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Public Opinion, Elections, and Environmental Fiscal Policy

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Abstract

We investigate how public opinion along with the electoral process affect the strength of environmental fiscal policies in the European Union (EU). Our analysis accounts for a set of economic, institutional, and political factors that can affect environmental taxes and expenditures. We pursue a dynamic panel data analysis covering 27 EU countries using public opinion data. We produce evidence showing that public concern for the environment, as gauged by opinion surveys, positively affects environmental protection expenditures, while elections negatively affect environmental tax revenues and environmental protection expenditures shrink in the aftermath of elections. We do not find evidence of partisan effects. The effect of public opinion and elections on environment-related fiscal decisions depends on the degree of integration with the global economy as well as several institutional factors including the level of corruption and the soundness of the rule of law. We also document that the results are impervious to a wide set of robustness tests.

Keywords: Environmental Protection, Taxes and Expenditures, Public Opinion, European Union, Panel Data

JEL Classification: D72, Q58, C23

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1. Introduction

Environmental issues constitute a central theme in public policy debates. Nevertheless, there exists a general sense that governmental action has not lived up to the current challenges, especially as concerns climate change. An important political economy question is what determines the extent and nature of governmental action in dealing with environmental pressures. Many theoretical discussions on the potential determinants of environmental policy exist. The relevant empirical work, however, is relatively scant, especially pertaining to the political economy determinants of environmental policy. This paper focuses on how public concern for the environment, as gauged by public opinion surveys, in addition to electoral pressure and governments' ideology, can explain variations in environmental taxes and expenditures. While evidence exists on the effects of electoral dynamics and ideology on the strength of environmental policy, this is the first attempt, to our knowledge, to consider the role of public opinion. The public's concern for environmental issues is shown to affect the strength of environmental policy throughout the government's term. Moreover, no analysis exists, to our knowledge, on the political economy determinants of the strength of environmental fiscal policy in the European Union (EU).

The pace of environmental protection policies adoption has been on the increase consistently both at national and supra-national levels, covering a diverse set of environmental objectives. These policies are composite arrangements of measures, guidelines, and interventions that include, *inter alia*, the revenue and expenditure decisions of fiscal authorities. For instance, the European Union and the United States

impose environment-related taxes to reduce pollution, while financing several environment protection activities.

As in the case of other fiscal instruments where several different political and institutional factors may affect fiscal outcomes, understanding the determinants of environmental fiscal policies is significant to the extent that the latter constitute a key feature in a country's environmental protection policy efforts. Attempts to empirically gauge environmental policy efforts exist mostly at the state level in the US. The measures typically used to capture environmental protection include indices of the strength of environmental programs, government spending on environmental protection, private sector pollution abatement spending, and regulatory enforcement actions (Konisky and Woods, 2012). Other studies employ various composite indices that combine measures of environmental quality and environmental policies, such as the Green Index (Hall and Kerr, 1991).¹ Two variables that naturally stand out because of their aggregate nature and apparent ease of comparison, however, are environmental protection expenditures and environmental tax revenues. Their specific scope reveals some measure of policy effort amidst a paucity of data that are reliable and continuously updated to capture environmental policy.

A number of studies consider the determinants of fiscal policy decisions either at the aggregate level (e.g. Alesina and Perotti, 1995; Haan and Sturm, 1994; Tujula and Wolswijk, 2004; Woo, 2003) or by focusing on various spending and taxes sub-components. For example, Maizels and Nissanke (1986) consider the military

¹ Konisky and Woods (2012) provide a survey of empirical studies using the various measures of environmental policy at the state level in the US.

component of the budget, Busemeyer (2007) focuses on public education spending, while Wang (2009) and Potrafke (2010) investigate health expenditures. This paper, focuses on how the public's concern for the environment and elections (among several other economic, political, and institutional variables), affect the level of environmental taxation and environmental protection expenditures for 27 EU countries. To our knowledge, this is the first attempt to produce evidence on the political economy determinants of the environment-related taxes and government expenditures in the European Union. The time span of our analysis ranges from 2003 to 2013, reflecting data availability. Moreover, this is the first study that explicitly addresses the effects of the public's concern for the environment on the related fiscal decisions, a dimension overlooked by the broader environmental protection literature. In addition, we examine how different institutional arrangements affect our results.

The contribution of the paper consists in investigating the determinants of environmental taxes and expenditures with a special focus on the public concern for the environment as gauged by opinion polls, elections, as well as the governments' preferences (ideology). We control for an extensive set of institutional, economic, and political variables to address, *inter alia*, the effects of the electoral process, partisan differences, the presence of 'green parties', the level of pollution, and several macroeconomic control variables.

The results from a dynamic panel data analysis suggest that public opinion's environmental concerns positively affect environmental protection expenditures, while elections negatively affect environmental tax revenues. Our evidence also suggests that the electoral effect is less pronounced in more globalized economies, in countries with more adequate rule of law, and in countries with lower levels of corruption. We also find that in the year after elections environmental protection expenditures shrink.

The rest of the paper is organized as follows. The next section briefly reviews the literature on the political economy of environmental protection. Section 3 discusses our data and estimation strategy. Section 4 presents and discusses the results of our analysis. Section 5 concludes.

2. The Political Economy of Environmental Protection

The literature identifies three general kinds of explanations regarding the strength of state environmental efforts (Konisky and Woods, 2012). The severity of environmental problems that may give rise to higher expenditures as when poor air or water quality lead to stronger state programs (Lowry, 1992; Hays et al., 1996, Potoski and Woods, 2002), the institutional and fiscal capacity of a state that can also explain more effective utilization and implementation of environmental protection programs (Hays et al., 1996; Bacot and Dawes, 1997; Daley and Garand, 2005; Woods, 2008) and the effect of politics as political pressure from citizens and interest groups (whether environmental or manufacturing interests) can affect environmental policy (Bacot and Dawes, 1997; Daley, 2005; Davis and Davis, 1999; Woods et al., 2008). Partisan or ideological considerations have also been proposed as a factor affecting the strength of environmental efforts, e.g., whether the state has Democratic governors and legislators (Wood, 1992; Woods, 2008).

The empirical literature on environmental fiscal policies uses both total environmental expenditures (Bacot & Dawes, 1997) and per capita expenditures (see for example Konisky and Woods, 2012; Lombard, 1993; Lowry, 1992; Newmark and Witko, 2007; Woods et al., 2009). Nevertheless, the empirical evidence from studies

that use environmental taxes and environmental protection expenditures in measuring and comparing state effort among countries outside the US is scant.

An indirectly related but extensive literature considers the relation between national income and environmental quality indices usually known as the Environmental Kuznets Curve (EKC) literature. Despite the long held debate and the substantial empirical literature suggesting that income growth can improve environmental conditions, “*causality has yet to be conclusively found*” (Carson, 2010, p. 19) and supporting evidence of a positive link is “*scant, fleeting, and fragile*” (Carson, 2010, p. 17).²

Another very recent but still quite limited literature drawing on the EKC theoretical work considers how increases in government expenditure may be associated with improved environmental quality.³ Empirical work in this vein finds government expenditure to be an important factor behind environmental improvement (see for example Bernauer and Koubi, 2006; Frederik and Lundstrom, 2001; Halkos and Paizanos, 2013; López et al., 2011; López and Palacios, 2014).⁴

²There is however “*robust evidence that pollution levels typically fall at high-income levels*” (Carson, 2010, p.19).

³ It should be noted, however, that the conjunction of a heightened concern for climate change in the run up to the Copenhagen Summit of 2009 and the 2008 economic crisis gave rise to discussion and literature on the potential of ‘green stimulus’ or ‘green Keynesianism’. Fiscal budgets of 2009 had a particularly strong green component (Barbier, 2010).

⁴ For instance, López and Palacios (2014) use disaggregated data at the monitoring station level for the 12 richest European countries spanning the period 1995 to 2008 and find a significant role of fiscal policies and energy taxes on pollution. Energy taxes reduce nitrogen oxide concentrations but have no

Both the EKC literature and the more recent work on government expenditure and environmental performance provide some interesting theoretical and empirical insights about attributes of the economy and government expenditure that may influence environmental quality, while several other theoretical studies incorporate related elements of government behavior. For instance, López et al. (2011) develop a simple model to capture the effects of increased government expenditure and its composition. Their model includes a government tax on emissions that is proportional to an optimal (Pigouvian) tax with its closeness to optimality depending on the country's quality of "institutions". Where better institutions prevail, taxes are set closer to those maximizing welfare. If higher government expenditure leads to a higher demand for environmental quality, depending on the quality of institutions, this will be reflected in governmental policy through higher emission taxes. Furthermore, whether this gives rise to improved environmental quality will also depend on the strength of countervailing scale effect influences, i.e., how increased economic growth leads to higher levels of pollution. In this model, however, there is no attempt to understand what may be driving government expenditures and their composition as pollution tax policy is simply assumed to be proportional to a welfare maximizing goal.

It is important to note that in much of the EKC literature governmental policy is treated as endogenous in the sense that an increase in per capita income will lead to an increased demand for environmental quality and this will prompt a tightening of environmental regulation. This endogeneity is often modelled by assuming a

effect on ozone and sulfur dioxide. The impact of energy taxes is seen to derive mostly from the way it affects production techniques.

benevolent government maximizing welfare (Copeland and Taylor, 2004) or by assuming a degree of benevolence (López et al. 2011). Either way, it is assumed that there is an “*automatic*” responsiveness to consumer preferences as income changes.

A political economy approach, in contrast, does not take government behavior as given and attempts to include some mechanism of government behavior beyond that of welfare maximizing. Along these lines, Antweiler et al. (2001) model government tax policy to depend on the degree to which a government is controlled by *Greens* or *Browns* to capture some element of political variation across countries. Another reason in favor of a more political economy approach is that it focuses on the determinants of policy rather than environmental quality outcomes. These are connected but not the same. While we are ultimately interested in environmental quality outcomes we are also interested in finding out what aspects of policy changes are bringing about the results and what institutional features give rise to those policy changes.

