



GÖTEBORGS
UNIVERSITET

DEPARTMENT OF POLITICAL SCIENCE

TACKLING CLIMATE CHANGE: EXAMINING BUREAUCRATIC INFLUENCES ON GREEN AID

A quantitative study of the effect of politicized bureaucracy on the effectiveness of climate mitigating aid – a global perspective.

Tova Jonasson

Essay/Thesis:	15 Credits
Program and/or course:	Bachelor's Programme in Political Science / SK1523
Level:	Bachelor
Semester/year:	Spring/2023
Supervisor:	Marcia Grimes

Abstract

The climate threat is alarming, which has spurred research regarding how to mitigate its consequences. A significant amount of environmental aid is transferred yearly, to help developing countries adjust and mitigate climate change. Yet, we know very little about whether aid is used in the most efficient way, to reach the Sustainable Development Goals of the Paris Agreement. With varying results, studies have investigated how corruption and low institutional quality reduce the efficiency of climate finance on emissions of greenhouse gases. However, there is little research examining which specific aspects of institutional quality that affects the efficiency of climate aid. This study focuses on how a highly politicized bureaucracy affects how well green Official Development Assistance (ODA) mitigate CO₂ emissions in recipient countries. By introducing five consequential mechanisms and the theoretical concept of political forbearance, I suggest that politicization reduces green aid efficiency.

A panel regression analysis with politicization as a moderating variable examines 121 recipient countries of green ODA for the years 2002-2019 and their emissions of CO₂ per capita. Control variables urbanization, population density, democracy, and GDP per capita could interfere with the relationship between the main variables and are therefore controlled for. Results show no support for the two conducted hypotheses, indicating no significant causation between the degree of politicization of the bureaucracy and the efficiency of climate aid in reducing CO₂ emissions. Finally, the conclusion discusses potential explanations for the insignificant results and proposes research model modifications for future research.

Keywords

Official Development Assistance, ODA, climate change mitigation, CO₂ emissions, politicization, bureaucracy, clientelism, forbearance

Table of Contents

Abstract	i
Table of Contents	ii
List of Tables.....	iii
List of Figures	iii
1. Introduction	1
2. Previous research and main concepts.....	2
2.1 CO ₂ emissions.....	2
2.2 Green Official Development Assistance (ODA)	6
2.3 Politicization	9
3. Theoretical framework	10
3.1 Theoretical models and hypotheses	16
4. Method and data	18
4.1 Research design	18
4.2 Operationalizations	19
4.2.1 Independent variable	19
4.2.2 Dependent variable.....	20
4.2.3 Moderating variable	21
4.2.4 Control variables	22
5. Results	25
5.1 Time Series-Cross Section analysis.....	27
6. Conclusion.....	32
References	35
Appendix	38

List of Tables

Table 1: Correlation matrix over dependent and independent variables.....	25
Table 2: Panel data regression analysis of CO ₂ per capita emissions between 2002-2018....	27
Table 3: Panel data regression analysis of CO ₂ per capita emissions with moderating effect, between 2002-2018.....	29
Table 4: Sample of countries (121pcs)	39
Table 5: Summary statistics, independent and dependent variables.....	40
Table 6: Panel regression with moderating effect resampled with a leading depending variable of 1-5 years, for respectively model 11-15.....	41

List of Figures

Figure 1: Theoretical mechanisms – how a politicized bureaucracy can decrease the effectiveness of green ODA.....	16
Figure 2: Theoretical model illustrating the hypotheses of the relationship between independent and dependent variables (H1), moderated by the variable <i>politicized bureaucracy</i> (H2).....	17
Figure 3: Scatterplot showing the relationship between green ODA and CO ₂ per capita emissions, 2002-2019 mean value for each country.....	26
Figure 4: Graph illustrating Table 2, model 7, of the moderating variable politicization and the relationship between independent variable green ODA and dependent variable CO ₂ per capita emissions, 2002-2018.....	
Figure 5: V-dem codebook description of the variable ‘v2stcritrecadm’ which operationalize the moderating variable ‘politicization of the bureaucracy’.....	38
Figure 6: Scatterplot over the independent and dependent variables mean value for each country. India included.	40
Figure 7: Figure 7: illustrates the same correlation as in figure 4, but dependent variable leading 5 years.	42

1. Introduction

The report released by UN IPCC in March 2023 (Hoesung, et. al., 2023) once again urgently stresses the importance of mitigating climate change and adapting to its consequences to be able to meet the Sustainable Development Goals (SGD's) (Sustainable Development Goals, n.d) and fulfill the conditions of the Paris Agreement (UNFCCC, 2015). Large amounts are invested yearly into green ODA to mitigate and adapt to climate change. The latest UN IPCC report yielded new insights into the problems regarding aid operations and how climate mitigating and adapting measures are undermined by weak administrative and executive management regarding climate finance. (Hoesung Lee, et.al., 2023; Numan, et. al, 2023). We need to increase knowledge and understanding of the ODA process to streamline aid procedures (improve organization and make aid procedures more effective) and enhance the incentives for further investments, in the most crucial sectors.

Previous research regarding streamlining eco-labeled aid (e.g. Wang, Guo & Li, 2022; Pinar, 2023; Pazienza, 2019; Li, Rishi & Bae JH, 2021) covers aid composition, economic growth, corruption and how quality of government and demographic characteristics affect aid implementation and impact (such as liberal democracy values, Rule of Law and urbanization). However, there is not much research done regarding how the bureaucracy's quality affects aid effectiveness. I want to dig deeper into how administrative quality and the executive control of the bureaucracy shape aid implementation. Alicia Holland (2016) conceptualizes 'forbearance' in environmental politics and how the concept could explain the varying results in environmental policy implementation. I want to study how the bureaucracy's composition and quality deriving out of high levels of politicization could be a large barrier to effective environmental policy. If a correlation between a highly politicized bureaucracy and inferior environmental performance is found, I could propose that resolving politicization in the bureaucracy could be a key to successful climate mitigation policies.

The purpose of this study is to investigate whether the effect of green ODA on climate change depends on the level of politicization of the bureaucracy. The study uses quantitative methods to empirically investigate the claim that a politicized bureaucracy undermines the effectiveness of green ODA on climate mitigation in recipient countries.

The study aims to answer the following research question: *To what extent does politicized bureaucracy influence the effect of green ODA on CO₂ emissions?*

First, I lay out previous research and present the theoretical framework of the study. Second, I introduce the methodology and data with the operationalizations. I test my hypotheses by using panel data in a time series-cross sectional regression analysis, first for the bivariate relationship between the independent variable *green ODA* and the dependent variable *CO₂ emissions per capita*, and then for hypothesis two including *politicized bureaucracy* as a moderating variable. With 7 figures and 7 tables with 20 models, I present the result and apply the theoretical framework for analyzing the data. Last, I conclude the results and obtained empirical knowledge, and present new research paths for future studies.

2. Previous research and main concepts

This section defines main concepts and presents the previous research relevant for this study.

2.1 CO₂ emissions

As mentioned, the Intergovernmental Panel on Climate Change (IPCC) recently released a new climate report (Hoesung Lee, et.al., 2023) which compiles the knowledge we currently have regarding climate change and how we must mitigate and adapt in the best way possible to reach the climate goals which have been set by the UN and ratified by nearly all states through the Paris agreement (UNFCCC, 2015) and Agenda 2030 (United Nations, 2015).

Every year, about 50 billion tonnes of Greenhouse gases are emitted into the atmosphere. Europe and the USA have dominated the emissions historically and in present time. However, in recent decades we have seen a significant rise in emissions in other countries and regions. Many developing countries will continue to increase their emissions of GHG (Green house gases) while industrializing, to be able to foster economic development and achieve a higher standard of living (Ritchie, Roser & Rosado, 2020). This puts pressure on developed countries to decrease emissions, and on developing countries to keep emissions of GHG relatively low while developing (Pinar, 2023). The primary cause of climate change is carbon dioxide, which constitutes about 70% of all GHG emissions in the world (Ritchie, Roser & Rosado, 2020; Opoku & Boachie, 2020). Thus, from now on carbon dioxide (CO₂)

will be the primary focus of this study. Further discussion regarding the dependent variable 'CO₂ emissions' under 4.2.2 'Dependent variable'.

To take measures to lower CO₂ emissions it is important to know where to invest resources for the biggest impact. In pollution-intensive sectors investment efficiency is especially important, since there is greatest potential for improvement (Blanco, Gonzalez & Ruiz, 2012). The most carbon dioxide-intensive sectors globally according to Our World in Data are foremost the energy sector, with the subcategories 'energy use', 'energy production', 'transport', and 'industry'. The energy sector is followed by agriculture, forestry, and landscape use as the second most carbon intensive sectors (Ritchie, Roser & Rosado, 2020). These are the sectors that receive the largest amounts of aid due to their carbon intensive character, and therefore the sectors selected for the focus of this study, in terms of where aid is targeted. This will be discussed further under 4. Operationalization - 4.2.2 Independent variable.

Next, I will present what different factors are known to affect CO₂ emission levels relevant to this study, and what conclusions are drawn in previous literature regarding the bureaucracy's connection to CO₂ emissions.

The relationship between economic growth, GDP and CO₂ emissions is well studied (e.g. Opoku & Boachie, 2020; Bloch, et.al., 2012). Widely cited explanations refer to the theory of the environmental Kuznets curve (e.g. Grossman & Krueger, 1991; López & Mitra, 2000; Carlsson & Lundström, 2000). The theory refers to a relationship between economic development and environmental degradation. The Kuznets Curve illustrates how pollution levels follow the GDP per capita increase in an inverted U-shape. In the beginning of a country's economic development, pollution levels are low. Gradually as the GDP per capita increases, so do pollution levels. The increase is evident up until the economic growth reaches a threshold, after which the pollution levels decrease again. This curve is explained by a country's ability to, after a certain level of economic development, prioritize implementing environmental reforms to manage pollution and degradation. (Stern, 2018) Regardless of evident research of the environmental Kuznets curve theory, there are still compelling differences in CO₂ emissions in countries with the same standards of living (Ritchie, Roser &

Rosado, 2020). This generates inquiries about which other factors alter a country's emission levels.

As shown in previous research, a qualified and competent public administration and high Quality of Government are extremely helpful for a state to be able to provide public goods to its citizens. (D'Arcy & Nistotskaya, 2017; Keefer, 2007). Povitkina & Bolkvadze (2019) tested and support this in the context of the provision of clean drinking water. Quality of Government is by Povitkina & Bolkvadze defined as "high administrative capacity, strong rule of law and low corruption" (Povitkina & Bolkvadze, 2019, p.1194). It is logical to assume that these qualities would also be helpful when providing the 'public good of fresh air' or climate change mitigation policies.

Carlsson & Lundström (2000) test the effect political- and economic freedom have on CO₂ emission levels for 77 countries from 1975-1996. The political freedom index includes variables of political and civil freedom. These are: the ways to political power (guns, or free and fair elections), existing opposition, freedom of the press, freedom of speech, freedom to form organizations and to demonstrate. Economic freedom is composed by economic indices of personal choice, protection of property and freedom of exchange. They find that increased economic freedom has direct and indirect effects that leads to higher emission levels, this has been confirmed by others (e.g. Paziienza, 2019; Li, Rishi & Bae JH, 2021) However, no correlation between political freedom and CO₂ emission levels are found. (Carlsson & Lundström, 2000)

Bureaucratic quality and administrative capacity could be assumed to be dependent on the demand for environmental reforms from the citizens. Assuming that citizens' demand for environmental reforms generates a response at political level and thus leads to bureaucratic executive action, and in that way lowers CO₂ emission levels. This generates additional questions touching on citizens' democratic representation and political influence, which vary remarkably depending on regime type. There is a shortage of studies using corruption as the moderating variable. Corruption is strongly related to form of government and regime type. However, I argue that the bureaucracy is subject to executive control independent of regime type. Thus, a politicized bureaucracy could affect the efficiency of eco-labeled ODA on a country's environmental performance independent of regime type.

