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Designing energy efficiency subsidy programmes: The factors of transaction costs

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ABSTRACT

Transaction costs are perceived as one of the main barriers in achieving energy efficiency. Hence, the omission of transaction costs in the evaluation (and preparation) of energy efficiency policies leads to suboptimal decision-making. However, empirical evidence on the main factors influencing transaction costs of energy efficiency programmes remains insufficient. By investigating two cases of major energy efficiency subsidy programmes in the Czech Republic, we analyse the role of two factors influencing the transaction costs: size of the projects and type of actors. The results show that while the dependence between the size of the projects and the size of transaction costs is rather straightforward, the role of actors is more complex. On one hand, no significant difference has been found between total transaction costs of the two types of actors entering the analysed programmes (private companies and public entities). Our results imply the potential for optimization of transaction costs in energy efficiency subsidy programmes lies in streamlining the internal processes (especially in the preparatory phase and in public tenders) and a clear legal environment. On the other hand, differences between the two entities were found in the costs of external services, indicating a room for optimization for public bodies.

1. Introduction

In 2010 the European Commission launched the Europe 2020 initiative, which sets ambitious targets to be reached by 2020. Among others, a 20% increase in energy efficiency should be attained (European Commission, 2010). The Energy Efficiency Directive (European Parliament and Council, 2012), adopted in 2012, sets out a further set of binding measures that should help the EU Members States reach the energy efficiency target. It requires that energy distributors or retail energy sales companies (or the Member States, if they opt for so-called alternative policy measures) achieve 1.5% energy savings per year through the implementation of energy efficiency measures. Furthermore, 3% of the total floor area of heated and/or cooled buildings owned and occupied by the EU Member State central governments has to be renovated each year.

The European Union supports its Member States in achieving the goals by providing a substantial level of funding through its Cohesion Policy programmes. In the programming period 2007 – 2013 a total of EUR 6.1 billion was allocated to the priority theme “Energy efficiency, co-generation and energy management”, representing 2% of the total allocation (Ramboll and Institute for European Environmental Policy, 2016). Furthermore, the theme “Enterprise” (under which energy efficiency improvements have also been co-funded) was supported with EUR 51.9 billion, i.e. about 20% of total ERDF and Cohesion Fund support in the EU during the 2007 – 2013 period (Applica and Ismeri Europa, 2016).

Given the ambitiousness of the goals and the significant levels of expenditures allocated to reach them, it is crucial that careful evaluation (ex-ante and ex-post) is carried out in order to ensure that the public money is spent effectively. Transaction costs of the programmes are one of the main aspects of such assessment. The negative impact of transaction costs on the implementation of energy efficiency measures has been acknowledged and supported by a number of studies (Ostertag, 1999; Reddy, 1991; Sanstad and Howarth, 1994). Transaction costs can impede the implementation of energy efficiency policy measures or even prevent them from being implemented at all (Mundaca et al., 2013). Even though transaction costs cannot be zero (from the mere reason of existence of economic activity (Cheung, 1998)), it is believed that lower transaction costs are”almost always beneficial” (Gu and Hitt, 2001).

When designing energy efficiency policies, transaction costs are often not systematically taken into account and are not systematically evaluated ex-post (McCann et al., 2005). North (1990) categorises transaction costs to market costs (such as legal fees) and costs of time that the actors spend to gain the necessary information. Importantly, the transaction costs always consist of a variable part (dependent on the

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size of the project) and fixed part (independent of the size of the project) (Musole, 2009). The specific categorisation then tends to be case specific. Michaelowa and Jotzo (2005) for instance identified costs of monitoring as fixed costs and costs of negotiation as variable costs. The typical phases during which the transaction costs of energy efficiency programmes arise would be planning, implementation and monitoring and verification (Mundaca et al., 2013; Rao, 2003).

The empirical evidence on the transaction costs of energy efficiency programmes is still inadequate, and in particular, the number of quantitative estimates is limited (McCann et al., 2005; Mundaca et al., 2013).[1] In the available studies, transaction costs are of non-negligible levels. For instance, Jaraité et al. (2010) estimated the transaction costs of three programmes aimed at efficient transport. They found that the transaction costs ranged from 3% (of total costs of a fuel efficiency programme) to over 18% (of compliance costs of the Fuel Label Program). Björkqvist and Wene (1993) analysed the transaction costs of energy efficiency measures in households. They estimated the level of transaction costs at 28% of the level of energy efficiency investment (using gross labour to express the transaction costs). Mundaca (2007a) analysed the white certificates scheme in the United Kingdom, estimating the transaction costs at 8–12% of the investment in lighting and 24 – 36% of the investment costs for insulation. Falconer and Whitby (2000) analysed the administrative costs of agro-environmental schemes in 8 European countries. The administrative costs varied from 6% to 87% of the compensation costs. Nevertheless the studies are usually not directly comparable as they differ by their focus (different policy programmes), by the method used to study the transaction costs (the choice of at which stage and on which actors the transaction costs are measured), and by the choice of indicator that the transaction costs are compared to.

