



A comparative study of transaction costs of payments for forest ecosystem services in Vietnam



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ABSTRACT

Two payments for forest ecosystem services (PFES) schemes under one common legal-institutional coordination mechanism but different historical-institutional background and organizational design are analyzed to measure and explain their transaction costs (TC). Data on TC related to payment transfers and conditionality compliance are collected using a combination of in-depth interviews with local PFES scheme coordinators, site visits, and secondary data analysis. The two PFES schemes show substantial differences in TC despite the fact that they emerged from the same legal-institutional framework due to differences in participation rates, types of forest ecosystem services providers, and payment characteristics.

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1. Introduction

Forests are vital to human life with regard to the ecosystem services they provide. These services include provisioning (e.g. food, fresh water, wood and timber), supporting (e.g. nutrient cycling and primary production), regulating (e.g. climate and soil regulation), and cultural services (e.g. recreational activities and aesthetics) (MEA, 2005). To better protect and conserve natural forests while sustainably exploiting their services, different policy instruments have been introduced, ranging from command-and-control to market-based incentives such as taxes and subsidies. Amongst those, there has been growing interest in payments for forest ecosystem services (PFES) as a potential market-based solution to mitigating deforestation, forest degradation, and biodiversity loss at both global and local level. Although payments for ecosystem services (PES) schemes are generally seen as a suitable tool to sustain ecosystem services (ES), their effectiveness and economic efficiency are still questionable due to a lack of empirical evidence (Muradian et al., 2010; Pattanayak et al., 2010; Liu and Yang, 2013;

Zheng et al., 2013; Naeem et al., 2015). Recent studies have identified several key issues related to PES, including (assumedly) high transaction costs (Wunder et al., 2008; Vatn, 2010; Tacconi, 2012; Cacho et al., 2013), carbon leakage (Wunder, 2008; Atmadja and Verchot, 2012), additionality (Bennett, 2010), and social equity (Pascual et al., 2010). This chapter zooms in on one of these key issues, namely transaction costs (TC).

The question of to what extent the existence of TC in PES schemes should be viewed as cost-inefficient or efficient is rather debatable, depending on the size of the TC. According to Tacconi (2012) and Cacho et al. (2013), PES schemes often incur high TC due to (i) the inherent difficulty in measuring and monitoring the actual ES being exchanged, and (ii) information asymmetry between ES buyers and providers. In contrast, some consider the incurrence of TC necessary given the “explicit trade-off between what you want to achieve and what that would cost in transactions” (Buitelaar, 2008: 181). For instance, a well monitored program and a well-designed contract (implying high monitoring and design costs) can help to secure and guarantee the transaction’s outcome, while saving on TC by not monitoring can lead to non-compliance and undesirable outcomes.

In the field of environmental economics, studies have focused on TC in agri-environmental schemes (Rørstad et al., 2007; Nilsson, 2009; Mettepenningen and van Huylenbroeck, 2009; Mettepenningen et al., 2011), water resources management (Challen, 2000; Garrick et al., 2013b; Marshall, 2013; Pannell et al., 2013), carbon (Antinori and

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Table 1
Categorization of the PES costs using the Kaldor-Hicks Tableau Format.
Source: adopted from Krutilla (2005).

| Cost component | ES sellers (forest owners) | Governmental agency/PES coordinator | ES buyers | Total financial costs |
|---|----------------------------|-------------------------------------|-----------|-----------------------|
| Land opportunity costs | C1 | | | C1 |
| Implementation costs | | | | |
| Infrastructure costs | | C2 | | C2 |
| Equipment and labour costs (A/R, avoided deforestation) | C3 | | | C3 |
| Transaction costs | aC4 | (1 - a - b)C4 | bC4 | C4 |
| Financial transfer (PES payments) | -P | | P | 0 |
| Net costs | -P + C1 + C3 + aC4 | C2 + (1 - a)C4 | P + bC4 | C1 + C2 + C3 + C4 |

Sathaye, 2007; Cacho et al., 2013) and biodiversity offset policies (Coggan et al., 2013). Concerning the TC of PES schemes, so far only a limited number of studies have been carried out, ranging from carbon sequestration (Milne, 1999; Cacho et al., 2013; Thompson et al., 2013), to watershed protection (Wunder and Alban, 2008) and bundled ES such as combined watershed protection, landscape beauty and biodiversity conservation (Asquith et al., 2008; Claassen et al., 2008; Frost and Bond, 2008; Turpie et al., 2008). In most cases, these studies seek to quantify the size of TC and identify their distributional effects across the public and private actors involved. Notably, there is neither a universally agreed definition nor measurement method for TC across these studies, *i.e.* different studies measure different types of TC using their own methodologies, thus complicating comparisons of TC between studies. While not accounting for TC will lead to overestimation of the cost-effectiveness of PES and inefficient decision-making (Pagiola et al., 2007; McCann, 2013), in many cases, a lack of sufficiently high quality data on TC is a common challenge to understand their magnitude, role, and significance.

