CHARLES UNIVERSITY

FACULTY OF SOCIAL SCIENCES

Institute of Political Science

Department of International Relations

Master's Thesis

2023 **Susann Wilson**

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An analysis of the new importers of plastic waste after China's ban on imports in 2017.

Master's thesis

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Study programme: International Relations

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Year of the defence: 2023

Declaration

1. I hereby declare that I have compiled this thesis using the listed literature and resources only.

2. I hereby declare that my thesis has not been used to gain any other academic title.

3. I fully agree to my work being used for study and scientific purposes.

In Prague on 30 July, 2023 **Susann Wilson**

References

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Abstract

This thesis research how the global trade of plastic waste has been relocated in the aftermath of China's ban on plastic waste imports in 2017. In recent decades, the burgeoning demand for plastics has fostered a marked upsurge in the global trade of plastic waste. Researchers has established that developed nations are often the source of plastic waste exports, while developing and underdeveloped nations are the primary destinations, resulting in the imposition of significant environmental burdens upon these nations. This phenomenon has triggered an environmental justice discourse, highlighting the unequal distribution of social and environmental costs. The implementation of China's waste import restrictions has led to an altered trade landscape, with mainly South-Asian countries emerging as significant importers of large quantities of plastic waste.

This thesis looks at how this trade landscape has changed and finds that the new major importer of plastic waste is South-Asian developing countries. Moreover, the work undergone in this thesis aims at filling in the scholarly gap when it comes to the explanatory reasons behind new importers motivations towards plastic waste imports. By developing and running multiple regression analysis this thesis finds that there are some statistically significant variables that can be applied to explain the countries increased plastic waste imports. As a common result within the field of International Relations, also this thesis finds that the independent variables affecting countries levels of plastic waste imports are economic factors such as GDP, GDP per capita and GNI per capita. Thus, this thesis also finds evidence that variables representing countries levels of social justice also have some impact on the country's levels of plastic waste imports.

Keywords: Global plastic trade, Plastic Waste, Global Trade, Pollution, Waste Management

Abstrakt (Czech)

Tato práce se zabývá tím, jak byl celosvětový obchod s plastovým odpadem přemístěn v důsledku čínského zákazu dovozu plastového odpadu v roce 2017. V posledních desetiletích rostoucí poptávka po plastech podpořila výrazný nárůst celosvětového obchodu s plastovým odpadem. Výzkumníci zjistili, že rozvinuté země jsou často zdrojem vývozu plastového odpadu, zatímco rozvojové a nerozvinuté země jsou primárními cíli, což vede k uvalení značné ekologické zátěže na tyto země. Tento jev spustil diskurs o environmentální spravedlnosti, který zdůrazňuje nerovnoměrné rozdělení sociálních a environmentálních nákladů. Zavedení čínských omezení dovozu odpadu vedlo ke změně obchodního prostředí, přičemž významnými dovozci velkého množství plastového odpadu se staly zejména jihoasijské země.

Tato práce se zabývá tím, jak se toto obchodní prostředí změnilo, a zjišťuje, že novým hlavním dovozcem plastového odpadu jsou rozvojové země jižní Asie. Kromě toho se práce v této práci zaměřuje na zaplnění vědecké mezery, pokud jde o vysvětlující důvody motivace nových dovozců k dovozu plastového odpadu. Vypracováním a spuštěním vícenásobné regresní analýzy tato práce zjišťuje, že existují některé statisticky významné proměnné, které lze použít k vysvětlení zvýšeného dovozu plastového odpadu do zemí. Jako běžný výsledek v oblasti mezinárodních vztahů také tato práce zjišťuje, že nezávislými proměnnými ovlivňujícími úroveň dovozu plastového odpadu do zemí jsou ekonomické faktory jako HDP, HDP na obyvatele a HND. Tato práce tedy také nachází důkazy, že proměnné představující úroveň sociální spravedlnosti v jednotlivých zemích mají také určitý vliv na úroveň dovozu plastového odpadu do země.

Klíčová slova: Globální obchod s plasty, plastový odpad, globální obchod, znečištění, nakládání s odpady

Název práce: Analýza nových dovozců plastového odpadu po čínském zákazu dovozu v roce 2017.

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Abbreviations

CE: Circular Economy

EU: European Union

FDI: Foreign Direct Investment

GDP: Gross Domestic Product

GNI: Gross National Income

HDI: Human Development Index

HIC: High Income Countries

OECD: Organization for Economic Co-operation and Development

UK: United Kingdom

UNCLOS: United Nation Convention on the Law of the Sea

UNCTAD: United Nations Conference on Trade and Development

UNEP: United Nations Environment Programme

US: United States

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“*There is no such thing as ‘away’. When we throw anything away, it must go somewhere*” – Annie Leonard

1.Introduction

Plastic production and plastic waste have grown rapidly after its introduction into the market in the 1950s (EIA, 2021). Between 1993 and 2016 global imports and exports of plastic waste grew by 817 per cent, with the largest exporters being developed states, like the United States (U.S.), Japan, Germany, Hong Kong, and the United Kingdom (UK) (H. L. Chen et al., 2021). Plastic has been introduced as a cheap product that can be used for everything from packaging, manufacturing, to clothing. On the other hand, plastic also present some challenges due to its non-biodegradable nature and the presence of toxic chemicals in the majority of plastic products. As a consequence, both these plastic waste characteristics and the economic burden of plastic waste management, combined with limited capacities for recycling of plastic waste, have contributed to the emergence of a global trade network of plastic waste.

