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Are labour productivity and residential living standards drivers of the energy consumption changes?

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ABSTRACT

The aim of this paper is to analyse the effects that explain the final energy consumption changes in Spain in the period 2000–2013 using the LMDI-I method, distinguishing between the final energy consumption by the productive sectors and households (residential and private transport). The consumption changes in the productive sectors and households have been decomposed into five effects. These are the intensity, the inverse of labour productivity, the structural, the standard of living and the activity effects. The energy intensity effect has been defined from a physical perspective in order to eliminate the possible effects brought about by causes unconnected with the energy process (the evolution of the market, the variation of productivity, etc.) that usually affect the energy intensity indicator when measured from a macroeconomic perspective. The results show that the activity, the living standard of private transport and sectoral intensity effect are those that contribute most to the increase of energy consumption in this period, whereas the inverse of labour productivity, the structural and the intensity effects in private transport contribute to reducing the final energy consumption. The results obtained for the sectoral intensity (except for non-private transport) and the residential intensity effects lead us to recommend that it is necessary to focus on a more effective and intensive policy in the matter of energy efficiency in Spain than that developed in the period of analysis.

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1. Introduction

The 21st Conference on Climate Change in Paris (United Nations, 2015) agreed to maintain the increase of the average global temperature below 2 °C with respect to preindustrial levels, and to continue the efforts to limit that increase of temperature to 1.5 °C, also with respect to preindustrial levels. It was thus attempted to considerably reduce the risks and effects of climate change. One of the main measures to achieve this is to reduce energy consumption and to diversify energy sources with the objective of incorporating non-emitters of greenhouse gases.

Energy efficiency improvements and the reduction of final and primary energy consumption are some of the energy priorities in the European Union (Pérez-Lombard et al., 2013). In the short term, "Europe 2020: Europe's growth strategy" set, among its objectives, a target of a 20% primary and final energy consumption reduction by 2020 (European Commission, 2010). For the horizon 2030, the objective

emissions by 27% and 40%, respectively (European Union, 2014). More ambitious still is the European Union's objective for 2050, since it will attempt to reduce greenhouse gas emissions by 80–95%, compared to 1990 levels (European Union, 2011).

Since 2000, Spain has also focused on the aim of reducing energy consumption in order to achieve European Union goals. Some energy efficiency plans have been implemented with a view to improving energy efficiency use. Specifically, during the period analysed 2000–2013, the Energy Saving and Efficiency Strategy 2004–2012 (Spanish Ministry of Economy, 2003) came into force. This was aimed at reducing final energy intensity by 1.3% for the period 2000–2012. It was subsequently developed in the 2005–2007 Action Plan and the 2008–2012 Action Plan by the Spanish Ministry of Industry, Tourism and Trade (MITT) (2005, 2007). Also, for the first time, in 2007, a specific plan for energy efficiency in public administrations was implemented. This was the so-called Energy Saving and Efficiency in the State's General Administration Buildings (PAEE-AGE, acronyms in Spanish) (Ministry of