Much of the early public choice work suggests that actual policy would depart from the prescriptions of welfare economics with small well organized and wealthy groups overwhelming the wider public (Olson, 1965; Tullock, 1967). Policy would be subject to rent seeking and capture by industry (Stigler, 1971). But a pure capture theory of environmental policy would have difficulty explaining many substantial regulations that clearly impose costs on industry.⁵ Public choice models of policy formation increasingly incorporate richer descriptions of motivation and behavior of key agents with policy influence and formation: government, bureaucracy, interest groups and

⁵ Though Maloney and McCormick (1982) identify conditions under which imposing environmental standards on firms can bring about an increase in profits.

voters. A common modeling approach is to assume that politicians gain utility by being re-elected (Mueller, 2003) and accordingly they promote policies that the median voter supports and is willing to pay for (Maux, 2009). Depending on the assumptions policy could move closer to welfare maximizing outcomes or substantially depart both in terms of the strength of policy efforts and the nature of instruments used. For instance, Aidt (1998) shows that under fairly demanding conditions, interest group competition over environmental policy can lead to public policy that maximizes social welfare. Using the same model, however, he shows how Pigouvian taxes can arise but depart substantially from the optimal level. Becker (1983) considers a model where competition among pressure groups leads to the policy outcome and suggested that while governments would redistribute rents to the more powerful it would choose more efficient (in terms of deadweight loss) policy instruments. Fredriksson (1997) formed a model of the use of environmental taxes where the government is assumed to care only about reelection which depends on aggregate campaign contributions from lobby groups and on aggregate social welfare, while Dijkstra (1999) looked at how the powerful interest groups would favor certain policy instruments like regulation over market instruments to the detriment of efficiency.

While lobbying is seen to play a central role in a public choice perspective, the influence of voters can work through a number of mechanisms including the capacity of interest groups, political parties and lobbying organizations to draw on the strength of voters or their willingness to contribute financially to different causes (Rasmussen et al., 2014). Naturally, voters' influence may work directly through their decision to cast a vote and politicians are likely to gauge public opinion in planning and setting policy positions. How responsive politicians are to public opinion has been an ongoing debate in political science. A recent survey of evidence in the US by Canes-Wrone

(2015) suggests that elections induced responsiveness to public opinion.⁶ To the extent that environmental policy may be a secondary issue for the electorate the responsiveness to public opinion about environmental issues may be dampened. List and Sturm (2006), however, find strong electoral incentives for environmental issues in the US. The explanation they suggest is that while secondary policies may have little impact on the majority of the voters, some voters may be substantially affected enough by a particular secondary issue that they turn into “single-issue voters” willing to vote for a politician that supports their preference on the single issue. Accordingly, politicians may ‘distort’ their policy on this particular issue to gain favor with this issue-focused group of voters.⁷ Along the same lines Costa (2016) develops a model where politicians increase environmental spending during election years to signal their preference for the environment as this is expected to draw support from a part of the electorate and provides evidence from 48 US States between 1970 and 2000, documenting that environmental expenditures increase during election years.

Overall research has paid much more attention to policy responsiveness to public opinion in the US than in Europe (Toshkov, 2011).⁸ With regards to environmental taxation in Europe Castiglione et al. (2014) acknowledge the paucity of research on its determinants and use the level of environmental tax revenues as a gauge of

⁶ See also Burstein (2003).

⁷ Another strand of the literature focuses on the behavior of opportunistically motivated politician before elections as incumbents attempt to affect voters’ economic well-being in order to enhance their reelection probabilities. For a review of the relevant literature see Drazen (2000), Franzese and Jusko (2006), De Haan and Klomp (2013) and Dubois (2016).

⁸ Toshkov (2011) studies the sensitivity of EU legislative output to public opinion since 1973.

environmental tax policy. Drawing from the literature on likely determinants, they estimate a pooled panel data model for three groups of countries with environmental tax revenues as the dependent variable and a vector of determinants reflecting production and consumption (per capita income, primary energy consumption saving), a vector reflecting environmental quality (municipal waste management, Sulfur emissions and production of primary renewable energy) and a vector reflecting governance strength (index of regulatory quality, environmental protection expenditure). They find a positive and significant link between environmental taxes and per capita income, which they suggest “*confirms the relationship between economic development and environmental awareness*” (p. 7). Interestingly, while a link is established between level of GDP and environmental policy (environmental tax revenues) it is still not clear what is driving this process from a political economy perspective. Is it that economic growth enhances “environmental awareness” or that the environment is a luxury good for which demand increases with per capital income, and that citizens put more pressure on governments to protect the environment? Nor is it adequately clear if the result is driven by the ‘scale’ effect such that higher income leads to higher emissions and thus higher tax revenues. The finding that pollution quality indicators (sulfur emissions) has a positive effect on environmental tax revenues does not clear up this matter. Again, the scale effect could be simultaneously driving sulfur emissions and tax revenues. It further highlights the need to disentangle causality and to weed out factors influencing government behavior. Is it greater citizen concern or worsening pollution that drives the increase in tax revenues?

In short, there is a need to better understand the political economy process and potential determinants shaping the environmental aspects of fiscal policy. It is in this

vein that we look at several potential institutional, economic, and political variables that might be relevant, with a special focus on the role of public opinion and elections.

3. Data and Empirical Strategy

3.1 Data

We use annual data on general government environmental protection expenditures and environmental tax revenues provided by *Eurostat*. We use all the available data for the European Union, covering the period from 2003 to 2013. Our dataset encompasses tax revenues for 27 EU countries and environmental protection expenditures for 25 of them.⁹ *Expenditures for Environmental Protection* consists of outlays and other transactions related to inputs for environmental protection activities, capital formation land purchases for environmental protection activities, users' outlays for buying environmental protection products, and transfers for environmental protection. *Environmental Taxation* refers to revenues from taxes whose base is a physical unit (or a proxy of a physical unit) of activities that have a specific and proven specific negative impact on the environment. Fig. 1 shows the average annual environmental tax revenues (27 countries) and the average annual general government's environmental

⁹ The 27 countries are: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden and United Kingdom. Environmental protection expenditures data are not available for Greece and Ireland.

protection expenditures (25 countries) expressed as a percentage of GDP. The average annual outlays have a range between 0.5% of GDP in 2004 and 0.68% of GDP in 2009.

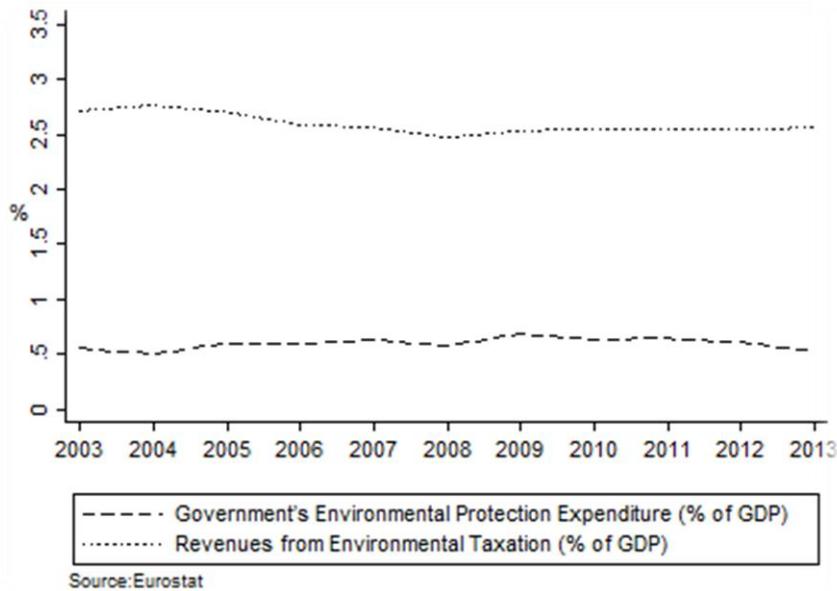
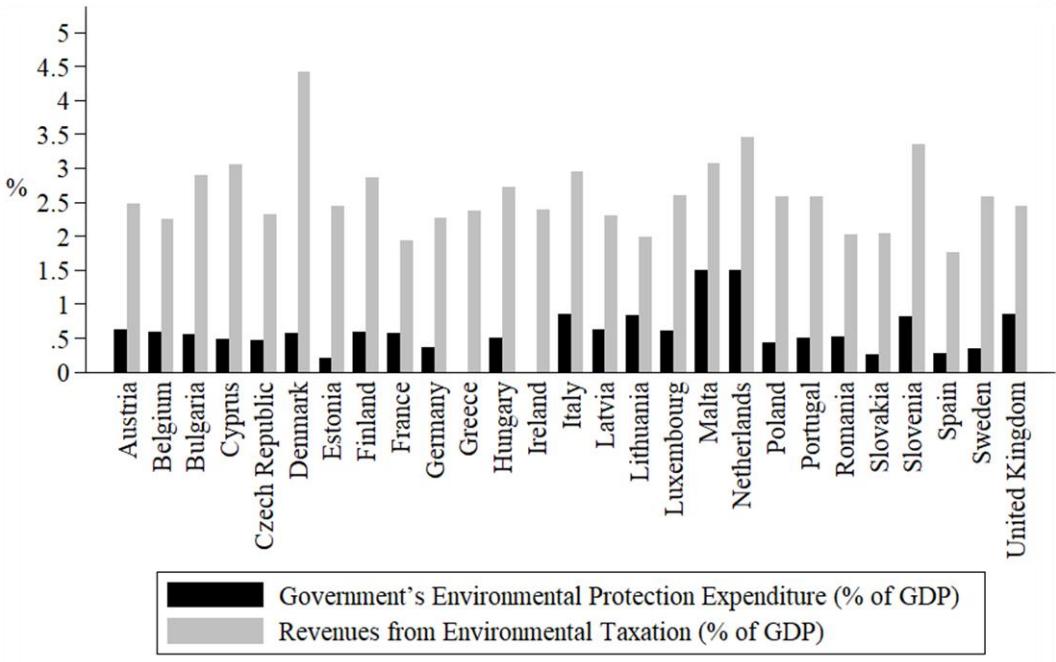


Fig. 1: General Government's Environmental Protection Expenditure and Revenues from Environmental Taxation (% of GDP). Annual average for 25 and 27 countries respectively (2003-2013).