For the last decades, China has stood as the dominant global importer of plastic waste (Brooks et al., 2018, p. 1). However, in 2017 the People's republic of China introduced a foreign waste ban, aimed at reducing the imports of foreign solid waste that had "caused environmental degradation and public discontent by early 2017" (Xia, 2019, p. 1132). Presented as the "Prohibition of Foreign Garbage Imports: The Reform Plan on Solid waste Import Management" on July 27, 2017 (Wen et al., 2021, p. 2), China banned twenty-four types of solid waste imports and would now only accept imports of plastic scrap with a contamination rate less than 0.5% (Joltreau, 2022, p. 1). With this move, China introduced the most drastic environmental regulation for decades. China has however worked on environmental regulations since mid 1990s, but as a consequence of poor implementation efforts, and the growing demand for raw materials, these regulations did not get implemented until two decades later (Xia, 2019, p. 1125). Xia presents some of the possible motivations for this strict environmental regulations, such as the environmental issues related to the rapid economic growth China had witnessed, and the related health risk that contributed to growing concerns among the population, leading to environmental protests (Xia, 2019, p. 1133). The growing public awareness and increased concern towards the Chinese government's legitimacy pushed the government to effectively create and implement the regulations in 2017. This time the Chinese government managed to properly implement the regulations and China experienced a significant change in trade volume of imports, from 80% in 2017 to 14% in 2018 (Sasaki, 2019). Considering that China previously imported

nearly half of all plastic waste traded globally (Uhm, 2021, p. 3), their import ban had a considerable impact on the dynamics of the global trade network of plastic waste. It is estimated that approximately 111 million metric tonnes of plastic waste will end up being displaced by 2030 as a result of this ban (Brooks et al., 2018, p. 1).

Not only will there be an increase in mismanagement of plastic waste, the changes in the global trade network of plastic waste will lead to the emergence of new major importers of plastic waste. Therefore, this research aims to investigate and identify the new importers within the global trade network of plastic waste. Furthermore, the study seeks to explore the motives and characteristic that have influenced country's behaviour towards these changes in plastic waste imports.

Global trade of plastic waste is a phenomenon that combines several critical aspects of International Relations. I will argue that this topic is both socially, politically, and scholarly relevant within the field of International Relations. When it comes to scholarly relevance, this topic touches upon considerable topics within IR, like trade relations, inequality, Global North and Global South relations, economic impact, global power relations, social justice, and environmental concerns. As Wang et al. pointed out "to date, little research has been performed on the global plastic waste trade, especially to quantify the impact of China's plastic import ban on the global plastic waste trade" (C. Wang et al., 2020, p.1), making it a topic open for more in-depth research. Porta argues that plastic waste is now one of the main topics on the international societal and political agenda since the production of the material has outrun our ability to properly manage it at its end-of-life (Porta, 2021). Thus, despite the emergency of the issue, little research has been conducted on the subject. To confront this issue, this research seeks to address this gap and shed light on the complexities of plastic waste trade in the realm of international relations.

Moreover, the plastic waste trade combines historical colonial power dynamic, as it reflects a pattern of developing countries being treated as waste and pollution heavens. The relationship between the Global North and the Global South is concerned with this trade, which resonates with historical colonial power differences. This connection between environmental and social issues strengthen the importance of studying the plastic trade.

The global trade across long distances and between developed and developing states is not a new phenomenon. However, trade of waste and more specific trade of hazardous waste is becoming a global concern. “Plastic constitutes the third highest waste source globally, with the total volume of plastic waste growing in-line with increases in the global population and per capita consumption” (H. L. Chen et al., 2021, p.1).

The social relevance of this thesis will be mostly grounded in environmental problems caused by how the imported plastic waste is dealt with locally, and how this impacts local societies. Improper waste management systems, leakage from landfills into the environment, and burning of plastic to produce cheap electricity are affecting the lifestyle of local population in importing countries. Researching social justice within the countries selected as cases will also contribute to a deeper understanding of the impacts of global trade which are of social relevance within IR. Looking into the geopolitical differences between production, consumption, and waste of plastic can illustrate not only the trade of plastic, but also other similar materials and manufacturing industries and illustrate political power and economic differences between developed and developing countries.

The political significance of this subject lies in its impact on global trade networks and environmental regulations. The focus is on how the recent regulations imposed by China have altered the dynamics of plastic waste trade, and how domestic political regulations influence countries' behaviour towards plastic waste imports after the ban. This research aims to shed light on why some countries have increased their plastic waste imports while others, facing similar circumstances, have not. Moreover, plastic pollution was the theme on the 2023 “world environment day” (United Nations, 2023). This day, introduced by the UN, was created to increase public awareness and action towards environment protection. The fact that plastic pollution is the theme of this year illustrates how pressing the issue is.

The economical aspect of global trade is also important to mention. Whilst the developing countries are importing plastic waste in accordance with the economic benefits it gives them, at the same time, the exporting states also gain an economic benefit from this trade, since many types of plastic waste are time-consuming and expensive to recycle. However, plastic waste is not just a costly process concerning the recycling process, it also has other economic impacts. As Payne et al. claim that plastic waste costs the “world” approximately $13 billion annually in damages to marine ecosystems (Payne et al., 2019, p. 175), while Beaumont et

al. write in their article that a 1-5% decline in marine ecosystems as a consequence of marine plastic pollution contributes to an annual economic costs conjectured between $3,300 - $33,000 per tonne of marine plastic (Beaumont et al., 2019).

To address the environmental and socio-economic challenges caused by plastic waste in the ocean, the United Nations Law of the Sea introduced a definition of "pollution of the marine environment" in 1982. UNCLOS defined marine environment pollution as

> ""pollution of the marine environment" means the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities" (United Nations, 1982, p. 26).

The mismanagement of plastic waste leads to plastic waste leakage into the environment, which furthermore affects other parts of the ecosystem. More than 11 millions tonnes of plastic ends up in the ocean each year (Norad, 2023). The new importers of plastic waste are mainly coastal countries with a considerable amount of the population living off the resources from rivers and the sea. Phinney (2022) writes that almost 70 million people rely on Mekong, a river going through Vietnam, Thailand, Cambodia and Laos, yet this is one of the dirtiest rivers in the world (Phinney, 2022). The social impacts of the increased plastic waste are both grounded in pollution and economic losses.

Given the pressing need to address the environmental, social and economic consequences of the plastic waste trade, this research is conducted to contribute to a deeper understanding of the global trade network of plastic waste and its impacts. By exploring the emergence of new importers and the factors influencing countries' behaviour, this study aspires to take part in a broader effort aimed at addressing plastic pollution within the framework of International Relations.

