). In other words, ecologists (and others) argue that some people's preferences ought to count more than others (e.g. expert opinion) when deciding upon human uses of highly non-linear ecosystems. This is especially true when it comes to the uncertain science of recognizing critical ecological thresholds – or tipping points – whose crossing would cause irreversible and potentially catastrophic consequences (Farber et al., 2002). In this view, an intermediate position held by this author is that analyses of costs and benefits alone are not sufficient to determine the best policy option that would impact a given ecosystem, however they can provide useful information for weighing various alternatives in conjunction with ecological and social indicators[2].

3.3 Equity Issues

There is a long-standing debate in welfare economics surrounding the supposed trade-offs between equity and efficiency (Dinwiddy and Teal, 1996). Essentially, conventional microeconomic analysis begins with a *given* endowment among individuals and/or allocation of productive assets among firms that can potentially be re-allocated more efficiently according to some decision-making rule, usually the Pareto Criterion (ibid). A Pareto efficient allocation is one where it is impossible to re-allocate commodities or factors of

2 See Vatn and Bromley (1994) for a more extreme position claiming that monetary valuations of ecosystems are neither sufficient *nor* necessary for decision-making about the environment

production that would make one person better off without making somebody else worse off (Varian, 2005). A less stringent criterion that forms the basis of most cost-benefit analyses is the Kaldor-Hicks "Compensation Criterion" that would re-allocate endowments/allocations as long as those who gain could *theoretically* compensate those who lose (Feldman, 1998). In either case, by accepting existing endowments/allocations as the starting point of analysis, conventional economic models are criticized for ignoring normative questions surrounding distributional justice between: i) rich and poor (equality); and ii) present and future generations (intergenerational equity) (Costanza, 1997b).

In terms of intergenerational equity, much research has gone into the appropriate selection of discount rate(s) for expressing individual time preferences though the issue remains highly contentious, especially for long time horizons (Gollier and Weitzman, 2010). For equality, cost/benefit analyses are regularly criticized because they often assume (implicitly) that everybody in society values a gain or loss of income equally despite strong evidence suggesting that marginal utility declines as income increases (Layard et al., 2008). Distributional weights are sometimes placed on particular (usually disadvantaged) groups' benefits in cost/benefit analyses though this practice is also controversial (Harberger, 1978).

3.4 Contrasting Views of Sustainability

Conventional economic models often imply some degree of substitution between stocks of manufacturing capital, human capital and natural capital so that the mainstream – or 'weak' – criterion for sustainability rests on maintaining total *net* capital stocks (Gowdy, 2000). In contrast, the 'strong' sustainability perspective holds that natural capital stocks are not substitutable and should be accounted for apart from other forms of capital (Rees, 2003).

There are two fundamental differences between the 'weak' and 'strong' sustainability paradigms. The first difference is more conceptual whereby proponents of 'strong' sustainability argue that *any* decrease in natural capital stock is not sustainable whereas 'weak' sustainability adherents hold that a decrease in natural capital stock can be sustainable if offset by increases in manufacturing and/or human capital stocks (Arrow et al., 2004). The second fundamental difference is related but has to do with units of measurement. Empirical methodologies designed under the 'strong' sustainability paradigm report results in biophysical units (e.g. area, net primary productivity, emissions, etc.) whereas methodologies following the 'weak' sustainability criterion typically utilize monetary units and/or indices to report results. Measures of 'strong' sustainability such as the 'Ecological Footprint' typically report the consumption patterns of wealthy countries as the most unsustainable (Rees, 2003). At the same time, measures that correspond to the notion of 'weak' sustainability usually report these same countries as sustainable (Arrow et al., 2004; UNU-IHDP and UNEP, 2012)[3].

4.0 The Role of Economic Valuations of Ecosystems

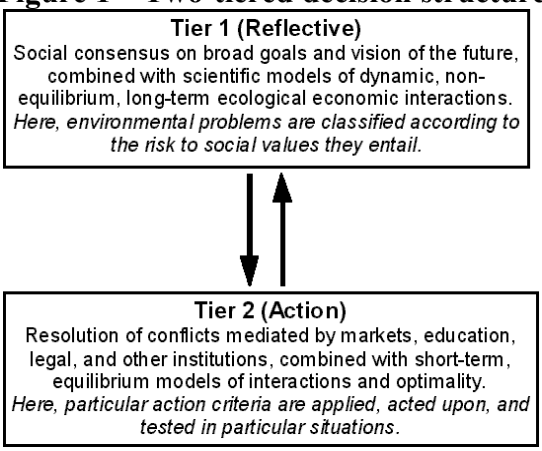
From the conceptual limitations identified in the previous section, three largely independent social goals arise: i) ecological sustainability; ii) just distribution; and iii) allocative efficiency (Daly, 1992). Mainstream economic models assuming perfect substitution between capital stocks and striving for Pareto efficiency from a given endowment have little or nothing to say with respect to the first two goals. This is not to throw away conventional economic models altogether but merely to recognize their role in