No studies that I know of test the correlation between the bureaucratic quality and CO₂ emission levels. However, Steinebach & Limberg (2021) raise the issue of inadequate national administrative capacity and international carbon markets. Carbon markets is a newly established (COP26 in 2021) approach to tackle climate change, as a part of the Paris Agreement (article 6) (The World Bank, 2022). Carbon markets give states the opportunity to invest and trade carbon credits which are earned through reducing GHGs in the atmosphere. Steinebach and Limberg (2021) claim low-capacity bureaucracies could struggle to manage and therefore be left out of these cooperations. International assistance for bureaucratic capacity improvements could help conquer this obstacle, encouraging more countries to take part in carbon markets. Steinbach & Limberg (2021) tested their argument through an empirical analysis of the market mechanisms used under the Kyoto Protocol. The analysis is based on a novel dataset of all available information (2004-now) from the UNFCCC about governments investments in Clean Development Mechanism (CDM).

CDM is an international market-based mechanism for the reduction of GHG emissions as a part of the Kyoto Protocol. Annex-B countries can through CDM fund projects to reduce emissions in developing countries in a more cost-effective manner to compensate for their own GHG emissions. In turn, developing countries attract international investments and benefit from the introduction of clean technology. The analysis compares the numbers of CDM investments four years before and after introducing a DNA establishment (Designated National Authority). The DNA organization was created to, on behalf of respective national governments, oversee the implementation and operation of the CDM at the national level, to increase the bureaucratic quality and effectivity. Since environmental objectives are hard to achieve and demand a high bureaucratic quality, the regular administrations were not sufficiently capable. (Steinebach & Limberg, 2021). This supports my claim that low bureaucratic quality reduces ODA effectiveness and complicates implementation of environmental policies.

The study of Steinebach & Limberg (2021) shows the benefits of a high-capacity bureaucracy in two instances of the installation of international market-based carbon reducing mechanisms. First, high-capacity countries established the institutional necessities (e.g. DNA organization) for participating in CDM investments faster than low capacity-bureaucracy countries. In addition, CDM investments increased significantly after the DNA formation.

Second, the study showed that low-capacity bureaucracy countries attracted less CDM projects (Steinebach & Limberg, 2021). This study supports my argument that the national bureaucratic capacity is essential for countries to implement necessary institutions locally to benefit from international investments such as green ODA.

How money is invested also matters for a country's CO₂ emissions. Foreign Direct Investments (FDI) are generally considered to have negative impacts on environmental performance (Opoku & Boachie, 2020) and CO₂ emissions (Pazienza, 2019), but there are also studies supporting the argument that FDI reduce CO₂ emissions per capita (Pinar, 2023). The negative connection between FDI and GHG emissions emphasizes the importance of alternative investments such as green ODA in climate finance. I ask if green ODA has a visible impact on CO₂ emission levels in recipient countries.

There are other factors that could affect a country's CO₂ emission levels. The ones relevant for this study are further developed under: '4.2.4 Control variables and other factors'. The studies presented here show that economic development and the activities by international actors can affect environmental performance. The next section examines what we know about whether green ODA can have an effect above and beyond these factors.

2.2 Green Official Development Assistance (ODA)

"Countries have committed to prioritize progress for those who're furthest behind" of reaching the Sustainable Development Goals (UNDP, 2023). The SGD's include the responsibility for developed countries to support developing countries to mitigate and adapt to climate change by financial means, commonly referred to as 'climate finance'.

'Climate finance' includes public and private fiscal and financial solutions aimed at targeting climate actions on a national or international level. Climate finance includes taxes, loans, and removal of subsidies harming the climate goals, and aid. Investments often are focused on green, industrial and technological solutions (such as renewable energy sources), the technological sector considered effective for economic return. This sector is also developing rapidly, which could make it even more attractive for researchers. There are many studies assuming the technological angle on climate finance and environmental performance (e.g. Pazienza, 2019; Numan et,al, 2023; Wang & Zhi, 2016). One experimental study by

Numan et.al. (2023) that touches on climate finance effectiveness in general could nevertheless be relevant for the topic of my study.

Numan et al. (2023) studied the correlation between climate finance and ecological footprint, with political risk as one of the explanatory variables. The study shows that political atmosphere and political risk (the effect political changes and insecurities could have on investments) is affecting the environmental degradation. The study empirically tested how green finance has affected 13 complex economies between the years 2006-2020 with panel data on ecological footprint (dependent variable). Economic complexity index, green finance, technological innovations, and political risk are explanatory variables. The results show that climate finance and technological investments reduce the ecological footprint in recipient countries with respectively 0.28% and 0.75%. However, political risk and economic complexity worsen the ecological footprint as much as the climate finance improves it (around 0.70%). The study operationalizes political risk as “a composite index of voice and accountability, the rule of law, regulatory quality, absence of violence/terrorism, political stability, government effectiveness, and control of corruption” (Numan et.al, 2023, p. 2). This supports my hypothesis that the quality of the established institutions could influence a country’s environmental performance. (Numan et.al., 2023, p. 2). Although green ODA could correlate with climate finance in general, Numan et.al (2023) do not touch on green ODA specifically, and not with a moderation analysis or with bureaucratic quality as an explaining variable. This further incentivizes me to study how the bureaucratic situation affects GHG emission levels in countries receiving green ODA with a moderation analysis.

As mentioned, there are many studies examining the effectiveness of climate finance on climate change, mostly with a technological perspective about renewable energy. Meanwhile, there are significantly fewer studies that focus on specifically green ODA as a tool to tackle climate change. Yet large amounts of green ODA are transferred yearly, making these transactions a relevant object for examination. Green Official Development Assistance (ODA), is one type of climate finance, defined as government aid that promotes and specifically targets the environmental development and welfare of developing countries (OECD, 2021). Only a few studies that I know of examine the relationship between green ODA and CO₂ emission levels, and with mixed results (e.g. Carfora et.al. 2021; Li, Rishi &

Bae JH, 2021). The following paragraphs present two previous studies relevant for this research.

Wang, Guo and Li (2022) have studied the effect ODA has on mitigating CO₂ emissions in 59 low- and middle-income countries, in relation to urbanization. They show that over a threshold level of urbanization, the ODA's negative impact on CO₂ emissions rises, calling for measures directed towards controlling the increasing CO₂ emissions in an early stage of development. Otherwise developing countries will see a shift to more carbon intensive development as urbanization increases (Wang, Guo & Li, 2022).

Pinar (2023) studies the impact of aid fragmentation, meaning the structure of total aid a recipient country receives, and whether the effect depends on institutional quality in the receiving country. Bigger aid fragmentation means a larger number of donors. Pinar studies how aid fragmentation affects the effectiveness of green aid in reducing CO₂ emissions with panel data for 92 countries between 2002-2018. Pinar finds that aid fragmentation reduces aid effectiveness on carbon emissions. Pinar uses the Rule of Law proxy¹ from the World Governance Indicators to control for institutional quality. The study finds that the Rule of Law proxy mitigates the negative effect of aid fragmentation on CO₂ emissions and, in line with my hypothesis, suggests low institutional coordination and quality to be a detrimental factor for efficient green aid flows (Pinar, 2023).

The above referred literature examines the effect of climate finance on CO₂ emissions. One of them uses the Rule of Law proxy to measure institutional quality, but I argue that it does not entirely capture the concept *institutional quality*. The rule of law measure bundles numerous political and institutional factors, making it difficult to know which factor causes the outcome. The aim of this study is to contribute to the effectiveness of green aid research by examining the effect a politicized bureaucracy has on the effectiveness of green aid on CO₂ emissions.

¹ "Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence." (Kaufmann & Kraay, 2010: <https://databank.worldbank.org/source/worldwide-governance-indicators/Type/TABLE/preview/on>)

2.3 Politicization

The public administration exists to provide public goods to the citizens, but to secure the quality and fairness of the government, “*impartiality within the exercise of public power*” (Rothstein & Teorell, 2008, p. 170) is necessary. An impartial, rule-bound, and objective bureaucracy is a high-quality bureaucracy. Politicization could diminish these values from the bureaucracy and civil service. Before I present the consequences of a politicized bureaucracy that could subsequently affect the implementation of ODA, I will define the concept and present previous literature on the subject.

Political bureaucracy, “*the substitution of political criteria for merit-based criteria in the selection, retention, promotion, rewards, and disciplining of the public service*” (Peters & Pierre, 2004, p.2). Politicization of the bureaucracy takes form in partisan control over the bureaucracy. In practice this means that politicians can let personal interest influence the appointment to public service and dismissals of civil servants. The consequences are bureaucratic sensitivity to the political executive, making bureaucrats overly loyal and bound to the government. Politicization of the bureaucracy often opens the administration for clientelism, patronage, nepotism, and attempts to control the implementation and execution of policy. (Rothstein & Teorell, 2012; Peters & Pierre, 2004) Hence, these mechanisms are delegitimizing and cause the bureaucracy to drift away from the earlier mentioned characteristics that describe a high-quality bureaucracy (Mayntz & Derlien, 1989; Ebinger, Veit & Fromm, 2019; Bauer & Ege, 2012; Eichbaum & Shaw, 2008).

There will possibly always occur a certain degree of partisan involvement in the bureaucratic administration and implementation. Either in the recruitment process of the bureaucracy, or in the form of demanded combability with governments politics and ideology, excessive loyalty to the political party or by implicit or explicit expectations from government employees (Peters & Pierre, 2004; Mayntz & Derlien, 1989). Different types and levels of politicized behavior are not equally as harmful for the quality of the bureaucracy. Some level of politicization of the bureaucracy may even be considered positive for the effectiveness and steering of the administration (Bauer & Ege, 2012; Mayntz & Derlien, 1989). For example, dismissing senior officials after a change of government is not considered equally damaging

for the democracy as recruiting all new appointments by political criteria (Peters & Pierre, 2004).

Politicization of the bureaucracy disrupts the impartiality of the public service. The desire for bureaucratic impartiality, *meritocracy*, on the output side is specified by Rothstein and Teorell (2008) to hinder clientelism and personal preferences or relations to affect the input and output of policies (Cornell & Grimes, 2015); recruitment to the civil service or implementation of policies, impartially deciding who gets what from the public sector, (Rothstein & Teorell, 2008), and the prioritization of the common good (Bauer & Ege, 2012). The meritocracy-ambition assumes that politicized bureaucrats change their behavior compared to qualified- and merit-based recruitments due to loyalty, monitoring and pressure from the political executives, while meritocracy is presumed to assure professionalism and value experience (Rothstein & Teorell, 2008; Peters & Pierre, 2004, Rockman, 2019; Cornell & Grimes, 2015). The hypothesis is built on the assumption that aid procedures are handled differently, and worse, by a politicized bureaucracy.

3. Theoretical framework

This section presents the theoretical framework based on the previously presented literature. With examples from previous literature from Povitkina & Bolkvadze's (2019) study of the provision of potable water in Moldova, and the concept of forbearance by Alisha C. Holland (2016) as support for my theoretical mechanisms, I present the theoretical mechanisms that support the hypothetical assumptions made. I argue that a politicized bureaucracy can undermine the effectiveness of green ODA on CO₂ emissions in recipient countries due to the following mechanisms.