It seems that transaction costs can to some extent be lowered thanks to the effect of a “learning curve” (Lee and Han, 2016; Michaelowa and Jotzo, 2005). However, the extent to which this is possible may depend on the character of transaction costs (Kiss, 2016). Various studies (Jaraité et al., 2010; Michaelowa and Jotzo, 2005; Sathaye and Murtishaw, 2004) have concluded that transaction costs depend on the size of the project (or energy efficiency measure), i.e. the bigger the project, the lower the burden of transaction costs.

The key drivers that influence the size and structure of transaction costs have been summarised by, e.g. (Coggan et al., 2010; Mundaca et al., 2013; Musole, 2009). Among others, the actors of the transactions (projects) are one of the main drivers. Ahonen and Hämekoski (2005) found dependence between the transaction costs and the “competence and capacity of project developer”. Coggan et al. (2013) identify the characteristics of the transactors (their experience, capacity to assess information, etc.) as one of the core factors influencing the structure and level of transaction costs. Relatedly, the institutional environment and internal rules, in which the actors carry out the transactions, adds to the defining factors of transaction costs (McCann, 2013; Shahab et al., 2018).

This article, therefore, aims at partially filling this gap and focuses on the role of the actors on the size and structure of the transaction costs of energy efficiency programmes. Using qualitative and quantitative analysis it studies the transaction costs of two major energy efficiency subsidy programmes in the Czech Republic. In the Czech Republic, the allocation to energy efficiency policy measures amounted to roughly EUR 1.03 billion in 2007–2013 (Ministry of the Environment, 2007; SEVEn, 2010). Besides having distributed substantial amounts of financing to energy efficiency, the two analysed operational programmes are optimal for the research as they coincide in their main characteristics (type of subsidised projects, size of the projects, administration processes). Therefore, the only major factor in which the two programmes differ are the actors – the eligible applicants (public bodies and private entities). Furthermore, given their size (and the number of subsidised projects), the two programmes provide a solid base for research, and as they are part of the EU Cohesion Policy, there is potential for replicability of the research and findings in other countries and the current and future programming periods.

Based on the current state of knowledge on the factors influencing the transaction costs, the research question has been translated into two main research hypotheses. The **first hypothesis** is that the size of transaction costs is not fixed and depends on the size of the subsidised project. The **second hypothesis** states that the level and structure of transaction costs differ according to the type of actor carrying out the project.

The structure of the article is as follows. Section 2 describes the analytical background of the research, embedding the research within the conceptual framework of transaction costs theory and providing a detailed description of the methodological approach. In Section 3, the results of the analysis are presented, with a focus on testing the two main hypotheses on the relation between transaction costs and the size of the project and the actors. Section 4 assesses and discusses the main findings and embeds them in a broader context. Section 5 concludes and conveys policy implications.

2. Theoretical framework

2.1. Concept of transaction costs

Transaction costs are perceived as one of the main barriers to efficiency. As to e.g. (Schleich and Gruber, 2008), such statement can be extended to energy efficiency measures, too. The transaction costs theory is imbedded in the New Institutional Economics theory which stipulates that all actors in an economy make their decisions with bounded rationality (Musole, 2009). That means that all transactions (and contracts) induce transaction costs. Not including transaction costs in the decision-making leads to suboptimal decisions from the systemic point of view as a non-negligible part of the reality is neglected.

However, there is not an academic consensus on a standard definition of transaction costs (Musole, 2009; Ostertag, 1999). Also, the methods used to measure transaction costs differ in different studies and are tailored to the specificities of the studied policies and measures (McCann et al., 2005; Mundaca et al., 2013; Musole, 2009).

A definition that is suitable for this article is the one adopted by Mundaca (2007) and derived from Matthews (1986), which identifies transaction costs as the costs of preparation of a contract (ex-ante costs) and its implementation, monitoring and enforcement. Such a definition fits the studied energy efficiency subsidy programmes. In line with McCann et al. (2005), transaction costs also comprise administrative costs.

Björkqvist and Wene (1993) further highlight the need to consider the time of the ones who rejected or were unable to participate in the innovation (energy efficiency measure) in order to assess the effectiveness of the given demand side management programme. In the analysis presented in this article, such an assumption is extended to rejected, unsuccessful applicants.

2.2. Model of transaction costs

Transaction costs were examined in two particular subsidy programmes financed from the European Cohesion policy in the period 2007 – 2013: Operational Programme Environment (OP E, specifically Priority axis 3 focused on energy efficiency) and Operational Programme Enterprise and Innovation (specifically the ECO-ENERGY programme). Running under the same framework umbrella (the Cohesion funds), the two programmes had similar administrative procedures. They both focused on subsidising a broad range of energy

[1] In the Czech Republic, Lízal et al. (2001) analysed adjustment costs of investments in the Czech Republic, their general specification can be viewed as another approach evaluating the transaction costs.