Motivated by the current lack of understanding of PES transaction costs, this study aims to address the above discussed knowledge and information gaps, particularly in the context of PFES. More specifically we examine the costs for (i) re-distribution of payment and (ii) the enforcement of conditionality. These costs are borne by the same type of PFES scheme coordinators in two different provinces in Vietnam where the country's oldest PFES schemes are found. The coordinating organization involved is the provincial Forest Protection and Development Fund (FPDF), a governmental non-profit agency that coordinates PES programs in Vietnam at provincial level. The main research objectives are (i) to identify and quantify the magnitude of TC borne by the FPDFs, and (ii) to compare and explain differences in TC between the two schemes based on a conceptual framework underlying the key determinants of TC.

The paper is structured as follows. Section 2 introduces the background information on the analytical framework of TC determinants and the general settings and procedures of PFES in Vietnam. Section 3 describes the data collection and measurement method of TC in more detail. Section 4 presents the results on the TC estimates, followed by explanations for the variations found in the TC between the two cases. Finally, Section 5 concludes.

2. Background

2.1. Definition and identification of transaction costs in PFES schemes

Generally, the total financial costs of the PFES scheme include (Mburu et al., 2003; Adhikari and Lovett, 2006; Wunder et al., 2008): (i) land opportunity costs, *i.e.* the foregone benefits of the next best alternative land use such as agricultural revenues, (ii) implementation costs, *i.e.* expenses on labour, equipment, and infrastructures needed for implementing PES activities (afforestation, reforestation, avoided deforestation), and (iii) transaction costs, *i.e.* any costs that are left out (see Table 1). In the specific context of PES, transaction costs are the costs incurred to define (*e.g.* search, design), exchange (*e.g.* negotiation, contracting, payment handling) and enforce (*e.g.* monitoring and

enforcement) the PES transaction, while the direct implementation and land opportunity costs are the conventional costs of executing the transaction once the contracts and the associated property rights (and obligations) are defined and enforced (Krutilla and Krause, 2010). This distinction between TC and the other types of project implementation costs is independent of the stage in the project implementation process. For instance, Grieg-Gran and Bann (2003), McCann et al. (2005) and Thompson et al. (2013) suggest that in the case of public policies, PES or projects aimed at reducing emissions from deforestation and degradation (REDD), transaction costs also emerge during the implementation phase. The PES payment itself is not considered a cost, but a financial transfer between ES sellers and buyers (Pagiola, 2005).

As can be seen from Table 1, the total financial costs of PFES comprise three components: (i) land opportunity costs, (ii) implementation costs, and (iii) transaction costs. These costs are distributed differently across PFES stakeholders.⁴ Land opportunity costs (C1) are incurred by forest owners (ES sellers), while infrastructure costs (C2) are, in most cases, incurred by the government. Equipment and labour costs (C3) are again incurred by forest owners. Transaction costs are shared between forest owners, ES buyers, and the PES coordinator ($a, b > 0$ and $a + b < 1$). As PES is considered a financial transfer between forest owners (ES sellers) and ES buyers, it is cancelled out in the calculation of total financial costs. Ideally, the PES payment P should be minimally equal to the sum of C1, C3, and aC4 to make sure that the forest owners obtain positive benefits from PES.

Various definitions of transaction costs (TC) are available from the literature. TC are often described and defined in accordance with the activities involved within PES schemes (Landell-Mills and Porras, 2002; Krutilla and Krause, 2010; Garrick et al., 2013a, 2013b). These activities and associated costs include search, negotiation, contracting, implementation, verification, certification, monitoring and enforcement costs (Grieg-Gran and Bann, 2003; Wertz-Kanounnikoff, 2006). Another way to categorize TC is to focus on the timing when costs occur, such as one-off start-up (*e.g.* search, design, and negotiation costs) and recurrent costs (*e.g.* monitoring and enforcement costs). While one-off costs occur *ex ante* the transaction's operation and can be considered sunk costs once programs are up and running, re-current costs come about *ex post* (Wunder et al., 2008). Lastly, TC can also be defined and classified based on their distributional effects across public and private participants in a transaction such as public (*e.g.* policy formulation and administrative costs) and private costs (*e.g.* information costs) (Krutilla and Krause, 2010).

In this study, we focus on characterizing and quantifying TC recurrently incurred during the transactions between ES providers and ES users. Here we define a typical PFES transaction based on Wunder (2005) as a two-way procedure, where ES buyers offer payments to ES providers, if and only if ES providers are able to adequately deliver the ES of interest to the buyers (*i.e.* ES providers are checked if they

⁴ The total financial costs are, by definition, the sum of all cost components, *i.e.* the sum of C1, C2, C3, and C4. The last row shows the net costs incurred by each stakeholder. It should be noted that the distribution of the costs may change from case to case. Here the table is set up specifically for the case of PFES in Vietnam.

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