The first aspect to consider is that a weak bureaucracy with low administrative qualities may not be able to provide institutional quality and environmental reforms because of lack of skills and experience. Ministers and other non-merit-based employees will likely not have the required knowledge, and often let ideological opinions be determining (Povitkina & Bolkvadze, 2019; Rockman, 2019; Peters & Pierre, 2004). Povitkina & Bolkvadze (2019) studied the institutional quality in Moldova with in-depth investigation by interview and documentary data, complemented by time-series cross-section data for water quality in the

world. The aid allocation to Moldova increased drastically when democratized, with the water management sector receiving \$109 million in foreign aid only in the year 2012. Povitkina and Bolkvadze (2019) identified that former experienced staff were replaced for new recruitments based on political criteria. The administration received threats of losing their jobs if not complying. Thus, this is a case of politicians prioritizing private interests before the provision of clean drinking water for the population. The politicization were a part of the cause and effect of poor administrative handling and the public good was down prioritized for economic gain and private interests of politicians. This filled the bureaucracy with unskilled and unexperienced civil servants. The remaining senior officials left for the private sector due to job insecurity. With a higher level of politicized administration, the institutional quality decreased and led to “loss of institutional memory” (Povitkina & Bolkvadze, 2019, p. 1208), which hampered the long-term goal of providing clean drinking water. A sector where it is crucial with broad knowledge and experience regarding infrastructure and technology like the environmental sector, is especially weakened by circumstances such as these (Rockman, 2019; Povitkina & Bolkvadze, 2019). I claim that the lack of skills and knowledge minimizes the bureaucratic coordination and administrative capacity so that even if the governments try to introduce climate mitigation reforms, the bureaucracy is too administratively weak and uncoordinated to be able to achieve long-term environmental policies with positive results.

The second mechanism I present as an explanation for a politicized bureaucracy to weaken the impact green ODA has on carbon emissions is clientelist activity. The clientelist-mechanism builds on the assumption that the population’s demand for environmental performance will make politicians respond with environmental reforms (in democratic states). This assumes that politicians listen to and comply with the wishes of its citizens, or if not, are replaced through democratic procedures. (Carlsson & Lundström, 2000) Many previous studies have found that the democracy-composition alone is not enough for providing public goods (e.g.: Rothstein & Teorell, 2008; Keefer, 2007; Povitkina & Bolkvadze, 2019). A way around the demands of its citizens while keeping the political power is to buy the votes of the citizens, i.e., clientelism.

In a clientelist political system, the clients provide political support, compliance, and silence to uphold the political structures, in exchange for policy benefits and money. Politicians try to keep the political power by using public resources for provision of targeted

goods to whom it may be politically beneficial to, to increase the likelihood to get reelected. Clientelism risks undermining efforts for actual policy changes to improve quality of life for the whole population and manage equality and development issues.

Keefe (2007) concludes that as bureaucratic quality falls, the possibility to provide targeted goods rises and the provision of public services to the general population declines. (Keefe, 2007) Kurer (1993) uses the word “pork-barrel benefits”, targeted goods, economic and service benefits (e.g. education, housing, playgrounds, healthcare, roads etc.), funded by public resources but specifically aimed at groups of voters from which they want to boost the political support. (Kurer, 1993) In practice, these tactics call for a conformable government-loyal bureaucracy. Politicians use patronage (individually targeted benefits such as employment, contracts, bonuses etc.) to buy the compliance and loyalty of the public servants. This relates to the first mechanism, as the bureaucracy in this type of political environment often becomes dependent on the government for employment, promotions, salary, and other benefits (Kurer, 1993; Hicken, 2011; Cornell & Grimes, 2015). Hence, the incentive for politicians to address societal issues and deliver reforms decreases if they can earn political support in other, faster ways. (Cornell & Grimes, 2015) This leads me to the next assumed mechanism to come out of a politicized bureaucracy, short-termism.

Short-termism as the third mechanism derives from a political desire to deliver fast and acknowledged policies to the citizens or to curb criticism and gain political support (Cornell & Grimes, 2015). The study of Moldova by Povitkina & Bolkvadze (2019) portrays how politicians through partisan control over the bureaucracy perfectly embody the short-termism mechanism. The government directed green aid toward fast-rewarding projects in order to achieve political support from citizens.

Povitkina & Bolkvadze (2019) investigated the assumption that democracies are better at providing public goods on the case of water provision in Moldova in 2016. The short-termism mechanism is explained by democratic aspects of accountability and the interchangeability of the possession of power through short electoral cycles. Hence, the Moldovan government took to targeted goods and short-term policies to keep political support. They focused on the expansion of infrastructure and visible restorations such as renovating and expanding the water pipe network and down prioritized the much more long-

term, demanding, and invisible work of improvement of the water quality through building water treatment plants and self-cleaning properties to sustain ecosystems and biodiversity. These priorities resulted in “fresh pipes with dirty water” (Povitkina & Bolkvadze, 2019, p. 1191). Povitkina & Bolkvadze emphasize that this was not possible without a conforming and highly loyal bureaucracy (which is supported by previous literature, e.g., Cornell & Grimes, 2015). The study shows that democratic governments are often more prone to be short-sighted to deliver rapid results to the population to maintain public support, while for the provision of public goods and especially environmental policies, it is often essential with long-term plans and commitment, as well as competence in the field. (Numan, et. al, 2023; Bloch, et.al., 2012)

Povitkina & Bolkvadze (2019) found through in-depth investigation by interview and documentary data, that big companies with contacts and influence over the politics were allowed to continue polluting the water without taking any safety measures. Politicians led the bureaucracy to refrain from enforcing environmental regulations to protect safe water quality. These workings embody how I suggest that forbearance takes form in political practice.

The fourth mechanism is bundling different institutional problems as consequences of a politicized bureaucracy. As mentioned above, a politicized bureaucracy tends to open for corruption, nepotism, and patronage. (Cornell, A., Grimes, M, 2015, Mayntz & Derlien, 1989; Rothstein & Teorell, 2012; Peters & Pierre, 2004) There are also several studies that show institutional problems aggravating other issues regarding aid allocation and related problems. Moldova has a high democracy-rate but scores low on Quality of Government (operationalized by Povitkina & Bolkvadze as: high corruption, weak Rule of Law, and low administrative capacity). Povitkina & Bolkvadze show that the democracy-component can even be harmful in combination with a low degree of state capacity. A politicized bureaucracy could therefore be the cause of low state capacity. (Povitkina & Bolkvadze, 2019) Additionally, aid procedures and accompanying issues could by themselves further challenge an already pressed bureaucracy due to the increased incentives for rent-seeking behavior and free-riding that are often connected to higher aid grants and global environmental goals. (López & Mitra, 2000; Grossman & Krueger, 1991; Carlsson & Lundström, 2000)

Pinar (2023) shows that the consequences of aid fragmentation on aid efficiency is worsened if the bureaucracy is weak and the institutional quality low, an example of mechanism four. Pinar implies that in countries with many active donors, a higher institutional quality is needed to handle the administration around aid procedures. Without institutional quality to mitigate the negative impact aid fragmentation has on the effectiveness of climate finances, the results take damage. (Pinar, 2023) In summary, all issues when managing aid procedures could be aggravated by a politicized and unskilled bureaucracy. The fourth mechanism is found in several other studies about international aid allocation and climate finances' effect on environmental degradation (e.g., Povitkina & Bolkvadze, 2019; Li, Rishi & Bae, 2021; Wang, Guo and Li, 2022).

Li, Rishi & Bae JH (2021) studied the impact of corruption, i.e.: 'control of corruption'², 'economic freedom' and 'Rule of Law', on the effectiveness of climate mitigating ODA on the levels of GHG emissions over the period 2003-2014 for 86 recipient countries. They created a dichotomous variable of corruption from three institutional quality-variables: corruption, economic freedom, and Rule of Law, which were operationalized with 1, and lower levels of institutional quality were operationalized with 0 (Li, Rishi & Bae, 2021, p. 96). When testing only the green ODA effect on carbon dioxide emissions, they found no correlation. However, they proceed to control the same relationship for the effect of 'control of corruption' and 'economic freedom'. They find that green ODA has a positive directional relationship with CO₂ emission levels in combination with high levels of corruption and low levels of economic freedom. The study shows no significance for the relationship while controlling for 'Rule of law' as a moderating variable. (Li, Rishi & Bae JH, 2021)

As Pinar (2023), Povitkina & Bolkvadze (2019) and Li, Rishi & Bae (2021) have found, higher levels of institutional characteristics that would generally be assumed to enhance positive effects of climate mitigation and provision of public goods (i.e. democracy,

² The corruption index is operationalized through Worldwide Governance Indicators. It contains "perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests" (Kaufmann, Daniel, Aart Kraay and Massimo Mastruzzi (2010). "The Worldwide Governance Indicators: Methodology and Analytical Issues". World Bank Policy Research Working Paper No. 5430 http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1682130)

high administrative capacity, low corruption and high Rule of Law) instead shows no or negative effect on CO₂ emissions and sustainable development in combination with low state capacity.³

The fifth mechanism that I argue affects the environmental performance in a politicized bureaucracy is the concept of *forbearance*, introduced by Alisha Holland (2016). In an article from 2016, Holland introduces the term 'Forbearance', defined as '*the intentional and revocable nonenforcement of law*'. The base thought of the argument is that politician's pressure or threaten officials to overlook law violations and refrain from enforcing laws/applying decisions in practice, to usurp political power, avoid political setbacks or attain personal advantages (Holland, 2016). I claim that this is made possible in an environmental aid-context in a politicized environment when the bureaucracy is made sensitive to politicians' aspirations.

The concept of political forbearance could encompass all the former mechanisms in how a politicized bureaucracy exercises political forbearance when managing green ODA procedures. Politicians appoint civil servants based on political criteria, which leads to lack of skills and knowledge; clientelism; short-termism, and other institutional problems. With these mechanisms in place, bureaucrats practice forbearance under the radar during enforcement of environmental laws and regulations. Underlying political (international or local) preferences, profit interests and donor preferences could also compete when green ODA is allocated to actual beneficiaries. (e.g., Alcañiz & Giraudy, 2022). Thus, politicization of the bureaucracy occurs both on an individual and an institutional level.

Civil servants in a politicized bureaucracy are self-censuring and allow this kind of partisan control over the bureaucracy for the sake of safeguarding their appointment and obeying the request and intentions of their patrons (Bauer & Ege, 2012; Cornell & Grimes, 2015). Against their better knowledge, bureaucrats could ignore and overlook environmental law-violations of companies, individuals, or other institutions that the government is

³ State capacity – a governments ability to achieve policy goals. (Lindsey, 2021) As mentioned, a politicized bureaucracy and its lack of skills and merited senior servants could deepen the governments troubles to provide public goods and achieve policy goals.

dependent on for political support. The non-enforcement of environmental laws and regulations could be compared to providing targeted goods, but instead the administration chooses not to enforce the law as a way of winning political support or reward a certain company, region, or person. To reduce incentives to engage in patronage, clientelist activities and politicians interfering in bureaucratic administration, Cornell & Grimes emphasize the need of “institutional safeguards and constraints [to] maintain a clear division of roles” (Cornell & Grimes, 2015, p. 206).

There is reason to believe that bureaucracies invest green ODA in companies not fulfilling environmental criteria or breaking environmental laws, or that civil servants by partisan control neglect to enforce environmental laws and regulations. All this because it could be politically expensive not to engage in these activities. These mechanisms are what the theoretical assumptions and hypotheses are based on.

3.1 Theoretical models and hypotheses

Figure 1. Theoretical mechanisms – how a politicized bureaucracy can decrease the effectiveness of green ODA.