After a short introduction of the topic and its relevance within the field of IR, the forthcoming section of this thesis consists of several parts, structured to logically present previous

research, the chosen methodology, the research conducted and the results of analysis. The first part consists of a literature review, presenting the pre-existing literature on the topic of plastic waste trade and new importers of plastic waste. Subsequently, a theoretical framework will be presented consisting of the theories applied in this thesis, focusing on global trade and plastic waste. The following part of the thesis will detail the selected methodology: the chosen methods will be presented and followed by the justification of the case selection, data collection and explanations about the appliance of the methods in the analysing process of the data. The next chapter will consist of the case study. The case study consists of countries labelled as the new importers of plastic waste and of countries that have not increased their imports in the same scale. By applying a comparative analysis methodology, in the form of multiple regression analysis, the main focus of this part will be to break down the different independent variables and analyse how these variables can be the cause of the effects by applying Mill's Methods of agreement in the analysing part. To wrap it up the last part of the thesis will consist of a conclusion and summary of the thesis, highlighting the findings from the analysis of the conducted research and concluding with whether there were enough findings to support the hypothesis and answering the research question. Future recommendations developed throughout the research process will also be presented.

2.1 Literature review

The increasing production, consumption, and waste of plastic have as mentioned led to a global trade network of plastic waste. This network has been evidently dominated by China for the last three decades, (Shi et al., 2021) until 2018. Studies by EIA (2021) shows that these high level of waste import has led to environmental problems in China and is one of the main explanatory elements behind their import ban in 2017 (Wen et al., 2021, p. 2). Even though China had some shorter periods with import restrictions with the "Green Fence" and "Border-Gate Sword" (Huang et al., 2020, p. 2), the strict import ban presented in 2017 contributed to major changes in the global trade network of plastic waste, that led to great uncertainty about the future of global trade of plastic. There is no doubt that the global trade network of plastic waste is now going through a reshaping as China, the number one importer of the waste, with import of around 70% of all exported plastic waste throughout the last 30 years (EIA, 2021, p. 7) have decided to ban almost all foreign import.

2.1.1 New importers of plastic waste

Shi, Zhang, and Chen (2020) are some of the researchers that have already researched the new countries taking over China's role as importers of plastic waste. They present South-East Asian countries as the new importers, and hereunder mainly Thailand, Malaysia, and Indonesia (Rucevska et al., 2017; Shi et al., 2021, p. 195; W. Wang et al., 2019). Zhao et al. (2021) support the view and present in their research that Asia is the main region for plastic waste import, in contrast they point to South Korea and Thailand as the new major importers. EIAs research on plastic trade also finds that Vietnam and Thailand are the major new importers (Zhao et al., 2021, p. 1). Qu et al., present that the countries that still allow importing of solid waste, mostly developing countries closely located to China, like Thailand, Malaysia, Indonesia, and India will see an increase in their recycling industry (Qu et al., 2019).

McVeigh presented a research on the U.S plastic waste exports relocation after China's ban in 2017. His research shows that Thailand's plastic waste import from the U.S increased by almost 2000% in 2018, a growth to 91.505 metric tonnes (McVeigh, 2018). Within the same period, it was a 273% growth in the trade from the U.S. to Malaysia, an import of 157.299 metric tonnes (McVeigh, 2018).

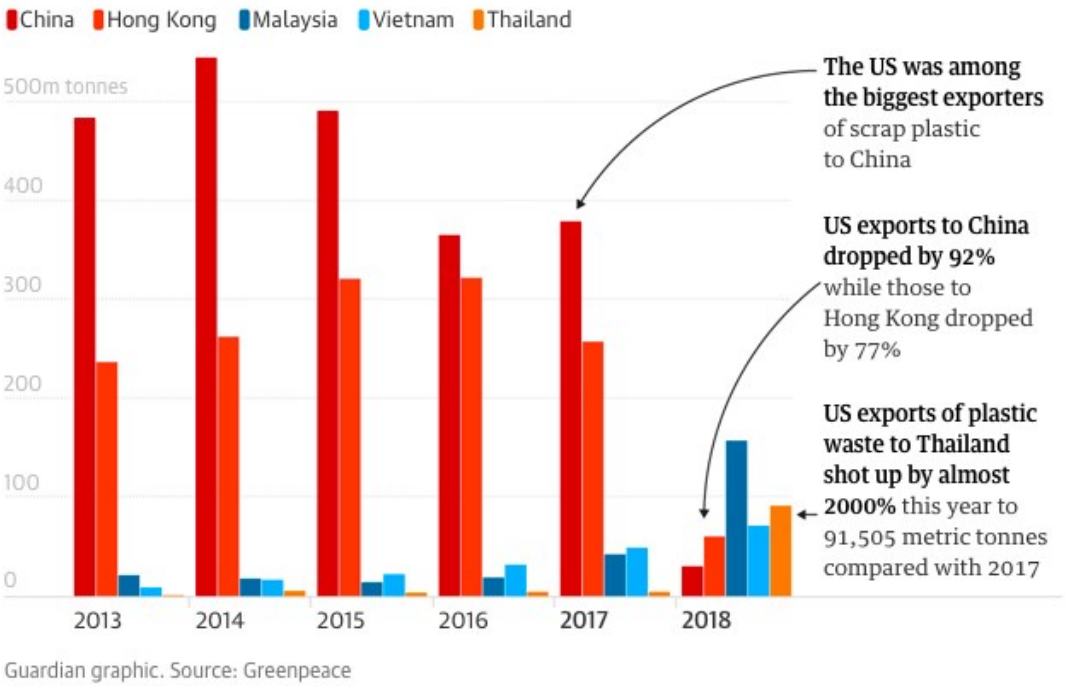


Figure 1*:* Nearly half of plastic waste exported from the US for recycling was shipped to Thailand, Malaysia, and Vietnam in the first six months of 2018 after China banned foreign waste imports (McVeigh, 2018).

Also, India and Vietnam experienced more than 100% growth after 2016 (W. Wang et al., 2019, p. 73). This further supports the findings that the global trade network of plastic waste is being reshaped, with the new importers being Southeast-Asian countries.

Developing countries, like Malaysia and other Southeast Asian countries do not have the necessary waste management system to handle the amount of plastic waste that is produced domestically, moreover not the needed capacity for additional imports (H. L. Chen et al., 2021; Yosi et al., 2019). Their main methods of dealing with the plastic waste is to burn it domestically, place it in landfills, or it ends up in the environment (H. L. Chen et al., 2021, p. 2).

