



Does government ideology affect environmental pollutions? New evidence from instrumental variable quantile regression estimations

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ARTICLE INFO

JEL classification:

P48

Q53

C32

Keywords:

Government ideology

Environmental pollutions

Quantile regression

Panel data

ABSTRACT

This study examines the effect of government ideology on carbon dioxide emissions along the entire length of the conditional distribution of the dependent variable (i.e., carbon dioxide emissions) using the instrumental variable quantile regression technique with fixed effects in a balanced panel of 65 countries over the period of 1981–2012. The estimation results indicate that government ideology is a significant determinant of carbon dioxide emissions only in the lower quantiles of the distribution. Specifically, the left-wing governments are associated with lower carbon dioxide emissions among the least polluted countries. Contrarily, the effect of government ideology on carbon dioxide emissions is statistically insignificant in the median and upper quantiles of the distribution, suggesting that government ideology does not have significant influences on carbon dioxide emissions among the median and most polluted nations. It was also found that the effects of government ideology on carbon dioxide emissions differ remarkably at different quantiles of the distribution in developed and developing countries.

1. Introduction

Does government ideology affect environmental policy? Do the levels of environmental pollutions vary when the governments have different political ideologies? In addition, are there different causes of environmental pollutions in the most polluted countries compared to the least polluted countries? These are several key open questions to policy makers all around the world. In contrast to the conventional conditional mean approaches, the main purpose of this paper is to examine the effect of government ideology on carbon dioxide (CO₂) emissions throughout the entire conditional distribution of environmental pollutions across countries using the quantile regression ap-

proach. The panel quantile regression technique has been frequently employed in many areas of economics (Koenker, 2004; Chernozhukov and Hansen, 2008). However, there are only a few empirical works that have utilized the quantile regression methodology in the field of environmental economics (e.g., Squalli, 2009, 2010; Marques et al., 2011; Zhang et al., 2016).¹

The existing literature suggests that nearly all environmental policies are developed and realized in a political setting (Jahn, 1998; Perciasepe, 2005; Depledge, 2006). However, government ideological differences surface on foremost environmental issues (Englebert, 1961; Morrison, 1973; Dunlap and Gale, 1974; Buttel and Flinn, 1976). This is because political parties tend to formulate and promote policies in line

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¹ Squalli (2009, 2010) examines the relationship between immigration and environmental pollutions in the United States using the quantile regression approach.

with their ideological preferences (Hibbs, 1977; Alesina, 1987). For example, Kamieniecki (1995) argues that political parties have systematically different stances on key environmental policies. Varone and Aebischer (2001) also find that both left-wing and right-wing parties have maintained obvious ideological differences on energy issues.² Government ideological differences among political parties may therefore impact the direction of environmental policy (Lester and Lombard, 1990; Vachon and Menz, 2006).

In this context, Scruggs (1999) argues that the political ideology of the ruling party may influence the environmental quality in a country. More recently, a similar argument has been made by McKittrick (2006), who emphasizes that “there should be an observable connection between the type of political party in office and the current state of the environment (p. 605).” In the United States, for example, Nelson (2002) finds that the political ideology of a senator is a key determinant to vote for major environmental policy measures. Harrison and Sundstrom (2007) also document that the government ideology of political parties is the most significant factor for the approval and implementation of environmental proposals (e.g., Kyoto Protocol). It is therefore important to take into account of political parties’ government ideology to devise and implement feasible policies to reduce environmental degradation, as argued by Jahn (1998).

A review of related literature indicates that the left-wing parties are generally more willing to protect environment, whereas the right-wing parties have higher tendency to overlook environmental issues (e.g., O’Connor et al., 2002; Neumayer, 2004; McKittrick, 2006).³ The underlying argument is that the left-wing parties are more inclined to embrace environmentally friendly policies because the specific measures of these policies usually imply the government’s increasing control over the economy (e.g., Buttell and Flinn, 1976; King and Borhardt, 1994; Crepez, 1995; Neumayer, 2003, 2004; Harrison and Sundstrom, 2007). A growing body of empirical research has investigated and verified the relationship between government ideology and environmental pollutions (e.g., King and Borhardt, 1994; Crepez, 1995; Jahn, 1998; Scruggs, 1999; Neumayer, 2003, 2004; Gassebner et al., 2011). Nevertheless, most of these studies did not offer any robustness tests for the effect of government ideology on environmental pollutions, therefore the existing estimation results are to some extent unconvincing.⁴

