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The EU Cohesion Policy implications to GHG emissions from production-based perspective

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ABSTRACT

The European Union (EU) Cohesion Policy is the cornerstone of the EU policy. Therefore the aim of this study is to cover the implication of cohesion policy to greenhouse gas emissions from production-based perspective. Considering that the main task of the EU Cohesion Policy 2007–2013 was the convergence process, by applying the β-convergence the study showed that the EU Cohesion Policy (2007–2013) was implemented successfully and economic convergence in the EU countries was observed. Furthermore, the convergence of GHG emissions from a production-based perspective was confirmed as well. Evaluating the correlation coefficient between the technological contribution to changes in GHG emissions and GDP growth rate, the results showed that contribution of technological progress was the largest in those EU countries where the fastest GDP growth rate was observed. However, despite the considerable technological contribution to GHG emissions reductions, it does not offset the effect of production scale in the countries such as Bulgaria, Poland and the Baltic States. In terms of economic structural changes, the result revealed that economic growth did not seem to make an effect on larger contribution of economic structural change to GHG emissions reductions. Meanwhile, considering the implication of the new EU Cohesion Policy (2014–2020), it was shown the importance of the EU 2020 strategy implementation. Using correlation coefficient between changes in GHG emissions and changes in the share of renewable energy, expenditure on R&D as a percentage of GDP and energy efficiency, only the growth in the share of renewable energy resources had significant direct impact on the reduction of GHG emissions. Therefore the promotion of the share of renewable energy as well as technologies which contributed to the decrease of GHG emissions and the growth of energy saving rate, is the most important in seeking GHG reduction in the EU.

1. Introduction

The increasing threat of global warming and climate change has been a major on-going concern in recent decades. Considering that the EU is one of the largest greenhouse gas (GHG) emitters in the world, researchers have paid much attention to GHG emissions. A number of studies (see Saikku et al., 2008; Fernández González et al., 2014a,c; Kaivo-oja et al., 2014; Brizga et al., 2014) have applied decomposition analysis in order to explain factors affecting general GHG emission in the EU countries.

However, there is a lack of studies about changes in GHG emissions caused by economic activities in all the EU countries. Most studies (see Marin et al., 2012; Butnar and Llop, 2011; Hammond and Norman, 2012; Padilla and Duro, 2013; Wood, 2009; Alves and Mountinho, 2013) have analysed tendencies of GHG emissions for separate activities only, such as manufacturing, service industries, agriculture and others.

Furthermore, considering the EU Cohesion Policy, it is very important to analyse the outcomes of the Policy implementation to changes in GHG emissions in the EU. The main task of the EU Cohesion Policy 2007–2013 was the convergence process when the main budget was allocated to less economically developed EU countries. Therefore in this paper it is analysed whether convergence of GHG emissions from a production-based perspective occurred in the case of the EU economic convergence.

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Additionally, fast economic growth (particularly in the new EU members where the level of GDP is the lowest) could influence the growth in GHG emissions. However, according to Environmental Kuznets Curve (EKC) theory, in mature economies in the case of economic growth that is related to effect of technological and economic structural changes, the environmental impact should decrease (Pasche, 2002; Dinda, 2004; Robalino-López et al., 2015; Farhani et al., 2014; Kaika and Zervas, 2013; Turner and Hanley, 2011). Therefore, this study reveals whether the EKC exists among the EU countries or not and in which the EU countries the contribution of technological and structural changes to a reduction in GHG emissions was the largest as well as its relationship to the level of GDP growth.

Moreover, in relation to the new EU Cohesion Policy (2014–2020), which links the allocation of funds to the Europe 2020 strategy objectives, this paper analyses how the changes in energy efficiency, share of renewable energy in the final energy consumption and expenditure on R&D influence changes in GHG emissions. According to these findings, the implications for the EU policy are suggested.

Thus, the rest of the paper proceeds as follows. Section 2 presents literature review of the EU enlargement process, studies of the EKC, the EU Cohesion Policy and GHG emissions from a production-based perspective. The methods of this paper are described in Section 3. Section 4 discusses the results of the convergence process on economies and GHG emissions, contribution of technological and structural alterations to changes in GHG emissions and the implications for the EU Cohesion Policy (2014–2020) implementation. Finally, Section 5 closes the paper with the main conclusions.