A reaction of the increased plastic waste imports in these Southeast Asian countries are the development of domestic restriction towards this type of trash. Countries like Vietnam and the Philippines have managed to make some restriction on plastic waste (Zhao et al., 2021, p. 1). In like manner, Thailand and Malaysia which experienced rapid import growth in 2018

have presented measurements to control and restrict the import of plastic wastes (C. Wang et al., 2020, p. 9).

The research "An analysis of the plastic waste trade and management in Asia" by Liang et al., presents an overview of that time current restrictions and policies on waste management in Asia (Liang et al., 2021). The research presents that the overall plastic export to Asia has declined after China's ban in 2018. However, they present Vietnam and Malaysia as new importers of plastic waste. Furthermore, it illustrates great differences in policies between the states, whereas some countries have forbidden the import of plastic waste, like China and Cambodia. Some of the countries have manged to establish a sort of management on the import of plastic waste, Malaysia, and Lao. Whereas some countries still "allow" import of plastic waste and did not have any restrictions at the time of this study, Myanmar, and Vietnam (Liang et al., 2021, p. 246).

2.1.2 Previous relocations from China to Southeast Asia

Examining the dynamic patterns of plastic waste distribution in Asia bears resemblance to the shifting landscape of manufacturing industries, whereby China's diminishing prominence as a manufacturing hub has led to the emergence of other Asian nations as key players. This parallel analysis not only sheds light on potential causal factors underlying the transformed distribution of manufacturing industries but also offers insights into the resultant consequences of the changed patterns in plastic waste trade. Some of the industries that have been relocated from China to other low-income developing states are textile and clothing industry, electronic assembly, toy manufacturing, plastic, and rubber production. Researching literature on the relocation of textile manufacturing industries from China to other Southeast Asian emerging economies illustrates the change in global production networks where labour-intensive industries are relocated from China to other Asian countries (Yang, 2016). Research presented by Altenburg et al., illustrates how clothing export in China started to decline in 2013 at the same period that it was a boost in production in Cambodia, Vietnam, Myanmar, and Bangladesh where they experienced an increase of 25-35 per cent of clothing manufacturing (Altenburg et al., 2020, p. 39). Yang points to several explanations for the changes from China to other South Asian countries, such as "rising labour costs in China, state initiatives of industrial upgrading and the unabated appreciation

of the Renminbi" (Yang, 2016, p. 4). Both appreciation of the Renminbi (strong Chinese currency compared to other currencies) and rising labour costs makes it more desirable for companies to move their industries to cheaper states. Other explanatory causes for these relocations are that the new production countries offer favourable government policies and incentives to attract foreign investment and boost their manufacturing sector, these countries have less strict labour laws and regulations contributing to comparative cost advantage and lower labour costs.

H1: Countries with lower environmental standards are more likely to become new importers of plastic waste compared to countries with higher environmental standards.

A case study of one of China's largest export-oriented garment firm finds the main factors for redistribution of manufacturing from China to among others Vietnam and Cambodia, are; responsiveness to meet requirements in term of volume and in-time delivery of products, availability and price of labour, land, water and electricity within stable conditions was important, and lastly the importance of policy intensives related to taxes, costs of finance, tariffs and administrative efficiency (Altenburg et al., 2020, pp. 40–41).

2.1.3 The new global plastic waste trade network

The majority of the plastic waste import into Asian countries are plastic exported from high-income countries (HIC),[1] members of the Organization for Economic Co-operation and Development (OECD) (Zhao et al., 2021). These OECD countries have exported 64% of all exported plastic waste (Brooks et al., 2018, p. 2). And since 1988, HIC has been the major exporters of plastic waste, with 87% of all export, worth $71 billion USD (Brooks et al., 2018, p. 2). United States and United Kingdom, both parts of the OECD, are the largest producers of plastic waste per capita and more than half of all plastic waste in the US are sent abroad (Carrington, 2020). Studies by McCormick et al., shows that in 2018, 68,000 shipping containers filled with plastic waste from the US was exported to developing, low-waged countries in the Global South that already "mismanage more than 70% or their own plastic waste" (McCormick et al., 2019).

[1] Based on 2015 Gross National Income

Possible aspects that serve as motivations for countries in Southeast Asia to increase their import of plastic waste is presented by Ritchie (2018). The main argument is that plastic waste import is economical beneficial. Both because plastic waste can be used by the manufacturing industries and repurposed into other goods, as this is a cheaper alternative compared to buying new raw plastic materials (Ritchie, 2018). Another economic benefit is that exporting companies pay the importing companies to import plastic waste that is expensive and time consuming to recycle domestically in the exporting country. This way it is cheaper to pay the importing country to deal with it. EEA presents how these Asian countries has other rules and regulations when it comes to waste management, so these countries can manage the plastic waste in a less controlled and expensive way than for example European Union (EU) countries (EEA, 2019). Furthermore, the EEA and other researchers (H. L. Chen et al., 2021; Z. Chen & Tan, 2021; O'Neill, 2019) presents that there is a lack of knowledge concerning the environmental impacts plastic waste can have on the receiving country.

H2: Countries with lower economic development are more likely to become new importers of plastic waste compared to countries with higher economic development.

H3: Countries with lower levels of social justice are more likely to become new importers of plastic waste than countries with better social justice.

Published literature on the topic of importers of plastic waste, mainly focuses on Asian countries, there is limited literature focusing on Latin American or African countries as new importers of plastic waste after China's ban. Research by Pacini et al. states that developing regions like Africa and Latin America play small part in the plastic network analysis. Pacini et al., conclude that it needs to be developed more research on these regions. In addition, they argue that the underrepresentation of these regions might be a result of data reporting problems and lack of technology (Pacini et al., 2021).

