Analysis

Is Environmental Income Reporting Evasive in Household Surveys? Evidence From Rural Poor in Laos

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ABSTRACT

Literature has consistently reiterated that the self-employed non-poor underreport their business income to tax authorities and in household surveys. In this work, we measure the extent to which poor households engaging in illegal environmental activities underreport income in Laos. We use a two year panel data and apply the Engel curve to detect and estimate the reporting gap. We further use a switching probit regression to identify the factors of income underreporting and its impact on income poverty outcomes. Results show that on an average, rural households who earn at least a quarter of their income from the environment underreport by over 50% in household surveys resulting in overestimation of income poverty. Moreover, we find that a perceived threat to food security drives rural poor to engage in illegal environmental extraction.

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1. Introduction

In the recent years, with the advent of environmental regulation in developing countries; illegal trade of environmental goods has increased many folds (Clarke et al., 1993; Skonhoft and Solstad, 1996; Copeland, 1991). But as pointed out by Angelsen et al. (2014) environmental income is a vital component of rural livelihoods and is also known to alleviate poverty as found by Alix-Garcia et al. (2015). However, little is known as to the extent of underreporting of environmental income by the rural poor in developing countries in household surveys. Also, most household surveys only capture income data as it is more economical than collecting consumption expenditure details. Hence income based poverty measures from these data surveys could be misleading and can result in overestimation of poverty.

To address these gaps, our study has a twofold objective. First, we estimate the magnitude of environmental income underreporting by rural households. Second, we examine the determinants of underreporting environmental income in household surveys and its consequent impact on income based poverty measure. To our best knowledge, this is the first work to make this attempt.

We use two year panel data from Lao People's Democratic Republic (hereafter as Laos) as it is known to have illegal environmental trade resulting in a decline in its forest cover (Forest Trends, 2014). Also there exists a poverty-environment nexus in Laos as noted by Dasgupta et al. (2005). The Laotian poor are extremely dependent on environmental resources to complement to their household income shortfalls. But the forest land and water surface are claimed as state-owned property (Forest Trends, 2014). However, the government does not have sufficient human power to effectively manage these resources and enforce the regulation. Hence, although the rural residents have no legal access to it, nevertheless, they exploit these environmental resources for their survival, in contravention of prevailing regulations.

We estimate u'nderreporting by applying a modified Engel curve method based on a combination of Pissarides and Weber (1989) and Hurst et al. (2014) methodology. This approach uses reported levels of consumption expenditures to predict the true income of households. Furthermore, we use an endogenous switching probit model to understand the characteristics of Laotian households that are more likely to underreport and its impact on income poverty. Our results indicate that the extent of income underreporting is high in households who have at least a quarter of their income from environmental activities due to which income based poverty is overestimated.

The rest of the article is organized as follows. The next section reviews literature followed by the methodological framework presented

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in Section 3. Section 4 describes the study region and data collection. Section 5 discusses the results and Section 6 concludes with some policy recommendations.

2. Literature Review

Underreporting of self-employed business income appears to be increasingly the norm in developed (e.g. Blau, 1987) and developing countries (e.g. Alm et al., 1991). Evidence consistently confirms that households methodically underreport self-employed business income to tax authorities (e.g. Feinstein, 1991; Alm et al., 1993; Johansson, 2005; Haider and Solon, 2006) as well as in household surveys (Meyer et al., 2009; Hurst et al., 2014). While the reasons to underreport earnings to tax authorities are obvious in terms of tax avoidance, the motives to misreport income in household surveys are attributed more to being consistent with information given to tax authorities due to data confidentiality concerns. Nevertheless, these studies largely pertain to underreporting of legal business income. However income underreporting can also arise due to illegal sources of earnings from underground economy as noted by Feige (1990).

Thereby literature has amply documented underreporting of the self-employed business income to tax authorities and more recently in household surveys. But what was less known; with the advent of environmental protection policies in developing countries, is whether the rural poor underreport their income illegally generated from environmental resources. Our work bridges this gap in literature.

But the poor have always relied on the environment as an alternative livelihood resource and used it as a safety net against income vulnerabilities and shocks (Heubach et al., 2011; Nguyen et al., 2015). Therefore, strict environmental protection can infringe into the rural household economics forcing the poor to participate in illegal hunting, fishing, collecting and logging from prohibited and controlled areas (Casson and Obidzinski, 2002; Le Gallic and Cox, 2006; Johannesen, 2005). Also, in many developing countries, it is also the case where the state declares its ownership to the resources—forests and water surfaces (state property), but it is unable to control, leading to the situation of not just *de jury* state property but de facto open access (Nguyen et al., 2017). This illegal environmental income is largely underreported by the rural households to concerned authorities. But it is also misreported in household surveys. This could be due to confidentiality concerns and the nature of illegality attached to the earning source.