Fig. 2 shows country averages of governments' environmental protection expenditures and environmental taxation revenues for our full sample. Estonia and the Netherlands are the countries with the lower and higher average environmental protection expenditures, at about 0.2% and 1.5% of GDP, respectively. The revenues from environmental taxation vary significantly across the EU. For example, environmental tax revenues constitute more than 4% of GDP in Denmark and less than 2% in other countries, including Spain and Lithuania



Source: Eurostat

Fig. 2: General government's environmental protection expenditure and Revenues from Environmental Taxation (% of GDP). Country average for 2003-2013.

To account for public opinion we construct a measure of the public's environmental concern, which relies on the *Standard Eurobarometer* survey series. These series of public opinion surveys are published twice a year, in spring and autumn since 1973 and address various issues related to the lives of EU citizens. To capture the importance that citizens of EU countries attach to environmental protection we rely on year averages for responses given to the, consistently asked, question: “*What do you think are the two most important issues facing (OUR COUNTRY) at the moment?*”. Survey participants choose their answer from a list of fourteen items, covering several issues that citizens may prioritize as most important. The fourteen key issues include: crime, the economic situation, public transport, inflation, taxation, unemployment, terrorism, foreign affairs, housing, immigration, healthcare system, the educational system, pensions, and *protecting the environment*. To capture the degree of public opinion's concern for

environmental issues we focus on the percentage of citizens that choose environmental protection as one of the most important issues their country faces. We use annual averages since the Eurobarometer is published twice a year. Fig. 3 shows the average percentage of citizens' environmental concern from 2003 to 2013 for all countries included in our dataset. To reduce possible measurement errors, we rescale this index by subtracting its' mean across all countries in our dataset in year t .

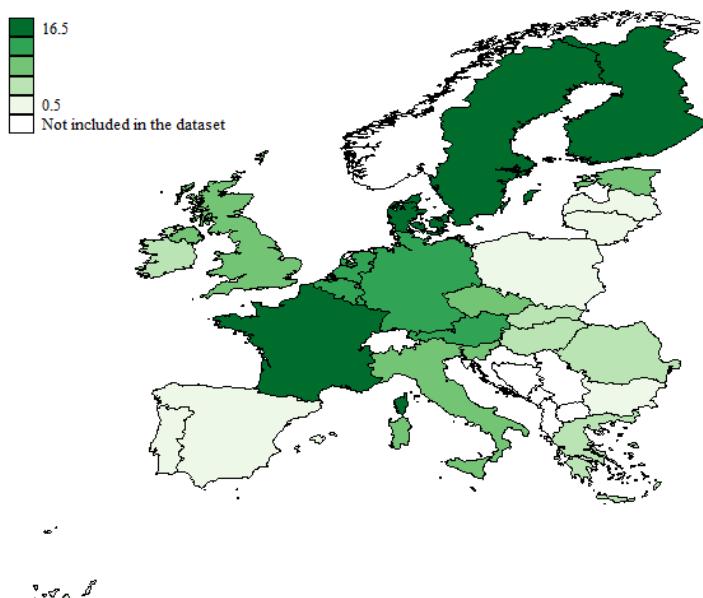


Fig. 3: Average % of answers prioritizing environmental protection in the *Eurobarometer*. Country average for:2003-2013.

3.2 The Empirical Model

To estimate the effects of elections, environmental concern, and political ideology on the environmental fiscal instruments we use a standard dynamic panel data model (e.g., Shi and Svensson, 2006; Chortareas et. al., 2016) specified as:

$$Y_{ijt} = \sum_{l=1}^2 a_l Y_{ijt-l} + \beta Elections_{it} + \gamma EnvConcern_{it} + \delta Ideology_{it} + \\ + \sum_{k=1}^m \mu_k X_{ikt} + \varepsilon_t + \eta_i + u_{ijt} \quad (1)$$

where the dependent variable Y_{ijt} denotes the j fiscal policy revenues from environmental taxation or environmental protection expenditures,¹⁰ in country i and year t , $Elections_{it}$ is an election dummy variable that takes a value of one in election years and zero otherwise, while $EnvConcern_{it}$ captures the public's concern over the protection of the environment (*Eurobarometer* survey data), and $Ideology_{it}$ describes the ideological orientation of the government. We use the ideology index proposed by Bjørnskov (2005), where the three largest government parties are first placed on a discrete left-right scale¹¹ and then ideology scores are constructed as the weighted sum of their scores. The weights applied correspond to the share of each party in the total seats in parliament held by the government.¹² X_{ikt} is a vector of m control variables, ε_t is time specific effects, η_i represents fixed country effects and u_{ijt} an *i.i.d.* error term,

¹⁰ Both as a share of GDP.

¹¹ Leftwing parties are assigned the value -1, centrist 0 and rightwing 1. Information is retrieved from the World Bank's *Database of Political Institutions* ((Beck et al., 2001)).

¹² To test the robustness of our results we employ a set of alternative ideology measures. Please see Section 4.2.

while l indicates the number of lags. The vector X_{ikt} includes several economic, demographic, and other explanatory variables. The macroeconomic conditions variables include the GDP growth rate ($GDPGrowth$) and the logarithm of real GDP per capita ($\ln GDPperCapita$). The demographic variables include the percent of the total population aged 0-14 ($Pop014$) and above 65 ($Pop65$) as demographic factors may affect fiscal policies (Klomp and de Haan, 2013). To control for environmental characteristics, we include the logarithm of CO2 emissions (metric tons per capita) as a measure of environmental pollution and the share of forest area as percentage of total land. Table 1 in the Appendix reports the descriptive statistics of all the variables used in our analysis.

3.3 Estimation Strategy

Equation (1) is a typical dynamic panel data specification. The corresponding *OLS* and *Fixed-Effects* estimators are biased and inconsistent because of the presence of fixed country effects and of lagged values of the dependent variable on the right-hand side of the equation. Although the *Fixed-Effects* estimator becomes consistent as T gets larger (Kiviet, 1995; Nickell, 1981), in our panel, where the time dimension (2003 to 2013) is relatively short, fixed effects estimations can result in a non-negligible bias. To address this potential problem, we use a *two-step system GMM* estimator as proposed by Blundell and Bond (1998). Much of the recent literature adopts this estimator to estimate a dynamic panel data model (see for example Shi and Svensson, 2006; Veiga and Veiga, 2007a). The Blundell and Bond (1998) GMM estimator extends the *difference GMM* estimator (see Arellano and Bond, 1991) by using lagged differences of the dependent variables as instruments in the levels equations in addition

to lagged levels of the dependent variables, which are used as instruments for the equations in first differences (see Arellano and Bover, 1995; Baltagi, 2008). As the estimated standard errors of the *two-step system GMM estimator* tend to be downward biased we use the Windmeijer (2005) finite sample correction to correct the bias. To avoid instrument proliferation, we collapse the instrument set, as suggested by Roodman (2009b), to reduce the number of moment conditions. We also perform the Arellano-Bond (1991) tests for the presence of first-order and second-order serial correlation of the differenced residuals and the Hansen test for over-identifying restrictions.

4. Results

4.1 Baseline Evidence

This section provides results for the effects of *Elections*, *Environmental Concern* and government *Ideology* on environmental fiscal policies. Table 1 reports the baseline results. Columns (1) and (2) only include *Elections* as variable of interest and the control variables. We find a significant negative effect, at the 5% level, on environmental tax revenues with results indicating that revenues from environmentally related taxation decrease during election years. This finding corroborates results from the political budget cycles literature. For example, Brender and Drazen (2005) find that in old established democracies, as are the majority of the countries in our dataset, elections negatively affect total revenue and grants of the central government. On the other hand, we do not find any significant electoral effect on environmental protection expenditures.

Next, in columns (3) and (4), we only include the measure of *Environmental Concern* and control variables. The coefficient of the environmental concern variable has a positive sign and is statistically significant at the 5% level only when *Environmental Protection Expenditures* is the dependent variable. This result suggests that the public's increased environmental concern positively affects environmental protection expenditures. It also indicates that governments are responsive to public opinion pressures, at least on the expenditure side, which involves less political risk as compared to raising taxes.

Columns (5) and (6), focus on the partisanship indicator. The coefficient of the government ideology variable, however, is not statistically significant for any of the fiscal instruments considered. This finding indicates the absence of partisan effects in environmental fiscal policies.

Finally, in columns (7) and (8) we include in the estimated specification all the variables of interest along with the control variables. The results are qualitatively similar to those in columns (1) to (6).

<Table 1 about here>

4.2 Interaction Terms

The results in section 4.1 document that elections have a significant effect on environmental tax revenues, while the public's environmental concerns significantly affect environmental protection expenditures. Several questions naturally arise from these results: How does the magnitude of electoral effects vary with different levels of environmental concern or different government ideologies observed across countries?

How does government's ideology affect its responsiveness to the public' concern over environmental issues?

To identify whether these factors can cause variation in the effects documented we introduce various interaction terms and we consider the respective conditional effects. In columns (1) and (2), we add to Equation (1) the interaction term *Elections***EnvConcer* to capture how the electoral effect varies among countries with different levels of public concern for the environment. The coefficient of the interaction term does not enter the regression significantly at the conventional levels, indicating that a sensitive to environmental issues electorate is not associated with a moderation in the reduction of environmental tax revenues during election years.

Columns (3) and (4) report the estimated coefficients when augmenting the baseline regression with the *Elections***Ideology* interaction term to capture the possibility that differences in governments' ideology affect the magnitude of the electoral effects. The interaction term emerges as non-statistically significant, indicating the absence of conditional effects.

Finally, to test if the effect of public environmental concern varies along government ideologies (e.g., if left wing governments are more responsive to public opinion pressures in favor of environmental protection) we include the interaction term *Envconcern***Ideology*. Columns (5) and (6) report on the estimated coefficient that once again fails to produce statistically significant results for both fiscal expenditures and environmental taxation.

<Table 2 about here>

4.3 Conditional Electoral Effects

A strand of the literature examines several factors conditioning the emergence and magnitude of fiscal policy manipulation prior to elections. For example, Alt and Lassen (2006) find that transparency in fiscal institutions is an important determinant for the emergence and size of electoral effects. Shi and Svensson (2006) show that politicians' rents from remaining in office can also explain differences in the electoral effect across countries.¹³ In effect, these factors affect politicians' incentives as well as their ability to manipulate fiscal instruments before elections to increase their reelection opportunities. In the case of environmental taxation, one would expect that institutional differences are also relevant in explaining the possible variation in the occurrence and size of the electoral effect as they can affect both politicians' ability to manipulate fiscal instruments as well as the degree to which they respond to lobbying efforts and pressures.