While there is increasing research within the field of global trade, pollution and plastic waste, there are still scholarly gaps when it comes to the in-depth research on the consequences of China`s ban on waste import and hereunder the now new importers. Studies (EIA, 2021; Shi et al., 2021; C. Wang et al., 2020, p. 9; Zhao et al., 2021) have already explored the topic of

new importers of plastic waste after China's ban. However, these studies have mostly provided descriptive insights into the phenomenon, without offering a deeper understanding of the underlying factors that drive the importation of plastic waste. In this research, I aim to contribute to our knowledge of the problem by presenting explanatory work conducted through a comparative case studies. More specifically, I will compare the new importers of plastic waste to other countries in similar economic and geographic contexts that have not increased their plastic waste imports in the same scope. By doing so, I hope to shed light on the reasons why some countries have increased their importers significantly while others have not. Furthermore, I intend to see if there are any similarities between the industrial relocation from China to other developing economies in Southeast Asia and the relocation of plastic waste. I believe that this can provide a useful framework for understanding the ongoing transformation in the global trade network of plastic waste. Overall, my study seeks to provide explanatory insights into the phenomenon of new importers of plastic waste, going beyond descriptive accounts and offering a more nuanced understanding of the factors that shape this global problem.

2.2 Conceptual and theoretical framework

The theoretical framework of this research will primarily draw on concepts from global political economy and international trade theories. The framework will be employed to gain a better understanding of the decision-making processes that drive exporters and importers. This framework examines the various internal and external factors that motivate actors to engage in trade and can offer valuable insights into the motivations of both exporters and importers in the plastic waste trade network.

2.2.1 Global Trade

In the field of International Relations, trade is typically viewed as a process that results in economic benefits for one party and the acquisition of goods for the other party. However, the trade of plastic waste presents a different dynamic. While one party may gain monetary benefits and "goods" in this exchange, the "goods" in question consist of waste materials that contribute to environmental pollution within that segment of the trade chain. This unique aspect of plastic waste trade complicates the standard trade relationship and requires a closer examination of the environmental and social consequences associated with such transactions. While the monetary benefits of plastic waste trade may be appealing to some

actors in the global market, the ecological costs must also be taken into account to ensure a more sustainable trade network.

The global trade regime consists of three main components: trade, national regulations, and international agreements (Capling & Trommer, 2017). All three components mentioned play a crucial role in shaping the global trade of plastic waste. Trade is the actual situation of exchanging goods and services. National regulations are particularly significant, as they determine the stringency of rules governing waste management practices within countries. With stronger national regulations, plastic waste trade will languish, whereas with fewer national regulations, trade will flourish (Capling & Trommer, 2017, p. 112). Developing states, in particular, tend to have less strict labour regulations and more lenient national environmental regulations, which can create a permissive environment for the importation of plastic waste. At an international level, economic trade regulations that promote free trade and open borders have a considerable impact on the global trade of plastic waste. However, the role of international environmental agreements, such as the Basel Convention, is even more crucial in this context. These agreements establish a framework for the environmentally sound management of hazardous waste, including plastic waste, and promote sustainable practices in waste management across borders (Qu et al., 2019, p.253). In summary, the interplay of national regulations, economic trade regulations, and international environmental agreements all contribute to shaping the global trade network of plastic waste.

Brooks et al. argue that the high domestic waste management costs provide a strong motivation for developed states to export their waste to lower-income states with significantly lower waste management costs (Brooks et al., 2018, p. 2). So, the developed countries, located in the Global North, benefit from cost savings associated with exporting waste to the Global South. Whereas the countries in the Global South, with China as a previous example, benefit "by importing recyclable waste to supplement its domestic manufacturing industries" (Liu et al., 2018), as well as the economic gain they receive from the exporting county. According to Thun, the transportation cost within the trade network is just a marginal part of a company's overall cost, and with these low transportation costs it does not matter if companies do their business with firms located on the opposite side of the world (Thun, 2017, p. 179). Another significant factor to consider in this trade network, at

least when China was the major importer, is that companies in the global trade network transported thousands of ships with containers filled with goods from China to the Global North, that were travelling back to China empty-handed (McCormick et al., 2019). This circumstance presented an opportunity for these entities to optimise the gains derived from trade by employing these empty containers to transport reuse, predominantly unwanted waste materials that the Global North was reluctant to manage internally. The shipping companies then offered competitive rates for the return trips back from the develop countries to avoid a trip with empty cargos (Qu et al., 2019, p. 252), furthermore, facilitating the relocation of such waste materials from the Global North to the Global South.

H4: Countries that have a stronger connection to international trade are more likely to become new importers of plastic waste.

2.2.1.1 Pollution Havens

The Pollution Haven Hypothesis argues that "a reduction in trade costs results in production of pollution-intensive goods shifting towards countries with lower environmental standards" (Minier, 2022). Developed countries with stronger environmental regulations have a disadvantage when it comes to pollution-intensive industries, so they tend to relocate these industries to poorer countries with lower environmental standards (Duan et al., 2021, p. 1). Another factor is that "environmental issues carry more political weight in industrialized countries than in less industrialized countries" (Madiès et al., 2022). As plastic waste consists of relatively low-value materials with a high level of environmental impacts, it is likely that developing countries will become the new pollution haven for solid waste and plastic waste from the developed states (Qu et al., 2019). As a result of this comparative advantage in developing countries, "international trade becomes a mechanism of re-allocating pollution emissions based on income level" (Duan et al., 2021, p. 1).

The Pollution Haven Effect claims that "an increase in environmental standards reduce exports of pollution-intensive goods" (Minier, 2022). Zhao et al. (2021) have shown that the global trade of plastic waste has declined. It is possible to question if this is a result of environmental agreements ratified in previous years, if this is a consequence of increased illegal trade of plastic waste that is no longer part of public statistics, if this is one of the

consequences of the COVID-19 pandemic, or if this is caused by other factors. In my point of view, based on the conducted literature review on new importers of plastic waste there is no doubt that these countries fit into the pollution haven hypothesis, as there are developed countries that export and developing countries that import the plastic waste. It is likely that some of the motivations or reasons behind these plastic waste trades are grounded in the same arguments as presented by the pollution Havens Hypothesis. Moreover, another connection can be made between the motivations behind relocations of industries from China to other developing countries and the Pollution Havens Hypothesis, as China itself experienced both economic growth, increased environmental regulations and stronger political attention towards this issue.

