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The evolution of the Italian EPR system for the management of household Waste Electrical and Electronic Equipment (WEEE). Technical and economic performance in the spotlight

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ABSTRACT

In this paper we analyse the Italian collective system for the management of household Waste Electrical and Electronic Equipment (WEEE), and its evolution over time, following the European Directives on WEEE, which include the Extended Producer Responsibility (EPR). The analysis focuses on the technical and economic performance of WEEE compliance organisations (consortia), as they are the key players in the Italian EPR regime. Economic results have not usually been provided in previous studies, due to the lack of available data. This study overcomes this problem by accessing the financial statements for the years 2009–2014 of all consortia. The main conclusions of the study are: The Italian EPR system barely exceeded the technical target of the first WEEE Directive (4 kg per capita). Improvements are necessary to achieve the target set for 2019 by the Recast Directive. The economic performance of the Italian EPR regime improved significantly over time. The fees charged per tonne of WEEE collected decreased by almost 43% from 652 Euro per tonne in 2009 to 374 Euro per tonne in 2014, while the fees per tonne put on the market (POM) were 134 Euro in 2009 and 104 Euro in 2014. The results prove the theory which states that, competing consortia use the learning effects to reduce the contribution fees for producers rather than to increase the quantity collected. Municipalities remain the most important actor in WEEE collection operations. Consortia compensate municipalities with a reimbursement that ranges between 28 and 38 Euros per tonne collected. These repayments cover only partially their costs. Additional studies should investigate their role.

1. Introduction

In November 1996, a European Parliament Resolution asked the Commission to present a proposal for the management Waste from Electrical and Electronic Equipment (WEEE, also referred to as e-waste) that included the EPR principle. WEEE was considered one of the priority waste streams. The WEEE stream is characterised by a wide variety of waste products (from vending machines to mobile phones, from fridges to lamps), mixtures of materials (hazardous and valuable components) and increasing quantities. The last available study by the United Nation University (Baldé et al., 2015) estimated a worldwide production of almost 42 million metric tonnes in 2014. WEEE Directive 2002/96/EC, published in February 2003, required member states from 13 August 2005 to collect at least 4 kg per capita of WEEE from households and to ensure that 'producers provide at least for the financing of the collection, treatment, recovery and environmentally sound disposal of WEEE from private households deposited at collection facilities'. Directive 2012/19/EU (Recast WEEE Directive) applied a collection target to all WEEE and based it on volumes placed on the market: by 2016, 45% of the average weight of EEE (Electrical and Electronic Equipment) placed on market in the past 3 years must be collected, 65% in 2019. EU legislation largely lets Member States to decide on allocation of financial and organisational responsibilities in EPR regimes. As a result, the costs of implementing WEEE legislation in Member States are distributed differently between the actors involved in the regime's implementation, notably producers, retailers, municipalities and consumers. Several studies have analysed EPR implementations in Europe applied to WEEE or other stream of waste covered by EPR principle (EC, 2014; EEA, 2005; OECD, 2005; Remedia, 2012; Sagis, 2014; Sanz et al., 2015; Cruz et al., 2014; Ferreira et al., 2015; Cahill et al., 2010; Fredholm et al.,

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2008). However, a comprehensive economic analysis of national WEEE management does not exist, largely due to a lack of data. This has important consequences for scholars and policy makers. A better understanding of the economics of national WEEE management would explain cause-effect mechanisms, allow to isolate those with the best technical and economic outcomes and thus contribute to appropriate policy proposals. This research aims to partially close this gap by providing an analysis of the EPR system in Italy with a focus on WEEE compliance organisations and the evolution of their technical and economic results. The solution adopted in Italy is a so called 'market model' solution as defined by Savage and his colleagues (EC, 2006). Producers have created 16 competing compliance organisations, whose activities are coordinated by a national clearing house. In this model, compliance has been achieved at minimal cost, creating 'financial stretch'. Innovation and learning effects are used to lower the contribution fees for producers rather than to increase the sorting results (Dubois, 2012 and EC, 2006). This paper comprises the following parts: after this introduction we present a brief discussion on the theoretical background and on the existing studies on EPR systems. Then, we present the evolution of the EPR system in Italy, the material and methods used in the study followed by the technical and economic performance of the EPR system. The main conclusions are that the EPR system has improved its economic performance and this is estimated with the economic results of the collective organisations. The consortia use their learning effects to improve the economic performance, while the technical performance is quite stable over time and does not exceed the targets set by the legal requirements. In fact, the technical performance demonstrates that the B2C WEEE regime barely reached the target of the first directive. The 2016 targets will be achieved as they apply also to non-household WEEE, which in Italy constitutes a far larger share of WEEE than in other countries. However, improvements are necessary in order to attain the 2019 targets. We also analyse the financial contributions that the collective organisations transfer to municipalities. Additional studies would be necessary to investigate the economics of WEEE collection operations performed by municipalities.

