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Research paper

Efficiency of the EU regulation on greenhouse gas emissions in Italy: The hierarchical cluster analysis approach

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ABSTRACT

Using both a multivariate technique and a classic convergence analysis, we set out to test in an original way if the European Union (EU) regulation on greenhouse gas (GHG) emissions produced by urban road transport has generated a policy transfer process. By doing so, this paper attempts to fill the gap in research on ex-post analysis to assess whether the decisions taken at the EU level are actually transposed and implemented locally. The results obtained allow to document whether the EU regulation has stimulated the adoption of sustainable mobility policies for a selected group of Italian cities. The findings show that the processes of policy transfer may produce different effects if heterogeneity exists between cities or regions, even if they belong to the same country. Italian evidence demonstrates that northern cities are more actively drawing policy lessons. The study also reveals that large cities choose to look abroad more often than small municipalities. These results indicate that there may be institutional and economic variables that influence the transfer process.

1. Introduction

The vastly growing literature highlights that mitigating global climate change and neutralizing the impacts of fossil fuel-based energy policy on the environment have emerged as the biggest challenges for the planet, threatening both natural and built systems with long-term consequences (Yigitcanlar and Dizdaroglu, 2015). Mobility-related activities are deemed to play a major role in generating externalities for both of the natural and built environments (Dizdaroglu and Yigitcanlar, 2016, 2014). Consequently, sustainability of transport activities, as part of the sustainable urban development movement, has become a priority policy issue for many cities and countries across the globe (Ioppolo et al., 2014; Kamruzzaman et al., 2015, 2014).

Concerns related to the sustainability of transport activities suggest new policy models (Yigitcanlar and Kamruzzaman, 2014), which can also be identified through the process of learning from previous experiences in other historical and/or geographical contexts. The concept of adoption of political choices elaborated outside of local borders, so-called the lesson drawing or policy transfer process, remains particularly underdeveloped in the field of transport (Macmillen and Stead, 2014).

The scientific debate seems to pay little attention to the process of policy transfer in this field. Marsden and Stead (2011), through a systematic review of international literature, found only seven research papers that address this issue from the year 2000 to 2010. In this regard, van den Bergh et al. (2007) emphasize that the research that focuses on the issue of sustainability of transport activity examines exclusively the ex-ante of policies and the hypothetical socioeconomic consequences, almost completely ignoring the successes and failures actually recorded in this area.

Observing a selected group of Italian municipalities, the objective of this research is to verify the existence and the effectiveness of a policy transfer process generated by the European Union (EU) policies concerning the greenhouse gas (GHG) emission reduction. By analyzing data on the environmental sustainability of urban transport measured in Italian cities with a population of over 100,000 in 2006 and 2013, the study seeks to obtain the following outcomes. Firstly, we want to reach the goal to verify whether, in the local context examined, there has been a policy transfer regarding the transport policy defined at the EU level. Secondly, assuming that there may have been some processes of policy transfer, we want to verify the level of efficiency in terms of the EU policy target—i.e. the reduction of the environmental impact of urban transport. These two fundamental issues relating to the existence and effectiveness of policy transfer require ad hoc analysis. In order to

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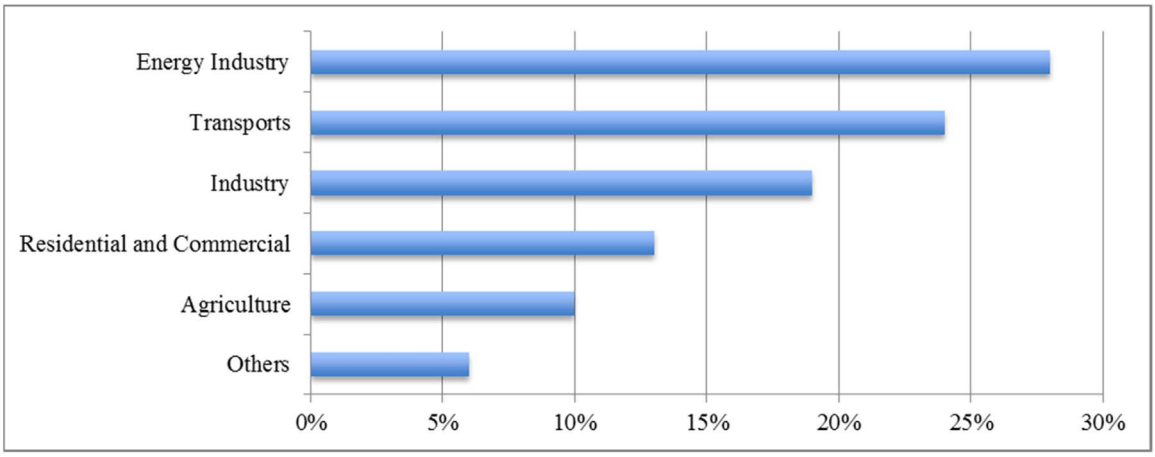

Fig. 1. GHG emissions by industries and households, EU 28, 2015.
Data from Euromobility (2016) and Eurostat (2014).

