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The employment impact of private and public actions for energy efficiency: Evidence from European industries

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ABSTRACT

This paper aims at investigating the main effects on EU employment dynamics related to private and public actions for energy efficiency. The econometric analysis relies on a sector-based panel dataset for 15 EU countries over the time span 1995–2009. The empirical analysis shows that after accounting for the role played by sectoral output growth, investment and innovation activities, sectoral energy efficiency gains display a negative effect on employment growth, in particular in energy intensive industries. On the contrary, we find that public actions towards energy efficiency may produce positive effects on employment dynamics. In particular, the higher incidence of taxation on energy costs, the effort towards energy efficiency gains realized in the public sector industries and the implementation of a comprehensive policy mix for energy efficiency at the country level, are factors positively influencing employment growth. This evidence highlights the complexity of the nexus between energy efficiency and employment dynamics, suggesting that superior employment performances can be achieved when complementarity effects between productivity enhancing activities and energy efficiency actions are realized.

1. Introduction

Energy efficiency (EE) represents one of the most effective means for achieving several goals, as increasing energy security, fostering international cost competitiveness and reducing polluting emissions (IEA, 2012a). In particular, achieving a more secure, sustainable and affordable energy system is recognized as a key challenge for the future world development (EC, 2011).

Decreasing energy and carbon intensity trends may be detected in almost all economic sectors of industrialized countries, with particular regard to the manufacturing industries. Although this trend generally occurred in all advanced economies, the different policy strategies adopted at the country level during the last two decades have had a relevant role in explaining divergences in EE patterns among countries (del Río and Hernandez, 2007). Almost all OECD countries are implementing a wide range of policy measures to foster EE, and in particular the EU has developed the most complete policy framework over the last decade. According to the new EU climate and energy strategy for 2030, the mandatory 40% emissions reduction target is complemented by a target of 27% increase in EE by 2030 with respect to a business as usual scenario (EC, 2014).[5] The Energy Efficiency Directive 2012/27/EU already introduced legal obligation, binding measures for energy saving schemes, specific advice for public sector and promoted both accurate individual metering to empower households and incentives for best practices and energy audits for the industry sector (IEA, 2015).[6] The EU is also promoting a modernization of the entire energy system through the planned introduction of smart meters for electricity and gas by 2020, the diffusion of easy and free access to data on real-time and historical energy consumption for consumers as well as cogeneration activities. By looking at the past, EU

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[5] The EU climate and energy strategy for 2030 was agreed by EU leaders on 23 October 2014 on the basis of the European Commission proposal [COM (2014) 15 final].

[6] Earlier measures are the Directive 2010/30/EU on energy labelling requirements; the Directive 2010/31/EU on energy performance certificates and energy performance requirements for buildings; and the Directive 2009/125/EC on eco-design requirements for energy-related products.

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countries seem to have preferred to implement regulatory instruments (e.g. codes and standards, obligation schemes) first and then economic instruments (e.g. direct investment, fiscal/financial incentives,[7] white and green certificates[8]), while policy support tools, research, development and deployment (RD&D) instruments and voluntary approaches were implemented only after the year 2000 (Costantini et al., 2014).

The achievement of an EE target in an advanced economy can be ensured by two distinguished channels: first, by a pure reduction in energy consumption through changes in consumption and production (energy saving) behaviours; second, by adopting new EE technologies that help reducing energy intensity while maintaining high standards in energy services.

With respect to this second channel, public support to both EE innovation and technology diffusion is crucial to improve the productivity of the energy input and reduce energy costs. According to the hypothesis formulated by Porter and van der Linde (1995), the increased demand for EE technologies induced by compliance requirements to policy targets may deliver a strong stimulus for the whole national system of innovation to provide the requested new technologies (Mowery et al., 2010), thus allowing the system to be more competitive, ensuring better performances also in terms of economic growth and job creation (Ghisetti and Quatraro, 2017). This approach is fully considered in the EU medium term strategic plan, since creating new market opportunities and new jobs is one of the explicit objectives of the EU green growth policy.[9]

In this perspective, understanding how the greening process of economic systems affects economic performance and employment dynamics, and how policies and innovations supporting the transition to a low-carbon economy can smooth the "jobs versus environment" nexus becomes a key point (Consoli et al., 2016).