We consider several such factors including the level of corruption, globalization, and the rule of law. In countries where corruption is innate, for example, politicians can be more susceptible to pressures from special interest groups and hence the reduction in environmental taxation larger. The higher the degree of integration of a country to the global economy the less prone politicians may be to reduce protection outlays. In countries with adequate judiciary institutions politicians are more constrained in their actions. Lastly, the level of environmental protection, as a good record of protecting the

¹³ For a review of the literature see Drazen, (2000), Franzese and Jusko (2006) and de Haan and Klomp (2013).

environment may allow for more degrees of freedom for politicians to loosen their commitment to higher environmental taxation.

To capture the effect of globalization we use the *KOF Globalization Index*¹⁴ (Dreher, 2006; Dreher et al., 2008) that measures three dimensions: *economic*, *social* and *political* globalization. The indices take values from 0 to 100 with higher values suggesting higher levels of globalization. We construct a composite index (*Globalization*) that incorporates only the last two dimensions equally weighted, with higher values indicating a more globalized country. The dimension of *social* globalization incorporates data on information flows and cultural proximity, while the dimension of *political* globalization incorporates data on membership in international organizations and participation in international treaties.¹⁵

To capture the effect of different levels of institutional quality regarding the rule of law we use data from the *Economic Freedom Index* (Gwartney et al., 2016) and focus on the *Legal System & Property Rights* dimension. This dimension evaluates a country's performance in the relevant area by taking into consideration the degree of judicial independence and impartialness as well as the effectiveness in enforcing the law. The index (*RuleofLaw*) takes values from 0 to 10 with higher values suggesting higher quality.¹⁶

¹⁴ The index is available in time series format for the full dimension of our EU counties panel.

¹⁵ The *economic* globalization measure incorporates by half data on restrictions, tariffs and taxes on international trade that are of small importance in the case of EU countries, hence we exclude this dimension from our final measure.

¹⁶ We follow the suggestion by Gwartney et al. (2016) and use the chain-linked index that is suitable for longitudinal studies.

As these two variables are available in time series format we rewrite our model as:

$$Y_{ijt} = \sum_{l=1}^2 a_l Y_{ijt-l} + \beta_0 Elections_{it} + \beta_1 Elections_{it} * Inst_{it} + \beta_2 Inst_{it} + \gamma EnvConcern_{it} + \delta Ideology_{it} + \sum_{k=1}^m \mu_k X_{kit} + \varepsilon_t + \eta_i + u_{ijt} \quad (2)$$

where $Inst_{it}$ refers to each one of the institutional variables described above and the rest of the variables as described before.

Columns (1) and (2) in Table 3 report the system GMM estimation results of Equation (2) when we consider if and how globalization affects the size of the electoral effect. The results suggest that higher levels of globalization mitigate the negative effect that elections have on environmental tax revenues as the coefficient of the interaction term ($Elections * Globalization$) turns out positive and statistically significant at the 10% level.

A similar result emerges when we investigate whether differences across countries with respect to the quality of rule of law affect the magnitude of the electoral effect. Columns (3) and (4) report on the relevant results and as before the coefficient of the interaction term ($Elections * RuleofLaw$) is positive suggesting that in countries that have better judiciary institutions the negative effect of elections on environmental tax revenues is of a lower magnitude.

<Table 3 about here>

Fig. 5 shows how the electoral effect on environmental tax revenues varies with the degree of globalization and the performance of the judiciary. The left panel suggests that as the level of globalization increases the negative electoral effect decreases in

magnitude, while the right panel suggests that elections have a stronger negative effect under weaker rule of law, an effect that also decreases as institutions improve.

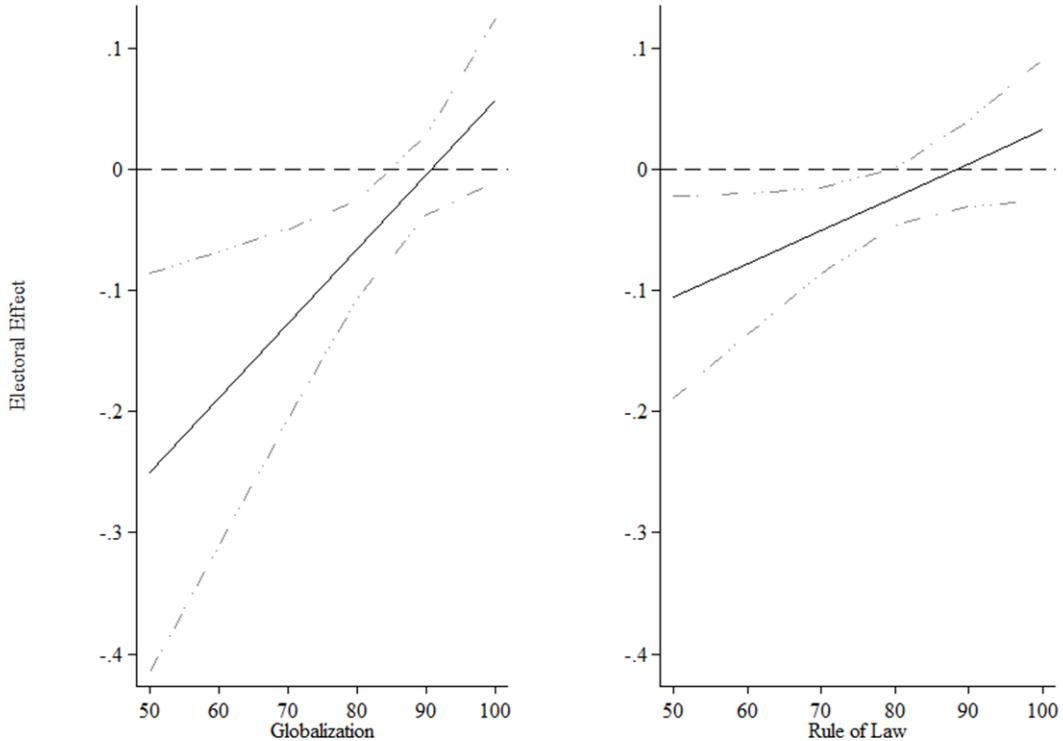


Fig. 5: Marginal Effect of Elections on Environmental Taxation. 90% Confidence Interval.

Next, we examine how the electoral effect differs among countries with different levels of corruption and different levels of environmental performance. We use corruption data from the World Bank's *World Governance Indicators* (Kaufmann et al., 2010). More specifically we use the *Control of Corruption* dimension that captures perceptions of the degree to which governance is used to acquire private gains and the extent by which elites and private interests dominate the state apparatus. The index takes values from -2,5 to 2,5 with higher values indicating better institutions. The index is updated annually since 2002 and covers the full-time dimension of our panel (2003-

2013), but nevertheless it is not suitable for time series analysis as it based on subjective judgments from survey respondents. To make this index operational we follow Alt and Lassen (2006), and create two binary variables to distinguish between low and high corruption countries. Then we interact these variables with the election dummy variable to capture the effect of elections that occur in low versus high corruption countries. To reduce the measurement error, while we take into account the full-time range of information available, we average the *Control of Corruption* index across years for each country. Then we create a *HighCorruption* variable that takes the value of one if a country's average is below the sample median control of corruption levels and zero otherwise, and a *LowCorruption* variable takes the value of one if the country's score is above the sample median and zero otherwise.¹⁷

To study how differences in the environmental performance might affect politicians' incentives and consequently the occurrence and magnitude of the electoral effects we utilize the *Environmental Performance Index* (Hsu et al., 2016). This index captures countries' environmental performance in the areas of human health and ecosystems protection by considering several related indicators. The index takes values from 0 to 100, with higher values indicating closer proximity to identified policy targets as established by best practices, the scientific community, and international treaties. Following a similar methodology as before we construct two variables. The variable

¹⁷ In effect, we split our sample in two groups. The group of Low corruption countries includes: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Ireland, Luxembourg, Netherlands, Spain, Sweden and the United Kingdom. The group of High corruption countries includes: Bulgaria, Czech Republic, Estonia, Greece, Hungary, Italy, Lithuania, Latvia, Malta, Poland, Portugal, Romania, Slovak Republic and Slovenia.

HighPerformance, which takes the value of one if a country's score of the re-scaled index is above the sample median and zero otherwise, and the *LowPerformance* takes the value of one if a country's score of the re-scaled index is below the sample median and zero otherwise.¹⁸

We can now rewrite the model as:

$$Y_{ijt} = \sum_{l=1}^2 a_l Y_{ijt-l} + \beta_1 HighLevel_i * Elections_{it} + \beta_2 LowLevel_i * Elections_{it} + \gamma EnvConcern_{it} + \delta Ideology_{it} + \sum_{k=1}^m \mu_k X_{kit} + \varepsilon_t + \eta_i + u_{ijt} \quad (3)$$

where *Level_i* refers to binary variables for corruption and environmental performance as described above and the rest of the variables as before.

Columns (1) and (2) in Table 4 report the results of the estimation for Equation (3) when we distinguish between election occurring in countries with high and low levels of corruption. The results suggest that the reduction in environmental tax revenues during election years is driven by election occurring in those countries classified as countries with control of corruption below the sample median.¹⁹ The coefficient of the

¹⁸ Data are available biannually since 2006 but not for all countries. We use data from 2010, when all the countries in our dataset exist. Low performance countries include: Belgium, Bulgaria, Cyprus, Denmark, Estonia, Greece, Hungary, Ireland, Lithuania, Luxembourg, Netherlands, Poland, Romania and Slovenia. High performance countries include: Austria, Czech Republic, Finland, France, Germany, Italy, Latvia, Malta, Portugal, Slovak Republic, Spain, Sweden and the United Kingdom.

¹⁹ This result is in line with Shi and Svensson (2006) who identify larger electoral cycles in countries with higher politicians' rents from remaining in office.

*Elections*HighCorruption* interaction term enters the specification with a negative sign and is statistically significant at the 10% level.

