

The challenges and opportunities of climate change policy under different stages of economic development

Genovaitė Liobikienė^{a,*}, Mindaugas Butkus^b

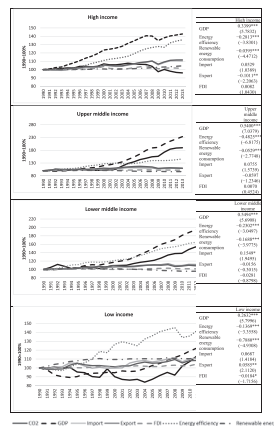
^a Lithuanian Institute of Agrarian Economics, V. Kudirkos g. 18, Vilnius 01113, Lithuania

^b Social Innovation Research Centre, Research Institute, Šiauliai University, P. Višinskio str. 25, LT-77156 Šiauliai, Lithuania

HIGHLIGHTS

- Economic growth contributed to increase of GHG emissions in all groups of countries.
- Export significantly reduced GHG emissions in high income countries.
- The export remains a challenge in low income countries.
- FDI insignificantly determined the changes in GHG emissions in all groups of countries.
- Energy efficiency and renewable energy reduced the GHG emissions in all cases.

GRAPHICAL ABSTRACT



ARTICLE INFO

Article history:

Received 7 May 2018

Received in revised form 11 June 2018

Accepted 11 June 2018

Available online xxxx

Editor: D. Barcelo

Keywords:

Climate change

Trade

Leakage phenomenon

FDI

Energy efficiency

Renewable energy

ABSTRACT

Climate change policy confronts with many challenges and opportunities. Thus the aim of this study was to analyse the impact of gross domestic product (hereinafter GDP), trade, foreign direct investment (hereinafter FDI), energy efficiency (hereinafter EF) and renewable energy (hereinafter RE) consumption on greenhouse gas (hereinafter GHG) emissions in 1990–2013 and reveal the main challenges and opportunities of climate policy for which policy makers should take the most attention under different stages of economic development. The results showed that the economic growth significantly contributed to the increase of GHG emissions and remains the main challenge in all groups of countries. Analysing the trade impact on pollution, the results revealed that the growth of export (hereinafter EX) significantly reduced GHG emissions only in high income countries. However, the export remains a challenge in low income countries. FDI insignificantly determined the changes in GHG emissions in all groups of countries. Meanwhile, energy efficiency and share of renewable energy consumption are the main opportunities of climate change policy because they reduce the GHG emissions in all groups of countries. Thus, technological processes, the increase of energy efficiency and the shift from carbon to renewable energy sources are the main tools implementing the climate change policy in all countries despite the different stage of economic development.

© 2018 Elsevier B.V. All rights reserved.

1. Introduction

The climate change is one of the main problems in the world. Therefore, Paris Agreement was greatly welcomed because eventually almost

* Corresponding author.

E-mail addresses: g.liobikiene@gmf.vdu.lt, (G. Liobikienė), mokslo.institutas@su.lt (M. Butkus).

all countries in the world, despite the different level of economic development, committed to reach their particular targets – to reduce or slow down the growth of greenhouse gas (GHG) emission. However, considering the studies where the global panel was analysed, the monotonic growth of GHG pollution, which is mainly caused by economic growth, is still observed (Chen et al., 2016; Shahbaz et al., 2015; Kais and Sami, 2016; Kais and Sami, 2015; Liobikienė and Butkus, 2017). Meanwhile, analysing the impact of economic growth on GHG emissions in different regions, authors (see: Chen et al., 2016; Kais and Sami, 2016; Kaika and Zervas, 2013; Azam and Khan, 2016; Bilgili et al., 2016; Al-Mulali et al., 2016; Li and Lin, 2015 and etc.) found that economic growth has diverse impact on emissions under the different stages of development. These results are in accordance with Ecological Kuznets Curve (EKC). The EKC postulates that the relationship between economic development and the environment resembles an inverted U-shape curve. That is, environmental pollution levels increase as a country develops, but begin to decrease as rising incomes pass beyond a turning point (Grossman and Krueger, 1991; Panayotou, 1997; Dinda, 2004; Agrad and Chapman, 1999 and etc.).

However, considering the EKC, we cannot expect that economic development itself, by increasing per capita income, could reduce GHG emissions (Bölük and Mert, 2014). Grossman and Krueger (1991) revealed three channels: scale, composition and technique effects, through which the economic growth affects environmental pollution. According to the scale effect, more production and consumption of energy resources induce more pollutant emissions, and the level of GHG emissions increases. The composition effect states that economic growth causes the structural shift in economy towards less polluting activities. The technique effect channel occurs when high income economies allocate more resources for the new technological processes, replacement of old and dirty technologies to new and clean ones, and environmental quality is improved (Bilgili et al., 2016; Copeland and Taylor, 2003). Therefore, these assumptions reveal that there exist other factors (not only gross domestic product (GDP)) which positively and negatively can affect the EKC patterns.