2.2.2 Plastic Waste

According to the UNEP, plastic waste can be defined as "any discarded plastic (organic, or synthetic, material derived from polymers, resins or cellulose) generated by any industrial process, or by consumers" (UNEP, n.d.). The historical development of plastic production points to a rapid increase in production, consumption, and waste production. In 1950 the global production of plastics was 1.5 million metric tons, approximately 70 years later the production had increased to 359 million metric tons in 2018 (Okoffo et al., 2021, p. 1), and estimated to increase up to 2600 million metric tons by 2050, (Liu et al, 2022, p.1) unless there will be implemented stronger international regulations and changes in consumer behaviour. With this extensive plastic production, taking into account that only 9% of world plastic production gets recycled (Wen et al., 2021, p. 9), we can today witness that approximately 75% of the waste floating in the marine environment are plastic, a number of approximately 170 trillion plastic particles are floating around in the oceans (Øfsti, 2023). Moreover, more than two-third of this plastic waste is non-biodegradable (W. Wang et al., 2019). Consequently, plastic waste is today one of the world's most pressing human health and environmental concerns (H. L. Chen et al., 2021).

One of the major problems is concerning the end-of-life fate of the waste material, both regarding the economic burden connected to the recycling process of plastic waste as well as regarding the fact that the plastic waste accumulates rather than decomposes (Geyer et al., 2017, p. 1), causing a threat to both the environment, wildlife, and human health. According to Geyer et al. approximately "8300 million metric tons (Mt) of virgin plastic have been

produced to date" (Geyer et al., 2017, p. 1). Plastic comes in several variations, high-density polyethylene (PE), low-density and linear low-density PE, polypropylene (PP), polystyrene (PS), and polyester, polyamide, and acrylic (PP&A) fibers (Geyer et al., 2017, p. 1).

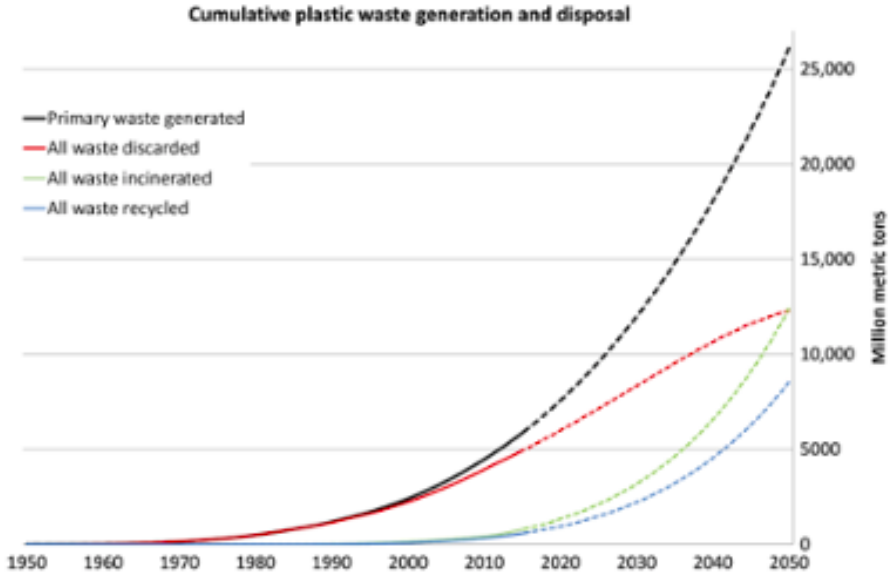


Figure 2*:* Cumulative plastic waste generation and disposal (in million metric tonnes). Projections of historical trends to 2050. (Geyer et al., 2017, p. 3).

It is anticipated that the production of plastic waste will double by 2040, which means that plastic production has increased 20-fold in the past 50 years (Payne et al., 2019, p. 175).

Today, the only way to permanently eliminate plastic waste is by destructive thermal treatment, such as combustion or pyrolysis (Geyer et al., 2017; Schmidt et al., 2019, p. 1). It is worth mentioning that these industries are already established, and the knowledge and technology are already present. However, the scenario is rather that these industries are still very expensive, and as the global trade network of plastic waste is still an option, many states prefer to trade away their waste than to further develop these technologies (Saue, 2022)

Today's plastic production, consumption, and waste management is part of a linear economy which involves "extracting resources required to produce synthetic products, which at the end of their useful product life enter the waste stream, most likely accumulating in either landfill or the natural environment" (Payne et al., 2019, p. 175). However, the focus on circular economy (CE) is developing throughout the world, started in the U.S., Japan, and

Germany (Liu et al., 2018). CE has three main focus parts, 3Rs, these are to reduce, recycle and redesign. By introducing a CE to the lifeline of plastic it aims to recycle more of the plastic, utilise plastic products to their full potential and reduce single-use plastic. However, most plastic material can only be recycled once or twice, so, for now, the recycling process provides a delay rather than a prevention of plastic ending up at a landfill or incineration (Ritchie, 2018). Plastic materials of certain types are traded and used as a substitute to new raw materials for a low-value, low-quality goods (Qu et al., 2019).

One of the consequences of this global trade network of plastic waste is that approximately 75% of the waste floating in the marine environment is plastic. More than two-third of this plastic waste is non-biodegradable (W. Wang et al., 2019). Consequently, plastic waste is today one of the world's most pressing human health and environmental concerns (H. L. Chen et al., 2021).

2.3 Research question

Who are the new importers of plastic waste after China's ban on import of plastic waste, and why have these specific countries increased their import of plastic waste when other countries have not?

2.3.1 Hypothesis

1. Countries with lower environmental standards are more likely to become new importers of plastic waste compared to countries with higher environmental standards.
2. Countries with lower economic development are more likely to become new importers of plastic waste compared to countries with higher economic development.
3. Countries with lower levels of social justice are more likely to become new importers of plastic waste than countries with better social justice.
4. Countries that have a stronger connection to international trade are more likely to become new importers of plastic waste.

2.4 Methodology

Given that the research question pertains to global trade and shifting distributions, a mixed-method approach is deemed the most suitable methodology for this thesis. The definitions of mixed-methods are many but largely mixed-methods are particularly relevant for

international relations studies as it allows for the exploration of multiple dimensions of the topic, including political, economic, social, and cultural factors, among others. The use of mixed-methods allows me to draw on the strengths of both methods and consequently obtain a more comprehensive understanding of the research.