The results from interacting the electoral variable with the high vs low environmental performance dummy variable appear in columns (3) and (4) of Table 4. The results show that differences in environmental performance cannot explain variation in the electoral effects on environmental tax revenues. The coefficients for both interaction terms bear a negative sign but fail to achieve statistical significance at conventional levels. Yet, the evidence suggests that elections occurring in low performance countries have a positive effect of environmental protection expenditures as the coefficient of the respective interaction term (*Elections*LowPerformance*) that captures effects from election occurring in low performance countries is positive and statistically significant at the 10% significance level.

<Table 4 about here>

4.4 Further Evidence & Robustness Tests

In the evidence presented in Table 1 we documented that elections had a negative impact on environmental tax revenues, while environmental concern has a positive effect on environmental protection expenditures. To test the effect of the aftermath of elections we introduce a *Year after Elections* dummy that takes the value of one during the year after elections and zero otherwise. The results presented in Columns (1) and (2) of Table 4 show that the year after elections negatively affects environmental protection expenditures with the respective coefficient being statistically significant at

the 10% level. At the same time when we use tax revenues as the dependent variable we find no effect. The related coefficient is negative but not statistically significant.

In addition to the post-electoral effect we study the exact timing of when changes in environmental fiscal policies occur during a government's term. To do so we introduce a variable (*YrCurnt*) that captures the number of years that are left in a government's term (Beck et al., 2001). This variable takes the value 0 in election years and $n-1$ after elections, where n is the constitutionally mandated length of term. Evidence presented in columns (3) and (4) of Table 4 show that governments in the beginning of their terms decrease environmental taxation.

To examine the robustness of our results we perform a series of tests. First, we use an alternative ideology variable (*Ideology2*) as proposed by Potrafke (2009). The variable places the cabinet on a left-right scale by assigning values from 1 to 5. If the share of rightwing parties in government, as measured in terms of the seats in the cabinet and in parliament, is larger than 2/3 the variable takes the value of 1. If the share is between 1/3 and 2/3 it takes the value of 2. This variable takes the value of 3 either when the share of centrist parties is 50% or when there is a coalition government of both left-wing and right-wing parties not dominated by one side. The index takes values 4 and 5 symmetrically for the left-wing parties. We provide the results in Table 5, Columns (1) and (2), which suggest that the respective coefficient is not significant at conventional significance levels. Thus, once again we document the absence of partisan effects in environmental fiscal policies. The same holds true if we substitute the *Ideology2* variable with a dummy variable (*Green*) that takes the value of 1 if a green party has seats in the parliament and zero otherwise [Columns (3) and (4)].

We further test the robustness of our results by substituting the demographic variables with a variable (*Dependency*) that captures the combined share of population

aged under 14 years old and above 65 years old as a percent of total population. The results shown in columns (5) and (6) of Table 5 remain qualitatively similar to those of the baseline specification. Next, we augment the baseline specification with the share of population living in the cities (*Urban Population*). The respective coefficients, as shown in columns (7) and (8) fail to achieve statistical significance, while the remaining variables are in line with the estimation presented in Table 1. This is also true when we substitute a variable (*Arable Land*) that captures the arable land area as a % of total land area for the variable that captures the forest area as a % of total land area, [Columns (9) and (10)]. To identify if past values of *Environmental Concern* have any impact on our dependent variables of interest, we add one lag of the variable in the baseline specification that does not turn out to be statistically significant [Columns (11) and (12)]. Finally, we re-estimate the baseline specification using a bootstrap-corrected fixed effects estimator for dynamic panel data as introduced by Everaert and Pozzi (2007).²⁰ The results are similar to those of the baseline specification and we present them in Columns (13) and (14) of Table 5.

<Table 5 about here>

5. Conclusion

This paper provides evidence on the effects of the public's environmental concerns, elections, and ideology on environmental protection expenditures and tax revenues for

²⁰ We implement the estimator following De Vos et al. (2015).

a panel of 27 EU countries over the period 2003-2013. We first consider the effects of elections on fiscal instruments related to environmental protection and, therefore, on the strength of fiscal environmental policy. Our results suggest that during election years, revenues from environmental taxation decline. This effect is conditional on various country-specific institutional aspects, being less pronounced in more globalized countries and in countries with better judicial institutions, while it is driven by elections in countries with high levels of corruption. Our evidence also suggests that the public's concern for the environment, as captured by a measure compiled using data from the standard *Eurobarometer* survey series, affects positively the level of environmental protection expenditures. Our evidence also shows that environmental protection expenditures decline in the aftermath of elections.

There is no evidence of partisan/ideological effects either on environmental tax revenues or on environmental protection expenditures. Moreover, the presence of a green party in the parliament does not seem to affect environmental fiscal instruments. The results are robust to the inclusion of alternative measures, additional control variables, and lagged values of the environmental concern variable.

Our findings document the importance of environmental awareness to governments' decisions regarding specific taxing and spending components and their timing. We also show that environmental taxation often assumed to be designed in accordance with welfare objectives, is subject to electoral effects and considerations in the EU countries. In effect, this finding suggests that opportunistic short-term policies may dominate the long-term goal of environmental protection. Hence, future research in this area could consider mechanisms and institutions to shield environmental fiscal policies from the opportunistic aspects of the political process while still allowing for responsiveness to the public's concern for the environment. Even the idea of an

independent authority monitoring fiscal tools related to environmental protection may be worth considering.

References

- Aidt, T.S., 1998. Political internalization of economic externalities and environmental policy. *Journal of Public Economics* 69, 1–16. [https://doi.org/10.1016/S0047-2727\(98\)00006-1](https://doi.org/10.1016/S0047-2727(98)00006-1)
- Alesina, A., Perotti, R., 1995. The Political Economy of Budget Deficits. *Staff Papers* (International Monetary Fund) 42, 1–31.
- Alt, J.E., Lassen, D.D., 2006. Transparency, Political Polarization, and Political Budget Cycles in OECD Countries. *American Journal of Political Science* 50, 530–550.
- Antweiler, W., Copeland, B.R., Taylor, M.S., 2001. Is free trade good for the environment. *The American Economic Review* 91, 877–908.
- Bacot, A.H., Dawes, R.A., 1997. State expenditures and policy outcomes in environmental program management. *Policy Studies Journal*.
- Barbier, E. B. (2010). Green Stimulus, Green Recovery and Global Imbalances. *World Economics*, 11(2), 130.
- Beck, T.H.L., Clarke, G., Groff, A., Keefer, P., Walsh, P., 2001. New tools in comparative political economy: The database of political institutions (Open Access publications from Tilburg University No. 15), World Bank Economic Review.
- Becker, G.S., 1983. A theory of competition among pressure groups for political influence. *The Quarterly Journal of Economics*.

- Bernauer, T., Koubi, V., 2006. States as Providers of Public Goods: How Does Government Size Affect Environmental Quality? SSRN Electronic Journal.
- Bjørnskov, C., 2005. Political Ideology and Economic Freedom (Working Paper No. 05-8). University of Aarhus, Aarhus School of Business, Department of Economics.
- Brender, A., Drazen, A., 2005. Political budget cycles in new versus established democracies. *Journal of Monetary Economics* 52, 1271–1295.
- Burstein, P., 2003. The impact of public opinion on public policy: A review and an agenda. *Political research quarterly* 56, 29–40.
- Busemeyer, M.R., 2007. Determinants of public education spending in 21 OECD democracies, 1980–2001. *Journal of European Public Policy* 14, 582–610.
- Canes-Wrone, B., 2015. From Mass Preferences to Policy. *Annual Review of Political Science* 18, 147–165.
- Carson, R.T., 2010. The Environmental Kuznets Curve: Seeking Empirical Regularity and Theoretical Structure. *Review of Environmental Economics and Policy* 4, 3–23.
- Castiglione, C., Infante, D., Minervini, M.T., Smirnova, J., Benitez-Silva, H., 2014. Environmental taxation in Europe: What does it depend on? *Cogent Economics; Finance* 2, 967362.

- Chortareas, G., Logothetis, V., Papandreou, A.A., 2016. Political budget cycles and reelection prospects in Greece's municipalities. *European Journal of Political Economy* 43, 1–13.
- Copeland, B.R., Taylor, M.S., 2004. Trade, Growth, and the Environment. *Journal of Economic Literature* 42, 7–71.
- Costa, H., 2016. Pork barrel as a signaling tool: the case of US environmental policy (Working Paper No. 225). Grantham Research Institute on climate change and the environment.
- Daley, D.M., 2005. Horizontal Diffusion, Vertical Diffusion, and Internal Pressure in State Environmental Policymaking, 1989–1998. *American Politics Research* 33, 615–644.
- Davis, C., Davis, S.K., 1999. State Enforcement of the Federal Hazardous Waste Program. *Polity* 31, 451–468.
- De Vos, I., Everaert, G., Ruyssen, I., 2015. Bootstrap-based bias correction and inference for dynamic panels with fixed effects. *Stata Journal* 15, 986–1018.
- Dijkstra, B.R., 1999. The Political Economy of Environmental Policy: A Public Choice Approach to, in: Market Instruments (New Horizons in Environmental Economics Series). Edward Elgar Publishing Ltd.
- Drazen, A., 2000. Political economy in macroeconomics. Princeton University Press, Princeton, N.J.

- Dreher, A., 2006. Does globalization affect growth? Evidence from a new index of globalization. *Applied Economics* 38, 1091–1110.
- Dreher, A., Sturm, J.-E., Ursprung, H., 2008. The impact of globalization on the composition of government expenditures: Evidence from panel data. *Public Choice* 134, 263–292.
- Dubois, E., 2016. Political business cycles 40 years after Nordhaus. *Public Choice* 166, 235–259.
- Efthyvoulou, G., 2012. Political budget cycles in the European Union and the impact of political pressures. *Public Choice* 153, 295–327.
- Everaert, G., Pozzi, L., 2007. Bootstrap-based bias correction for dynamic panels. *Journal of Economic Dynamics and Control* 31, 1160–1184.
- Franzese, R.J., Jusko, K.L., 2006. Political-Economic Cycles, in: Weingast, B.R., Wittman, D.A. (Eds.), *The Oxford Handbook of Political Economy*. Oxford University Press, New York, pp. 545–564.
- Fredriksson, P.G., 1997. The political economy of pollution taxes in a small open economy. *Journal of Environmental Economics and Management* 33, 44–58.
- Gwartney, J., Lawson, R., Hall, J., 2016. Economic Freedom Dataset, *Economic Freedom of the World: 2016 Annual Report*. Frazer Institute.
- Haan, J. de, Klomp, J., 2013. Conditional political budget cycles: a review of recent evidence. *Public Choice* 157, 387–410.