The vast amount of studies showed that, due to the technological progress and cleaner energy sources, the main factors which contribute to the reduction of GHG emissions are energy efficiency (Özbuğday and Erbas, 2015; Wang et al., 2015; Shahbaz et al., 2013b) and renewable energy sources (Bilgili et al., 2016; Bölük and Mert, 2014; Ben Jebli et al., 2016; Farhani and Shahbaz, 2014; Bento and Moutinho, 2016; Jafarullah and King, 2015; Ben Jebli and Ben Youssef, 2015; Sugiawan and Managi, 2016; Sulaiman et al., 2013; Dogan and Seker, 2016; Bölük and Mert, 2015; Sebri and Ben-Salha, 2014). Tang and Tan (2015), Sbia et al. (2014) and Zhang and Zhou (2016) revealed that foreign direct investment (FDI) also contributes to the reduction of GHG emissions. FDI stimulates the better management practices and advanced technology, resulting in cleaner environment (Shahbaz et al., 2015; Lee, 2013). Thus, seeking to solve the growth of GHG emissions, the main opportunities of climate change policy should be the promotion of energy efficiency, renewable energy consumption and FDI.

Meanwhile, the main challenges of climate change policy remain the growth of economy and trade, which cause the increase in production accompanied by energy consumption and in turn the growth of GHG emissions (Azam and Khan, 2016; Al-Mulali et al., 2016; Ertugrul et al., 2016; Shahbaz et al., 2014a; Lau et al., 2014; Ren et al., 2014). Furthermore, analysing the trade impact on GHG emissions it is very important to consider the leakage phenomenon, which in EKC studies has been ignored. The leakage phenomenon is defined as process when the reduction of GHG emissions occurs not due to the increase in production efficiency, but due to the production shift from developed countries to the third ones (Ertugrul et al., 2016; Kuik and Gerlagh, 2003; Dogan and Seker, 2016). Thus, due to the more stringent regulations, globalization and free trade, developed countries reduce their own emissions by transferring their dirty industries to developing countries (Bilgili et al., 2016; Ertugrul et al., 2016; Shahbaz et al., 2013a;

Carvalho et al., 2013). This fact, from the perspective of climate change policy, is evaluated very negatively. Therefore, the aim of this study is to analyse the main factors which can positively and negatively affect the changes in GHG emissions. In other words, to reveal the main challenges and opportunities of climate policy for which policy makers should take the most attention. Furthermore, considering that Kais and Sami (2015, 2016), Azam and Khan (2016), Al-Mulali et al. (2016), Omri et al. (2014) and Shahbaz et al. (2015) analysing the different factors as trade openness, FDI and renewable energy consumption revealed that their relationship varies at different stages of economic development, in this paper analysing the determinants of GHG emissions the stage of economic development will be considered as well. This analysis will provide more accurate insights how more successfully to implement the climate change policy for countries at different stages of economic development.

The rest of the paper is organised as follows: the related literature is reviewed in Section 2. The data and descriptive statistics are presented in Section 3. Section 4 presents the model and estimation technique. The empirical findings and policy implications are presented in Section 5 and Section 6 concludes the paper.

2. Literature review

2.1. Impact of economic development and trade on GHG emissions as the main challenge of climate change policy

The vast majority of authors showed that economic growth is one of the dominant drivers of GHG emissions (Chen et al., 2016; Shahbaz et al., 2015; Kais and Sami, 2015, 2016; Yao et al., 2015; Rüstemoğlu and Andrés, 2016; Fernández González et al., 2014 and etc.). However, the theory of EKC stated the different idea, that the environmental degradation is growing until the turning point, and when per capita income passes beyond this point the reduction of environmental pollution is observed. Referring to the review by Bento and Moutinho (2016), the presence of the EKC was confirmed in about 70% of 21 studies in different regions including developed and developing countries.

Taking into account the studies which examine the EKC hypothesis grouping countries according to the level of economic development stage, Al-Mulali et al. (2016) showed that GDP increased GHG emissions almost in all analysed regions. Furthermore, they confirmed EKC hypothesis in five regions (Central and Eastern Europe, Western Europe, East Asia and the Pacific, South Asia and the Americas) except Middle East and North Africa and Sub Saharan Africa. Kais and Sami (2015, 2016) revealed that the impact of economic growth on the GHG emissions is positive for the global panel, Europe and North Asia, Middle East, North Africa and sub-Saharan Africa. Meanwhile, they showed that the square of per capita GDP has a positive impact on GHG emissions only in global panel and in Latin America and the Caribbean but not in the European and North Asian region and not in Middle East, North African and sub-Saharan region. Azam and Khan (2016) study supported the EKC hypothesis for low and lower middle income countries as Tanzania and Guatemala, but not for upper middle and high income countries as USA and China.

Trade is one of the main indicators which enhances the economic growth (Ertugrul et al., 2016; Ren et al., 2014; Shahbaz et al., 2013a). Furthermore, trade is multidimensional factor which consists of two different variables: import (hereinafter IM) and export. The vast majority of authors measured trade openness using imports plus exports to GDP ratio (Kais and Sami, 2016; Al-Mulali et al., 2016; Lau et al., 2014; Ren et al., 2014; Kasman and Duman, 2015 and etc.), but this proxy of trade in EKC studies is not correct because it encompasses two different variables. Analysing the national GHG emissions which are mainly evaluated referring to the national production based inventories, it is valuable to include separate variables as export, which is directly related to production, and import which should reduce the level of production.

Download English Version:

<https://daneshyari.com/en/article/8858969>

Download Persian Version:

<https://daneshyari.com/article/8858969>

[Daneshyari.com](https://daneshyari.com)