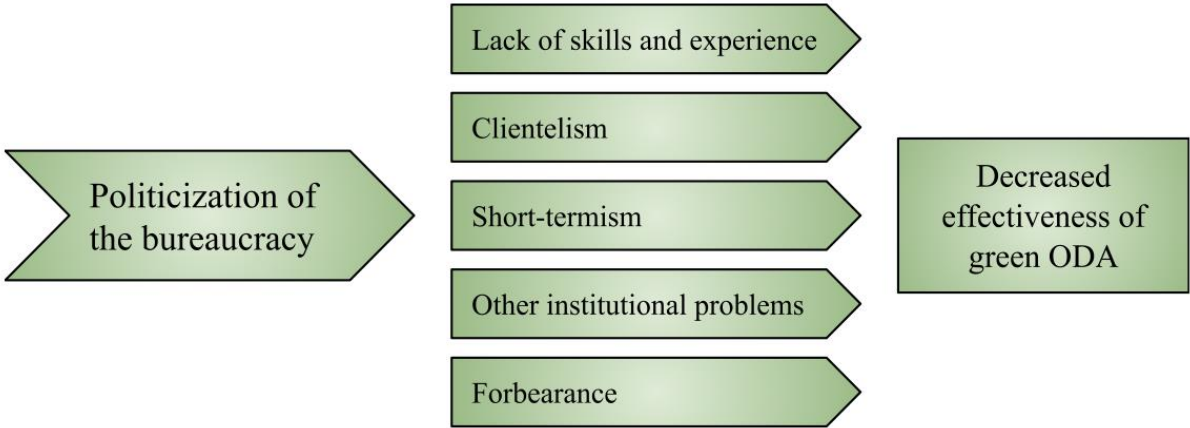
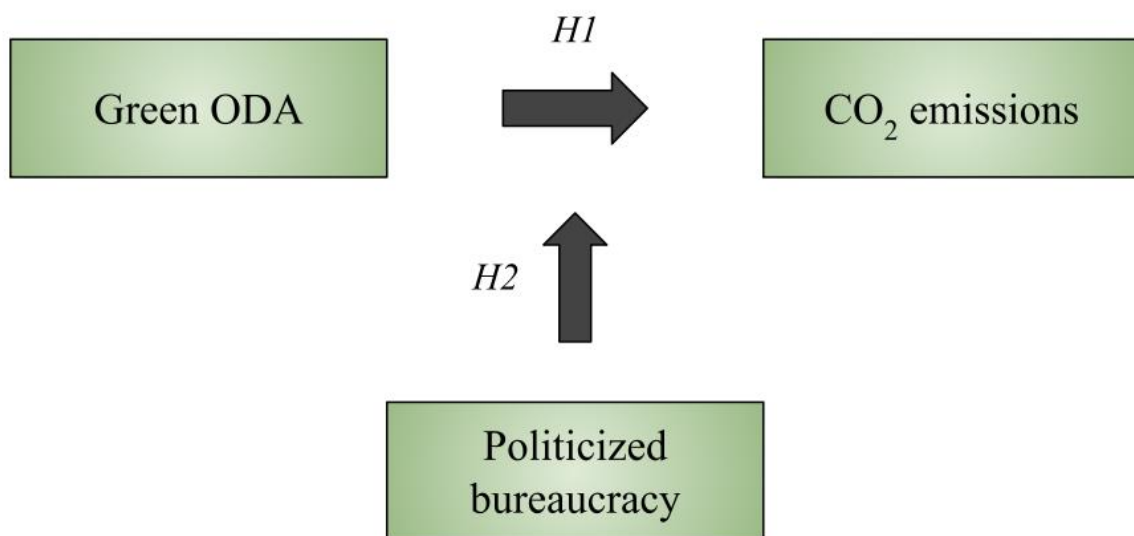


Figure 2 portrays how the moderating function politicized bureaucracy is assumed to affect the mitigating effect eco-labeled ODA have on CO₂ emissions.

Figure 2. Theoretical model illustrating the hypotheses of the relationship between independent and dependent variables (H1), moderated by the variable *politicized bureaucracy* (H2).



Based on the previous research and theoretical framework, I expect to find a negative relationship between the independent variable Green ODA and the dependent variable *CO₂ emission levels*.

H1: Countries that receive higher amounts of green ODA have lower levels of CO₂ emissions.

Based on previous literature and the theoretical mechanisms shown in *Figure 2*, I further expect higher levels of the moderating variable ‘Politicized bureaucracy’ to weaken the relationship between the independent and the dependent variable. That is, a country with lower levels of politicization of the bureaucracy is expected to show more effective climate mitigating function of the received green ODA, and therefore lower levels of CO₂ emissions (a stronger negative relationship between the independent and dependent variable). With the expected effect of the moderating variable (illustrated in *Figure 2*) will have on the relationship between the independent and dependent variables in mind, I have composed the following hypothesis 2.

H2: Higher levels of politicization of the bureaucracy lowers the effect green ODA has on CO₂ emissions in recipient countries.

4. Method and data

The method consists of two parts. First, I present the research design and research population. The second part consists of operationalization and variable data origin.

4.1 Research design

In order to empirically test how politicization of the bureaucracy in recipient countries affects the impact green ODA has on CO₂ emission levels, a quantitative analysis is appropriate.

Using panel data, I test my hypotheses through time series cross-section analysis over the years 2002-2019 (but with gaps). The unit of analysis is country-year, with a sample of all countries (121 countries⁴) with available data to be able to make as good inferences about the total population as possible. Time-series data is advantageous since time-invariant factors do not affect the estimates. To isolate the effect of the explanatory variables and control for country-individual and time-specific characteristics, rather than comparing variation between countries over time, I use country-year fixed effects. This reduces risks of biased results and endogeneity and can capture unobserved heterogeneity (factors specific for each country and year that can affect the relationship).

The data is not completely balanced (there are observation gaps for some countries due to missing data) which can compromise the statistical power. When using cross-sectional analysis with fixed effects, which rely on within-country variation, an unbalanced panel can affect the interpretation of estimates and the validity of standard errors. The representation of the real population and the generalizability could be compromised due to the above-mentioned shortcomings. Unfortunately, this is the best available data at the moment. I still believe that the chosen research model is the most appropriate for the purpose of this study.

As a robustness check to further control for heteroskedasticity (control variability or spread of the standard errors in the regression analysis) and address potential endogeneity, I conduct clustered standard errors. This accounts for within-cluster (in this case countries)

⁴ See Table in Appendix for a complete list of the country sample.

correlation or variation and adjust the standard errors in the regression analysis to reflect this potential correlation.

4.2 Operationalizations

4.2.1 Independent variable

The independent variable ‘green ODA’ is operationalized through data from OECD database, the dataset “Development Assistance Committee (DAC) Creditor Reporting System (CRS)”, specifically the variable ‘*Aid Activities targeting Global Environmental Objectives*’ from the years 2002-2019 (OECD, 2023).

Countries eligible to receive ODA are all low- and middle-income countries based on gross national income (GNI) per capita (G8 members and EU members excluded). OECD’s Development Assistance Committee (DAC) consists of 31 developed countries who have committed to help developing countries by allocating bilateral aid. All bilateral aid from the DAC-countries is labeled by the donor with purpose and recipient country. The aid is categorized to facilitate the monitoring of and comparability between aid and countries in the database. The labeling of environmentally targeting aid is based on the five quantitative policy markers of the Rio Conventions: The environment marker, Biodiversity, Climate change mitigation, Desertification, and Climate change adaptation. The data originally overlaps due to aid having multiple targeted goals (directed towards more than one of the Rio Conventions which are mutually reinforcing), e.g. biodiversity and climate change mitigation. This research focuses on the category ‘climate change mitigation’ to rule out the risk of double- or triple count aid flows. This category includes aid directed towards all sectors work for stabilizing and lowering GHG emissions and increase absorption and sequestration of GHG’s by renewable energy sources and more efficient and reduced energy use.

The independent variable must constitute aid that targets the most carbon dioxide intensive sectors. Sectors included are the following: use & production of energy; transport & storage; industry, mining, & construction; agriculture, forestry & fishing (Ritchie, Roser & Rosado, 2020). The DAC-committee register bilateral aid flows to recipient countries and marks them with one or many of the Rio conventions objectives and assigns scoring as either of ‘principal objective’, ‘significant objective’ or as ‘not targeting the objective’ at all

(OECD, 2023). In this analysis only the aid that is scoring ‘principal’ or ‘significant’ objective is counted for, to ensure it is aimed at lowering CO₂ emissions.

The aid is measured in constant US \$ prices, so that the aid flows is adjusted for inflation, which makes comparisons between years more accurate in actual output (OECD, 2023).

There are other forms of international green investments that are targeting climate mitigation. This is a relevant factor to consider when interpreting the results. Could other environmental-targeting international investments not included in the DAC-dataset drive the results I get in any direction?

4.2.2 Dependent variable

The dependent variable ‘CO₂ emissions’ must be operationalized to the best extent possible based on what the ‘climate change mitigation’ aid de facto intends to improve, considering that it is the effect of the aid that I want to measure. I have chosen to only study aid that aims to; reduce, stabilize, and absorb greenhouse gases from the atmosphere. I will operationalize the dependent variable by the QoG (Quality of Government institute) database, originally taken from the EPI (Environmental Performance Index) dataset with the variable ‘CO₂ emissions per capita’ [edgar_co2pc] which reflects a country’s total emissions divided by population. CO₂ emissions divided by total population facilitates the comparability between countries. These variables exclude emissions from “large-scale biomass burning with Savannah burning, forest fires, and sources and sinks from land- use, land-use change, and forestry (LULUCF)” (Povitkina et.al, 2021, p. 47)

I could have chosen to use a variable of total GHG emission levels (including emissions of methane, nitrous oxide, hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs) and ozone). There was no variable that accounted for these emissions for the desired years (only available for 2002-2016). However, CO₂ emissions constitutes the vast majority of GHG emissions in the atmosphere and I consider this a valid operationalization based on the purpose of the study.

4.2.3 Moderating variable

The moderating variable ‘politicized bureaucracy’ will be operationalized through Varieties of Democracy (V-Dem) Institute’s database. The question to collect the data asks “*To what extent are appointment decisions in the state administration based on personal and political connections, as opposed to skills and merit?*”, the variable name is ‘*Criteria for appointment decisions in the state administration*’ (v2stcritrecadm_osp)⁵. The question also includes hiring, promotions, and dismissals in the state administration, but excludes the military. The respondents have been asked to rank the answer on a scale from 0-4, where 0 implies that all decisions within the state administration are based on personal or political contacts, and 4 implies that all decisions are based on merit and competence. The measurement model point estimates are in the original ordinal scale from 0-4, but I have inverted the scale so that higher levels of politicization represent higher values on the ordinal scale, which is more logical when measuring the politicization moderating effect (Coppedge, et al., 2023).

Politicized bureaucracy as a moderating variable will contribute to previous literature regarding how institutional problems in recipient countries affect aid efficiency. Previous research studies how corruption (Li, Rishi & Bae JH, 2021), urbanization (Wang, Guo & Li, 2022; Numan et.al., 2023), and various economic aspects (Pazienza, 2019; Pinar, 2023) affect aid effectiveness. These concepts all have in common (apart from aid fragmentation: Pinar, 2023) that they are difficult to temper. If I find that politicization of the bureaucracy does complicate the aid process and reduce aid effectiveness, there is an obvious solution to the problem. The concept *politicization* is a less complicated concept than e.g., corruption (counting many types: grand, petty, economic, political etc.), occurring in many different levels and instances of the public sphere.

⁵ Pemstein *et al.* (2023, *V-Dem Working Paper Series* 2023:21); Coppedge, et.al. (2023) "V-Dem Codebook v13" Varieties of Democracy (V-Dem) Project. <https://doi.org/10.23696/vdemds23>

4.2.4 Control variables

The various factors that possibly interfere with the relationship between effectiveness of eco-labeled ODA in reducing carbon emissions are many. Therefore, it is important to control for possible underlying factors that are expected to affect the relationship between the main variables. The origin of the data of the control variables are accounted for with each variable.