Composed by both qualitative and quantitative methods, I will use comparative analysis as my primary research approach. Comparative analysis is often used when researchers are looking for patterns, either similarities or differences that can be used to explain a continuity or change (NUPI, N.D.). This method suits my research as I intend to systematically compare different cases, countries, to each other and by doing this be able to identify the countries similarities and differences. This insight of countries' economic, social, and political characteristics will, through Mill's method, be used to identify the pattern that will point to the explanatory variables for why some countries have increased their plastic waste imports and other countries have not followed in the same manners.

Using this method, I will first systematically choose the countries that will be the subjects of the thesis case study. These countries will be inspired by the literature review already conducted but chosen based on plastic waste import statistics. The cases will consist of one group of countries that have increased their imports of plastic waste after China's ban according to the import statistics, and the other group will consist of countries that have not increased their imports of plastic waste in the same scope as a consequence of China's new regulations. As comparative analysis facilitates for comparison of cases based on variables, I will base my research variables on the hypothesis presented above. These dependent variables will further be supplemented by indicators consisting of independent variables which are specific measurements of data points. These indicators will be applied to all cases selected and furthermore be used to identify which independent variables are statistically significant in affecting the dependent variable.

Secondary research will be applied in a deductive reasoning process to gain new information from already published statistics. This data will be used to explain who are the new importers in the global trade network of plastic waste after China's ban in 2017, and more importantly, contribute explanatory information on the differences between these new importers and the

countries that have not increased their imports in the same scale after the Chinese ban. This research will be conducted on data from official documents and statistics.

A method that will be applied later in the research is John Stuart Mill's method of agreement. John Stuart Mill published *A System of Logic* in 1843, a book introducing, among others, five different methods. These methods can be applied when researching agreements and/or differences in cases and these methods are well known both within IR scholarship, and more generally in method discussions (Ghalehdar, 2022). Even though the methods were introduced a long time ago, and several new methods have been published since, Mill's methods can still be very relevant in today's research.

Mill's method of agreement will be applied to analyse the data of the second part of the research for this thesis. The method aims at isolating the cause from the series of complex events that are analysed together. Furthermore, the method of agreement looks at two or more appearances of an event and distinguishes what the events have in common, this is further outlined as the cause of the effect (Baronett, 2016). This method provides a reliable way to identify the causes that result in the effect of countries, if they either increase their plastic waste imports or not. Whereas Mill's used the terminology causes and effect, it can be viewed as analogous to the independent and dependent variables more commonly used in today's scholarly literature.

Mill's method will be used to identify the common circumstances/independent variables that are present in the case groups. Mill's method on agreement will be applied to the data collected on the cases, countries in this thesis, and analysis of the results of the different variables, in this case political, economic, environmental, and social factors. By analysing the data to find common outcomes, I intend to point out what is the cause for that specific outcome, which in this case is either increased imports or not. Some examples can be in the independent variables representing social justice, including but not limited to freedom of speech and human rights, which will serve as subjects of investigation. Mill's method on agreement will be applied to analyse the gathered data, pointing out the different results, being able to present results based on causes and further the effect.

2.4.1 Case selection

The countries Vietnam, Malaysia, Turkey, Thailand, Indonesia, and Myanmar are selected as cases inspired by the completed literature review. Additionally, the countries Lao, India, Sri Lanka, Cambodia, and the Philippines are added as cases for this thesis. This second group of countries have not been researched in the same depth as the first group of countries as these countries are sparsely referenced in the pre-existing literature on new imports of plastic waste. However, these countries are selected based on their development level and geographic location. As this thesis aims to answer which countries are the new importers of plastic waste after China's ban, it was necessary to first conduct data on the countries import statistics to be able to research which of these countries have increased their imports more than the other countries. It is essential to conduct this research and have the correct countries for the future part of the thesis.

2.4.2 Data

In this research, the empirical data will consist of both primary and secondary data sources. The research will consist mainly of document analysis and statistics presented by various organisations and countries. Conducting a qualitative literature review contributed to constructing the primary body of this research by examining the already existing relevant literature. This secondary data will be used both to understand and to compare with the primary data collected in this research. The primary data will be collected by using OurWorldInData (Oxford, n.d.), World Bank, government official webpages, and possibly other sources as well if it happens that there is a gap in the information from these resources.

There will always be possible limitations when conducting research. Despite the sincere attempt of this thesis to maintain neutrality during the data collection process, it is imperative to acknowledge the author's background as a resident of the Global North, having been raised within a Western society. This context may unwillingly influence the author's perspective on data interpretation and the selection of relevant sources. Despite this, the majority of the research will be conducted statistically, so the researcher's neutrality would not be an issue in this part of the research.

2.4.3 Data collection

To meet the presented goals of this thesis and to be able to answer the research question I will in the first part collect the necessary data from import statistics to justify the information gained from the literature review on new importers of plastic waste after 2017. By researching the import statistics of plastic waste and justify the selected countries in Asia, it enables me to construct the main body of this study. Throughout this part of the research, I intend to identify the new importers of plastic waste as well as countries that have not increased their plastic waste imports, get a broader understanding of the character of these countries, and gather information about the scope of China's ban.

This main body will further be complemented with further research based on primary source documents. The majority of the information needed is possible to find in official documents, shared by the governments, EU, or UN. It is irrefutable that a substantial quantity of plastic waste is being traded illegally. Building on the literature review and the first part of statistical research, this part will consist of a case study between the new importers of plastic waste compared to countries that have not increased their import in the same scope. The variables will consist of different themes conceptualised from the information in the secondary data, building on the working hypothesis presented above. The hypothesis both focuses on economic, political, environmental, and social factors. Through the thematic variables created the large amount of data will be narrowed down to the most important data, hopefully enabling me to find the statistically significant independent variable that contributed to the difference between the new importers and the other group. The model with variables will exist of some primary elements like GNP per capita, waste, trade connections and environmental regulations. The data will be collected through different sources. The Oxford led webpage OurWorldInData will be used frequently, the UN will be used, the World Bank and Statista will be used to find data concerning economy, Reporters without borders will be used researching social justice, literature providing information on themes like infrastructure and trade routes will be used where there is no statistics available.

Data collection related to the hypothesis on economic development will be found by collecting and comparing countries GNI per capita, GDP and GDP per capita in the period 2017-2019, depending on the relevant data available in the respective time-period. Concerning the hypothesis on social justice, both freedom of speech (press freedom), human

rights and regime types will be researched. Another hypothesis is concerning countries connection to international trade. To be able to find answers to this hypothesis the topics FDI, trade connections, and trade openness of the country will be research. Lastly, the hypothesis on environmental standards will be answered by researching environmental regulations and waste management systems.