2. Theoretical background

Several studies have aimed at evaluating the EPR systems. Some of this research has a theoretical approach. This is the case of the studies by Dubois (2012, 2016), Palmer and Walls (1997), Walls (2006) Massarutto (2014). Economic theory studied EPR mechanisms extensively (Dubois, 2012). However, the implementation of the EPR principle need to be carefully considered (Wiesmeth and Hāckl, 2011). First, it is necessary to define the goals within an EPR policy and, in the next step, the appropriate instruments have to be selected (Wiesmeth and Hāckl, 2011). The WEEE Directives imposed collection targets as well as recovery and recycling targets. Dubois (2012) points out that static targets, do not provide incentive for additional sorting. In fact compliance organisations work on the producers' interests. Therefore, competing consortia will use the learning effect to reduce the contribution fees paid by their members (i.e. the producers) rather than increase the sorting results. The same view is shared by Savage and colleagues (EC, 2006) where they report that 'market model' creates 'financial stretch' in order to comply to the minimal cost, without providing incentives for environmental or behavioural improvement beyond that stipulated by the legislation. On the other hand, 'national collective system' (monopoly) has invariably exceeded the collection and recovery targets set by the government, and provided 'environmental stretch' by investing in consumers' behaviour change (EC, 2006). Therefore, the first research question is to study if the WEEE system in Italy, which presents static collection targets and is organised as a 'market model', presents reduced contribution fees paid by the consortia members and stable collection rates as expected from the theory.

The second research question is the assessment of the Italian ERP system, or in other terms, to quantify the technical and economic results of the national system. The following studies present evaluation tools in order to perform such assessments. The OECD study (2005) defines three categories of cost and environmental benefits: operation costs, environmental benefits and side effects. Widmer et al. (2005) provide five broad parameters to consider when a WEEE management system is designed or characterised. These are: legal regulation; system coverage; system financing; producer responsibility and ensuring compliance (usually by setting targets for collection or recycling). Periodically updated country reports by policy research firm Sagis, co-authors of this study, analyse national WEEE legislation, corresponding compliance activities and their environmental results and project their economic costs. Fredholm et al. (2008) present a framework developed to compare environmental and economic performance of recycling systems. Remedia's study (Remedia, 2012), analysed the Italian EPR system for the household sector in 2011. It studied the flows of WEEE as well as the economic results of the EPR regime. The European Commission study of 2014 (EC, 2014) assesses the performance of the European EPR systems for WEEE, and for other types of waste covered by the EPR principle, by distinguishing the technical performance and the economic performance. Cruz et al. (2014), describe and examine five European ERP schemes established for packaging waste with focus on local authorities and industry.

We adopt the methodology reported in the European study (EC, 2014) because it provides comprehensive and practical indicators to assess the EPR system. The technical performance of the WEEE system is evaluated by some indicators such as the collection and/or recycling rates as well as by the total quantity POM and WEEE collected. The economic performance is defined as "how costly it was to implement the EPR principle" and the cost effectiveness is represented by the total fees of the system, the fees per EEE POM, the fees per EEE collected and the fees per inhabitant per year. As member states need to report EEE and WEEE volumes to the European Commission, systems for the collection of 'technical' (or environmental) data are in place and such data is usually available. However, there is little transparency as regards the economic performance of the EPR WEEE regimes for a number of reasons. A monopolistic compliance organisation may not wish to disclose full financial information, as this may compromise its negotiating position vis-à-vis recyclers. Where compliance organisations compete, their costs information may be considered a trade secret (EC, 2014; Sagis, 2014). Last but not least, the WEEE management costs of several actors (notably municipalities and distributors) are difficult to isolate. For these reasons, no conclusive studies exist about the total costs of WEEE regimes and their economic performance. The European study approximates the costs of the system by the amount of fees paid by the producers to EPR compliance organisations. This computation is a good approximation of the cost of the system because the compliance organisations play a central role in aggregating funds from producers in view of channelling them towards other actors to reach the environmental objectives of the legislation. The limitation is that the fees might cover only partially the costs of the national system. Other actors, such the local authorities, can play a role in the national system and they might be only partially compensated by the EPR compliance organisations i.e. the consortia. Therefore, the studies of the national systems should include considerations on the cost coverage of the EPR system i.e. which types of costs are covered by the EPR and in which proportions (EC, 2014).