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Chair of Political Economy of Development

# **Institutional Quality and The Environment**

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## INTRODUCTION

It is believed that we are currently living in a new geological epoch, namely the Anthropocene, due to the human impact on the Earth System which resulted in climatic, biological and chemical structural changes. This human-driven phenomenon is assumed to have started with the industrial revolution and its intensity to have grown considerably from the 1950s onwards, in correspondence to significant progresses in health and wealth. In fact, since the second half of the 20<sup>th</sup> century the world has experienced an extreme fast-paced economic growth, reducing the number of people below the poverty line, drastically increasing GDP per capita, building new infrastructures, using and discovering new technologies. However, this economic boost was at the expense of nature, leading to the environmental degradation of the planet and its rising temperatures, mainly due to the intense exploitation of natural resources by mankind.

Today, as a consequence of the increasing human pressure on the Earth system, natural resources, which are fundamental for the development of the Global South, are lacking. They provide the raw materials and energy that any economic system needs in order to function; especially in developing countries where large shares of national output are typically produced by the agriculture sector. Thus, although climate change is constraining the life of many, countries around the world are not affected to the same extent by environmental concerns. In fact, some are doomed to be confronted with more environmental issues than others, especially the most vulnerable ones whose livelihood is mainly based on the agriculture industry. Hence, this emergency situation makes it necessary for national governments to take action in order to prevent and tackle environmental risks, which generally also influence nations' socio-economic trends.

There is, indeed, a plethora of elements that determine the environmental performance of a country. One of them is the ability of national institutions to implement appropriate policies, promote a new use of energy, introduce political and social initiatives in order to enable the transition toward a more sustainable economy and society. Such evolution implies the provision of guidelines and a constant monitoring in order to ensure its effectiveness, which is the task of institutions. In fact, the public-good nature of environmental protection requires the state intervention: private agents do not take into consideration the full costs of pollution externalities and the wellbeing of future generations, opening the door for government action. The objective of the present dissertation is to analyse the

role of institutions and their eventual impact on a country's environmental commitment and quality. It studies the relationship between institutional quality and the environment. The question this research is addressing is whether a higher quality of institutions entails better environmental conditions.

The research assesses the existing contributions of the past literature on the subject and provides empirical evidence to examine the influence of institutions on environmental outcomes by exploring institutional and environmental conditions of the Far East. This world region was chosen for the following two principal reasons: the variety of institutions and economic policies among the countries and the limited amount of research conducted on the relation between institutions and the environment on these territories.

The role of institutions in environmental policy and quality is examined by reviewing existing contributions from past literature, showing how the main findings have been theorised and empirically validated. Governance, the extent of economic and political freedom and corruption level are used as indicators to assess institutional quality. For each of these parameters this dissertation analyses the correlation with chosen variables of environmental commitment - environmental regulation, environmental market-instruments and environmental international treaties – and of environmental quality – greenhouse gas emissions, deforestation, land degradation and air and water pollution. The major findings that emerge from this investigation are that a democratic regime enhances environmental political commitment, but not necessarily environmental quality, economic freedom may hinder environmental policy's stringency and corruption reduces environmental commitment (with exception of multilateral environmental cooperation) and fosters environmental degradation.

These results partly coincide with the findings from the data collected on the Far East. Such research found that democracy reduces deforestation, political rights are positively correlated with the implementation of environmental taxes and negatively with deforestation, economic freedom hinders environmental taxation, and corruption is associated with increased air and water pollution.

The thesis is structured as follows: the first chapter introduces the role of institutions and illustrates the criteria of the quality of institutions, focusing on governance, the extent of political and economic

freedom and corruption; chapter two analyses environmental policy, concentrating on the role of environmental regulation, market instruments and international treaties; chapter three explores environmental recent trends, such as the level of green-house-gases emissions, deforestation or air pollution; the fourth chapter provides empirical evidence by examining the links between institutional and environmental conditions of the Far East, namely East and South-East Asia; finally, chapter five concludes.

## CHAPTER I

### THE QUALITY OF INSTITUTIONS

Any functioning society is built on institutions. They play a fundamental role in ensuring its development. Institutions are human devices created by societies to place constraints that affect individuals' incentives and relations. They are established formal and informal mechanisms that shape social, economic and political interactions through the provision of incentives (North, 1990). Formal institutions entail all rules, laws and provisions formally recognised and officially enforced. Meanwhile, informal institutions are deemed as more subtle, as they comprise embedded social and cultural values. They develop gradually, connecting the past, present, and future. As a result, history is essentially a story of institutional change which affects the direction and structure of the economic performance.

Institutions encompass political and economic institutions. The celebre *homo homini lupus* represents the need for political institutions to regulate social relations. They may be defined as institutional bodies that through the formation and enforcement of law delineate the structure and dynamics of the social and political system. Whereas, economic institutions concern those regulations and policies that determine a country's economy. They involve rules governing labour, product and financial markets and all those other factors influencing the functioning of the market.

Institutions are held to be the major driver of economic growth; development may be defined as a process of institutional innovation. Adequate institutions foster economic development, yet inefficient ones result in the so-called institutional inertia, which prevents any form of economic growth. The Korean experiment stressed the impact of institutions on economic development. Until

the end of World War II both North and South Korea were under the control of Japan, sharing therefore the same cultural and historical roots. After the separation, the two Koreas established two very distinct sets of institutions, which resulted in completely different economic outcomes. Moreover, on the basis of the American colonial experiment and its relative reversal of fortune, scholars identified two distinct sets of institutions established within the colonisation process, namely contracting institutions and property rights institutions. The former were implemented in densely-settled and relatively developed places plenty of resources (e.g., Central and South-America), where colonisers needed to extract the latter. Hence, wealth-extracting and non-inclusive institutions were settled. Meanwhile, property rights institutions were established in sparsely-settled and less developed places (e.g., North America and Australia), where there was no interest to exploit natural resources. Thus, the institutions implemented were inclusive and wealth-creating. In the following centuries, countries with property rights institutions witnessed a rapid economic growth, whilst those with contracting institutions remained trapped in a stagnant economic situation. Therefore, scholars identified inclusive and wealth-creating institutions as forecasters of economic growth.

This dissertation studies formal institutions. To evaluate their quality, the three dimensions of governance, political and economic freedom, and corruption are examined.

## **1.1 Governance**

Kaufman (2010) defines governance as “the traditions and institutions by which authority in a country is exercised”. It encompasses the procedures involved in the selection of the government and the set of norms and standards regulating a society. It may be deemed as the rules of the game, as it reflects the relations among political and economic institutions and their defining features. Different forms of governance take place on the basis of these interactions.

The Polity IV Project (Marshall and Jaggers 2010) – a major dataset covering political regimes’ annual changes and main features from 1800 onwards - identifies the three most recurring types of governance: autocracy, democracy and anocracy. On the basis of the degree of competitiveness and openness in political participation, choice of the government and limits to the executive power, a scale ranging from –10 (corresponding to full autocracy) to +10 (equivalent to full democracy) is delineated. Anocracy combines characteristics of both political regimes, being in the middle of the

range. As we can see in Figure 1, anocracies have experienced a gradual increase, ultimately surpassing autocracies. Meanwhile, in the last decades global trends have shown a sharp rise in democracies and a steep decline in autocracies. Democracy is regarded as being comprised of three key factors: the opportunity for citizens to express their political preferences, the guarantee of civil liberties and the presence of a limited executive power. Adhering to this definition, the Polity Project has estimated its rapid spread all over the globe. Whether it exists a negative or positive correlation between democracy and the environment has been debated and discussed by numerous scholars. Two main points of view have emerged. Midlarsky (1998) and Hardin (1968) suggest environmental conservation to be incompatible with the free-market and property rights' protection, intrinsic values of liberal democracy. Provided that citizens in a liberal democracy are granted individual political and economic rights, the public good of environmental protection may be devaluated and overlooked due to the lack of collective effort by the community. On the contrary, others believe in a positive correlation between the environment and democracy for several reasons. Firstly, Kotov and Nikitina (1995) argue that democratic institutions are based on the aggregate preferences of citizens. Hence, political leaders are required to satisfy citizens' demands in order to be elected. Thus, in a democracy environmentalists are more likely to be heard and to bring their ideas to action. Furthermore, freedom of press and freedom of thought allow a free circulation of information and different opinions, enabling people to learn about climate change and create their own view on it and, eventually, pressuring the government (Payne 1995). Whether a democratic governance implies greater protection of the environment is still a matter of debate with mixed opinions.



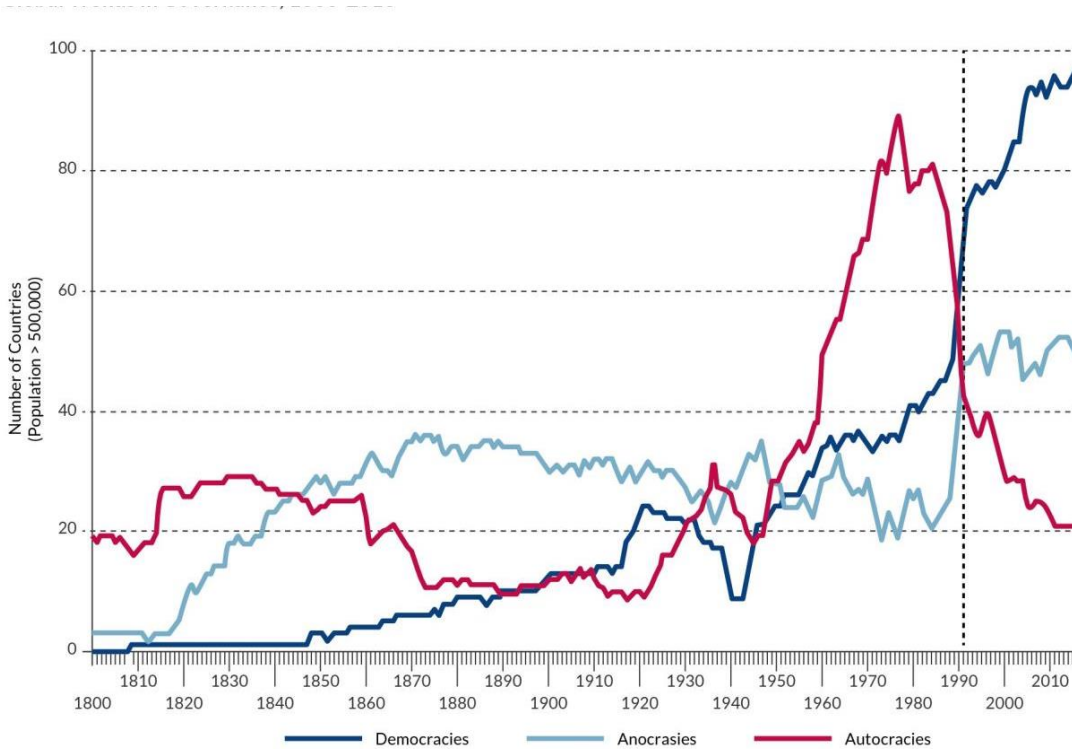


Fig. 1. Global trends in Governance, 1800-2010. Source: Center for Systemic Peace

