Valuation of First Nations peoples' social, cultural, and land use activities using life satisfaction approach☆

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ABSTRACT

Social, Cultural, and Land Use (SCLU) activities of First Nations peoples of Canada are valued using a two-layer multi-domain – Financial, Health, Housing, and SCLU – model of life satisfaction. The model was estimated using primary data and 2SLS and 3SLS·The SCLU domain contributed more than twice than the Financial domain to general satisfaction (GS). SCLU activities, such as trapping days, gathering days, traditional diets, quality of time spent on gathering and trapping, and satisfaction with land laws made significant contributions to GS. In terms of elasticities, the quality of time spent on gathering was the most important contributing factor.

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1. Introduction

Ecosystem services (ES) contribute to First Nations (FN) peoples' wellbeing through social, cultural, and land use (SCLU) activities (Sangha et al., 2011). The focus of the ES evaluation literature has been on revealed-preference methods such as hedonic-price and travel-cost methods and stated-preference methods such as contingent valuation and choice experiments. An overwhelming majority[i] of these valuation studies has been conducted in areas where the market plays a dominant role in the allocation of goods and services and the basic values of the society – individualism, materialism and control over nature – legitimize such role. In such societies estimated marginal willingness to pay for ES may provide a good approximation of their value in the absence of market information. These methods may not be appropriate, however, in social systems and contexts where the dominant values are incompatible with those values that enable market processes to function.

We contend that the social, cultural, and economic context of the FN peoples of Canada[ii] is different than the contexts of those peoples living in western market economies and is incompatible with either the revealed- or stated-preference methods. The FN peoples' worldview is based on collectivism, non-possession, and respecting and living in harmony with nature (Mussell et al., 2004). Social, cultural, and spiritual activities are the main source of their wellbeing, and these activities are highly connected to the land and ecosystems (Parsons and Prest, 2003). Decreasing access to natural resources is restricting the social, cultural, and spiritual activities of FN peoples, specifically those living on reserves,[iii] and has a profound negative impact on their wellbeing (Richmond et al., 2005).

The valuation of SCLU activities, therefore, is critical to the design of FN peoples' welfare programs. Prior efforts to evaluate the contributions of SCLU activities have used market-oriented valuation methods such as the replacement cost method (Usher, 1976), the hedonic wage method (Duffield, 1997), and choice experiments (Adamowicz et al., 2002).

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[i] Some studies, such as Swallow and Woudyalew (1994); Kant (1997) and Alam (2006) used willingness to contribute time or labor.

[ii] The indigenous peoples of North America and their descendants are known as Aboriginal peoples. About 60% of the Aboriginal peoples of Canada belong to First Nations while remaining belongs to Inuit and Métis.

[iii] A "reserve" is a government-owned land set aside by the Canadian government for the use of a First Nation's people.

These studies share some common problems associated with the valuation of FN land use activities, such as the failure to account non-substitutability of land use activities with market commodities (see discussion in Adamowicz et al., 1998).

In addition to these FN context specific problems, stated- and revealed-preference methods suffer from other limitations. For example, the Hedonic Price Method invokes the assumption of weak complementarity between private and public goods and thus typically generates biased estimates. This is so because equilibria in private good markets are rare due to sluggishness in price changes, lack of full information, and associated transaction costs (Frey et al., 2009). Similarly, the credibility and validity of stated-preference methods may be uncertain due to their hypothetical and upward-bias, and scope and embedding effects (Hausmann, 2012).

In response to these challenges we employ a life satisfaction approach (LSA) for evaluation of SCLU activities of FN peoples. This approach is especially appropriate in societies where the population's engagement in markets is low and where markets for SCLU activities do not exist or are ineffective, as is the case in most FN of Canada.

This paper is a part of a larger project on the subjective wellbeing of FN peoples in Canada. The social and cultural determinants of health have been presented in Kant et al. (2013). A path analysis of the direct and indirect linkages between overall wellbeing, different domains' wellbeing, and the exogenous factors contributing to domains' wellbeing have been presented in Kant et al. (2014). The path analysis provided correlations and not causal relationships. The main objective of this paper is to extend our previous analysis to the valuation of SCLU activities that requires unbiased and consistent estimates of the contribution of SCLU activities to the total satisfaction with life. The objective is achieved by using advanced techniques of multiple regression equations which generate consistent and unbiased estimates of the relative values of land use activities. We have also refined the conventional LSA estimation methods, so that they can be applied to the valuation of SCLU activities.

We start by describing the LSA approach and our refinements to the approach. Next, we present a theoretical model of FN peoples' life satisfaction, and describe the data collection and estimation methods. It is followed by the discussion of estimated model, comparative values of SCLU activities, and implications of results, limitations of the study and conclusions.