Urban population

Several recent studies found that urbanization significantly increase CO₂ emission levels due to higher levels of industrialization which leads to higher energy consumption (e.g., Numan et.al., 2023; Wang, Guo and Li, 2022; Li, & Rishi & Bae, 2021). Others find that urbanization could be helpful at resolving and preventing environmental problems and in the long run reduce CO₂ emissions per capita (Wan & Wang, 2014; Pinar, 2023). This is explained by increasing energy efficiency and cities contribution to education, income, and social mobilization for environmental policies. (The World Bank, 2023). The urban population variable from the World Development Indicators is measured with The World Bank's total number of population estimates⁶ and the United Nations World Urbanization Prospects⁷. 'Urban population' refers to people living in urban areas, definition can vary depending on chosen boundaries and distinctions from national statistical offices (Our World in Data, 2023). This could to some extent affect the comparability between countries.

Population density

A larger population increases the emissions due to higher energy consumption. Population density is often associated with urbanization. Therefore, I control for population density. Population density is measured in total population divided by land area. The variable is

⁶ World Development Indicators, The World Bank (2023) <https://doi.org/10.57966/6rwy-0b07>

⁷ United Nations, Department of Economic and Social Affairs, Population Division (2022). *World Population Prospects 2022*, Online Edition.

obtained from Our World In data⁸ and consists of data from UN WPP (2022)⁹ and FAOSTAT (2022)¹⁰.

Democracy

I control for electoral democracy to account for the difference in environmental performance that democracies and autocracies tend to show. I use the variable for electoral democracy from Varieties of Democracy (V-dem) institutes' database [v2x_polyarchy]¹¹. The electoral democracy variable combines the indices measuring: freedom of association, clean elections, freedom of expression, elected officials, and suffrage.

A low bureaucratic quality is often linked to autocratic or newly democratized states (Keefer, 2007; Povitkina & Bolkvadze, 2019). The general idea is that democracies perform better at providing environmental policies than less democratic governments because of built in accountability and representation of public opinions and political freedom. It is more costly to buy the votes of the majority with targeted goods and economical compensation. Hence, democracies more commonly invest in public goods that target the whole population, while autocratic states tend to invest in targeted goods for the ones that keeps them in power (Gerring, et.al. 2012; Keefer, 2007; Povitkina & Bolkvadze, 2019).

The regime type could also be assumed to affect how much aid countries receive – liberal democracies tend to claim to not support autocratic regimes. Changes in regime type (either ideological shifts or democratization or authorization) are known to create incentives and an environment where politicization escalates. (Peters & Pierre, 2004; Hammarén, 2020) Although developing this interaction further would be an interesting angle and contribute further to the knowledge on the subject, it is not within the scope of this study.

⁸ Our World In Data (2023) <https://ourworldindata.org/grapher/population-density>

⁹ UN World Population Prospects (2022) <https://population.un.org/wpp/Download/Standard/Population/>

¹⁰ FAOSTAT (2022) Land Use domain. <http://www.fao.org/faostat/en/#data/RL>

¹¹ Teorell *et al.* (2019); Coppedge, et.al. (2023) "V-Dem Codebook v13" Varieties of Democracy (V-Dem) Project. <https://doi.org/10.23696/vdemds23>

GDP per capita

Most researchers are in agreement about the Environmental Kuznets Curve theory, and have found economic growth causing environmental pollution up to a certain threshold (e.g. Stern, 2018; Opoku & Boachie, 2020; Bloch, et.al., 2012; Grossman & Krueger, 1991; López & Mitra, 2000; Carlsson & Lundström, 2000). Therefore, I apply **GDP per capita** as a control variable, which can account for the overall economic development of a state. A more developed country economically tends to pollute more but have also more resources to invest in climate change mitigation (but does not get as much climate aid). However, GDP per capita generally correlates with the variable corruption (Moiseev, N., Mikhaylov, A., Varyash, I., Saqib, A. 2020), thus, I assume that it will likewise with the related variable politicized bureaucracy.

5. Results

The following section starts with a variable correlation matrix, followed by a scatterplot over the mean for each country's independent and dependent variables (green ODA on CO₂ emissions per capita). Table 5 in the Appendix presents summary statistics of all employed variables. After the scatterplot, a Time Series Cross-Section regression analysis is conducted, addressing hypothesis 1 concerning the relationship between independent and dependent variables presented with models excluding and including potential confounders. Lastly, hypothesis two is addressed with another Time Series Cross-Section regression with panel data, including the moderating variable. Results from hypothesis 2 are illustrated with a graph to facilitate the explanation of the moderating effect. Complementary tables and figures in the appendix further present robustness checks and additional statistics.

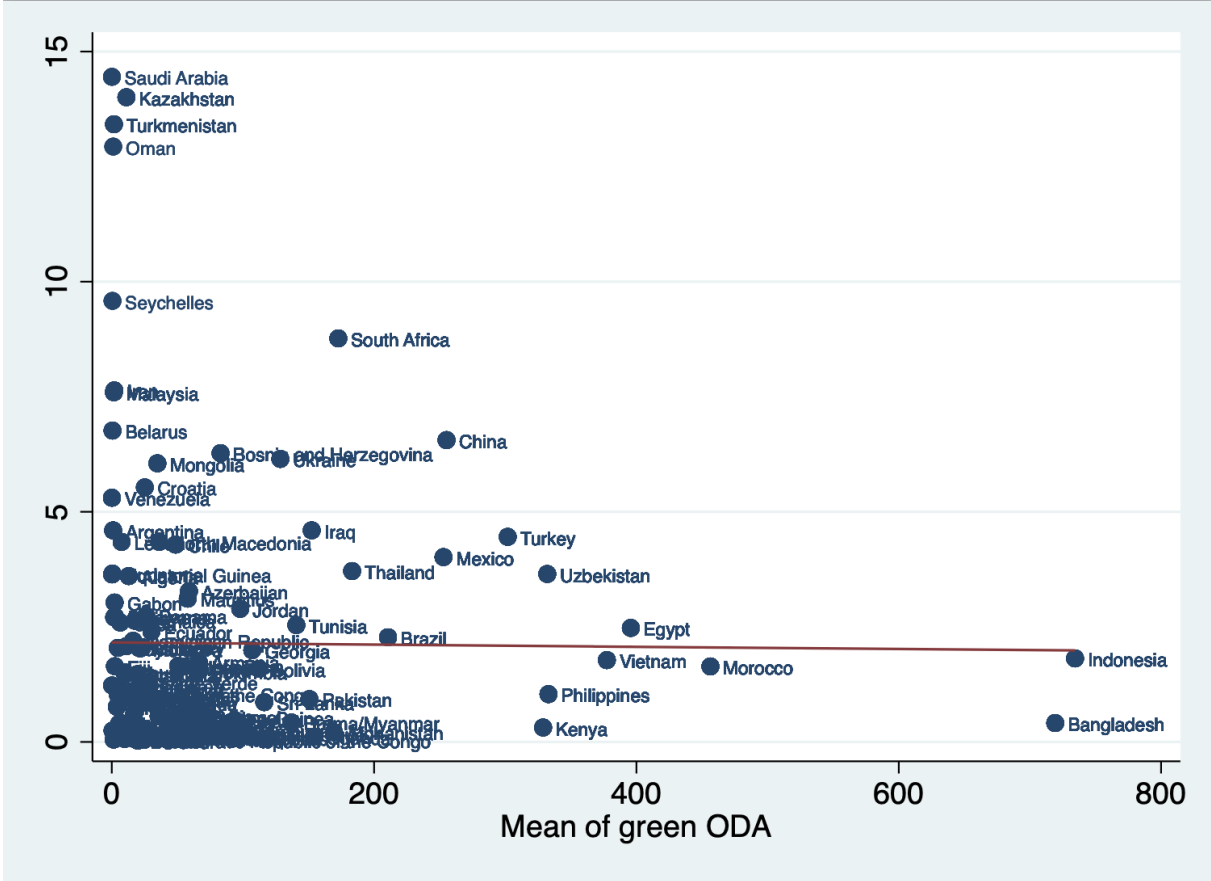
Table 1: Correlation matrix over dependent and independent variables

	Year	ODA	CO2 pc.	Politicization	Urbanization	Pop.density	Democracy	GDP pc
Year	1.0000							
Green ODA	0.1407*	1.0000						
CO2 pc	0.0230	-0.0019	1.0000					
Politicization	0.0487*	-0.1749*	-0.0318	1.0000				
Urbanization	0.0098	0.3836*	0.1875*	-0.1674*	1.0000			
Pop. density	0.0615*	0.2461*	-0.1266*	-0.1911*	0.1195*	1.0000		
Democracy	0.0085	0.0147	0.0340	-0.4930*	-0.0617*	-0.0478*	1.0000	
GDP pc	0.1294*	-0.0097	0.6753*	-0.1202*	0.0776*	-0.0706*	0.1166*	1.0000

* = Indicates significance at the .05 level

Correlation matrix in Table 1 above illustrates the correlation coefficients between all employed independent and dependent variables. However, this table does not tell us anything about a potential causal relationship between variables. In Figure 3 below, a scatterplot further introduces us to the relationship between the mean values of each country for main explanatory variables green ODA and CO₂ emissions per capita.

Figure 3: Scatterplot showing the relationship between green ODA and CO2 emissions per capita, 2002-2019 mean value for each country.



*India excluded, an obvious outlier, greatly overrepresented in population and recipient of ODA. **Scatterplot with India in appendix, figure 6. NOTE India not excluded in regression analyses.

The scatterplot above illustrates weak tendencies of a negative correlation between the independent variable green ODA and CO2 emissions per capita (mean values for each country) between 2002-2019. However, we still do not know if the mean of CO2 emission levels for each country is due to the amount of green ODA received. In order to examine the relationship between the variables and to control for other factors that could affect the relationship, it is necessary to conduct a statistical analysis, which will help us come closer to knowing if there is a casual relationship between the variables. I conduct a Time Series Cross-section regression analysis presented in Table 2 below.

5.1 Time Series-Cross Section analysis

Table 2: Panel data regression analysis of CO₂ per capita emissions between 2002-2018

CO ₂ emissions per capita	Model 1	Model 2	Model 3	Model 4	Model 5
Green ODA	-0.0000114 (0.0000601)	-0.0000824* (0.0000395)	-0.0000521 (0.0000386)	-0.0000460 (0.0000378)	-0.0000352 (0.0000293)
Urbanization		9.07e-09*** (1.77e-09)	9.23e-09*** (1.55e-09)	9.34e-09*** (1.54e-09)	6.88e-09*** (1.55e-09)
Population density			-0.00341* (0.00156)	-0.00332* (0.00163)	-0.00179 (0.00126)
Electoral democracy				0.273 (0.391)	0.306 (0.301)
GDP per capita					0.147*** (0.0371)
_cons	1.565*** (0.127)	1.404*** (0.118)	1.737*** (0.151)	1.601*** (0.277)	0.796* (0.327)
<i>N</i>	1497	1497	1497	1497	1497
<i>R</i> ²	0.146	0.201	0.213	0.215	0.323
adj. <i>R</i> ²	0.136	0.191	0.203	0.204	0.313
<i>Country fixed effects</i>	YES	YES	YES	YES	YES
<i>Year fixed effects</i>	YES	YES	YES	YES	YES
<i>Clustered standard errors</i>	YES	YES	YES	YES	YES

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2 above illustrates the relationship between independent and dependent variables, with the dependent variable CO₂ emissions *leading one year*. Model 1 conducts a bivariate analysis of the relationship between the main variables green ODA and CO₂ emissions per capita. The coefficient measures -0.0000114 and indicates a slightly negative correlation between the variables, confirming what was illustrated in the scatterplot above. This implies that every one unit increase of green ODA reduces the CO₂ emission levels per capita with -0.0000114. This would confirm hypothesis 1, that green ODA reduces CO₂ emissions in recipient countries. However, the relationship is not significant, as shown by the p-value way

above 0.05 (0.850), meaning the probability that the numbers are due to random chance is high. With an adjusted R² square of 0.062 for Model 1, 6,2% of the variation in the dependent variable CO₂ emissions per capita could be explained by the independent variable. This indicates that the model may not fully cover the potential factors that affect the variation in the dependent variable.