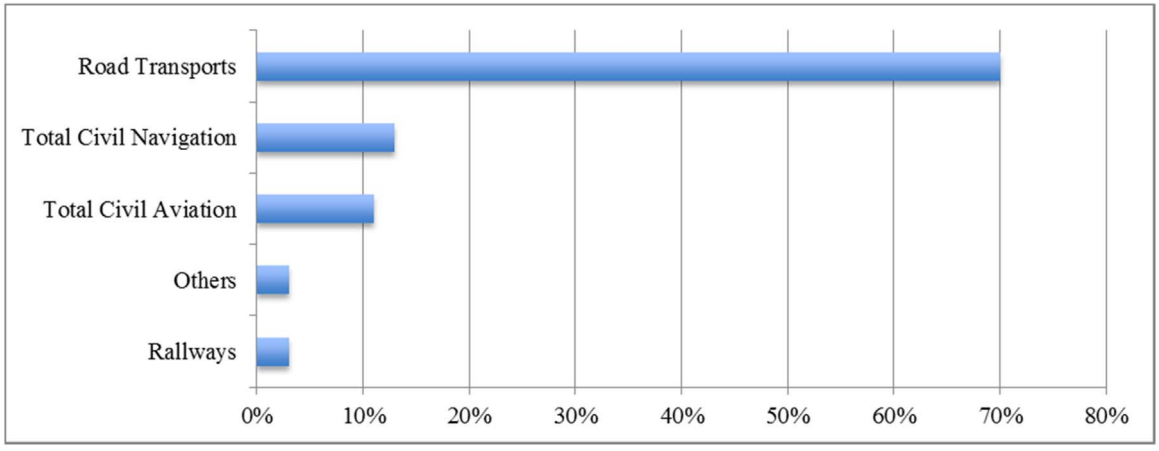

Fig. 2. GHG emissions by transport mode, EU 28, 2015.
Data from Euromobility (2016) and Eurostat (2014).

Table 1
Main policy measures included in the Transport White Paper.

Legislative act	Description
Fuel Quality Directive (*Directive 2009/30/EC*)	Greenhouse gas intensity in the energy used in road and non-road transport
Regulation on CO_2 from cars (*Regulation 443/2009*)	Emission performance standards for new passenger cars
Labeling for tires (*Regulation 1222/2009*)	Labeling requirements to increase the safety and the environmental and economic efficiency of road transport
Euro VI for heavy duty vehicles (*Regulation 595/2009*)	Emissions—heavy duty vehicles (Euro VI)
Promotion of Clean and Energy Efficient Road Transport Vehicles (*Directive 2009/33/EC*)	Clean and energy efficient road transport vehicles

undertake such analysis, the evaluation will be structured in two integrated steps: i) Hierarchical Cluster Analysis; ii) Convergence Analysis.

The paper is structured as follows. The second section identifies the typologies of policy transfer and discusses several good examples of transport policy transfer. In the third section, we describe the EU regulations in the field of road transport sustainability. The fourth and fifth sections describe the methodology and provide relevant descriptive statistics, respectively. In the final section, we discuss the findings and provide policy suggestions aimed at encouraging policy makers to carry out ex-post evaluation of the effects of policy transfer.

2. Sustainability and transport policy transfer in the European Union

The processes of transfer of ideas, actions and policies in the transport sector have followed over the years in a variety of contexts and economic systems. Nevertheless, literature only marginally analyzes this approach. Moreover, official policy documents regarding programs and new policy do not explicitly refer to policy transfer practice. However, what emerges is that policy transfers are isolated events, i.e. not belonging to a structured development policy based on knowledge of the choices already made and results achieved. This is also due to the fact of the excessive fragmentation of the institutional environment in charge of planning, financing and operating transport activities (Carlucci et al., 2017b).

Following the definition given by Dolowitz and Marsh (1996), we