3 See Wilson et al. (2007) for an interesting analysis of the conflicting results given by various global sustainable development indicators

the greater decision-making process that must also confront ecological and social realities in our increasingly 'full' world (Costanza et al., 1997b).

Norton et al. (1998) describe a two-tiered approach to decision-making that I find incredibly useful for envisioning the role of cost/benefit analyses and ecosystem valuations in the greater process of human-ecological organization (Figure 1). The first tier is reflective and requires social goals to be built around a vision of the future shaped by public discourse and negotiation or "value formation through public discussion" (Sen, 1995). The second tier puts the social goals agreed upon into practice by selecting decision-making mechanisms (including, inter alia, cost/benefit and cost-effectiveness analyses) for specific contexts.

Figure 1 – Two-tiered decision structure



Source: Norton et al. (1998)

Essentially, the reflective tier has built/is building social consensus around the argument that unsustainable development poses a threat to other social goals – for example, the Millennium Development Goals – leading to calls for action (Tier 2) that reduce environmental risks through context-specific management policies (World Bank, 2010). Cost/benefit analyses that include monetary valuations of non-market impacts are argued to provide decision-making criteria for choosing the 'best' option among various policy alternatives (Stage, 2010). Most importantly, the arrows moving in both directions in Figure 1 are meant to show that it is possible to return to the reflective tier to re-examine the choice of cost/benefit (or any other) decision-making criteria in the action tier based on new evidence from decisions made (Norton et al., 1998).

The sustainability debate is creating some pressure in the reflective tier to move beyond the mainstream monetary cost/benefit decision rule towards an integrated multi-criteria decision whereby monetary valuations play a role alongside ecological and social indicators. For example, Recommendation 39 of the United Nations Secretary-General's High-Level Panel on Global Sustainability (2012) is to develop a common set of indicators to measure sustainable development by 2014.

However, as per the theme of this conference, there are clearly a number of 'missing points in the dialogue' leading to the very open question of whether the current sustainability debate can lead to the type of timely and large-scale action needed to avoid irreversible ecological degradation (with accompanying social unrest). In this sense, the take-home message of this paper is that there is an urgent need to be explicit about the underlying social goals being pursued by any given policy/action. Most importantly, many policies are designed to accomplish multiple social goals (e.g. 'win-win' policies) but it is imperative to recall that each social goal has a distinct definition of how any particular action is considered

more or less 'valuable' (e.g. how much it contributes to the goal in question). Thus, not only must social goals be made explicit but the degree in which a given policy makes trade-offs between achieving each goal should also be transparent.

In the context of the sustainability debate, economic valuations of ecosystems can provide missing information necessary for achieving the goal of allocative efficiency, but they must be accompanied by a similar 'conversion' of how much economic activity 'contributes' to the goal of ecological sustainability. Examples of some of the most promising work in this regard is related to energy and emergy analyses of the economy that, unlike market-based analyses, uphold the Laws of Thermodynamics (Ayres et al., 1996; Odum, 1996; Cleveland et al. 2000, Brown et al. 2009).

5.0 Conclusion

Values play an important, often implicit, role in everyday life. In this paper, I argue that discussions surrounding monetary valuations need to be explicit about the overall goal of mainstream economic models (e.g. utility maximization). Issues surrounding intrinsic values of ecosystems, aggregation, equity, and differing sustainability paradigms were identified as limitations of economic valuations. In order to promote ecologically sustainable economic policy, information obtained via economic valuations needs to be viewed within a multi-criteria valuation process that encompasses a variety of social goals (e.g. ecological sustainability, allocative efficiency and just distribution, to name a few). Failure to do so not only compromises the relevance of the monetary valuation undertaken but also provides potentially misleading information to decision-makers that can have dire consequences for the environment and future generations.

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