The rising adj. R² with Model 2-5 shows that added control variables help explain the output of the regression. Model 2 control the main variables' relationship for urbanization, and conducts a significant coefficient of -0.0000824, with a P-value of 0.039. The robust standard errors conducted from the cluster standard errors (0.0000395) indicates a relatively notable degree of variability in the standard errors, which means that the precision of the coefficient estimates might be limited. In model 3-5 other control variables are introduced, and the initially significant coefficient estimates for the main relationship are lost.

The linear regression in models 1-5 in Table 2 is not enough statistical support to assume that there could be real causation between the independent and dependent variables green ODA and CO₂ emissions. However, since the coefficient for the control variable urbanization stays significant through all models, even when accounting for the other variables in the model, this could indicate that there could be a real statistical relationship with the dependent variable CO₂ per capita emissions.

As a robustness check, the regression has been conducted with the dependent variable leading 1-5 years to test the relationship with different timeframes. It is hard to theoretically assume and motivate how long after allocation green ODA will influence CO₂ emission levels, as this depends on each specific project. Nonetheless, the coefficient stays insignificant through all different timeframes. Next, I move on to statistically test hypothesis 2, to examine how the moderating variable effects the green ODA efficiency.

Table 3: Panel data regression analysis of CO₂ per capita emissions with moderating effect, between 2002-2018

CO ₂ emissions per capita	Model 6	Model 7	Model 8	Model 9	Model 10
Green ODA	-0.00000872 (0.0000602)	0.000268 (0.000191)	-0.0000298 (0.000166)	-0.0000260 (0.000167)	0.00000696 (0.000139)
Politicization	-0.125 (0.186)	-0.103 (0.184)	-0.110 (0.176)	-0.0763 (0.182)	-0.0495 (0.123)
Green ODA*Politicization		-0.000193 (0.000152)	-0.0000144 (0.000115)	-0.0000139 (0.000115)	-0.0000291 (0.0000983)
Urbanization			9.22e-09*** (1.56e-09)	9.31e-09*** (1.57e-09)	6.82e-09*** (1.59e-09)
Population density			-0.00332* (0.00160)	-0.00328* (0.00164)	-0.00177 (0.00125)
Electoral democracy				0.222 (0.401)	0.271 (0.326)
GDP per capita					0.147*** (0.0371)
cons	1.813*** (0.385)	1.771*** (0.385)	1.948*** (0.349)	1.773*** (0.471)	0.910* (0.435)
<i>N</i>	1497	1497	1497	1497	1497
<i>R</i> ²	<u>0.148</u>	<u>0.150</u>	<u>0.215</u>	<u>0.216</u>	<u>0.323</u>
adj. <i>R</i> ²	<u>0.137</u>	<u>0.139</u>	<u>0.203</u>	<u>0.204</u>	<u>0.312</u>
<i>Country fixed effects</i>	YES	YES	YES	YES	YES
<i>Year fixed effects</i>	YES	YES	YES	YES	YES
<i>Clustered standard errors</i>	YES	YES	YES	YES	YES

Standard errors in parentheses

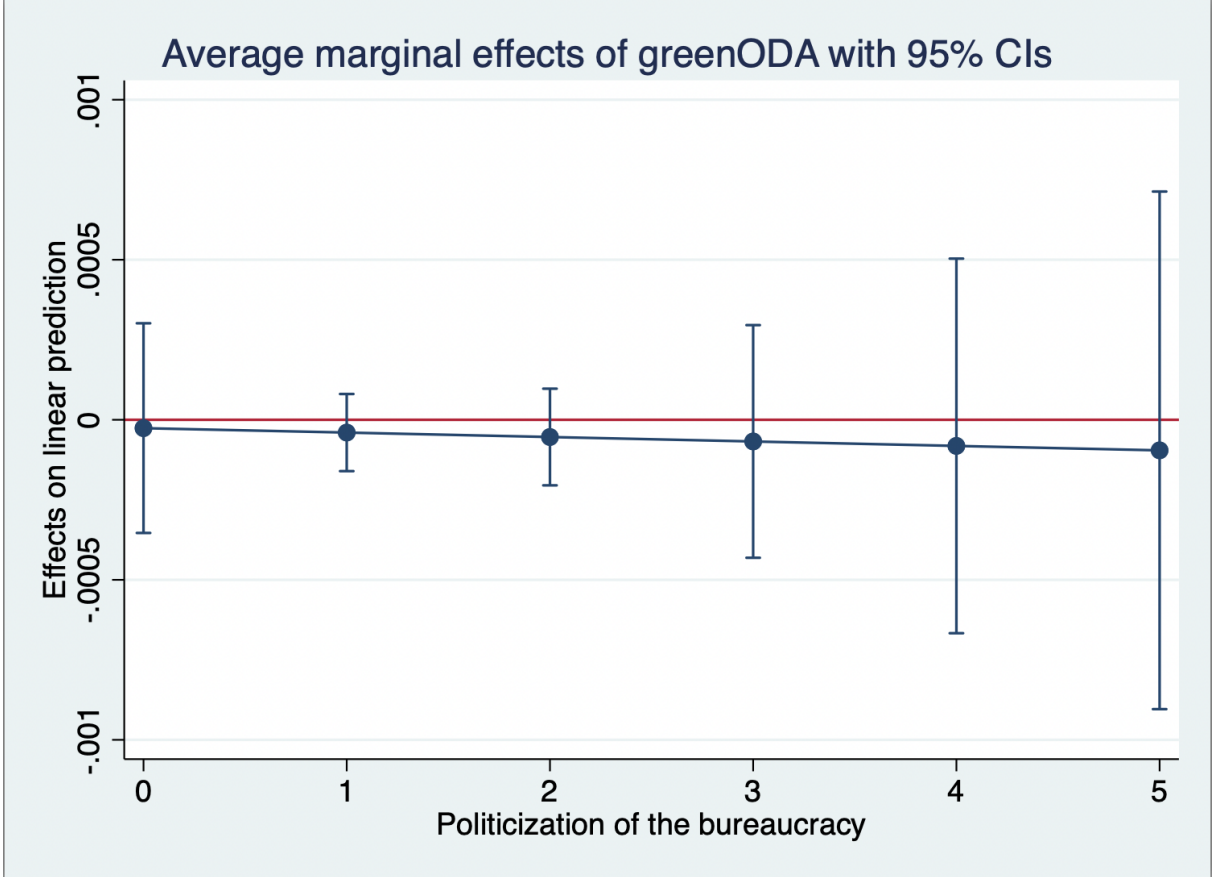
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3 above concerns hypothesis 2. The dependent variable *leading one year* in all models. Model 6 includes the two main explanatory variables and the politicization variable. Model 7 introduces the moderating effect of politicization on the independent variable green ODA. The robust standard errors are relatively high in comparison to the coefficient and the adjusted R2 measures low. This indicates that the moderating effect could explain only a small portion of the variation of the dependent variable. Further, model 8-10 introduce additional control

variables to check for spurious results (other factors causing both independent and dependent variables). The coefficients for the control variables are all statistically significant with a p-value below 0.05. However, in model 8-10, the statistical significance for the moderating effect of politicization disappears, indicating a spurious relationship due to underlying effects of other factors. Nonetheless, the coefficients of the control variables urbanization, population density, and GDP per capita stay significant through most models. This indicates that the possibility for a causation between for instance urbanization and population density and CO₂ emissions per capita is more likely, supporting parts of the theoretical assumptions of the control variables. This does not remove the risk of other underlying factors interfering with the relationship between control variables and the dependent variable CO₂.

To further test the relationship in hypothesis 2, Model 9 is conducted again with different time frames for the dependent variable (*leading 1-5 years*), found in Appendix, Table 6, model 11-15.

Figure 4: Graph illustrating Table 2, model 7, of the moderating variable politicization and the relationship between independent variable green ODA and dependent variable CO₂ per capita emissions, 2002-2018



It is difficult to interpret the moderating effect on the relationship between the independent and dependent variables only by Table 3 and 4. Hence, the graph above illustrates how the level of politicization of the bureaucracy affects the relationship between green ODA and CO₂ per capita emissions. The dependent variable *leading one year*. Figure 7 in the Appendix illustrates the same correlation as in figure 4, but dependent variable leading 5 years.

6. Conclusion

This section discusses the empirical findings in relation to the hypotheses and ends with concluding thoughts regarding the validity of the study.

This study aimed to examine how politicization of the bureaucracy affects the effectiveness of green ODA on CO₂ per capita emissions, more specifically if green ODA had a real effect on CO₂ emissions, and if higher levels of politicization reduce this effect. Due to the theoretical framework of 5 conducted theoretical mechanisms of politicization, including the concept of forbearance, I hypothesized that politicization would cause bureaucratic sensitivity to partisan control. This would in turn lead to refrainment to execute environmental laws and regulations for political and private gain. With panel data I have conducted a Time Series-Cross section analysis for the years 2002-2018 for 121 countries.

The statistical analysis did not provide empirical support for the hypotheses, indicating need for more research on the subject.

I was prepared for a possibility to not find statistical significance for hypothesis one regarding the relationship between green ODA and CO₂ emissions, in line with previous literature (e.g., Li, Rishi & Bae JH, 2021). The insignificant results from the regression analysis does not necessarily indicate that there is no causal correlation between my independent and dependent variables, but that the research model and controlled for the selected control variables presented in Table 2, model 1-5, do not pick up potential causality. This could be explained by many different factors discussed below.

Moving on, regarding hypothesis two I will focus on the interpretation on Table 3 (model 6-10) and the graph presented in Figure 4, conducted from variables in model 7.

If I were to talk about any tendencies drawn from the graphs, the tendency of green ODA having a slightly reducing effect on CO₂ emissions gets stronger in countries with more politicization of the bureaucracy. The tendency of a correlation is somewhat more apparent in figure 7 in the Appendix, that illustrates the same graph but with the dependent variable leading 5 years. This is directly contrary to hypothesis 2, expecting politicization to weaken

the correlation between the independent and dependent variables. What this depends on is difficult to answer.

If a country has a bureaucracy rated a 5 (highest degree of politicization), green ODA has a slight negative relationship with CO₂ emission levels. Thus, this graph shows tendencies of more politicization resulting in a slightly stronger relationship between green ODA and CO₂ emissions. That said, even at higher levels of politicization, the coefficient is not significantly different from zero. Nevertheless, when the spread, indicated by the standard error (in parentheses) is large compared to the b-coefficient as shown in all models above, any conclusions are highly uncertain. Additionally, no models indicate any significant b-coefficients and cannot be used to imply any theoretical evidence of expected or unexpected causality between employed variables.

The unexpected effect politicization seems to have on the relationship between green ODA and CO₂ emissions generates new questions about how bureaucratic qualities affect ODA. In '2. Previous research and main concepts', I mentioned that a small portion of politicization in the bureaucracy could increase the bureaucratic effectivity. (Peters & Pierre, 2004; Mayntz & Derlien, 1989). Perhaps the administrative efficiency deriving out of politicization, combined with other factors influencing the independent and dependent variables, helps to understand the findings.