Being governance a very broad concept, various criteria have been given trying to assess it. Besides the Polity Project, the six dimensions proposed by the Worldwide Governance Indicators project (WGI) have been, ultimately, universally recognised. These criteria are voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law and, finally, control of corruption. It exists a broad body of literature focusing especially on rule of law. Provided that environmental conservation largely relies on regulation, rule of law is essential to guarantee it. Castiglione (2011) illustrates the relationship between rule of law and environmental degradation by analysing rule of law's impact on the Environmental Kuznets Curve (EKC). The EKC suggests that an increasing level of income corresponds to a greater environmental damage until GDP per capita reaches a certain point and the trend is inverted. The initial trade-off between income and environmental quality may be explained by the industrialisation and urbanisation processes any growing economy must face, which imply a substantial increase in emissions and reliance on fossil fuels. Moreover, developing economies have limited access to new technologies, and therefore to renewable resources. The turning point is achieved when the economy is developed

enough to permit new green technologies use and cleaner production techniques which lead to a shift towards a less emissions intensive society in consequence of new energy sources, such as solar o wind energy. This transition is translated into an inverse U-shaped curve where GDP per capita is on the x-axis and pollutant emissions per capita on the y-axis, as it is illustrated by the graph in fig. 2.



Fig. 2. The Environmental Kuznets curve. Source: Buhalis (2022)

Castiglione (2011) argues that a stronger rule of law results in the turning point being reached at a lower income level and, consequently, in fewer pollutants emissions. Through an analysis of 28 countries from 1996 to 2008 the author observes a negative correlation between rule of law and pollution, since stronger rule of law leads to a lower threshold income level in the EKC. To evaluate rule of law's impact on the EKC, Castiglione referred to the equation proposed by Bradford (2005):

$$\frac{\partial P_t}{\partial t} = \alpha(y - y^*)g \quad (1)$$

where  $\frac{\partial P_t}{\partial t}$  is the change of pollution which is a function of the level ( $y$ ) and rate of growth ( $g$ ) of GDP per capita.  $y^*$  corresponds to the turning point of the Kuznets curve; if  $\alpha$  is negative, pollution rises until it reaches  $y^*$  and declines after. In order to measure the impact of rule of law, the author represents the turning point  $y^*$  as a function of the degree of rule of law:

$$y^* = \delta_1 + \delta_2 Rol \quad (2)$$

Where  $Rol$  is the degree of rule of law. By combining equations (1) and (2), Castiglione obtains the following equation:

$$P_t = \mu + \alpha(y - (\delta_1 + \delta_2 Rol))gt \quad (3)$$

Hence, applying equation (3) to the data collected, the author found a negative correlation between a higher degree of rule of law and pollution. Furthermore, rule of law appears to be negatively correlated to deforestation. Stronger rule of law leads to a reduction in the rate of deforestation. Appealing to the EKC, an initial rising income leads deforestation increase, until it reaches the turning point and deforestation rate starts declining (Culas 2006).

## **1.2 Political and economic freedom**

Political and economic freedom are held to be interdependent, one requiring the other. Economic freedom primarily presupposes political freedom, without which it cannot be pursued. For instance, property rights enforcement is essential for market freedom.

Political freedom is defined as political participation and action freed from any constraint on speech, press or assembly, enabling free elections and selection of the government. It encompasses political rights and civil liberties. Meanwhile, economic freedom refers to the free exchange, production and consumption of goods and services in the market. Individuals are free to access the market, to compete, cooperate and to control their own labour and property without any form of coercion.

### **1.2.1 Civil and Political Rights**

Civil and political rights are legal claims that protect and ensure individuals' basic freedoms. The former entails liberties freed from any kind of oppression, such as freedom of speech, assembly, religion or association; and the protection from discrimination based on ethnicity, religion or gender. They guarantee the basic rights of the individual. The latter mainly involves those rights inherent in political participation, namely right to vote, to petition or to assemble, enabling citizens to control society administration and its nature of law.

Civil and political liberties imply greater environmental quality, as the possibility of information, petition and association renders citizens more aware of the environmental crisis and thus empowers them to affect the political choices of the government. There is an increasing body of literature regarding the relationship between civil and political rights and the environment which has proven to be statistically significant. Using the indices provided by the Freedom House, Barrett and Gaddy (2000) estimated the effect of constraints on the freedom of assembly, demonstration, organisation, debate and the press on sulphur dioxide, smoke, heavy particles, dissolved oxygen, nitrates and faecal coliforms. The results obtained suggest that freedom is negatively correlated with pollution. Moreover, Torrance and Boyce (1998) found civil rights to be predictors of environmental damage in low-income countries. They evaluated their impact on environmental quality by measuring it on seven different pollution variables, namely sulphur dioxide, smoke, heavy particles, dissolved oxygen, faecal coliform, safe water and sanitation. For each of the seven variables it was estimated the following equation:

$$POL = \alpha + \beta_1 Y + \beta_2 Y^2 + \beta_3 Y^3 + \delta_1 GINI + \delta_2 LIT + \delta_3 RIGHTS + \gamma_i Z_i + \mu \quad (4)$$

Where POL is the variable tested, Y the income, GINI the coefficient of income inequality, LIT the literacy rate and RIGHTS political rights and civil liberties. Following this equation, political and civil rights were found to have statistically significant negative effects on five out of the seven variables tested.

One kind of civil rights that has been extensively studied concerning its relation with the environment is private property right. It refers to the legal ownership of a good, service or resource. It promotes investment and specialisation, thus leading to economic growth. Its impact on the environment has been subject of numerous researches. Insecure property rights have been observed to result in higher rates of deforestation, as they often derive from the inability to enforce ownership, usually as a consequence of government instability and lack of accountability (Deacon 1994). Using deforestation as the environmental damage variable in the EKC, Culas (2006) detected a downshift of the curve taking into account property rights' impact. This evaluation suggests that the guarantee of secure property rights for forests may decline citizens' pressure on it. Panatoyou (1997) as well demonstrated how the provision of property rights may contribute to the flattening of the ECK.

### 1.2.2 Trade Openness

Trade openness can be measured through the sum of a country's imports and exports measured as a share of the country's national income and is a proxy for the lack of barriers to international trade. It entails the buying and selling of goods and services across countries, enabling international financial flows and capital movements. During the 1980s many Latin-American countries embraced the Washington consensus, a series of political economic reforms centred on outward-oriented trading policies in order to achieve economic growth.

This set of policies promoting free trade among developing countries has been harshly condemned by environmentalists for the environmental damage it led to. The complex dynamics between trade and the environment has been explored by several scholars, with the emergence of two opposite points of view.

Birdsall and Wheeler (1992) believe in a win-win situation, where trade is actually beneficial to the environment, since it fosters economic growth and, therefore, GDP per capita, rapidly reaching the turning point of the EKC. In the short run countries implementing open trading policies should become dirtier, but in the long run they should become cleaner. Besides, free trade provides incentives to invest in new technology and cleaner production processes, eventually mitigating climate change. Furthermore, developing countries with weak environmental regulation in order to trade with developed countries, should engage in cleaner production processes to meet the higher environmental standards of the latter. Moreover, a consequence of trade liberalisation is the expansion of multinational companies, international corporations conducting business activities among the world. Data suggest that multinationals firms adopt the same environmental standards in every country they operate. Thus, since pollution regulations of multinational corporations are presumed to be higher than those of developing countries, free trade should imply less pollution in the latter. Additionally, population is one of the major sources of pollution. Wealthy countries normally have low birth rates, hence in the long run countries who develop more pollute less.

According to Suri and Chapman (1998), there is an inevitable trade-off between open trade and the environment. Free trade means that the consumption of commodities in a country derive from the

production of such commodities in another country. Developed countries with stricter environmental standards simply displace the production of goods they consume in countries with weaker pollution regulation. Thusly, OECD countries, benefiting from the import of goods, experience a downslope of the EKC. Meanwhile, the dislocation of heavy industries in developing countries, lacking rigid environmental rules, implies greater shares of pollution and, hence, an increase in the EKC slope. Therefore, open trade may entail poor countries being worsen off for the benefit of the more industrialised ones. Moreover, collecting data from 33 countries during a time-period of circa 20 years (from 1971 to 1991 or 1992), Suri and Chapman (1998) estimated that the impact of open trade on the EKC would raise the turning point for energy consumption to approximately \$224000, a level likely unattainable by any country.

As suggested by Baumol and Oates, poor countries adopting low environmental standards in order to enable their economic growth, willingly become the world's deposit for dirty industries.

### **1.3 Corruption**

Corruption is defined as public officials' illegitimate enrichment of themselves through the abuse of their power. It may entail the misuse of public money, the demand for money in exchange of a favour, or lack of transparency. Public resources become private gains. By prioritising private interests over the public good, it enhances political instability and social conflict. It threatens the economic status of a country, as it hinders government expenditure, foreign and local investment and, therefore, economic growth. As corruption often implies an inefficient use of resources, it may contribute to the environmental deterioration.

Past literature has identified corruption's direct and indirect effects on pollution. The former encompasses weak environmental standards, the latter the impact on income per capita and on pollution. Higher corruption implies weaker rule of law, and, thus, the absence of adequate environmental laws and their efficient implementation. Besides, it influences the turning point of the EKC.

López and Mitra (2000) found that, despite its negative impact on the environment, corruption does not preclude the inverted-U-shaped relationship between pollution and income. However, it shifts the curve upwards and on the right, since the reaching point is achieved at an income and pollution levels

well above the social optimum. As it is illustrated in the graph (fig. 3), the B curve, which represents the EKC of a corrupted country, has higher levels of income ( $x$ ) and pollution ( $t$ ) than those of curve A, equivalent to social optimal equilibrium of the EKC, respectively  $x^*$  and  $t^*$ .