Our work contributes to two different literatures. First, although many studies have validated the significance of environmental income to poor rural livelihoods (e.g. Adhikari et al., 2004; Babulo et al., 2009; Angelsen et al., 2014; Nguyen et al., 2015), our work adds to this literature by identifying reporting errors. Second, we show that underreporting is not just limited to firms (e.g. Pomeranz et al., 2017) or self-employed business income (Hurst et al., 2014; Alm et al., 1993; Saez, 2010; Moskowitz and Vissing-Jørgensen, 2002) but it can also include illegal environmental income of poor rural households.

Thereby we hypothesize that many poor households systematically underreport their environmental income in household surveys, especially when it forms a major component of total household income. We also theorize that income poverty estimations based on rural household survey data where environmental income plays a major role may overestimate income poverty.

3. Theoretical Framework and Methodology

We base our methodology on the theoretical model following Pissarides and Weber (1989) and the Engel curve. This model takes note of hidden household income while accounting for the relationship between income and food consumption. More specifically, they describe the model as below:

$$\text{Food consumption(log)} = f(\text{vector of household characteristics}, \text{permanent income (log)}) \tag{1}$$

But permanent income is not always accurately reported and there is a difference between permanent income and actual reported income. Assuming that food consumption is similar for otherwise comparable self-employed and salaried households, they use an Engel curve approach to detect the differences in food consumption behaviour of the two groups. They attribute this difference to underreported income. We follow this framework in our estimations.

Our empirical strategy has two parts. In the first part, we detect if rural households underreport environmental income and the extent of underreporting by using a modified Engel curve approach. In the second part we determine the characteristics of households who are more likely to underreport. We further analyse the impact of underreporting to household surveys on income poverty outcomes by applying an endogenous switching probit regression.

3.1. Detection of Environmental Income Underreporting

In this work, we follow Sjaastad et al. (2005) and consider income from naturally grown forests and adjoining water bodies that effortlessly provide goods or services as environmental income.[1] Thereby, we consider income from fishing, hunting, collecting and logging as environmental income.[2]

We apply the Engel curve methodology following Pissarides and Weber (1989) that uses the connection between income and food consumption expenditures of salary earners and self-employed to detect actual income. We extend this concept to environmental income underreporting.[3] The basic concept is to estimate consumption for all households but to have a dummy for households who have a major share of environmental income along with other control variables like household characteristics, regional and year dummies. The propensity to consume food is expected to be the same for both households. Therefore the environmental income dummy will disclose the part of earnings not reported by households with environmental income.

The underlying assumption of this approach is that the estimated gap in food expenditures is attributed to income underreporting. Although heterogeneity in preferences can cause differences in spending habits, nevertheless food cannot be classified as a business expense (Kukk and Staehr, 2014). Moreover, durable goods have larger price differences. We estimate the Engel curve following Hurst et al. (2014) as below

$$\text{Log C}_{ijt} = \alpha_j + \beta_J \log Y_{ijt}^{perm} + \Omega_j X_{ijt} + \omega R_{Jt} + \mu T_{Jt} + e_{ijt} \tag{2}$$

where, $J = E$ indicates households with environmental income share above 25% in total income and $J = F$ indicates households with no environmental income or <25% share of environmental income. C_{ijt} refers to food consumption expenditure in logarithms, β_J refers to the propensity to consume, $\log y_{ijt}^{perm}$ is the permanent component of income in

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[1] Based on Sjaastad et al. (2005, p. 45) we consider environmental income as income from natural capital like tress, forests, fish from water bodies as environmental income. They do not have any human intervention or effort in their creation.

[2] We do not include income from cultivated forest plantations, agricultural or aqua cultural farms as specified by Angelsen et al. (2014). They define environmental income as the income generated from the wild and uncultivated environmental resources.

[3] The approach of Pissarides and Weber (1989) was mostly applied to estimate black economy of the organized sector. But in this study although we deal with a partially organized environmental sector in Laos, the illegal and unreported environmental income still forms a part of the black economy. Hence, we follow the same approach of Pissarides and Weber (1989) and Engel Curve to estimate income underreporting of a partially organized Laotian environmental sector.