According to previous literature, an interesting perspective to analyse this issue is to look at the evolution of both environmental and labour productivity (Mazzanti and Zoboli, 2009). While a stagnating economic dynamics can deliver a reduction of energy consumption and polluting emissions, a flat dynamics of labour productivity may represent a signal of low production efficiency associated with low investment levels towards generation and adoption of environmental technologies. However, these investments have been shown to be at the basis of positive complementarities between labour and environmental performances (Cecere and Mazzanti, 2017). Hence, differentiated patterns among countries and sectors in the co-evolution of environmental and productivity dynamics might explain different employment dynamics, reflecting the prevalence of complementarity or trade-off effects between labour and environmental performances (Marin and Mazzanti, 2013).[10]

Given this analytical framework, the objective of this paper is to provide an evaluation of the impact of EE actions implemented by both the private and the public sectors on employment dynamics. At the best of our knowledge, there are no systematic empirical investigations of the relationship between EE actions and employment dynamics, although as previously mentioned this issue might be of particular relevance for policy design, as the speeding up of a sustainable transition process might be one solution to social challenges such as reducing inequalities and promoting inclusive growth, if positive complementarities between labour use and EE take place.

The rest of the paper is structured as it follows. Section 2 describes the main relevant issues arisen in the existing contributions and provides the context of the analysis. Section 3 describes data and methodology, while Section 4 discusses the empirical model and summarizes the main results. Section 5 concludes and provides the policy implications.

2. Background literature and research hypotheses

The ongoing economic and financial crisis has engendered increasing attention to a broadly defined transition to the green economy as a powerful mechanism to escape from the current downturn, especially in the EU context (EC, 2012). This implies that not only environmental objectives should be achieved without harming economic competitiveness, productivity and economic growth, but also that the framework of policies designed to promote environmental sustainability should be able to sustain economic recovery and employment growth (Crespi, 2016).

Broadly speaking, two opposite views emerge from the literature. From the one side, environmental protection policies are expected to have a negative or at least neutral impact on employment, with a trade-off between environmental protection and job creation. From the other side, there is a flourishing literature strand that stresses potential win-win effects associated to stringent environmental policies.

With respect to the first view, the negative impact of stringent policies on the labour market can fall into one or more of these three broad categories: a reduction of aggregate employment; no significant variation in employment rates; a change in the distribution of employment in favour of industries with relatively better environmental performance (CEDEFOP, 2015). The most common argument supporting the negative effect of introducing new and more stringent environmental regulations is related to the higher costs that firms may face, and the related harmful effect on productivity and competitiveness (Dechezleprêtre and Sato, 2014). According to this view, the increasing production costs due to environmental regulation would determine an increase in the output prices and, accordingly, an output contraction that, coupled with a lowering in the demand level, would result in sale losses, lower labour productivity and, eventually, job losses (Hazilla and Kopp, 1990). The actual magnitude of this negative economic effect depends on several issues as: the pass-through mechanism according to which the cost increases result in price increases; the demand elasticity of output; the differences in term of labour intensiveness between conventional and environmental activities, where the latter are usually considered more labour intensive (Morgenstern et al., 2002). In addition, considering the sectoral heterogeneity, the employment effect also depends on the magnitude of the compliance expenditures with respect to the industries' revenue, the energy intensiveness and the industry size, so that larger losses are expected for power and energy producers and energy intensive industries (EPA, 2011). In this regard, while environmental regulation may generate a reduction in the employment level in certain sectors, the net aggregate effect also entails the creation of new jobs associated with environmental activities, suggesting a reallocation from regulated to less polluting (or polluting-control) industries (Bartik, 2015).

On the other hand, starting from the seminal works of Porter (1991) and Porter and van der Linde (1995), the alternative view of the so-called Porter Hypothesis (PH) supports the idea that environmental

[7] Financial incentives include subsidies for energy audits or investments and soft loans. Fiscal incentives include tax reduction, tax credit or accelerated depreciation, tax on inefficient equipment (appliances and cars). Economic incentives can be defined as a fixed amount, as a percentage of the investment (with a ceiling), or as a sum proportional to the amount of energy saved.

[8] White certificates often imply a legal obligation for energy companies (suppliers and retailers or distributors, usually electricity and gas utilities) to undertake energy efficiency activities with their customers. For a broad overview at the EU level of legal regulation and diffusion see Bertoldi et al. (2010).

[9] Today this appears even more relevant in light of the impacts of the recent economic and financial crisis, which have affected both the environmental and economic dimensions resulting, among other, in a decreasing energy demand and an increasing unemployment rate. According to EUROSTAT data (EUROSTAT, online database Labour Force Survey) after the crisis the EU employment rate started declining from the 2008 peak of 65.8%, recovering that level only in 2015.

[10] For instance, over the last twenty years large differences in labour productivity and energy efficiency dynamics have been registered between EU countries. If we look at three major EU manufacturing countries (i.e. France, Germany and Italy), while the first two countries experienced significant progresses in both dimensions, Italy showed a weak dynamics in energy efficiency while registered the worst performance in terms of employment rates (IEA, 2016).