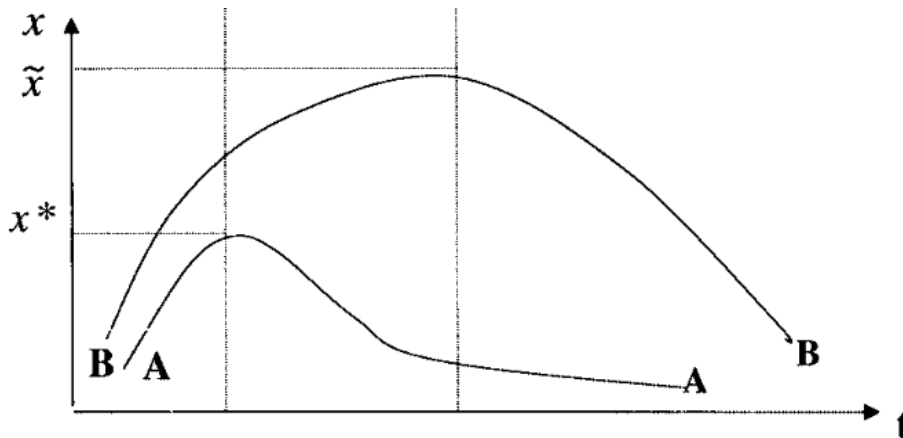


Fig. 3. The EKC with corruption. Source: Lopez and Mitra (2000)

A country's degree of corruption is positive correlated to the level of GDP per capita of the turning point. The greater is the corruption, the higher is the turning point.

Corruption causes environmental damage through several ways, as for instance, the implementation of policies under the pressure of carbon fuels firms, bureaucrats acting for their private gain or biodiversity loss because of the lack of monitoring on illegal deforestation and fishing.

Callister (2002) provides evidence of corruption's effect on forest conservation. A study report in 2003 claimed Indonesia's deforestation rate to be a consequence of the country's extremely high corruption levels. Fredriksson and Svensson (2003) illustrated that more corruption eases environmental standards, as political instability rises. Liao et al. (2017) showed that anti-corruption lessens  $\text{SO}_2$  emissions. Welsh (2004) and Leitao (2010) found that rent-seeking activities increase respectively  $\text{CO}_2$  and  $\text{SO}_2$  emissions.

Moreover, corruption leads to the so-called environmental crimes which have been globally acknowledged and classified in illegal trade of endangered species, illicit logging, illegal fishing, trade in hazardous waste and trafficking of ozone depleting resources.

## **CHAPTER II**

### **ENVIRONMENTAL POLICY**

To evaluate a country's environmental performance this thesis examines its environmental commitment, that is its environmental policy. The latter entails all those regulatory and non-regulatory devices implemented to manage human impact on the environment. It aims to reduce harmful effects on the ecosystem, by building a harmonious relationship between politics, economics, society and the environment. In fact, in order to achieve sustainable development, an environmental perspective should be integrated in all layers of society. It refers to the commitment of a state to the protection and conservation of its biodiversity and ecosystem. In this study, it is analysed on the basis of environmental regulation, market instruments and international treaties and agreements.

#### **2.1 Environmental Regulation**

Environmental regulation has assumed several forms with the involvement of both government and non-government actors. Its birth dates back to the 1970s, after the publication of the *Limits to Growth* report in 1972, which warned about the environmental consequences of economic and population growth. It led to the formation of new policies and ad hoc specialised bodies in the protection of the environment by governments in western countries, such as the Environmental Protection Agency (EPA) in the US, the launch of the Victorian Environment Protection Act in 1972, and the first European environmental policy in 1972. The approach adopted was centralist, with the state being the major actor. Environmental legislation primarily entailed establishing strict standards and targets to limit environmentally harmful activities under the so-called 'command and control' mechanism. This mechanism consisted of setting certain maximum limits of pollution (command) and punishing any eventual transgression of such targets (control). It involved the release of licences and permits to companies which were enabled to pollute to socially acceptable level. In the 1980s, following the rise



of neoliberalism, the previous interventionist perspective was replaced by a more flexible and cooperative method hinged on market-based instruments. Criticism of the ‘command and control’ mechanism for being too rigid and expensive for business enterprises, endorsed by the neoliberal free-market ideology, enabled industries to pressure governments to adopt softer environmental regulations. The embedded economic instruments in the political structure turned the design of environmental laws into a process of privatisation and deregulation (Holley 2017). However, the substitution of direct regulation for light policy initiatives had limited impact on the protection of the ecosystem. In fact, as explained by Gunningham and Holley (2010), “such standards have the considerable attractions of providing flexibility to enterprises, but, in the absence of more coercive intervention by the state, their impact has for the most part been very modest” (Gunningham, Holley 2010: 5). Increasing environmental degradation led once again to the search for a new method in the late 1990s. The design of environmental laws is now based on a polycentric governance, with the private sector and civil society among the major players. Environmental regulation has therefore become the result of a deliberative process based on dialogue, cooperation and participation. The interplay between private and public is held to be more successful and able to provide a real solution to the increasing complexity of climate change. Thus, this new system comprises factors not necessarily related to the government and the state; it may be influenced by companies’ or non-governmental organisations’ interests and decisions. It is founded on the concept of the so-called ‘smart regulation’, which is built on the assumption that multiple actors and multiple instruments are more efficient than a single actor and instrument (Gunningham and Holley 2010). This plurality is presumed to ensure a successful combination of complementary actions and ideas from elements of civil society or the market sector. However, ‘smart regulation’ still envisages governments as the main actors in the legislation of environmental laws. Over the years, environmental regulation has developed in various forms and involved different actors, from the government to civil society and private firms.

Past literature and empirical evidence suggest that environmental regulation is conditioned by the three variables discussed in chapter one.

Democratic governance is held to be positively correlated with the stringency of environmental regulation; it generally implies stricter environmental standards. Congleton (1992), through the

comparison of the effect of democratic and authoritarian models on environmental regulation, detected that “authoritarian regimes are inclined to enact less stringent environmental standards than democratic regimes” (Congleton 1992: 421). Starting from the assumption that both types of governance aim at maximising the welfare of the individual, the author, through the utility function and the correspondent indifference curve, measured the preferences of the decision maker, i.e., the median voter in a democratic regime and the dictator in an authoritarian one. The utility function is computed on the basis of real income (GNP) and environmental quality. The marginal cost of environmental regulation may rise as private wealth rises. Hence, as illustrated in figure 4, since a dictator is assumed to be healthier than an average democratic citizen, the authoritarian chooses a higher level of income and less severe environmental standards than the median voter. Furthermore, given the precarious nature of their power, authoritarian governments are less risk adverse than democratic ones. As environmental regulation may be considered a kind of insurance against environmental deterioration, democratic regimes are more likely to adopt higher environmental standards.

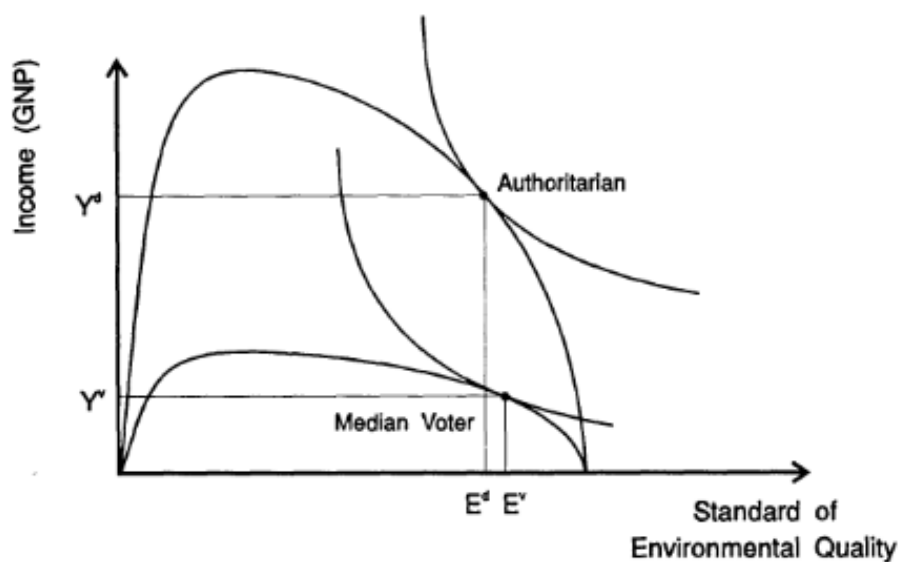


Fig. 4. Utility maximizing environmental regulations for dictator and media voter. Source: Congleton (1992)

Moreover, concerning economic freedom’s impact on environmental laws, trade liberalisation and regulation are considered to be at odds with each other. In fact, the ideology underpinning the free-

market refuses government intervention, which is perceived as the primary hindrance to economic growth. This general refusal entails also environmental regulation. Rapsikevicius et al. (2021) argue that economic and political freedom empower third parties to pressure the government to reduce environmental standards, which implies a weaker and softer environmental regulation. However, it could be argued that political freedom actually contributes to the implementation of strict environmental rules, as it allows environmental movements to influence the decision-making process.

Finally, with regards to its relationship with corruption, the latter appears to be negatively correlated with environmental regulation's stringency. The more a country is corrupted, the less stringent is its environmental regulation. Fredriksson et al. (2003), using the corruption index calculated by the ICRG (International Country Risk Guide) as a measure of corruption and the ENVLPOLICY indicator developed from the index prepared by the 1992 United Nations Conference on Environment and Development as a measure of regulation, and applying the relationship between the two measures to 63 countries, found that a high rate of corruption in a politically stable country results in weaker environmental laws. However, this negative correlation between corruption and environmental regulation declines as political instability increases. The study conducted by Fredriksson et al. (2004) seems to confirm this hypothesis. In fact, by drawing on data collected from the time-period 1982 to 1996 on OECD countries, it showed that corruption has negative effects on the design and subsequent implementation of environmental laws. Moreover, Damania et al. (2003) analysed the statistical association between trade liberalisation and corruption and its impact on the stringency of environmental laws. Apparently, open trading policies' effect on environmental regulation is conditional on the level of corruption. Through a regression analysis drawn from a panel data from 48 countries (both developed and underdeveloped), it emerged that trade liberalisation in highly corrupted countries entails stricter environmental standards. However, in countries with transparent and honest governments the correlation between open trade and environmental regulation is inverted. Trade liberalisation implies softer environmental rules.

## **2.2 Market Instruments**

Market-based instruments (MBIs) are policy devices designed to affect the behaviour of consumers and producers in order to foster an eco-friendlier use of resources and a reduction of pollutant emissions. Their substantial function is to counterbalance the hidden costs of commodities'

production and consumption, which are frequently absorbed by people not involved neither in the production nor in the consumption processes. They are implemented to correct environmental externalities. The latter entails that pollution costs are not incurred by the polluters, which implies that the social cost exceeds the private ones. They determine the right price that captures the pollution damage for resources which are not properly priced in the market (Polluter Pays' Principle).

The European Environmental Agency (EEA) identifies five types of MBIs: environmental taxes, environmental charges, tradable permits, environmental subsidies and incentives and liability and compensation scheme. The subsequent sections analyse environmental taxes, market permits and environmental subsidies.