- Haan, J. de, Sturm, J.-E., 1994. Political and institutional determinants of fiscal policy in the European Community. *Public Choice* 80, 157–172.
- Halkos, G.E., Paizanos, E.A., 2013. The effect of government expenditure on the environment: An empirical investigation. *Ecological Economics* 91, 48–56.
- Hall, B., Kerr, M.L., 1991. 1991-1992 green index: a state-by-state guide to the nation's environmental health. Island Press, Washington, D.C.
- Hsu, A., Esty, D.C., Levy, M.A., Sherbinin, A.D., 2016. 2016 Environmental Performance Index (EPI).
- Kaufmann, D., Kraay, A., Mastruzzi, M., 2010. The Worldwide Governance Indicators: Methodology and analytical issues (No. 5430), World Bank Policy Research Working Paper.
- Klomp, J., Haan, J. de, 2013. Political budget cycles and election outcomes. *Public Choice* 157, 245–267.
- Konisky, D.M., Woods, N.D., 2012. Measuring state environmental policy. *Review of Policy Research* 29, 544–569.
- List, J.A., Sturm, D.M., 2006. How elections matter: Theory and evidence from environmental policy. *The Quarterly Journal of Economics* 121, 1249.
- Lombard, E.N., 1993. Determinants of state air-quality management: A comparative analysis. *The American Review of Public Administration*.

López, R., Galinato, G.I., Islam, A., 2011. Fiscal spending and the environment: Theory and empirics. *Journal of Environmental Economics and Management* 62, 180–198.

López, R., Palacios, A., 2014. Why has Europe Become Environmentally Cleaner? Decomposing the Roles of Fiscal, Trade and Environmental Policies. *Environmental and Resource Economics* 58, 91–108.

Lowry, W.R., 1992. The dimensions of federalism: state governments and pollution control policies. Duke University Press, Durham.

Maizels, A., Nissanke, M.K., 1986. The determinants of military expenditures in developing countries. *World Development* 14, 1125–1140.

Maloney, M.T., McCormick, R.E., 1982. A positive theory of environmental quality regulation. *Journal of Law and Economics* 25, 99–123.

Maux, B.L., 2009. Governmental behavior in representative democracy: a synthesis of the theoretical literature. *Public Choice* 141, 447–465.

Mueller, D.C., 2003. *Public Choice III*. Cambridge University Press.

Newmark, A.J., Witko, C., 2007. Pollution, Politics, and Preferences for Environmental Spending in the States. *Rev Policy Res* 24, 291–308.

Olson, M., 1965. *The logic of collective action : public goods and the theory of groups*. Harvard University Press, Cambridge, Mass.

- Persson, T., Tabellini, G.E., 2003. *The Economic Effects of Constitutions*, Munich lectures in economics. MIT Press, Cambridge, Mass.
- Potoski, M., Woods, N.D., 2002. Dimensions of State Environmental Policies. *Air Pollution Regulation in the United States*. *Policy Studies Journal* 30, 208–226.
- Potrafke, N., 2009. Did globalization restrict partisan politics? An empirical evaluation of social expenditures in a panel of OECD countries. *Public Choice* 140, 105–124.
- Potrafke, N., 2010. The growth of public health expenditures in OECD countries: Do government ideology and electoral motives matter? *Journal of Health Economics* 29, 797–810.
- Rasmussen, A., Carroll, B.J., Lowery, D., 2014. Representatives of the public? Public opinion and interest group activity. *European Journal of Political Research* 53, 250–268.
- Shi, M., Svensson, J., 2006. Political budget cycles: Do they differ across countries and why? *Journal of Public Economics* 90, 1367–1389.
- Stigler, G.J., 1971. The theory of economic regulation. *The Bell journal of economics and management science*, 3–21.
- Toshkov, D., 2011. Public opinion and policy output in the European Union: A lost relationship. *European Union Politics* 12, 169–191.

Tujula, M., Wolswijk, G., 2004. What determines fiscal balances? An empirical investigation in determinants of changes in OECD budget balances (No. 422), Working Paper Series. European Central Bank.

Tullock, G., 1967. The welfare costs of tariffs, monopolies, and theft. *Economic Inquiry* 5, 224–232.

Wang, Z., 2009. The determinants of health expenditures: evidence from US state-level data. *Applied Economics* 41, 429–435.

Woo, J., 2003. Economic, political, and institutional determinants of public deficits. *Journal of Public Economics* 87, 387–426.

Wood, B.D., 1992. Modeling Federal Implementation as a System: The Clean Air Case. *American Journal of Political Science* 36, 40–67.

Woods, N.D., 2008. The Policy Consequences of Political Corruption: Evidence from State Environmental Programs*. *Social Science Quarterly* 89, 258–271.

Woods, N.D., Konisky, D.M., Bowman, A.O.M., 2008. You Get What You Pay For. *Environmental Policy and Public Health. Publius: The Journal of Federalism* 39, 95–116.

Tables

Table 1: Baseline Results.

| VARIABLES | (1) Protection Expenditures | (2) Tax Revenues | (3) Protection Expenditures | (4) Tax Revenues | (5) Protection Expenditures | (6) Tax Revenues | (7) Protection Expenditures | (8) Tax Revenues |
|---|-----------------------------------|------------------------|-----------------------------------|------------------------|-----------------------------------|------------------------|-----------------------------------|------------------------|
| Elections | 0.0135 (0.0189) | -0.0376** (0.0189) | | | | | 0.0135 (0.0211) | -0.0374** (0.0183) |
| Environmental Concern | | | 0.0152** (0.00668) | -0.0111 (0.0141) | | | 0.0153** (0.00684) | -0.00813 (0.0126) |
| Ideology | | | | | -0.0141 (0.0209) | 0.0460 (0.0668) | -0.00211 (0.0185) | 0.0407 (0.0565) |
| GDP Growth | -0.0101 (0.0124) | -0.0316 (0.0217) | -0.0114 (0.0115) | -0.0326* (0.0193) | -0.0108 (0.0123) | -0.0330* (0.0176) | -0.0115 (0.0120) | -0.0321** (0.0161) |
| InGDPperCapita | -0.0835 (0.0726) | -0.225 (0.213) | -0.0934 (0.0730) | -0.220 (0.179) | -0.0833 (0.0692) | -0.246 (0.181) | -0.0926 (0.0723) | -0.230 (0.156) |
| Population, ages 0-14 (% of total) | 0.0183 (0.0331) | -0.0132 (0.0538) | -0.00989 (0.0282) | 0.00124 (0.0412) | 0.0185 (0.0317) | -0.0117 (0.0520) | -0.00949 (0.0272) | -0.00503 (0.0453) |
| Population ages 65 and above (% of total) | 0.00812 (0.0207) | -0.00859 (0.0355) | 0.000393 (0.0206) | -0.00149 (0.0285) | 0.00526 (0.0200) | -0.00473 (0.0291) | 0.000514 (0.0210) | -0.000461 (0.0262) |
| InCo2 | -0.137 (0.242) | 0.243 (1.169) | -0.191 (0.187) | 0.295 (1.118) | -0.0938 (0.199) | 0.241 (0.895) | -0.192 (0.179) | 0.253 (0.823) |
| Forest area | -0.00213 (0.00243) | 0.00377 (0.00485) | -0.00305 (0.00220) | 0.00437 (0.00508) | -0.00229 (0.00231) | 0.00356 (0.00412) | -0.00302 (0.00229) | 0.00388 (0.00443) |
| Dependent Variable (t-1) | 0.568*** (0.148) | 1.252*** (0.366) | 0.597*** (0.134) | 1.230*** (0.334) | 0.554*** (0.159) | 1.250*** (0.324) | 0.589*** (0.132) | 1.268*** (0.306) |
| Dependent Variable (t-2) | 0.102 (0.166) | 0.281 (0.412) | 0.0186 (0.138) | 0.323 (0.377) | 0.107 (0.156) | 0.317 (0.329) | 0.0194 (0.141) | 0.309 (0.285) |
| Observations | 181 | 243 | 181 | 243 | 181 | 243 | 181 | 243 |
| AR(1) | 0.024 | 0.025 | 0.011 | 0.037 | 0.022 | 0.014 | 0.011 | 0.004 |
| AR(2) | 0.420 | 0.273 | 0.459 | 0.141 | 0.228 | 0.172 | 0.563 | 0.143 |
| Hansen Test | 0.163 | 0.432 | 0.321 | 0.555 | 0.195 | 0.542 | 0.304 | 0.661 |
| No of Countries | 25 | 27 | 25 | 27 | 25 | 27 | 25 | 27 |

Notes: Robust standard errors in parenthesis with finite-sample correction for the two step covariance matrix as developed by Windmeijer (2005). Instruments collapsed as suggested by Roodman (2009b). ***, **, * denote significance at the 1,5, and 10-percent level. a) Arellano-Bond test for first and second order serial correlation in the first difference residuals, H0: No serial correlation. b) Hansen test for over-identifying restriction, where the null H0 corresponds to valid over-identifying restriction.