There is a high standard deviation for the variable green ODA, meaning the aid grants varies greatly between countries and years (see Table 6 in Appendix for summary statistics). The basis for green ODA allocation, and issues of partially insufficient data availability may both help to understand the null results.

The focus of this study has been the most carbon intensive sectors (energy, transport, industry). These sectors are large and may not be the sectors with highest improvability with small funds such as ODA. One possible explanation for the slightly inverted results could be that in countries with highly politicized bureaucracy there could also be lower economic development, and therefore small economic means makes a greater difference. Additionally, a lot of factors influence a country's carbon emissions. It could be hard to capture these factors in such a relatively simple research model and isolate the effects on the CO₂ emissions variable.

There is a possibility that the fixed effects model may not have succeeded to capture possible endogeneity and that the within-country variation. Additionally, I cannot rule out the possibility of reversed causality between the independent and dependent variables. ODA is allocated to help countries mitigate carbon emissions, but there could also be a reversed effect where countries with higher carbon emissions attract green ODA to a greater extent than low-emitting countries.

There are other measures to compare environmental and ecological quality. The focus of this study is climate change and therefore climate change mitigation aid and CO₂ emissions are ideal indices. Future studies could examine the other five statistical policy markers of the Rio Convention. In addition to this study, which does not differentiate aid allocated by different donor countries, a future study could examine the impact different factors in donor countries have on the allocation and effectiveness of green aid.

From an ethical perspective, this study does not aim to imply that countries with a highly politicized bureaucracy should not receive aid. Aid is undeniably vital for many developing countries lacking resources and financial means to mitigate and adapt to climate change. Additionally, aid is a good investment for donor countries (Climate Action, n.d.). However, a better understanding of how climate aid should be invested is required for all countries to have a chance at reaching the SDGs and fulfill the commitment to the Paris Agreement (UNFCCC, 2015). This research attempts to increase the knowledge in this field.

In addition to the possible explanations for the statistically insignificant results and the unexpected linear direction revealed in this study, it is essential to consider the possibility that the research model is built on inaccuracies or inadequacies within the theoretical framework employed. With the results from the conducted panel regressions presented above, I can neither confirm nor dispute either of the hypotheses of this study, and so I must reject both hypotheses for now. However, due to the unexpected results that were contrary to the hypotheses, my results creates paths for future research.

References

- Bauer, M. W. & Ege, J. (2012) Politicization within the European Commission's bureaucracy. *International Review of Administrative Sciences*, 78(3) (pp. 403-424). Doi: 10.1177/0020852312445022
- Blanco, L., Gonzalez, F., & Ruiz, I. (2013) The Impact of FDI on CO₂ Emissions in Latin America. *Oxford Development Studies* 41(1) (pp. 104-121) doi:
- Bloch, H., Rafiq, S., & Salim, R. (2012) Coal consumption, CO₂ emission and economic growth in China: Empirical evidence and policy responses. *Energy Economics* 34(2) (pp. 518-528) doi: [10.1016/j.eneco.2011.07.014](https://doi.org/10.1016/j.eneco.2011.07.014)
- Carfora, A., Scandurra, G., & Thomas, A. (2021) Factors affecting official development assistance distribution. A panel investigation. *Journal of Cleaner Production*. (304) pp. 1-11. Doi:
- Carlsson, F. & Lundström, S. (2000) Political and Economic Freedom and the Environment: The Case of CO₂ Emissions. *Working Papers in Economics* (29) Gothenburg University: Department of Economics.
- Coppedge, M., et.al. (2023) "V-Dem Codebook v13" Varieties of Democracy (V-Dem) Project.
- Cornell, A., Grimes, M. (2015). Political Control of Bureaucracies as an Incentive for Party Behavior. In: Dahlström, C., Wängnerud, L. (eds) *Elites, Institutions and the Quality of Government. Executive Politics and Governance*. Palgrave Macmillan, London. https://doi.org/10.1057/9781137556288_12
- D'Arcy, M. & Nistotskaya, M. (2017) State first, then democracy: using cadastral records to explain governmental performance in public goods provision. *Governance: An International Journal of Policy, Administration, and Institutions*, 30(2) (pp. 193-209) doi:10.1111/gove.12206
- Development Assistance Committee. (1991) *Principles for evaluation of development assistance*. OECD. <https://www.oecd.org/development/evaluation/2755284.pdf>
- Ebinger, F., Veit, S. & Fromm, N. (2019) The partisan—professional dichotomy revisited: Politicization and decision-making of senior civil servants. *Public Administration*, 97(4) (pp. 861-876) DOI: <https://doi.org/10.1111/padm.12613>
- Gerring, J., Thacker, S. C., & Alfaro, R. (2012) Democracy and Human Development. *The Journal of Politics*, 74(1) (pp. 1-322) doi: <https://doi.org/10.1017/S0022381611001113>
- Grossman, G. M. & Krueger, A. B. (1991) Environmental Impacts of a North American Free Trade Agreement. *National Bureau of economic research* (3914) doi: 10.3386/w3914
- Hicken, A. (2011) Clientelism. *Annual Review of Political Science*, 14. (pp. 289-310) doi: [10.1146/annurev.polisci.031908.220508](https://doi.org/10.1146/annurev.polisci.031908.220508)
- Hoesung Lee, et.al. (2023) *SYNTHESIS REPORT OF THE IPCC SIXTH ASSESSMENT REPORT (AR6) - Longer Report*. IPCC. URL: https://report.ipcc.ch/ar6syrr/pdf/IPCC_AR6_SYR_LongerReport.pdf
- Holland, A. C. (2016) *Forbearance*. *American Political Science Review* (110:2) Harvard University. doi:[10.1017/S0003055416000083](https://doi.org/10.1017/S0003055416000083)
- Keefer (2007) Clientelism, Credibility, and the Policy Choices. *American journal of Political Science*, 51(4) (pp. 804-821) doi: <https://doi.org/10.1111/j.1540-5907.2007.00282.x>

- Kurer, O. (1993) Clientelism, corruption and the allocation of resources. *Public Choice* (77) (pp.259-273) doi: [10.1007/BF01047869](https://doi.org/10.1007/BF01047869)
- Li D. D., Rishi, M., Bae J. H. (2021). Green official development Aid and carbon emissions: do institutions matter? *Environment and Development Economics* 26(1) (pp. 88–107) <https://doi.org/10.1017/S1355770X20000170>
- Lindsey, B. (2021-11-18) State capacity: what is it, how we lost it, and how to get it back. Washington D.C.: Niskanen center. Retrieved 2023-04-02, from: <https://www.niskanencenter.org/state-capacity-what-is-it-how-we-lost-it-and-how-to-get-it-back/>
- López, R. & Mitra, S. (2000) Corruption, Pollution, and the Kuznets Environment Curve. *Journal of Environmental Economics and Management*. (40) (pp. 137-150) doi: 10.1006/jeem.1999.1107
- Mayntz, R. & Derlien, H-U. (1989) Party Patronage and Politicization of the West German Administrative Elite 1970-1987 – Toward Hybridization? *Governance: An International Journal of Policy and Administration*, 2(4), (pp. 384-404) ISSN 0952-1895
- Miller, G. (2000) Above Politics: Credible Commitment and Efficiency in the Design of Public Agencies. *Journal of Public Administration Research and Theory*. 10(2) (pp. 289-327) <https://eds.p.ebscohost.com/abstract?site=eds&scope=site&jrnl=10531858&asa=Y&AN=3330254&h=rmCGfmFCoc%2bDethJDOg%2fAY2VyTHNpZx0RexY7F8ERwd3iesovm6hmWLIWafJmZtoSoSHPHw3U5i7727dVnqRfA%3d%3d&cr=f&resultLocal=ErrCrlNoResults&resultNs=Ehost&crlhashurl=login.aspx%3fdirect%3dtrue%26profile%3dehost%26scope%3dsite%26authtype%3dcrawler%26jrnl%3d10531858%26asa%3dY%26AN%3d3330254>
- Numan, U., Ma, B., Sadiq, M., Bedru, H.D. Jiang, C. (2023) The role of green finance in mitigating environmental degradation: Empirical evidence and policy implications from complex economies. *Journal of Cleaner Production*. (400) (pp.1-13) doi: [10.1016/j.jclepro.2023.136693](https://doi.org/10.1016/j.jclepro.2023.136693)
- Opoku, E.e.O. & Boachie, M.K. (2020) The environmental impact of industrialization and foreign direct investment. *Energy Policy*. (137) (pp.1-12) doi: [10.1016/j.enpol.2019.111178](https://doi.org/10.1016/j.enpol.2019.111178)
- OECD (2023), "Creditor Reporting System: Aid activities targeting Global Environmental Objectives", *OECD International Development Statistics* (database), doi: [10.1787/9c778247-en](https://doi.org/10.1787/9c778247-en)
- Pazienza, P. (2019) The impact of FDI in the OECD manufacturing sector on CO₂ emission: Evidence and policy issues. *Environmental Impact Assessment Review*, (77) (pp. 60-68) doi: [10.1016/j.ear.2019.04.002](https://doi.org/10.1016/j.ear.2019.04.002)
- Peters, G. & Pierre, J. (2004) Politicization of the civil service: concepts, causes, consequences. In G. Peters & J. Pierre (Eds.) *Politicization of the Civil Service in Comparative Perspective: the quest for control*. (pp. 1-13) Routledge. Co <http://ndl.ethernet.edu.et/bitstream/123456789/55567/1/B.%20Guy%20Peters.pdf#page=11>
- Pinar, M. (2023) Green aid, aid fragmentation and carbon emissions. *Science of the Total Environment, Elsevier*. (870) pp.1-13. Doi: [/10.1016/j.scitotenv.2023.161922](https://doi.org/10.1016/j.scitotenv.2023.161922)
- Povitkina, M., Alvarado Pachon, N. & Dalli. C.M, (2021). *The Quality of Government Environmental Indicators Dataset, version Sep21*. University of Gothenburg: The Quality of Government Institute, <https://www.gu.se/en/quality-government>
- Povitkina & Bolkvadze (2019) Fresh pipes with dirty water: How quality of government shapes the provision of public goods in democracies. *European Journal of Political Research*, (58) (pp. 1191-1212) doi: 10.1111/1475-6765.12330

Ritchie, H., Roser, M. & Rosado, P. (2020) - "CO₂ and Greenhouse Gas Emissions". Published online at OurWorldInData.org. Retrieved from: <https://ourworldindata.org/co2-and-greenhouse-gas-emissions>

Rockman, B. A. (2019) Bureaucracy Between Populism and Technocracy. *Administration & Society*, 51(10) (pp. 1546-1575) Doi: 10.1177/0095399719874758

Rothstein, B., & Teorell, J. (2008) What is Quality of Government? A Theory of Impartial Government Institutions. *Governance*, 21(2) (pp. 165-190) Doi: <https://doi.org/10.1111/j.1468-0491.2008.00391.x>

Sangmpam, S. N. (1992) The overpoliticized State and Democratiation: A Theoretical Model. *Comparative Politics*, 24(4) (pp. 401-417) doi: <https://doi.org/10.2307/422152>

Steinebach, Y. & Limberg, J. (2021) Implementing market mechanisms in the Paris era: the importance of bureaucratic capacity building for international climate policy. *Journal of European Public Policy*, 29(7). (pp. 1153-1168) DOI: [10.1080/13501763.2021.1925330](https://doi.org/10.1080/13501763.2021.1925330)

Stern, D. (2018) The Environmental Kuznets Curve. *Reference Module in Earth Systems and Environmental Sciences*, Elsevier. Doi: <https://doi.org/10.1016/B978-0-12-409548-9.09278-2>.