Despite a great amount of academic researches and discussions, the relationship between government ideology and environmental pollution is not straightforward, and the empirical studies are often inconsistent. For example, Neumayer (2003) argues that left-wing governments are “possibly also associated with lower pollution levels, but the evidence is less consistent and robust” (p. 203), whereas the estimation results of Gassebner et al. (2011) indicate that there is no robust effect of left-wing parties on pollutant emissions. One important reason that the existing empirical results are not robust and stable is that the various econometric techniques utilized by previous studies are flawed. For instance, in the majority of previous studies, the relationship between political ideology and environmental quality is considered as linear and estimated with linear equations of various kinds. However, as partly revealed by previous studies, the actual relationship between the two might probably be nonlinear. As a result, in this paper, we contribute to this important prior research by examining the effect of government ideology on environmental quality throughout the entire conditional

distribution of CO₂ emissions. CO₂ is the most important environmental emission because the growing atmospheric concentration of CO₂ is generally considered as the main cause of global climate change (e.g., Schmalensee et al., 1998; Lanne and Liski, 2004; Barassi et al., 2011; Zhao et al., 2016; Zhang et al., 2017b).

In this study, we try to answer the following key questions: Does government ideology influences CO₂ emissions? If so, do the influences change at different levels of CO₂ emissions? To give reasonable and reliable answers to these questions, the instrumental variable quantile regression model with fixed effects is utilized. The effect of government ideology on CO₂ emissions is estimated over the entire width of the conditional distribution of the dependent variable (i.e., CO₂ emissions).⁵ The biggest advantage of the panel quantile regression approach is that it enables us to examine a variety of conditional quantiles of the dependent variable, thereby revealing a range of heterogeneity in the analysis of CO₂ emissions. As a result, the quantile regression methodology, originally developed by Koenker and Bassett (1978), is a more comprehensive and elaborate analytic tool that could provide a deeper understanding of the contributors to environmental degradation by characterizing the entire conditional distribution of the dependent variable across different years and countries.⁶ As such, the main contribution of this study is twofold. First of all, this study for the first time estimates the effects of government ideology on CO₂ emissions in a balanced panel of 65 countries. Second, the instrumental variable quantile regression is employed as the main estimation method, so that the heterogeneity in the sample (e.g., the differences in the level of development and the amount of CO₂ emissions across countries) could be well addressed.

It is particularly important to employ quantile regression method in this study, because the effect of government ideology on CO₂ emissions may differ at different quantiles of the CO₂ emissions distribution. Given that the development and implementations of environmental reforms in the economy is an underlying contradiction between the right-wing and left-wing parties, government ideological differences may at least to some extent explain the different levels of environmental pollutions across nations. Specifically, it is necessary and meaningful to investigate whether government ideology has a greater impact on CO₂ emissions in most polluted countries (higher quantiles) as compared to the least polluted countries (lower quantiles). This is because there are potential institutional differences (i.e., the structure of domestic political institution) between the most polluted and least polluted countries. These differences, in turn, may influence the causes of environmental pollutions. As a result, it is important to examine the entire conditional distribution of the dependent variable to better understand the role of government ideology on environmental policies.

It is also possible that environmental degradation is persistent over time: countries that experience high levels of environmental pollutions in the past would continue to experience higher environmental pollutions in the future (Lee et al., 2009). As such, there may be different determinants of CO₂ emissions at different quantiles of the distribution, particularly in the most polluted nations. In this case, the quantile regression technique could be utilized to examine whether and to what extent the relationship between political ideology and CO₂ emissions differs in the different quantiles of the distribution for CO₂ emissions. The estimation results may lead to important policy recommendations, as policymakers need to assess the causes of environmental degradation in the most polluted and least polluted countries.

² The left-wing parties in general support social equality and prefer egalitarianism, often in opposition to social hierarchy and social inequality. In contrast, right-wing politics usually believe that certain social orders and hierarchies are inevitable, inescapable or natural due to the natural law, objective characteristics of economics or tradition. Traditionally, left-wing parties are more inclined to environmental protection even at the cost of economic growth.

³ In the United States, for example, Buttell and Flinn (1976) emphasize that Democrats are more sympathetic to environmental policies, while Republicans are indifferent with the gravity of environmental degradation.

⁴ One could also refer to Neumayer (2003) for a detailed literature review of the early studies on the relationship between government ideology and environmental pollutions.

⁵ Specifically, the instrumental variable quantile regression approach with fixed effects developed by Harding and Lamarche (2009) is utilized in this study. Harding and Lamarche (2009) demonstrated that the instrumental variable quantile regression technique with fixed effects is more efficient and robust compared to other panel data models, including ordinary least squares, fixed effects, instrumental variable, pooled quantile regression, quantile regression with fixed effects, and instrumental variable quantile regression.

⁶ Buchinsky (1998) interprets the merits of the quantile regression approach in detail.

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