### **2.2.1 Environmental Taxes**

The term environmental tax is in itself very broad, making it difficult to define. To date there is no universally recognised definition. However, current literature often relies on the one of Eurostat (2001), pursuant to which an environmental tax is “a tax whose tax base is a physical unit of something that has a proven, specific negative impact on the environment” (Eurostat 2001: 9). This approach ignores the purpose behind the tax's design, it refers exclusively to the outcome of it.

Environmental taxes are one of the most widely employed market-based instruments for climate issues. They are regarded as price-based instrument, as they are applied to enhance behavioural changes by altering prices in existing markets. The tax rate is set so that it absorbs environmental externalities into the price. They incorporate the 'polluter pays' principle (PPP) which ensures that the environmental cost is at least partially internalised by polluters. There are three kinds of environmental taxation: energy taxes, transport taxes and taxes on pollution and resources. Since the 1980s their use has grown remarkably, especially in the 1990s in Europe.

To the best of my knowledge there is missing literature at the moment on the impact of governance, political or economic freedom and corruption on environmental taxation. The most relevant study on the subject is the research conducted by Davidovic et al. (2019) on the relationship between the quality of government and people's willingness to pay environmental taxes. Quality of government was estimated using the International Country Risk Guide (ICRG) index composed of the three measures of 'corruption', 'law and order' and 'bureaucracy quality'. As illustrated in fig. 5, Davidovic

et al. found a positive correlation between public support for environmental taxes and government's quality. Environmental concern and left ideology appeared unsurprisingly to positively affect public willingness to pay environmental taxes, since leftists are generally more favourable to state intervention and regulation than their rightist counterparts, who rather prefer a minimalist state that does not interfere with the free market. The effect resulted to be stronger in countries with a high-level government quality.

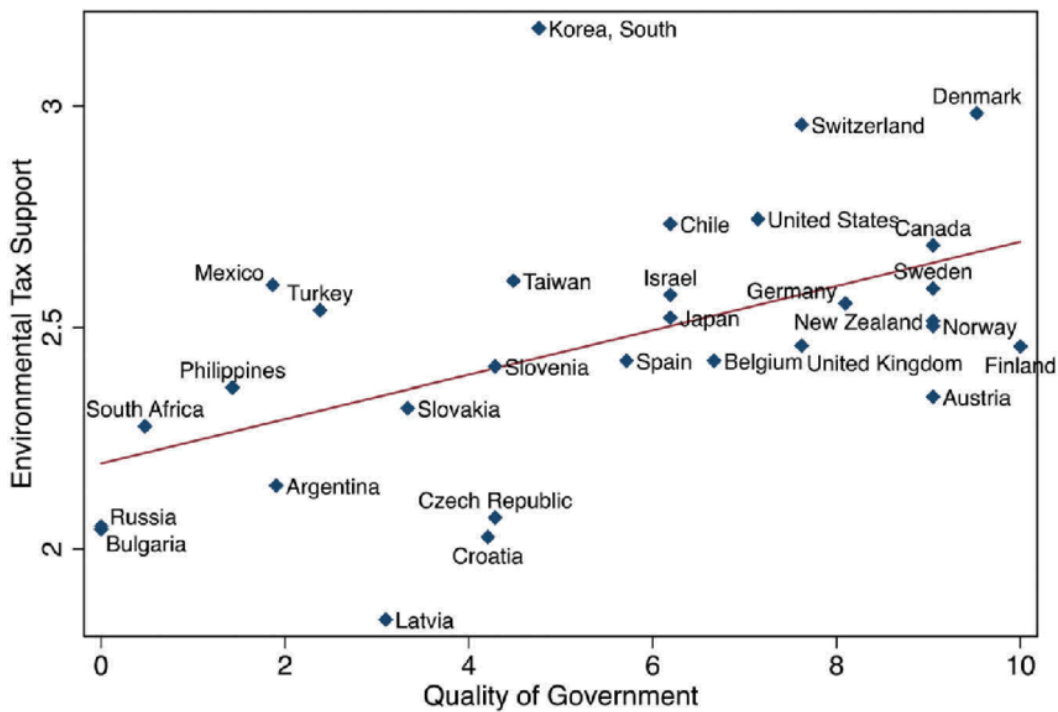


Fig. 5. Correlation between environmental tax support and quality of government. Source: Davidovic et al. (2019).

### 2.2.2 Market Permits

Market permits are quantity-based instruments that determine the access to resources and pollution levels, and then allocate them to a limited number of actors within the industry sector in form of licences. They are issued in order to reduce emissions, by allowing a certain amount of pollution under a fixed limit. The overall number of licences issued correspond to the total level of emissions

permitted by the industry. In this way, firms are encouraged to employ new innovative technologies that are more eco-efficient. Additionally, companies that manage to pollute less than what the licence allows can sell the surplus to other firms that exceed the level set by the permit. The permit limit may be established on the basis of either absolute or relative values. The idea of market permits was first promoted in the 1960s by the economists Dale and Crocker, who claimed the need for an international permit market to reduce carbon emissions.

According to the information I have, there is no current literature on the relationship between market permits and governance, economic and political freedom and corruption.

### **2.2.3 Environmental Subsidies**

Environmental subsidies are price-based instruments used by governments to motivate a more environmentally sustainable behaviour. They have been defined by the OECD as “any measure that keeps prices for consumers below market levels, or for producers above market levels, or that reduces costs for consumers and producers” (OECD 1998). Environmental subsidies are financial aid as a means to stimulate behavioural change and to mitigate the expenses of compliance with environmental regulations. Thus, they are also implemented to promote green investments, as they alleviate the risks of investing in new ecological technologies. They may assume the form of grants, loans, transfers of funds or tax exemptions. The European Environmental Agency outlines the market areas where subsidies are most applied, namely agriculture, energy, fisheries, industry and transport sectors.

To my knowledge, also with regards to the effects of governance, economic and political freedom and corruption on environmental subsidies, there is no current literature on the subject.

### **2.3 International Treaties and Agreements**

An international treaty is one of the main sources of international law. It consists of a formal and legal commitment between two or more states to govern relations between them. Other terms, such as agreement, pact, or convention, are also used in common usage. Over the past decades, they have been a consistent device needed to address issues of a transnational nature. As environmental problems are international by nature, they require cooperation and intergovernmental management of

natural resources, opening the door for international environmental treaties. International environmental treaties are defined as “legally binding agreements between individual nation-states to control transboundary pollution or to govern transboundary resources” (Wangler, Altamirano Cabrera, Waikard 2011: 300).

Following the publication of the *Limits to Growth* report in 1972, there has been a growing tendency over the years to resort to international agreements in order to mitigate the environmental damage caused by continuing population and economic growth. The report illustrated the consequences of expanding human pressure on the planet and the inevitable collapse of the latter. The new awareness generated by the report prompted a series of events that underlined the urgent need to create an international alliance to monitor the evolution of the environment. The first of these is the 1972 United Nations Conference on the Environment in Stockholm, where the Stockholm Declaration and Action Plan for the Human Environment were adopted. It led to the creation of the United Nations Environment Programme (UNEP). A few years later, in 1979, the World Climate Conference took place in Geneva, initiating international cooperation in scientific climate research. 1988 saw the birth of the Intergovernmental Panel on Climate Change (IPCC), a UN body providing governments with regular reports evaluating the current state of climate change. In 1992, the well-known United Nations Conference on Environment and Development (UNCED), also known as Rio Earth Summit, was held, with the inclusion among its participants of civil society and numerous non-governmental organisations. Within the summit it was signed the United Nations Framework Convention on Climate Change (UNFCCC), an international environmental treaty with the scope of stabilising greenhouse gas (GHG) emissions in the atmosphere. Its supreme decision-making body is the Conference of Parties (COP), which gathers the states that have ratified the convention. It is supposed to meet every year and its main task is to assess the progresses made and the effects of the measures taken. During a Conference of the Parties held in Kyoto in 1997, the Kyoto protocol was adopted, an international legally binding instrument with the aim of reducing greenhouse emissions. The states who ratified it were required to quantitatively reduce their GHG emissions from their levels in 1990. The first phase, from 2008 to 2012, demanded a 5% decrease, the second, from 2013 to 2020, an 18% one. The protocol entered into force in 2005. However, the protocol received a high amount of criticism for measures deemed insufficient. Additionally, the adhering countries collectively accounted for only 12% of global emissions. The major gas consumers did not take part. A

fundamental step was then the Paris Agreement in 2015, an international treaty on climate change designed to hold the global temperature rise below two degrees above pre-industrial levels. The 2021 United Nations Climate Change Conference (COP26) held in Glasgow, given the growing threat of climate change, proposed more ambitious targets, including halving emissions in the next decade and zero net carbon emissions by 2050.

According to past literature, democracies are more likely to show higher international environmental commitment, they are held to sign and ratify more multilateral environmental agreements (MEAs) and to better comply with international requirements than autocracies. Congleton (1992) holds that an international agreement requires each party to make two main decisions. First, they must decide whether to adhere to the provisions (e.g., reduce carbon dioxide emissions) of the treaty, which implies signing and ratifying it. The second choice consists of selecting the degree of compliance on the basis of several factors, “each nation must determine its actual level of provision in light of its ratification agreement status, strategic considerations, endowments, and opportunity costs” (Congleton 1992: 421). The second decision entails evaluating a country’s environmental assets that would benefit from the international alliance. The author argues that a national government in a democratic country, in light of the next elections, would benefit from a reputation of environmental protection, and would therefore be more prone to engage in an international environmental agreement. Neumayer (2002) provided statistical evidence that support the hypothesis that democracies exhibit stronger international environmental commitment than non-democracies. To test the hypothesis the author estimated the correlation between democracy and environmental commitment. To evaluate the former, he combined four different proxies: the ‘Polity Project’ index of democracy and autocracy, the ‘Freedom House’ index of political rights and civil liberties, the Vanhanen’s index of democracy<sup>1</sup> and the ‘World Bank’ governance indicator of voice and accountability. A variety of measure was used for the environmental commitment variable: the ratification of multilateral environmental treaties, participation to international environmental organisations, the proportion of a country’s protected land, the presence of a National Council on Sustainable Development in a state, qualitative

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<sup>1</sup> A measure of democracy based on the degree of electoral competition and political participation



and quantitative information regarding a country's environment. The correlation between democratic governance and multilateral environmental cooperation was found to be positive.