Sustainable development goals. (n.d.) *Goal 13: Take urgent action to combat climate change and its impacts - 13 Climate action*. United Nations. Retrieved 2023-03-28, from: <https://www.un.org/sustainabledevelopment/climate-change/>

The World Bank (2023) Urban population (SP.URB.TOTL) World Bank staff estimates based on the United Nations Population Division's World Urbanization Prospects: 2018 Revision. [CC BY-4.0] (<https://datacatalog.worldbank.org/public-licenses#cc-by>)

The World Bank (17-07-2022) *What you need to know about Article 6 of the Paris Agreement*. Who we are – Feature Story. Retrieved 29-06-2023 from <https://www.worldbank.org/en/news/feature/2022/05/17/what-you-need-to-know-about-article-6-of-the-paris-agreement>

UNDP (2023) The SDGs in action – What are the Sustainable Development Goals? United Nations Development Programme: <https://www.undp.org/sustainable-development-goals>

UNDP (2019) Brazil receives US\$ 96 million for having reduced its deforestation. Retrieved 2023-04-26, from: <https://www.undp.org/press-releases/brazil-receives-us-96-million-having-reduced-its-deforestation>

UNFCCC (2015) *Paris Agreement*. United Nations: https://unfccc.int/sites/default/files/english_paris_agreement.pdf

United Nations (2015) Transforming our world: the 2030 Agenda for Sustainable Development. (A/RES/70/1) The General Assembly: https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf

Wang, Q., Guo, J., Li, R. (2022) Official development assistance and carbon emissions of recipient countries: A dynamic panel threshold analysis for low- and lower-middle-income countries. *Sustainable Production and Consumption*. (29) (pp.158-170) doi: 10.1016/j.spc.2021.09.015

Wolf, M.J. and Emerson J. W. and Esty D. C. and de Sherbinin, A. and Wendling, Z. A., et al.. 2022. 2022 Environmental Performance Index. New Haven, CT: Yale Center for Environmental Law and Policy. epi.yale.edu. Date accessed: 17 October 2022

Appendix

Figure 5: V-dem codebook description of the variable ‘v2stcritrecadm’ which operationalize the moderating variable ‘politicization of the bureaucracy’.

3.9.0.6 Criteria for appointment decisions in the state administration (C) (v2stcritrecadm)

Project Manager(s): Agnes Cornell

Additional versions: *_osp, *_ord, *_codelow, *_codehigh, *_sd, *_mean, *_nr

Question: To what extent are appointment decisions in the state administration based on personal and political connections, as opposed to skills and merit?

Clarification: Appointment decisions include hiring, firing and promotion in the state administration. Note that the question refers to the typical *de facto* (rather than *de jure*) situation obtaining in the state administration, excluding the armed forces. If there are large differences between different branches of the state administration or between top and lower level state administrators please try to consider the average when answering the question.

Responses:

0: All appointment decisions in the state administration are based on personal or political connections. None are based on skills and merit.

1: Most appointment decisions in the state administration are based on personal or political connections. Only a few are based on skills and merit.

2: Approximately half of the appointment decisions in the state administration are based on personal or political connections. Approximately half are based on skills and merit.

3: Only few of the appointment decisions in the state administration are based on personal or political connections. Most appointment decisions are based on skills and merit.

4: None of the appointment decisions in the state administration are based on personal or political connections. All are based on skills and merit.

Scale: Ordinal.

Data release: 9-13.

Cross-coder aggregation: Bayesian item response theory measurement model (see *V-Dem Methodology*).

Citation: Pemstein *et al.* (2023, *V-Dem Working Paper Series* 2023:21); *V-Dem Codebook* (see

Table 4: Sample of countries (121)

Afghanistan	Gabon	Oman
Albania	Georgia	Pakistan
Algeria	Ghana	Panama
Angola	Guatemala	Papua New Guinea
Angola	Guinea	Paraguay
Argentina	Guinea-Bissau	Peru
Armenia	Guyana	Philippines
Azerbaijan	Haiti	Republic of the Congo
Bangladesh	Honduras	Rwanda
Belarus	India	Saudi Arabia
Benin	Indonesia	Senegal
Bhutan	Iran	Seychelles
Bolivia	Iraq	Sierra Leone
Bosnia and Hercegovina	Jamaica	Solomon Islands
Botswana	Jordan	Somalia
Brazil	Kazakhstan	South Africa
Burma/Myanmar	Kenya	South Sudan
Burundi	Kyrgyzstan	Sri Lanka
Cambodia	Lebanon	Suriname
Cameroon	Lesotho	Syria
Cape Verde	Liberia	Tajikistan
Central African Republic	Libya	Tanzania
Chad	Madagascar	Thailand
Chile	Malawi	The Gambia
China	Malaysia	Togo
Colombia	Maldives	Trinidad and Tobago
Comoros	Mali	Tunisia
Costa Rica	Mauritania	Turkey
Croatia	Mauritius	Turkmenistan
Cuba	Mexico	Uganda
Democratic RepublicCongo	Moldova	Ukraine
Djibouti	Mongolia	Uruguay
Dominican Republic	Morocco	Uzbekistan
Ecuador	Mozambique	Vanuatu
Egypt	Namibia	Venezuela
El Salvador	Nepal	Vietnam
Equatorial Guinea	Nicaragua	Yemen
Eritrea	Niger	Zambia
Eswatini	Nigeria	Zimbabwe
Ethiopia	North Korea	
Fiji	North Macedonia	

Table 5: Summary statistics, independent and dependent variables

Variables	Obs	Mean	Std. dev.	Min	Max
Green ODA	1,726	109.2634	369.4189	.000159	6330.041
CO2 pc emissions*	1,497	2.105296	2.581003	.02586	15.88037
Politicization	1,726	1.9898	.5442883	.845	3.291
Urban population	1,726	2.59e+07	8.15e+07	48451	8.49e+08
Population density	1,726	115.6052	176.6892	1.601676	1681.727
Electoral democracy	1,726	.4579397	.2122931	.017	.912
GDP per capita	1,726	7.328365	5.980226	.573	37.8

* Variable leading 1 year

Figure 6: Scatterplot showing the relationship between green ODA and CO2 emissions per capita, 2002-2019 mean value for each country, India included.

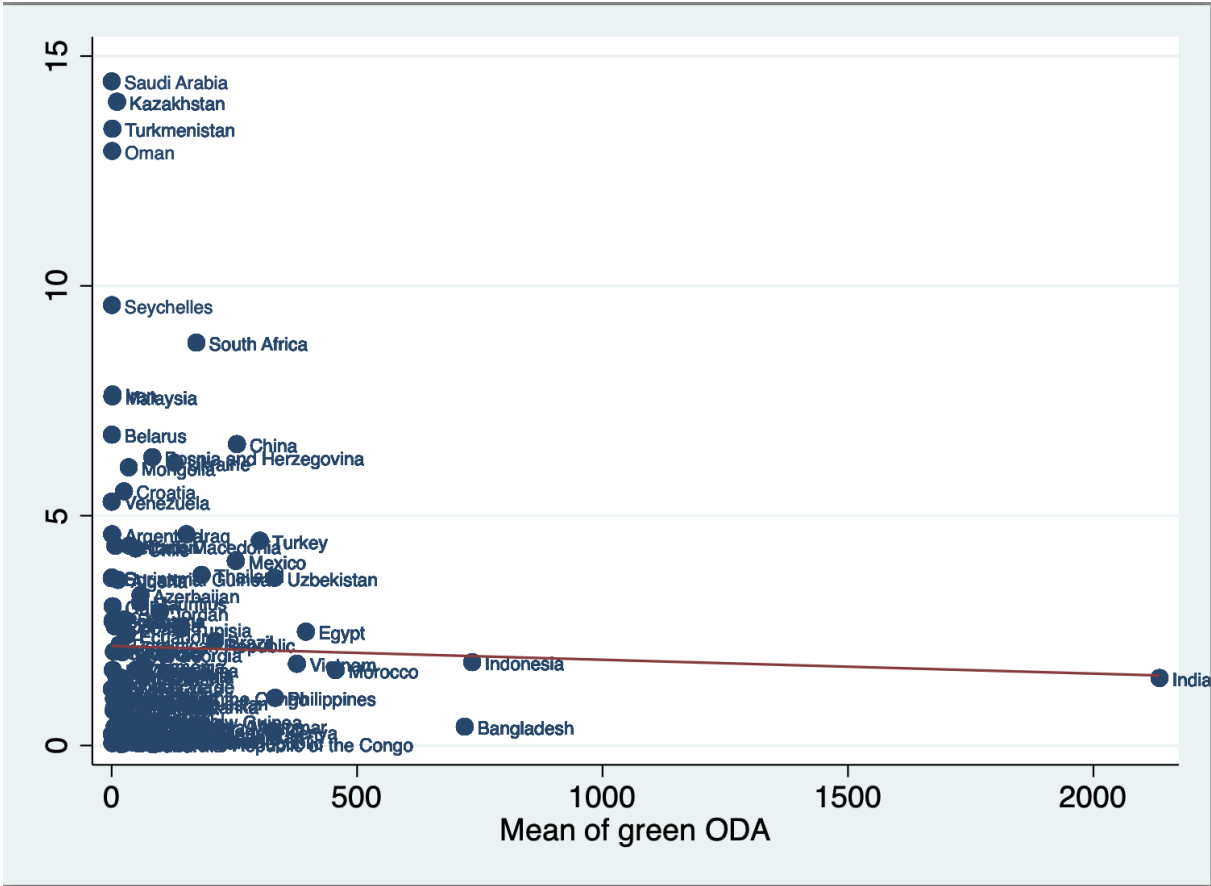


Table 6: Panel regression with moderating effect resampled with a leading depending variable of 1-5 years, for respectively model 11-15

CO ₂ emissions per capita	Model 11	Model 12	Model 13	Model 14	Model 15
Green ODA	-0.0000260 (0.000167)	0.0000415 (0.000159)	0.000127 (0.000168)	0.000174 (0.000166)	0.000158 (0.000167)
Politicization	-0.0763 (0.182)	0.0195 (0.156)	0.0445 (0.134)	0.120 (0.124)	0.263 (0.164)
Green-ODA*Politicization	-0.0000139 (0.000115)	-0.0000300 (0.000106)	-0.0000923 (0.000124)	-0.000150 (0.000129)	-0.000132 (0.000127)
Urbanization	9.31e-09*** (1.57e-09)	8.71e-09*** (1.46e-09)	7.86e-09*** (1.40e-09)	7.14e-09*** (1.26e-09)	6.56e-09*** (1.20e-09)
Population density	-0.00328* (0.00164)	-0.00385 (0.00212)	-0.00391 (0.00211)	-0.00319 (0.00181)	-0.00328 (0.00193)
Electoral democracy	0.222 (0.401)	0.578 (0.351)	0.512 (0.314)	0.554 (0.311)	0.536 (0.319)
_cons	1.773*** (0.471)	1.512*** (0.430)	1.628*** (0.381)	1.462*** (0.356)	1.278** (0.468)
<i>N</i>	1497	1392	1288	1194	1096
<i>R</i> ²	0.216	0.190	0.173	0.150	0.125
adj. <i>R</i> ²	0.204	0.178	0.160	0.136	0.111
<i>Country fixed effects</i>	YES	YES	YES	YES	YES
<i>Year fixed effects</i>	YES	YES	YES	YES	YES
<i>Clustered standard errors</i>	YES	YES	YES	YES	YES

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 7: illustrates the same correlation as in figure 4, but dependent variable leading 5 years.