Table 2: Interaction Terms.

| VARIABLES | (1) Protection Expenditures | (2) Tax Revenues | (3) Protection Expenditures | (4) Tax Revenues | (5) Protection Expenditures | (6) Tax Revenues |
|---|-----------------------------------|------------------------|-----------------------------------|------------------------|-----------------------------------|------------------------|
| Elections | 0.0126 (0.0209) | -0.0375** (0.0170) | 0.0144 (0.0212) | -0.0373* (0.0192) | 0.0126 (0.0211) | -0.0374** (0.0190) |
| Environmental Concern | 0.0156** (0.00657) | -0.00880 (0.0122) | 0.0155** (0.00694) | -0.00822 (0.0133) | 0.0163** (0.00772) | -0.00797 (0.0140) |
| Ideology | -0.00246 (0.0189) | 0.0373 (0.0625) | 0.00291 (0.0211) | 0.0373 (0.0540) | -0.000333 (0.0196) | 0.0420 (0.0545) |
| Elections*EnvConcern | -0.00225 (0.00457) | 0.00197 (0.00719) | | | | |
| Elections*Ideology | | | -0.0139 (0.0240) | 0.0159 (0.0475) | | |
| EnvConcern*Ideology | | | | | 0.00162 (0.00381) | 0.000439 (0.00805) |
| GDP Growth | -0.0112 (0.0121) | -0.0311* (0.0174) | -0.0120 (0.0120) | -0.0320* (0.0173) | -0.0113 (0.0118) | -0.0325** (0.0159) |
| InGDPperCapita | -0.0915 (0.0728) | -0.216 (0.180) | -0.0931 (0.0722) | -0.239 (0.177) | -0.0946 (0.0718) | -0.232 (0.152) |
| Population, ages 0-14 (% of total) | -0.0102 (0.0278) | -0.00405 (0.0442) | -0.00938 (0.0269) | -0.00465 (0.0464) | -0.0103 (0.0268) | -0.00557 (0.0439) |
| Population ages 65 and above (% of total) | 0.000571 (0.0211) | -6.85e-06 (0.0254) | 0.000798 (0.0208) | -0.000361 (0.0271) | 0.000354 (0.0205) | -0.000616 (0.0258) |
| InCo2 | -0.206 (0.191) | 0.232 (0.819) | -0.190 (0.180) | 0.260 (0.895) | -0.191 (0.182) | 0.272 (0.833) |
| Forest area | -0.00300 (0.00234) | 0.00372 (0.00441) | -0.00313 (0.00230) | 0.00400 (0.00501) | -0.00307 (0.00223) | 0.00396 (0.00439) |
| Dependent Variable (t-1) | 0.591*** (0.133) | 1.253*** (0.319) | 0.586*** (0.129) | 1.279*** (0.352) | 0.587*** (0.131) | 1.275*** (0.305) |
| Dependent Variable (t-2) | 0.0210 (0.143) | 0.292 (0.312) | 0.0121 (0.145) | 0.318 (0.321) | 0.0258 (0.144) | 0.315 (0.278) |
| Observations | 181 | 243 | 181 | 243 | 181 | 243 |
| AR(1) | 0.010 | 0.005 | 0.009 | 0.006 | 0.012 | 0.005 |
| AR(2) | 0.568 | 0.172 | 0.606 | 0.160 | 0.566 | 0.136 |
| Hansen Test | 0.310 | 0.682 | 0.313 | 0.636 | 0.318 | 0.652 |
| No of Countries | 25 | 27 | 25 | 27 | 25 | 27 |

Notes: See Table 1

Table 3: Globalization and the Rule of Law--Interaction Terms.

| VARIABLES | (1) Protection Expenditures | (2) Tax Revenues | (3) Protection Expenditures | (4) Tax Revenues |
|--|-----------------------------------|------------------------|-----------------------------------|------------------------|
| Elections | -0.186 (0.261) | -0.558** (0.234) | 0.0745 (0.0539) | -0.244* (0.130) |
| Environmental Concern | 0.0114* (0.00620) | 0.00842 (0.0164) | 0.0161* (0.00831) | -0.00668 (0.0153) |
| Ideology | 0.000740 (0.0112) | -0.000136 (0.0394) | -0.00221 (0.0191) | 0.0358 (0.0462) |
| Election*Globalization | 0.00235 (0.00300) | 0.00614** (0.00271) | | |
| Globalization | -0.00717 (0.00504) | 0.0187 (0.0124) | | |
| Elections*RuleofLaw | | | -0.00799 (0.00746) | 0.0276* (0.0162) |
| RuleofLaw | | | 0.0154 (0.0339) | -0.0529 (0.0838) |
| GDP Growth | -0.00967 (0.0110) | -0.0191* (0.0104) | -0.0141 (0.0123) | -0.0332** (0.0153) |
| lnGDPperCapita | -0.0487 (0.0472) | -0.338 (0.225) | -0.104 (0.0895) | -0.198 (0.142) |
| Population, ages 0-14 (% of total) | 0.00600 (0.0245) | -0.0292 (0.0528) | -0.00732 (0.0443) | 0.0138 (0.0514) |
| Population ages 65 and above (% of total) | 0.0113 (0.0136) | -0.0206 (0.0354) | -0.00334 (0.0183) | 0.00328 (0.0290) |
| lnCo2 | -0.0844 (0.180) | -0.0138 (0.623) | 0.0163 (0.415) | 0.185 (0.599) |
| Forest area | -0.00355** (0.00178) | 0.00161 (0.00330) | -0.00412 (0.00256) | 0.00413 (0.00521) |
| Dependent Variable (t-1) | 0.543*** (0.123) | 1.147*** (0.170) | 0.567*** (0.167) | 1.250*** (0.249) |
| Dependent Variable (t-2) | 0.00508 (0.112) | 0.101 (0.159) | -0.0311 (0.157) | 0.342 (0.291) |
| Observations | 181 | 243 | 181 | 243 |
| AR(1) | 0.019 | 0.001 | 0.014 | 0.023 |
| AR(2) | 0.228 | 0.257 | 0.468 | 0.111 |
| Hansen Test | 0.669 | 0.353 | 0.279 | 0.789 |
| No of Countries | 25 | 27 | 25 | 27 |

Notes: See Table 1

Table 4: High/Low Corruption/Environmental Performance.

| VARIABLES | (1) | (2) | (3) | (4) |
|---|----------------------------|----------------------|----------------------------|----------------------|
| | Protection Expenditures | Tax Revenues | Protection Expenditures | Tax Revenues |
| Elections* HighCorruption | 0.0305 (0.0342) | -0.0686* (0.0359) | | |
| Elections* LowCorruption | 0.00234 (0.0218) | -0.00316 (0.0345) | | |
| Elections*HighPerformance | | | -0.0200 (0.0230) | -0.0229 (0.0459) |
| Elections*LowPerformance | | | 0.0515* (0.0284) | -0.0490 (0.0669) |
| Environmental Concern | 0.0149** (0.00680) | -0.00861 (0.0129) | 0.0154** (0.00605) | -0.00831 (0.0123) |
| Ideology | -0.000623 (0.0187) | 0.0429 (0.0563) | 0.00223 (0.0189) | 0.0376 (0.0572) |
| GDP Growth | -0.0119 (0.0118) | - (0.0161) | -0.0116 (0.0118) | - (0.0154) |
| InGDPerCapita | -0.0896 (0.0702) | -0.242 (0.161) | -0.0903 (0.0640) | -0.225 (0.163) |
| Population, ages 0-14 (% of total) | -0.00858 (0.0262) | -0.00804 (0.0447) | -0.0108 (0.0250) | -0.00325 (0.0438) |
| Population ages 65 and above (% of total) | 0.00101 (0.0207) | -0.00135 (0.0267) | 0.00204 (0.0193) | 0.000129 (0.0264) |
| InCo2 | -0.193 (0.173) | 0.291 (0.830) | -0.215 (0.173) | 0.222 (0.863) |
| Forest area | -0.00305 (0.00229) | 0.00404 (0.00449) | -0.00301 (0.00222) | 0.00376 (0.00435) |
| Dependent Variable (t-1) | 0.589*** (0.128) | 1.286*** (0.302) | 0.603*** (0.115) | 1.256*** (0.317) |
| Dependent Variable (t-2) | 0.0204 (0.139) | 0.331 (0.277) | 0.0240 (0.138) | 0.294 (0.289) |
| Observations | 181 | 243 | 181 | 243 |
| AR(1) | 0.013 | 0.007 | 0.012 | 0.001 |
| AR(2) | 0.761 | 0.136 | 0.873 | 0.126 |
| Hansen Test | 0.330 | 0.673 | 0.397 | 0.621 |
| No of Countries | 25 | 27 | 25 | 27 |

Notes: See Table 1

Table 4: Year After Elections & Years Left in Current Term.

| VARIABLES | (1) Protection Expenditures | (2) Tax Revenues | (3) Protection Expenditures | (4) Tax Revenues |
|--|-----------------------------------|-----------------------|-----------------------------------|------------------------|
| Elections | -0.00693 (0.0224) | -0.0760** (0.0373) | 0.0232 (0.0367) | -0.105** (0.0435) |
| Year After Elections | -0.0405* (0.0214) | -0.0736 (0.0449) | | |
| YrCurnt | | | -0.000181 (0.0183) | -0.0494** (0.0247) |
| Environmental Concern | 0.0150** (0.00673) | -0.00882 (0.0129) | 0.0155* (0.00880) | -0.00936 (0.0141) |
| Ideology | -0.00432 (0.0181) | 0.0417 (0.0683) | 0.00472 (0.0328) | 0.0451 (0.0456) |
| GDP Growth | -0.0112 (0.0125) | -0.0286* (0.0168) | -0.0161 (0.0136) | -0.0381*** (0.0128) |
| lnGDPperCapita | -0.0949 (0.0737) | -0.247 (0.186) | -0.0951 (0.0936) | -0.276 (0.191) |
| Population, ages 0-14 (% of total) | -0.00879 (0.0268) | -0.00106 (0.0468) | -0.0173 (0.0159) | 0.00130 (0.0387) |
| Population ages 65 and above (% of total) | -0.000231 (0.0201) | 0.00306 (0.0270) | -0.00460 (0.0181) | 0.00151 (0.0226) |
| lnCo2 | -0.178 (0.158) | 0.163 (0.907) | -0.122 (0.197) | 0.265 (0.367) |
| Forest area | -0.00264 (0.00222) | 0.00406 (0.00476) | -0.00298 (0.00206) | 0.00436 (0.00453) |
| Dependent Variable (t-1) | 0.597*** (0.135) | 1.264*** (0.334) | 0.694*** (0.218) | 1.268*** (0.195) |
| Dependent Variable (t-2) | 0.0267 (0.136) | 0.319 (0.340) | 0.0605 (0.146) | 0.381 (0.280) |
| Observations | 181 | 243 | 180 | 241 |
| AR(1) | 0.009 | 0.007 | 0.022 | 0.004 |
| AR(2) | 0.545 | 0.171 | 0.441 | 0.184 |
| Hansen Test | 0.221 | 0.528 | 0.169 | 0.603 |
| No of Countries | 25 | 27 | 25 | 27 |

Notes: See Table 1

Table 5: Robustness Tests.