Economic freedom and environmental conservation are frequently alleged to be incompatible. Membership of multilateral environmental agreements often entails serious economic costs in order to meet environmental goals. Nevertheless, conflicting views have arisen concerning the impact of the free market on participation in international environmental agreements. It can be argued that since international environmental agreements often involve restrictive measures on free trade and, therefore, open trade countries are more concerned, the latter are more inclined to negotiate in order to exert influence on the measures taken (Neumayer 2002). Contrarily, others suggest that trade interests may inhibit rather than stimulate multilateral environmental cooperation if it implies trade restriction measures that will significantly harm a country's economic prospects (Esty and Geradin 1997). Neumayer (2002) computed the consequences of free trade on international environmental alliance. The dependent variable (environmental commitment) was estimated on the basis of participation to six MEAs, namely the Kyoto Protocol, The Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam Convention), the Cartagena Protocol on Biosafety to the Convention on Biological Diversity, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Montreal Protocol and the Convention on Biological Diversity (CBD). For the independent variable of interest (open trade) a wide range of measures was used: membership of the World Trade Organisation (WTO), the natural log of exports and imports divided by GDP, the Fraser Institute index of trade openness<sup>2</sup> and the Heritage Foundation index of trade openness<sup>3</sup>. Membership of WTO has been identified as the most statistically significant variable (it had strong statistical effect on four out of the six MEAs). The Cartagena Protocol on Biosafety and the Rotterdam Convention are respectively 30% and 26% more likely to be signed by WTO members than non-members. Meanwhile, import openness was found to be non-significant for participation to four MEAs and negatively influent for the remaining two.

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<sup>2</sup> A composite measure of international trade taxes expressed as a percentage of exports plus imports, the difference between the official and black-market exchange rates, the trade sector's size versus the expected size, and citizens' ability to enact capital transactions with foreigners. It varies from 0 (least trade open) to 10 (most trade open).

<sup>3</sup> It evaluates a country's tariff barriers and rate. It ranges from 1 (most trade open) to 5 (least trade open).

With respect to corruption, the relationship between the latter and international environmental cooperation is unclear. Fredriksson et al. (2007) found that corruption increases environmental lobbies' ability to pressure governments to ratify MEAs. Data on Kyoto Protocol suggest that states with plenty of environmental lobby groups and a high corruption rate ratified the protocol earlier. This may be explained by the fact that the more a government is corrupted, the more it is receptive to lobbyists' requests. Furthermore, Altamirano-Cabrera et al. (2013) argue that there is a positive correlation between corruption and MEAs if the latter involve monetary transfers, which would eventually end in the hands of environmental interest groups.

### **CHAPTER III**

#### **ENVIRONMENTAL QUALITY – RECENT TRENDS**

In this chapter, as a second indicator of a country's environmental performance, environmental quality is studied. In economic terms environmental quality is deemed as a public good<sup>4</sup>. It provides us with a wide range of natural resources, food, clean air, clean water, biodiversity protection and mitigation of pollution. It improves our welfare through the supply of the so-called ecosystem services - the essentials for our survival. However, since the industrial revolution and, especially, the second post-war period, the exploitation of the environment and its natural resources has undergone an exponential increase that has severely damaged its capability to provide the latter services. Climate change, polluted water, poor air quality, food's scarcity, land degradation and chemical pollutants have all been induced by such alterations. Pollution entails the irreversible disruption of the natural conditions of the biosphere and its components, which enhances environmental degradation. It may assume several forms: the rising water level, the depletion of the ozone layer, the melting of glaciers, the greenhouse effect, the emergence of acid rain and the widespread contamination of the land. Hence, governments are required to find a balance between human activities and the exploitation of the environment to ensure the life support function of the latter.

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<sup>4</sup> It refers to a commodity or service which is accessible to everyone and, if used by one person, does not prevent its availability to others. It is defined by its non-excludability and non-rivalry.

To examine environmental quality this dissertation addresses four main environmental trends, namely greenhouse gas emissions, deforestation rate, land degradation and the percentage of polluted air and water.

### **3.1 Greenhouse gases**

Greenhouse gases are gases whose molecules hold at least three atoms. They cause the greenhouse effect, by absorbing infrared radiation. They are one of the main causes of climate change, as they retain heat in the atmosphere, warming the earth. Their permanence in the atmosphere may vary from a few years to thousands of years. Over the last two centuries their concentration in the atmosphere has drastically grown, reaching unprecedented levels, as a consequence of increasing human activities. The main types of greenhouse gas are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF<sub>6</sub>) and nitrogen trifluoride (NF<sub>3</sub>). The first three are the most common ones. Carbon dioxide mainly derives from the combustion of fossil fuels and solid waste. Methane is primarily a result of fossil fuel production, organic waste and agricultural production. Nitrous oxide enters the atmosphere because of industrial activities, the burning of fossil fuels, land use and water waste. The chart in fig.6 illustrates the breakdown of total greenhouse gas emissions by sectors from 1990 to 2018. We can observe that energy and heat are the largest drivers of global GHG emissions, followed by transport, construction and agriculture sectors.

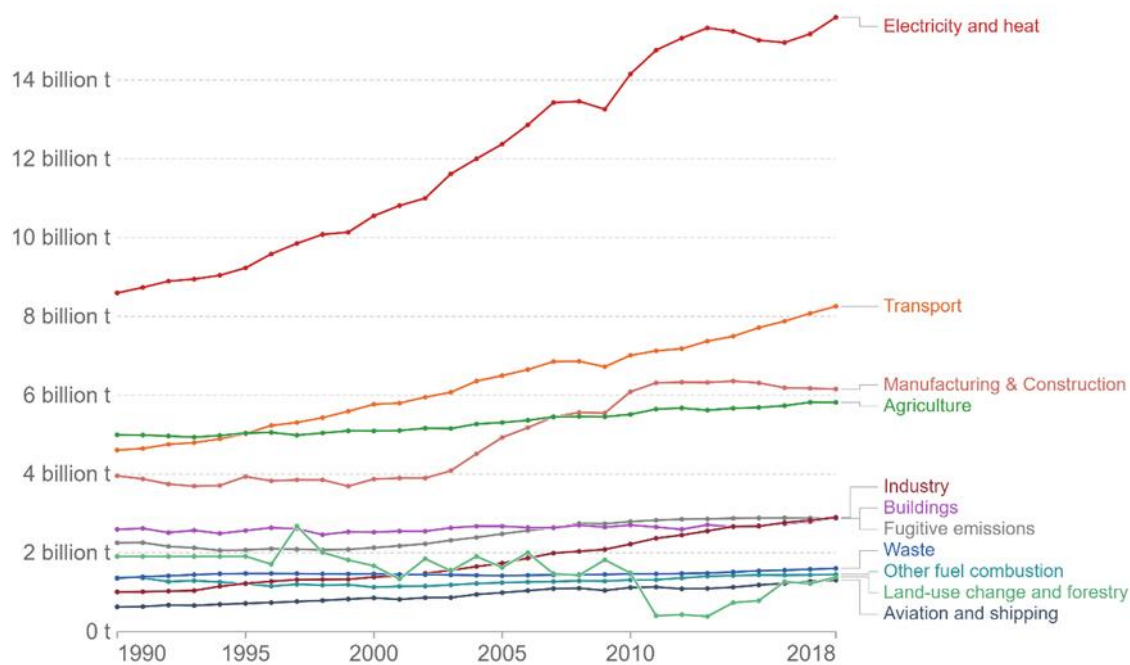


Fig. 6. Greenhouse gas emissions by sector measured in tonnes of CO<sub>2</sub>. Source: <https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions>

The nature of the relationship between a democratic governance and greenhouse gas emissions has been a debated issue among scholars. The two theories that emerged are antithetical: one regards democracy as a source of increasing greenhouse gas emissions, the other argues that democratic institutions reduce them. Through a panel data of 163 countries, Fredriksson et al. (2007) detected a negative correlation between democracies and carbon dioxide's emissions. Democracies achieve greater reductions in GHG emissions than autocracies, as they showed fewer CO<sub>2</sub> emissions per capita and per unit of GDP. Muttakin et al. (2022) argued that firms and corporations in a democratic country are more prone to collaborate to reduce GHG emissions. On the basis of a sample of 7993 firms from 37 countries, their thesis was matched by empirical evidence. A higher level of democracy implies an overall lower volume of GHG emissions. Li and Reuveny (2006) reported that democracies emit less carbon dioxide and nitrous oxide per capita than autocracies. Democracy's estimation referred to the Polity IV Project (Marshall and Jaggers 2010) democracy index, which varies from 10 (full democracy) to -10 (full autocracy). Following the conduction of cross-sectional analyses, it was found that one standard deviation increase above the mean in the Polity IV range caused CO<sub>2</sub> and N<sub>2</sub>O

emissions per capita to decline respectively by 0.47% and 14%. Moreover, relying on a sample of 108 countries in 1990, Gleditsch and Sverdrup (2003) suggested that the transition towards democracy lead to a reduction in carbon dioxide's emissions. Conversely to this line of thinking, a different branch of literature holds democracy and GHG emissions to be positively correlated. Using a sample of 98 countries, Midlarsky reported that a higher democracy level entails a larger amount of CO<sub>2</sub> emissions. Furthermore, Congleton (1992) sustained that democracies emit more methane in absolute terms but less per unit of GDP than their less democratic counterparts. Finally, Scruggs and Rivera (2008) found no empirical evidence that democratic regimes produce less GHG emissions than autocratic ones.

Past literature suggests that political and economic freedom may hinder greenhouse gases reductions. Joshi and Beck (2018) reported that political and economic freedom increase the slope of the EKC with carbon dioxide being the pollutant variable. Using a sample of 22 OECD countries and 87 non-OECD countries classified in free, partially free and not free, the authors investigated the impact of political and economic liberties on CO<sub>2</sub> emissions. They debunked the theory according to which carbon dioxide would undergo the inverted-U pattern of the EKC. In both developed and developing countries, political and economic freedom enhance carbon dioxide emissions and, thus, impede the inverse U-shaped EKC. Moreover, Carlsson and Lundstrom (2003), by drawing on data from 75 countries covering the timeframe between 1975 and 1995, tested the impact of political and economic freedom variables on carbon dioxide emissions and eventually found the effect to be statistically insignificant. The authors then argue that the insignificant effect of political freedom is probably due to the transboundary nature of CO<sub>2</sub> emissions which subjects them to the free-riding phenomenon by other countries. Finally, Murdoch et al. (1997), by relying on a data set from 25 European countries, held political freedom to be a source of increasing carbon dioxide's emissions.

Corruption and GHG emissions are positively correlated. Corruption weakens environmental standards and hampers their enforcement. Yet, its indirect effect on income's reduction may decrease GHG emissions. Welsh (2004), using a panel data set of 122 countries, found corruption's direct and indirect effect on N<sub>2</sub>O emissions to be respectively positive and negative. However, the direct effect outweighs the indirect one. Hence, overall corruption increases nitrous oxide's emissions. Contrarily, Cole (2007) on the basis of data from 94 countries in the timeframe 1987-2000, held that corruption's

negative indirect effect on CO<sub>2</sub> emissions exceeds its positive direct effect. Thus, according to this study, corruption reduces carbon dioxide's emissions.