2. The life satisfaction approach

The LSA overcomes several of the problems associated with the revealed- and stated-preference methods. The LSA is not affected by the hypothetical nature of questions, unfamiliarity of the task under valuation, and strategic behavior of respondents (Frey et al., 2009). It also avoids some of the problems of lack of consideration of budget constraints and trade-offs among several substitutes that are reported in contingent valuation research (Kahneman and Sugden, 2005).

Compared to revealed-preference methods, the LSA has at least four advantages: (i) capturing individual welfare in the absence of market equilibrium; (ii) capturing effects of externalities on life satisfaction even when these externalities are not noticed by the individuals; (iii) capturing the full utility consequences, on the basis of experienced utility, independent of the degree of market capitalization; and (iv) lowering the effects of risk perception distortions (Frey et al., 2009). The LSA does not rely on the assumptions of rationality and perfect information (Ferreira et al., 2006). The advantages of LSA in assessing public goods have been demonstrated through a large number of studies that include evaluation of air pollution (Welsch, 2006; Luechinger, 2009), airport noise (Van Praag and Baarsma, 2005), climatic conditions (Rehdanz and Maddison, 2005; Brereton et al., 2008), and natural environments and land areas (MacKerron and Mourato, 2013; Kopmann and Rehdanz, 2013).

The attributes of LSA suggest it as the most appropriate approach for the valuation of public goods in social and cultural contexts where

market processes do not play a significant role and explicit decisions about trade-offs among land use activities and market goods are not well accepted[iv] as is the case of valuation of FN peoples' SCLU activities. Our study also indicated the need to introduce refinements in the methods of data collection and analysis used in the LSA in the context of its application to FN peoples.

One of the conditions necessary for the LSA application is that subjective well-being is all inclusive (Frey et al., 2009) and the time-period of life satisfaction is clearly identified (Van Praag and Ferrer-I-Carbonell, 2008, p. 81). Prior studies using secondary data did not meet these conditions (Van Praag and Ferrer-I-Carbonell, 2008, p. 81) because lack of control over the questions asked. We used primary data collected with special care to ensure inclusiveness and identification of the time-period.

On the data analysis front, most LSA-based valuation studies have included a single public good (measured by either one or few aspects, e.g., air pollution measured by NO_2 and SO_2) and income as the only two contributors to life satisfaction (utility) and social, economic, and geographical controls. In these estimations, either explicitly or implicitly, it is assumed that the trade-offs are between income and only the public good to be valued, and any other public good either does not contribute to the life satisfaction or is already monetized through perfectly competitive markets. Arguably, the inclusion of only one public good while knowing the possible contributions of other public goods (not traded in the market) to life satisfaction leads to the problem of omitted variables. We address this problem by using the two-layer model suggested by Van Praag and Ferrer-I-Carbonell (2008, p. 92) and including all relevant SCLU activities that may contribute to the subjective well-being of FN peoples.

The problem of endogeneity of key variables, specifically of income, due to missing variables is well recognized in the studies using single equation estimation of life satisfaction (Clark et al., 2008). Some studies, such as Luechinger (2009), have used predicted income to address endogeneity of income while others, such as Welsch (2006), have ignored it due to lack of persuasive instruments. Van Praag and Ferrer-I-Carbonell (2008, p. 86–92) used a missing psychological trait, called a Z factor, to address the problem of endogeneity in their two-layer model. It seems that in the single equation and two-layer models, the problem of endogeneity has not been addressed to the possible extent.[v] We use three mechanisms, the Z factor, two-stage least square (2SLS), and three-stage least square (3SLS) methods, to address the problem of endogeneity to a higher extent.

Finally, most public goods valuation studies through LSA focus on their monetization. In the context of FN, however, the monetization may not be that meaningful due to the absence of markets even for private goods (such as housing) that can be treated as complementary to public goods. Hence, we focus on developing a comparative perspective, rather than assigning dollar values, of the contributions of SCLU activities. We present and discuss marginal contributions of different domains and elasticities of GS with respect to SCLU activities and other factors.

3. First Nations peoples' life satisfaction model (LSM) and data collection

The central theme of LSA studies is the concept of overall life satisfaction, known as General Satisfaction, comprising of satisfaction in key domains (Cummins, 1998; Van Praag and Ferrer-I-Carbonell,

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iv This does not mean that the First Nations peoples do not make trade-offs; they do make trade-offs among different land use activities and among different on-reserve and off-reserve employment opportunities.

v Van Praag and Ferrer-I-Carbonell (2008, p. 90 and 91) did not use Z factor in the estimation of domain equations and also did not discuss the implications of non-significant coefficients of the Z factor in the GS equation for four samples. Even the significance of Z factor does not necessarily mean that there is no endogeneity in the estimated model because it explained only about 50% variance.