| VARIABLES | (1) Protection Expenditures | (2) Tax Revenues | (3) Protection Expenditures | (4) Tax Revenues | (5) Protection Expenditures | (6) Tax Revenues | (7) Protection Expenditures | (8) Tax Revenues |
|---|-----------------------------------|------------------------|-----------------------------------|------------------------|-----------------------------------|------------------------|-----------------------------------|------------------------|
| Elections | 0.0111 (0.0209) | -0.0361** (0.0173) | 0.00890 (0.0193) | -0.0344* (0.0188) | 0.0128 (0.0215) | -0.0375** (0.0183) | 0.0158 (0.0202) | -0.0377** (0.0178) |
| Environmental Concern | 0.0154** (0.00701) | -0.00872 (0.0113) | 0.0129* (0.00677) | -0.0113 (0.0151) | 0.0147* (0.00836) | -0.00819 (0.0129) | 0.0131* (0.00670) | -0.0113 (0.0118) |
| Environmental Concern (t-1) | | | | | | | | |
| Ideology | | | | | -0.00440 (0.0213) | 0.0416 (0.0594) | -0.00120 (0.0168) | 0.0405 (0.0587) |
| Ideology2 | 0.00856 (0.0192) | 0.0258 (0.0309) | | | | | | |
| Green | | | -0.0819 (0.0596) | -0.0174 (0.120) | | | | |
| GDP Growth | -0.0105 (0.0116) | -0.0291** (0.0130) | -0.0119 (0.0108) | -0.0319 (0.0196) | -0.0110 (0.0125) | -0.0325* (0.0171) | -0.0117 (0.0123) | -0.0313** (0.0155) |
| lnGDPperCapita | -0.0920 (0.0733) | -0.200 (0.124) | -0.0797 (0.0721) | -0.211 (0.185) | -0.101 (0.0634) | -0.237 (0.181) | -0.0911 (0.0700) | -0.232 (0.161) |
| Population, ages 0-14 (% of total) | -0.0102 (0.0286) | -0.00299 (0.0405) | 0.00319 (0.0322) | 0.00114 (0.0525) | | | -0.0170 (0.0259) | -0.0127 (0.0473) |
| Population ages 65 and above (% of total) | 0.00252 (0.0215) | 0.000692 (0.0249) | 0.0108 (0.0235) | -0.000601 (0.0345) | | | -0.00471 (0.0187) | -0.00952 (0.0286) |
| Dependency | | | | | -0.000328 (0.0220) | -0.00122 (0.0283) | | |
| lnCo2 | -0.225 (0.193) | 0.164 (0.768) | -0.294 (0.195) | 0.238 (1.238) | -0.214 (0.224) | 0.270 (0.880) | -0.143 (0.167) | 0.286 (0.846) |
| Forest area | -0.00303 (0.00228) | 0.00342 (0.00419) | -0.00191 (0.00220) | 0.00451 (0.00560) | -0.00284 (0.00255) | 0.00410 (0.00467) | -0.00274 (0.00201) | 0.00466 (0.00427) |
| Urban population | | | | | | 0.00235 (0.00274) | 0.00394 (0.00433) | |
| Dependent Variable (t-1) | 0.598*** (0.131) | 1.236*** (0.263) | 0.587*** (0.141) | 1.246*** (0.357) | 0.563*** (0.124) | 1.272*** (0.317) | 0.593*** (0.134) | 1.266*** (0.294) |
| Dependent Variable (t-2) | 0.0161 (0.141) | 0.264 (0.225) | 0.0569 (0.126) | 0.305 (0.385) | 0.0270 (0.152) | 0.315 (0.302) | 0.0119 (0.141) | 0.296 (0.278) |
| Observations | 181 | 243 | 181 | 243 | 181 | 243 | 181 | 243 |
| AR(1) | 0.011 | 0.001 | 0.014 | 0.018 | 0.010 | 0.004 | 0.011 | 0.003 |
| AR(2) | 0.591 | 0.109 | 0.774 | 0.180 | 0.633 | 0.151 | 0.466 | 0.132 |
| Hansen Test | 0.313 | 0.653 | 0.335 | 0.614 | 0.319 | 0.667 | 0.266 | 0.633 |
| No of Countries | 25 | 27 | 25 | 27 | 25 | 27 | 25 | 27 |

Notes: See Table 1

Table 5: Robustness Tests. (Continued)

| VARIABLES | (9) Protection Expenditures | (10) Tax Revenues | (11) Protection Expenditures | (12) Tax Revenues | (13) Protection Expenditures | (14) Tax Revenues |
|--|-----------------------------------|-----------------------|------------------------------------|-----------------------------------|------------------------------------|-------------------------|
| Elections | 0.00833 (0.0202) | -0.0434** (0.0217) | 0.0130 (0.0204) | -0.0379** (0.0186) | 0.00548 (0.0174) | -0.0251** (0.0122) |
| Environmental Concern | 0.0122** (0.00620) | -0.00426 (0.0150) | 0.0156** (0.00709) | -0.0107 -0.000545 (0.00983) | 0.00557* (0.00312) | -0.00749 (0.00466) |
| Environmental Concern (t-1) | | | | (0.00855) | | |
| Ideology | -0.0120 (0.0180) | 0.0617 (0.0718) | -0.000784 (0.0213) | 0.0467 (0.0506) | -0.0123 (0.0112) | 0.00499 (0.0161) |
| Ideology2 | | | | | | |
| Green | | | | | | |
| GDP Growth | -0.00876 (0.0113) | -0.0323* (0.0181) | -0.0116 (0.0118) | -0.0325** (0.0158) | -0.000942 (0.00255) | -0.0176*** (0.00421) |
| InGDPperCapita | -0.0687 (0.0455) | -0.272 (0.191) | -0.0997 (0.0851) | -0.242 (0.148) | 0.275 (0.169) | -0.255 (0.241) |
| Population, ages 0-14 (% of total) | -0.00960 (0.0243) | -0.0150 (0.0500) | -0.00595 (0.0244) | -0.00988 (0.0439) | 0.0972** (0.0426) | 0.00593 (0.0318) |
| Population ages 65 and above (% of total) | 0.00228 (0.0166) | 0.00495 (0.0246) | 0.000689 (0.0220) | -0.00248 (0.0260) | -0.0251 (0.0320) | 0.000753 (0.0238) |
| Dependancy | | | | | | |
| InCo2 | -0.278* (0.163) | 0.125 (0.821) | -0.182 (0.173) | 0.268 (0.823) | 0.0317 (0.186) | 0.0995 (0.154) |
| Forest area | | | -0.00293 (0.00241) | 0.00392 (0.00466) | -0.0528 (0.0530) | 0.0485 (0.0452) |
| Arable land | 0.00392 (0.00270) | 0.00642 (0.00792) | | | | |
| Dependent Variable (t- 1) | 0.582*** (0.134) | 1.322*** (0.367) | 0.587*** (0.147) | 1.295*** (0.296) | 0.509*** (0.0968) | 1.022*** (0.0946) |
| Dependent Variable (t- 2) | 0.0673 (0.125) | 0.288 (0.311) | 0.00892 (0.140) | 0.317 (0.271) | 0.0237 (0.0980) | -0.116 (0.0996) |
| Observations | 181 | 243 | 181 | 243 | 181 | 243 |
| AR(1) | 0.019 | 0.004 | 0.025 | 0.006 | | |
| AR(2) | 0.655 | 0.212 | 0.498 | 0.102 | | |
| Hansen Test | 0.430 | 0.572 | 0.292 | 0.637 | | |
| No of Countries | 25 | 27 | 25 | 27 | 25 | 27 |

Notes: See Table 1

APPENDIX I

Table 1: Descriptive Statistics

| VARIABLES | Obs. | Mean | Std. Dev. | Min | Max | Source |
|--|------|---------|-----------|--------|-------|-------------------------------------|
| <i>Env Protection Expenditures (%GDP)</i> | 237 | 0.600 | 0.322 | 0.0600 | 1.920 | Eurostat |
| <i>Env Tax Revenues (%GDP)</i> | 297 | 2.598 | 0.597 | 1.570 | 4.990 | Eurostat |
| <i>Elections</i> | 297 | 0.256 | 0.437 | 0 | 1 | Beck et al. (2001) |
| <i>Green</i> | 297 | 0.549 | 0.498 | 0 | 1 | Own Collection |
| <i>GDP Growth</i> | 297 | 1.887 | 3.999 | -14.81 | 11.90 | World Bank |
| <i>Population ages 65 and above (% of total)</i> | 297 | 16.23 | 2.385 | 10.43 | 21.59 | World Bank |
| <i>Population, ages 0-14 (% of total)</i> | 297 | 16.13 | 1.846 | 13.09 | 21.48 | World Bank |
| <i>Environmental Concern</i> | 297 | 0.128 | 4.413 | -6.696 | 19.30 | Eurobarometer |
| <i>Year After Elections</i> | 297 | 0.236 | 0.425 | 0 | 1 | Beck et al. (2001) |
| <i>InCo2</i> | 297 | 2.013 | 0.388 | 1.170 | 3.212 | Beck et al. (2001) |
| <i>LnGDPPercapita</i> | 297 | 10.46 | 1.330 | 8.807 | 14.87 | World Bank |
| <i>Ideology2</i> | 297 | 2.923 | 0.816 | 1 | 5 | Beck et al. (2001)/Own Construction |
| <i>Dependancy</i> | 297 | 32.37 | 1.873 | 27.59 | 36.69 | World Bank |
| <i>Ideology</i> | 297 | -0.0539 | 0.741 | -1 | 1 | Beck et al. (2001)/Own Construction |
| <i>Urban population (% of total)</i> | 297 | 72.71 | 12.01 | 49.76 | 97.78 | World Bank |
| <i>Arable land (% of land area)</i> | 297 | 25.86 | 12.37 | 6.361 | 58.90 | World Bank |
| <i>Forest area (% of land area)</i> | 297 | 33.22 | 17.32 | 1.094 | 73.11 | World Bank |
| <i>RuleofLaw</i> | 297 | 7.481 | 1.300 | 4.610 | 9.500 | Gwartney et al. (2016) |
| <i>Globalization</i> | 297 | 82.93 | 9.296 | 53.81 | 94.39 | Dreher (2006) |