### **3.2 Deforestation**

Deforestation is the process of clearing forested land. The last centuries witnessed a massive removal of trees substantially for agricultural and constructional purposes. The annual average of lost trees is estimated to be 15 billion. Massive deforestation has radically changed the world's landscapes. Approximately 2000 years ago 80 percent of Western Europe was covered by forests, compared to 34 percent today (EEA, European Environment Agency). Unrestrained deforestation has become one of the major drivers of climate change. In fact, forests are one of our most precious resources, as they provide biodiversity protection and clean air. The main issue with deforestation is its effect on the concentration of carbon dioxide in the atmosphere. Through photosynthesis trees absorb CO<sub>2</sub>; therefore, their removal entails a massive release of carbon dioxide and fewer trees to trap it, which results in increasing accumulations of the greenhouse gas in the atmosphere. Hence, deforestation implies biodiversity loss and carbon dioxide's emissions. Furthermore, soil erosion, desertification and flooding are all prevented by trees. Moreover, deforestation may cause plenty of societal issues, along with the extinction of indigenous cultures and an increase in rural violence.

The controversial interplay between democracy and deforestation is currently the focus of numerous scholarly debates. According to some, democracy induces lower rates of deforestation, while according to others, it not only fails to reduce deforestation, but even increases it. Buitenzorgy and Mol (2010) support both views, since they provided evidence of an EKC relation between deforestation and democracy. Deforestation rate, as the dependent variable, was measured on the basis of the average annual rate of forest cover change, namely the net change in the total forest area, in the time period between 1990 and 2000. The independent variable is the level of democracy, which was estimated using the Polity Project index ranging from +10 (full democracy) to -10 (full autocracy). As shown in fig. 7, it was found an inverted-U shaped curve between the two variables. The graph suggests that early stages of democracies experience high deforestation rates, which are then lowered after reaching a certain democracy level. Thus, deforestation rates are lower under an autocracy and a mature democracy, while the peak is reached under semi-democracies and transitional regimes. After the high rates in the initial phases, democracies experience relatively low

deforestation rates. However, Cary and Bekun (2021) replicated the data used by Buitenzorgy and Mol (2010) and created an updated data set covering the time frame from 1990 to 2000, including the valuation of democracy spill over effects. Taking into consideration the latter, no evidence was found for the EKC hypothesis between democracy and deforestation. Moreover, Li and Reuveny (2006) reported that a higher level of democracy reduces deforestation. Conversely, Midlarky (1998), on the basis of a sample of 77 countries within the time period from 1981 to 1990, found that democracy entails an increased percentage of annual deforestation.

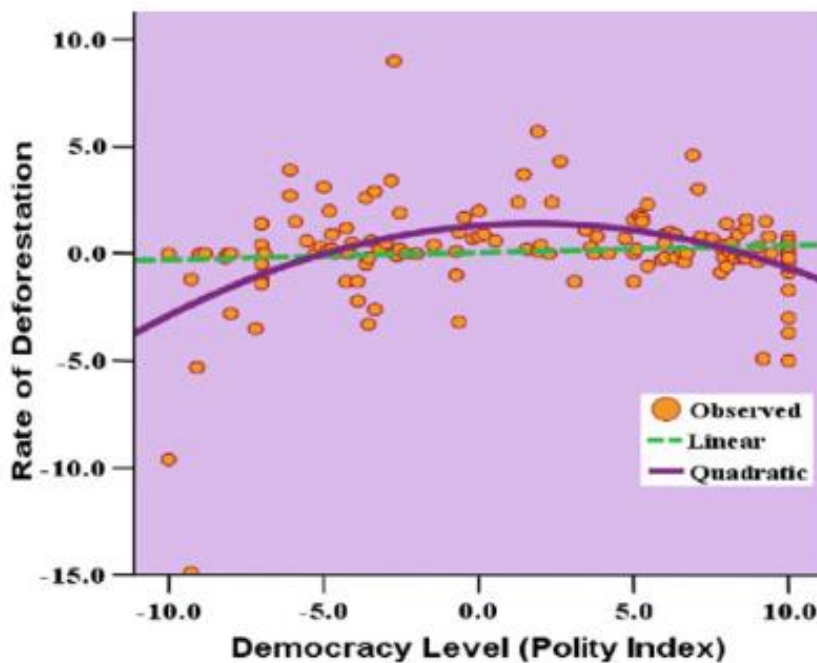


Fig. 7. Scatter plot and curve estimation of deforestation rate against level of democracy. Source: Buitenzorgy and Mol (2010).

Political and civil rights protection enhances major conservation of the forestland. Bhattarai and Hamming (2001), examining a cross-country data analysis of 66 countries spanning the period between 1972 and 1991, reported that political rights and civil liberties reduce annual deforestation rates. Moreover, numerous studies have been conducted especially on property rights' impact on deforestation. Deacon (1994) held that forestland is a form of capital asset, and argued that poorly enforced property rights expose it to human harmful activities. The data analysis of 129 countries in 1980 and 84 in 1985 supported his hypothesis, according to which insecure ownership results in

higher deforestation rates. Using a sample of 14 developing countries, Culas (2007) found that property rights' enforcement flattens the EKC for deforestation. Institutional improvements for secure property rights may reduce deforestation rates and increase forest conservation.

Corruption is held to be positively correlated with deforestation. Food and Agricultural Organisation (FAO) deems corruption as one of the major drivers of forest loss. Corruption may foster high deforestation rates, by facilitating illicit timbering, logging and trafficking of forest products. Koyuncu and Yilmaz (2009) examined the relationship between corruption and deforestation in 100 countries by using three distinct corruption indices - Corruption Perception Index (CPI), International Country Risk Guide index (ICRG) and Business Intelligence index (BI) - for three different time periods, namely 1980-1990, 1990-1995 and 1990-2000. The authors found a statistically strong positive correlation between the two variables for all indices and periods. Meyer et al. (2003), on the basis of cross-sectional analysis data of 117 countries, reported that corruption is one of the ultimate causes of deforestation. Furthermore, Wright et al. (2007) measured fire detections in 37 countries from 2002 to 2004 and found that corrupted countries are the least competent to manage fire frequency.

### **3.3 Land Degradation**

Land degradation is the loss or decline of soil's biological and economic productive capacity. It is strictly related to climate change and the loss of biodiversity. Land degradation entails the release of soil carbon and nitrous oxide into the atmosphere, providing a crucial source to global warming. It is caused by human-driven activities that abuse land's use, reducing its biodiversity, soil quality, value and general health. It has escalated in the last two centuries as a result of increasing agricultural production, urbanisation processes and intensive cultivation. FAO estimates that today it damages nearly 2 billion hectares and that every year 12 million hectares are degraded. Soil deterioration also poses serious socio-political problems. It may foster political instability, as it can lead to poverty, starvation and forced migration. As stated by Monique Barbut, the Executive Secretary of the UN Convention to Combat Desertification (UNCCD), "there is an intrinsic link between security and land – between hunger and conflict". Hence, land degradation constitutes a major threat not only to the environment, but equally to people's livelihood. For these reasons the UNCCD set the target of a land degradation-neutrality, an ideal condition where demand is met without further damaging limited land



resources. The UNCCD (decision 3/COP.12, UNCCD, 2015a) defines it as “a state whereby the amount and quality of land resources necessary to support ecosystem functions and services to enhance food security remain stable, or increase, within specified temporal and spatial scales and ecosystems.”

The impact of democracy on land degradation is subject to conflicting opinions. Li and Reuveny (2006), on the basis of a regression analysis from a sample of 105 countries, estimated that an increase in democracy reduces land degradation. Data were obtained from FAO index of land degradation, measured from water erosion (e.g., deformation, sedimentation), wind erosion (e.g., over blowing), physical degradation (e.g., compaction, crusting) and chemical deterioration (e.g., acidification, loss of nutrients). The study reported that democratic institutions exhibit lower levels of land degradation than their autocratic counterparts. Moreover, its findings suggested the existence of an EKC for land degradation, implying that democracies in their earlier stages may indirectly induce greater soil deterioration and then reduce it after having reached the threshold. Neumayer (2002), employing a cross-sectional analysis of 206 countries, reported that democracies protect a larger percentage of their land area. Differently, Midlarsky (1998), as illustrated before, showed that democracy is negatively correlated with environmental conservation. Democratic regimes appear to have positive effects also on soil erosion by water. However, no relation was found between democracy and soil erosion by chemicals and the percentage of protected land was found to rise with higher democracy levels. Finally, Scruggs and Rivera (2008), relying on a cross-sectional analysis of 169 countries, detected no difference in land degradation levels between democratic and non-democratic countries.

### **3.4 Air and Water Pollution**

The World Health Organization (WHO) defines air pollution as the “contamination of the indoor or outdoor environment by any chemical, physical or biological agent that modifies the natural characteristics of the atmosphere”. It entails the concentration of substances in the air that affect its quality. It is extremely detrimental for human health, as it can cause respiratory and other disease with mortality risk. The WHO estimates that 4.2 million people die each year due to exposure to polluted air. Air pollutants are generally distinguished between primary and secondary pollutants. The former include pollutants that are directly released into the atmosphere in their final form, while the latter are generated in the atmosphere as a result of chemical transformations or reactions of the

primary pollutants. Air pollution originates primarily from the industry and agriculture sectors, transports, which emits carbon monoxide, nitrogen oxide, unburnt and aromatic hydrocarbons, and artificial heating, that releases sulphur oxide, carbon and nitrogen oxides and heavy metals. Data from the Institute for Health Metrics and Evaluation (IHME) suggest that air pollution is more prevalent in low- and middle-income countries due to high indoor pollution rates because of their usage of solid fuels for cooking and high outdoor pollution levels during the industrialisation phase linked to shift from low- to middle-income status.

Water pollution consists of the release of toxic substances and energy into water bodies, altering their chemical, physical and biological characteristics. This involves the alteration of chemical and biological cycles that regulate ecological balances. It causes detrimental repercussions on water quality, its biological resources, wildlife and human health. The presence of pollutants in freshwater undermines its suitability for various basic human activities, such as bathing, drinking and cultivation. According to the *Global Burden of Disease* study (a collaborative research programme from the Institute for Health and Metrics Evaluation), in 2017 1.2 million deaths occurred prematurely as a result of unclean water. Due to the large quantity of contaminants, a complete depuration process appears rather difficult. The United Nations Environment Programme (UNEP) estimates that globally 80 percent of water waste remains untreated. The main pollutants in water bodies stem from domestic discharges, with a predominantly organic content, from toxic substances from industrial (hydrocarbons, dyes, acids...), urban and agricultural discharges (pesticides), and from nutrients, such as nitrates and phosphates, which can lead to eutrophication<sup>5</sup>.