2. Literature review

In 2004 the European Union had its largest enlargement when eight new Central and Eastern European countries joined the EU. Curran and Zignago (2012) stated that the Union had never experienced such a major change in its structure and economic geography in such a short period of time before. By entering the EU new member states took full advantage of economic integration within the European Single Market through the free movement of goods (Doyle and Fidrmuc, 2006). Thus the enlargement coincided with major changes in the structure of trade within and beyond the EU (Curran and Zignago, 2012). Moreover, the new EU members were included in the EU-wide system of redistribution, including Structural and Cohesion funds. Doyle and Fidrmuc (2006) confirmed that eligibility for regional aid is directly related to the new EU members' economic development. Thus impact of enlargement was greater on the new EU member states than on the old ones (Liobikienė and Mandravickaitė, 2011; Curran and Zignago, 2012). In the new EU member states the rate of accelerating growth was related to the benefits of institutional and financial investment resulting from the old member states of the European Union (Kolodko, 2009).

Therefore many authors (see Welsch and Bonn, 2008; Rapacki and Prochniak, 2009; Juknys et al., 2014) found that faster economic growth in the new EU member states than in the old members determined the process of the EU economic convergence. Thus the EU convergence process was influenced by the successful implementation of the EU Cohesion Policy (2007–2013) via reallocation of funds across the poorest EU regions (Rakauskienė and Kozlovskij, 2014). Despite that one third of the EU Cohesion Policy (2007–2013) budget was meant to environmental issues and climate change, the main concern was about the integration impact on economies (Jacoby, 2010; Curran and Zignago, 2012).

2.1. Studies of Environmental Kuznets Curve (EKC) in the EU

Considering that the EU Cohesion Policy's (2007–2013) main aim was the convergence process, when economy in the less developed EU countries grew fast, it is very important that the environmental impact would grow more slowly or, even better, decrease. However, researchers (see Zhang et al., 2012; Kim and Kim, 2012; Kumar and Managi, 2010) revealed that in developing countries economic growth was the most important contributor to the increase in GHG emission. Meanwhile other authors (see Liou and Wu, 2011; Alves and Mountinho, 2013; Botringer and Rutherfors, 2013; Voigt et al., 2014; Herrerias, 2013; Turner and Hanley, 2011) declared that in countries with mature economies GHG emissions should decrease through the use of advanced technologies and innovations. Moreover, some authors (see Parith et al., 2009; Wood, 2009; Butnar and LIop, 2011; Wang et al., 2013; Brizga et al., 2014) also highlighted that an alteration of economic structure, which reveals whether an economy grows faster in less polluting sectors (i.e. services) than in more polluting ones, also contributes to the reduction of GHG emissions. Thus technological and economic structural changes lead to the occurrence of EKC (Pasche, 2002; Dinda, 2004; Robalino-López et al., 2015; Farhani et al., 2014; Kaika and Zervas, 2013; Turner and Hanley, 2011).

However, Fernández González et al. (2014a) found that in the EU countries the inertia of European economic growth affected GHG emissions. Bölük and Mert (2014) during the period of 1990–2008 found no statistical evidence of existing EKC for GHG emissions in 16 EU countries. As for separate EU countries that the authors covered, the EKC during the period of 1960–2011 was observed in Sweden and Germany (Waslekar, 2014). According to the study of López-Menéndez and colleagues (2014), the decreasing EKC pattern during the period of 1996–2010 was observed in Austria, Belgium, Finland, France, Germany, Italy, Netherlands, Sweden and the UK. However, the increasing EKC pattern was found in almost all new EU members: Bulgaria, Romania, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Portugal (López-Menéndez et al., 2014). Thus many EU countries must make additional efforts in order to reduce GHG emissions.

2.2. GHG emissions from a production-based perspective and the implementation of EU Cohesion Policy (2014–2020)

Regarding emissions of GHG in the EU countries, the most important is the production perspective, especially production activities that require fossil fuels (Parith et al., 2009; EEA, 2010). In Fig. 1 it is shown that greenhouse gas emissions from a

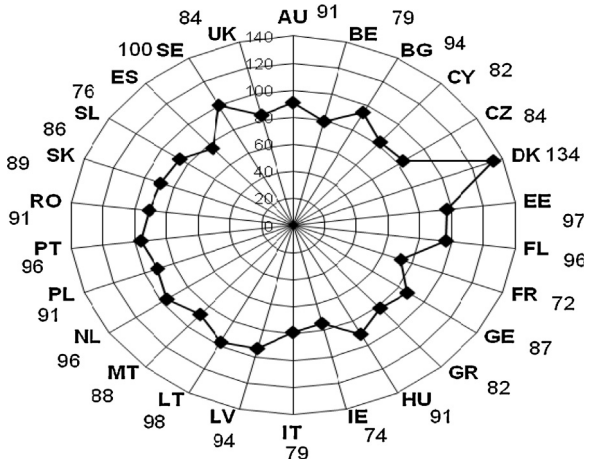

Fig. 1. The share of GHG emissions from a production-based perspective.