Past literature suggests political freedom to be negatively correlated with both air and water pollution. Torras and Boyce (1998) measured civil liberties' impact on five distinct pollution variables, three atmospheric ones – sulphur oxide, smoke and heavy particles – and two water ones – dissolved oxygen and faecal coliform. Political freedoms were proved to be strong determinants of pollution levels, particularly in low-income countries. Greater political freedom implies less contaminants. Barrett and Graddy's study (2000) partially confirms these findings. Relying on the widely used

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<sup>5</sup> It refers to an excessively large supply of nutrients, particularly nitrates and phosphates, in a given aquatic environment, leading to an abnormal growth of phytoplankton which, by consuming oxygen, makes the environment unsuitable for other species.

Freedom House index for civil and political freedoms, they found air pollutants to be negatively correlated with liberties with the exception of sulphur oxide, whose level is the same for both low and medium politically free countries. Out of the 11 water pollution variables, five of them – cadmium, total coliforms, nitrates, and biological and chemical oxygen demand – resulted to increase with further freedom degree. Moreover, Murdoch et al. (1997), using a cross-country analysis, reported that civil liberties induce sulphur dioxide's reductions.

Corruption seems to increase both air and water pollution. Welsh (2004), analysing six indices of air and water pollution for 106 countries, estimated that the direct effect of corruption on pollution is unequivocally positive. One standard deviation rise in corruption was found to have a maximum overall effect of 0.3 standard deviations in N<sub>2</sub>O concentration in urban air and about 0.7 standard deviations in suspended solids in rivers. Corruption appeared to have an especially strong impact on air and water pollution in low-income countries. Ivanova (2011), relying on a cross-sectional analysis from 39 countries within the period between 1999 and 2003, detected that countries with lower corruption levels are more likely to emit less sulphur dioxide. As seen before concerning nitrous oxide's emissions, Cole (2007) reported that corruption is negatively correlated with sulphur dioxide's emissions. Even though corruption's direct effect on SO<sub>2</sub> is positive, its indirect effect is negative, which results in an overall negative impact.

## **CHAPTER IV**

### **EMPIRICAL EVIDENCE**

This chapter provides empirical evidence regarding the findings analysed in the previous chapters. It consists of examining the Far East according to the measurements used in the previously cited literature. This world region was chosen for the following two principal reasons: the variety of institutions and economic policies among the countries and the limited amount of research conducted on the relation between institutions and the environment on these territories.

The term Far East refers to the geographical area comprising East Asia, South-East Asia and Eastern Russia, namely Siberia. It became widespread under the British Empire's reign to denote, from a

Eurocentric perspective, any location east of British India. Additionally, the term, besides designating a geographical setting, conveys a cultural background distant from the European standards, which explains the exclusion of Australia and New Zealand, despite being further east from Europe in comparison to any other Asian country. The expression is in fact accused of Eurocentrism. Nowadays, the countries deemed as part of the Far East are Brunei, Cambodia, China, Indonesia, Japan, Laos, Malaysia, Mongolia, Myanmar, North Korea, Philippines, Singapore, South Korea, Taiwan, Thailand, Timor-Leste and Vietnam. Data on governance, political and economic freedom, corruption, environmental commitment and quality are reported for each of the countries mentioned above. It is worth mentioning that for research purposes North Korea has been excluded from the analysis, as its data may not be regarded as reliable.

The following table shows all the data collected from this research. The data displayed are from the year 2018 (the most recent data available for most variables) with the exception of the values relating to governance, for which the most recent available date is 2015, and participation in international environmental agreements. The table is structured as follows: the first column lists all the countries studied and each of the next eleven columns provides the values of the variables. The second column illustrates the governance level. To assess the extent of democratic or authoritarian governance of the countries, this study relies on the widely used Polity Project index, which depicts the autocracy-democracy spectrum by ranging from 10 (full democracy) to -10 (full autocracy). If the score is between -5 and 5, it indicates an anocracy, a combination of the two. The table shows the 2015 Polity Project score for each of the countries. China, Laos and Vietnam are classified as autocracies, Cambodia, Myanmar and Singapore as anocracies and Indonesia, Japan, Malaysia, Philippines, South Korea, Taiwan, Thailand and Timor-Leste as democracies. The third and fourth columns show respectively political and economic freedom, with Freedom House index and Heritage Foundation index being used as indices. The former entails the sum of political rights and civil liberties levels in a country, spanning from 0 (lack of political freedom) to 100 (absolute political freedom). The data displayed in the third column are from 2018. The latter provides the extent of economic freedom in a country from 0 (lack of economic freedom) to 100 (absolute economic freedom). The reported Heritage Foundation data are as well from 2018. According to the Freedom House 2018 data, China, Brunei, Cambodia, Laos, Thailand, Vietnam and Myanmar are not free, Malaysia, Indonesia, Philippines and Singapore partly free and Japan, South Korea, Mongolia, Taiwan and Timor-Leste

free. Meanwhile, the Heritage Foundation 2018 data hold Singapore to be free (80-100), Japan, Malaysia, South Korea, and Taiwan mostly free (70-79.9), Brunei, Indonesia, Philippines and Thailand moderately free (60-69.9), Cambodia, China, Laos, Mongolia, Myanmar and Vietnam mostly unfree (50-59.9) and Timor-Leste repressed (0-49.9). The fifth column reports the degree of corruption for each country determined according to the Transparency International's Corruption Perception Index (CPI) in 2018, which assigns a score on a scale from 0 (extremely corrupt) to 100 (very honest). Singapore and Japan appear to have the lowest corruption levels, while Cambodia, Laos and Vietnam the highest ones. The sixth column shows the share of total environmental tax revenue in comparison to countries' GDP in 2018. The data are taken from OECD. Japan and Mongolia result to have the highest percentages, respectively 1.32% and 1.82%. Meanwhile, Singapore and Thailand the lowest ones, respectively 0.25% and 0%. The seventh column presents the participation to International Environmental Treaties. The values reported correspond to the sum of selected international environmental agreements to which each country participated. The treaties taken into consideration are the Kyoto Protocol, the Rotterdam Convention (The Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade), the Cartagena Protocol (the Convention on Biological Diversity), the Montreal Convention and the Paris Agreement. It should be specified that I simply analysed the countries' membership without examining when they joined. The eighth column provides the CO<sub>2</sub> emissions per capita in metric tons in 2018, data are reported from the Climate Watch<sup>6</sup>. The countries with fewest emissions are the Philippines (2.15) and South Korea (2.15), while those with most emissions are Mongolia (17.58), Malaysia (12.18) and Brunei (23.64). The ninth column shows the percentage decrease in tree cover from 2000 to 2018, the values are taken from the Global Forest Watch<sup>7</sup>. Laos, Malaysia and Singapore faced the largest losses. The tenth column presents the share of land used for agriculture purposes in 2018; data are derived from Our world in data. Mongolia, China and Thailand show the largest shares, respectively 72.84, 56.08 and 43.28. The eleventh column reports the share of the population exposed to more than ten micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) of PM<sub>2.5</sub><sup>8</sup> in 2018. Data are taken from OECD statistics. Countries with a larger exposed population are China (49.3)

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<sup>6</sup> An open online platform that provides data on countries' environmental conditions.

<sup>7</sup> An open website that offers the latest data on forests' protection.

<sup>8</sup> It refers to all those particles with a dimension equal to or smaller than 2.5 microns, which are considered air pollutants. It is extremely harmful to the human health as it increases the risk of respiratory diseases.

and Mongolia (42.1). Finally, the twelfth column illustrates the metric tons of biochemical oxygen demand (BOD) per cubic km of water in 2018. Data are reported from Nation Master<sup>9</sup>. Among the data displayed, China and Laos appear to have the highest values of BOD.

Country	Governance <sup>10</sup>	Political Freedom <sup>11</sup>	Economic Freedom <sup>12</sup>	Corruption <sup>13</sup>	Environment at tax revenue compared to GDP, % <sup>14</sup>	Participation to International Agreements	CO <sub>2</sub> emissions per capita in metric tons <sup>15</sup>
Brunei	N.A.	28	64.2	63	N.A.	3	23.64
Cambodia	2	30	58.7	20	N.A.	4	4.33
China	-7	14	57.8	39	0.92	5	8.49
Indonesia	8	64	64.2	38	N.A.	5	6.32
Japan	10	96	72.3	73	1.32	5	9.27
Laos	-7	12	53.6	29	N.A.	4	5.56
Malaysia	6	45	74.5	47	0.76	5	12.18
Mongolia	10	85	55.7	37	1.82	5	17.58
Myanmar	-3	31	53.9	29	N.A.	3	4.47
Philippines	8	62	65.0	36	N.A.	5	2.15
Singapore	-2	52	88.8	85	0.25	4	11.80
South Korea	8	84	73.8	57	N.A.	3	2.15
Taiwan	10	93	76.6	63	N.A.	N.A.	N.A.
Thailand	7	31	67.1	36	0	5	6.07
Timor-Leste	7	69	48.1	35	N.A.	2	5.18
Vietnam	-7	20	53.1	33	0.85	5	4.05

% decrease in tree cover from 2000 to 2018 <sup>16</sup>	Share of land area for agriculture <sup>17</sup>	Share of population exposed to PM2.5 <sup>18</sup>	Metric tons of BOD emissions per cubic Km of water <sup>19</sup>
0.15	2.73	7.7	N.A.
1.3	31.53	22.3	N.A.
0.35	56.08	49.3	3.78
0.76	33.18	19.4	0.16
0.19	12.13	13.7	4.27
1.5	10.37	20.7	N.A.
1.5	26.09	16.4	0.4
0.23	72.84	42.1	N.A.
0.65	19.74	30.0	N.A.
0.38	41.72	18.7	0.69
1.5	0.93	18.7	N.A.
0.41	16.94	27.4	5.68
N.A.	N.A.	23.8	N.A.
0.67	43.28	27.4	N.A.
0.17	25.55	15.6	N.A.
1.4	39.25	20.04	N.A.

Table 1. Collected data on institutional quality and environmental performance.

Table 2 provides the correlation coefficient of each institutional quality variable with each environmental performance variable. The values have been estimated according to the data displayed in table 1. With the exception of environmental taxes and tree loss, governance's impact on environmental performance appears to be almost non-existent. It shows a very weak positive correlation with environmental taxes and a weak negative correlation with tree loss, the coefficient being equal to -0.54, which implies that a democratic governance reduces tree loss. Political freedom results to be weakly positively correlated with environmental taxes' revenue compared to GDP (0.59) and negatively with tree loss (-0.49). Hence, political freedom promotes environmental taxation and

<sup>9</sup> A website providing datasets concerning countries' profile in economics, geography and military.

<sup>10</sup> Source: Polity Project 2015

<sup>11</sup> Source: Freedom House 2018

<sup>12</sup> Source: Heritage Foundation 2018

<sup>13</sup> Corruption Perception Index 2018

<sup>14</sup> OECD 2018

<sup>15</sup> Climate watch 2018

<sup>16</sup> Global Forest Watch 2018

<sup>17</sup> Our World In Data 2018

<sup>18</sup> OECD 2018

<sup>19</sup> National Master 2018

inhibits tree loss. Concerning the other variables, the coefficient is too weak to suggest any kind of impact. Economic freedom has a negative impact on environmental taxes (-0.49) and land use (-0.42). It decreases the possibility of implementing environmental taxes and using land for agriculture purposes. It seems to have no correlation with the other variables. Finally, corruption is positively correlated with biochemical oxygen demand emissions (0.64) and CO<sub>2</sub> emissions (0.45), entailing that it enhances water pollution and GHG emissions (CO<sub>2</sub> and BOD are respectively a greenhouse gas and a water pollutant). Moreover, corruption and land use appear to be negatively correlated (-0.42), suggesting that the former reduces the latter.

Correlation coefficient	Environmental taxes	International Treaties	CO <sub>2</sub> emissions	Tree loss	Land use	PM2.5 exposure	BOD
Governance	0.31	0.05	0.17	-0.54	0.15	-0.24	-0.15
Political freedom	0.59	-0.02	0.03	-0.49	0.04	-0.11	0.29
Economic freedom	-0.49	0.20	0.19	0.21	-0.42	-0.26	0.17
Corruption	-0.15	-0.04	0.45	-0.11	-0.54	-0.33	0.64

Table 2. Correlation between institutional quality variables and environmental performance variables.

## CONCLUSION

This study sought to analyse the impact of the quality of institutions on the environment. To this end, a review of past literature examining the relationship between institutions and the environment was conducted, the key findings of which have been reported. This was then accompanied by a research on the interplay between institutions and the environment in Far Eastern countries in order to provide some empirical evidence.

Existing literature has shown that higher institutional quality is partially associated with better environmental performance. Indeed, democratic governance (as opposed to the authoritarian form of governance) usually entails a higher stringency of environmental regulation and a greater possibility of participation in international environmental agreements. Also, a high level of corruption is generally correlated with weak environmental standards. Thus, there is a general consensus among scholars that the quality of institutions leads to a higher environmental commitment. The same cannot be claimed for the link between institutional quality and environmental outcomes, for which the



findings are mixed. Regarding corruption, it is unanimously believed that it contributes to environmental degradation: corruption was found to be positively correlated with greenhouse gas emissions, deforestation and water and air pollution. The impact of democracies on environmental quality, on the other hand, seems to be controversial. Mixed opinions have emerged on its effect on greenhouse gas emissions, deforestation and land degradation, with some studies arguing for a positive impact, and others for a negative one. Political freedom, as well, was found to be partly beneficial (reduces deforestation and air and water pollution) and partly detrimental (increases greenhouse gas emissions) for the environment.

This analysis of the existing literature on the subject was complemented by an original research conducted on the relationship between institutions and the environment in Far Eastern countries. The quality of institutions was measured on the basis of the indicators used in the previously studied literature. All data collected refer to 2018 (with the exception of data on governance and participation in international treaties, which refer to respectively 2015 and 2022). To investigate the relationships between the variables, the correlation coefficient was calculated for each of them. Only correlations with a coefficient equal to or greater than 0.4 in absolute value were commented.

Data suggest that democracy is negatively correlated with tree loss; political freedom as well shows a negative correlation with tree loss, and a positive one with environmental taxes. Economic freedom is negatively associated to land use and environmental taxes. Finally, corruption exhibits a positive link with biological oxygen demand (BOD) and carbon dioxide (CO<sub>2</sub>), but a negative one with land use. Thus, overall, it appears that democracy and political freedom are beneficial for the environment, while corruption is detrimental, with the exception of land use.

However, it is important to note that the evidence provided relies on a simple bivariate correlation between two variables, without taking into account the possible role of third factors: more robust results would need a multivariate analysis, which goes beyond the scope of this study.

Finally, an interesting topic for further future research could be the relationship between institutional quality and environmental market instruments, on which literature is lacking.

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## LA QUALITÀ ISTITUZIONALE E L'AMBIENTE

Dalla seconda metà del XX secolo il mondo ha assistito a una crescita economica estremamente rapida, riducendo il numero di persone al di sotto della soglia di povertà, aumentando drasticamente il PIL pro capite, costruendo nuove infrastrutture, utilizzando e scoprendo nuove tecnologie. Tuttavia, questo boom economico è avvenuto a discapito della natura, provocando il degrado ambientale del pianeta e l'aumento delle temperature, principalmente a causa dell'intenso sfruttamento delle risorse naturali da parte dell'uomo. Questa situazione di emergenza ha reso quindi necessario l'intervento dei governi nazionali per prevenire e affrontare i rischi ambientali. La transizione verso un'economia e una società più sostenibili implica la predisposizione di linee guida e di un monitoraggio costante per garantirne l'efficacia, ritenuto compito delle istituzioni. L'obiettivo della presente tesi è analizzare il ruolo delle istituzioni e il loro eventuale impatto sulla politica e qualità ambientali di un Paese. Il ruolo delle istituzioni nella politica e nella qualità ambientale viene esaminato analizzando la letteratura esistente. A tale analisi è stata integrata una ricerca originale sul rapporto tra istituzioni e ambiente in 17 Paesi dell'Estremo Oriente. Per valutare la qualità istituzionale, sono esaminate le tre dimensioni della governance, della libertà politica ed economica e della corruzione. Come indicatori di politica ambientale sono usati l'implementazione di leggi e norme, la presenza di strumenti di mercato e la partecipazione a trattati internazionali relativi alla conservazione ambientale. Per quanto concerne la qualità ambientale, essa viene misurata utilizzando come variabili le emissioni dei gas serra, la deforestazione, il degrado del suolo e l'inquinamento dell'aria e dell'acqua.

La governance indica le procedure di selezione del governo e l'insieme delle norme che regolano una società. Riflette le relazioni tra le istituzioni politiche ed economiche e le loro caratteristiche. Sulla base di queste interazioni hanno luogo diverse forme di governance. Il Polity IV Project - un importante set di dati che copre i cambiamenti annuali e le principali caratteristiche dei regimi politici - identifica i tre tipi di governance più ricorrenti: autocrazia, democrazia e anocrazia. Sulla base del grado di competitività e livello di partecipazione politica, della scelta del governo e dei limiti al potere esecutivo, viene delineata una scala che varia da -10 (corrispondente alla piena autocrazia) a +10 (equivalente alla piena democrazia). La libertà politica e quella economica sono considerate interdipendenti tra loro, l'una presuppone l'altra. I diritti civili e politici sono rivendicazioni legali che proteggono e garantiscono le libertà fondamentali degli individui. La libertà politica viene

generalmente misurata secondo l'indice della Freedom House, che equivale alla somma dei livelli di diritti politici e libertà civili in un Paese, che variano da 0 (assenza di libertà politica) a 100 (libertà politica assoluta). La libertà di mercato può essere stimata attraverso la somma delle importazioni e delle esportazioni di un Paese, misurate come quota del reddito nazionale del Paese stesso, ed è un indicatore dell'assenza di barriere al commercio internazionale. Comporta l'acquisto e la vendita di beni e servizi da un Paese all'altro, consentendo flussi finanziari e movimenti di capitale internazionali. Tra gli indici di libertà economica più usati dagli studiosi figura l'Heritage Foundation, che indica il grado di libertà economica di un Paese da 0 (assenza di libertà economica) a 100 (libertà economica assoluta). La corruzione è definita come l'arricchimento illegittimo dei funzionari pubblici attraverso l'abuso del loro potere. Può comportare l'uso improprio di denaro pubblico, la richiesta di denaro in cambio di un favore o la mancanza di trasparenza. Le risorse pubbliche diventano guadagni privati. Gli indicatori maggiormente usati per stimare tale variabile sono il Corruption Perception Index (CPI) e il Business Intelligence Index (BI).

La letteratura esistente ha dimostrato che una maggiore qualità istituzionale è associata a migliori prestazioni ambientali a livello di politiche implementate. Una governance democratica (rispetto a una forma di governo autoritaria) comporta solitamente un maggior rigore nella regolamentazione ambientale e una maggiore possibilità di partecipazione agli accordi ambientali internazionali. Un alto livello di corruzione è generalmente correlato a standard ambientali inferiori. Pertanto, vi è un consenso generale tra gli studiosi sul fatto che la qualità delle istituzioni implichi un maggiore impegno ambientale a livello di policy. La medesima cosa non si può dire per il legame tra qualità istituzionale e quella ambientale, per cui i risultati sono contrastanti. Per quanto riguarda la corruzione, è opinione unanime che essa contribuisca al degrado ambientale: la corruzione è risultata essere correlata positivamente alle emissioni di gas serra, alla deforestazione e all'inquinamento delle acque e dell'aria. L'impatto delle democrazie sulla qualità ambientale, invece, sembra essere un argomento dibattuto. Sono emerse opinioni contrastanti sul suo effetto sulle emissioni di gas serra, sulla deforestazione e sul degrado del territorio, con alcuni studi che sostengono un impatto positivo e altri negativo. Anche la libertà politica è risultata essere in parte benefica (riduce la deforestazione e l'inquinamento dell'aria e dell'acqua) e in parte dannosa (aumenta le emissioni di gas serra) per l'ambiente.

Tali risultati coincidono parzialmente con quanto emerso dalla ricerca sui 17 paesi dell'Estremo Oriente. La qualità delle istituzioni è stata misurata sulla base degli indicatori utilizzati nella letteratura precedentemente studiata. Tutti i dati raccolti risalgono al 2018 (ad eccezione dei dati sulla governance e sulla partecipazione ai trattati internazionali, che risalgono rispettivamente al 2015 e al 2022). Per indagare le relazioni tra le variabili, è stato calcolato il coefficiente di correlazione per ciascuna di esse. Sono state esaminate solo le correlazioni con un coefficiente pari o superiore a 0,4 in valore assoluto.

I dati mostrano che la democrazia è correlata negativamente alla deforestazione; anche la libertà politica presenta una correlazione negativa con la deforestazione e una positiva con le tasse ambientali. La libertà economica è associata negativamente all'uso del suolo e alle tasse ambientali. Infine, la corruzione mostra un legame positivo con la domanda biochimica di ossigeno (BOD) e l'anidride carbonica (CO<sub>2</sub>), ma negativo con l'uso del suolo. Nel complesso, quindi, sembra che la democrazia e la libertà politica siano benefiche per l'ambiente, mentre la corruzione risulta essere dannosa, ad eccezione dell'uso del suolo.