By using Mill's methods as presented above, this information will be used to understand and explain which of these variables are the cause of the level of trade and import of plastic waste in the different countries. Furthermore, this research contributes to an in-depth analysis, whereas there is a low number of cases being researched, additionally, the cases selected are based on the literature review and geographic location, not through random selection.

Following China's prohibition, the illegal trading of plastic waste has likely escalated due to the paucity of viable alternatives. A primary impediment to data collection pertains to the arduousness of obtaining information concerning illegal trade. Consequently, to circumvent this difficulty, I shall limit my research to solely documented official trade. An optimal approach for disseminating information would involve analysing the exporting countries, as these entities are more likely to possess readily accessible information relative to the importing countries. The latter primarily consists of developing countries with compromised documentary infrastructures.

2.4.4 Data analysis

The first part of this thesis involved a comprehensive review of existing literature to obtain the requisite information and terminology necessary to comprehend the primary data. The newly acquired data from primary sources will subsequently undergo meticulous analysis to provide optimal responses to the research inquiries. In the third part, the analysis of data will involve a systematic examination of the emerging themes, causes, as well as a comparative assessment of the varying variables within each country. The data analysis will be carried out through multiple regression analysis. The decision to do a multiple regression analysis of the data is based on the grounds that regression analysis is being applied to estimate the relationship between two or more variables (Cheusheva, 2023). The two categories of input variables in a multiple regression analysis are a dependent variable and intendent variables. The dependent variable is consisting of the main factor this research is trying to explain,

countries levels of plastic waste imports. The independent variables are then the explanatory variables, the variables that might have an influence on the dependent variable (Cheusheva, 2023). The results from the multiple regression analysis will then be analysed and discussed with the use of thermology.

Positively, the analysis of the variables conducted from the selected countries will provide some statistically significant independent variables. The intricate nature of the global trade in plastic waste encompasses a multinational character. An investigation of the changed trade patterns using a diverse range of quantitative and qualitative sources can significantly enrich the comprehension of broader phenomena such as global trade dynamics, the concept of pollution havens, and variations in trade preferences among countries situated in the Global South. As there are limited cases being researched the research's external validity is limited (Sala Serra & Domingo Torrell, 2022), however as mentioned above I hope that the findings in this research can be applied to a bigger picture within global trade and environmental decisions. Regarding internal validity, the relatively small number of cases chosen for this research is expected to minimize internal errors. However, due to the time constraints inherent in this thesis, the selection of independent variables had to be limited. While these variables show promise in capturing the comprehensive scope of the study, the possibility of minor internal validity errors cannot be entirely ruled out (Sala Serra & Domingo Torrell, 2022).

3. Countries plastic waste imports 2017-2019 (2010-2021)

As explicated in the methodological section, the initial phase of this thesis will involve procuring data pertaining to the countries that will serve as the focal points in the following phase of the research.

The sources used in this data collection is the United Nations Conference on Trade and Development (UNCTAD) Research Paper no. 53 "*Global trade in plastics: insights from the first life-cycle trade database*" (Barrowclough et al., 2020) and the Oxford led webpage OurWorldInData's "*Ocean plastics: How much do rich countries contribute by shipping their waste overseas*" (Ritchie, 2022).

The report by UNCTAD is based on "new prototype database created by UNCTAD and the Graduate Institute, which draws on a granular examination of official trade classifications and compiles data on a far broader set of plastics-related inputs and products than those commonly used" (Barrowclough et al., 2020, p. 1). This research presents the whole life cycle of plastic, but for this thesis, more importantly, it presents both the top-20 exporters and importers of plastic waste in 2018. They find that most of the top-20 exporters of plastic waste are high-income economies as defined by the World Bank. They also find that some of the top importers of plastic waste are large economies, however the research states that "it is not clear whether these countries re-export the waste or whether they dispose of it domestically" (Barrowclough et al., 2020, p. 24). Furthermore, this research finds that most of the plastic waste traded abroad is in fact not recycled, this can lead to major environmental and health consequences for the importing countries that do not have the capacities to manage the waste in an environmentally sound manner (Barrowclough et al., 2020, p. 24).

As illustrated in figure 7, present in the UNCTAD research, we can both see the top-20 exporters and importers in 2018 based on volume (metric tonnes) of plastic waste. Concerning this thesis, it is the top importers that are the most relevant. The findings in this research supports the findings from the pre-existing literature presented in the literature review. Malaysia, Thailand, Vietnam, Turkey, Indonesia, and India are all among the top-20 importers of plastic waste in 2018.

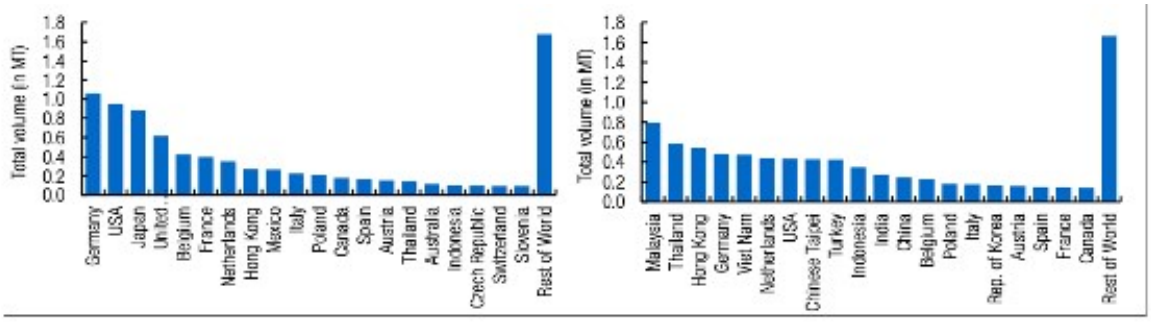


Figure 3: Volume of plastic waste exports and imports in 2018 (Barrowclough et al., 2020, p.24).

As seen in this figure there are not only developing states that are part of the top-20 importers of plastic waste in 2018. However, the next part of the thesis will use research from

OurWorldInData to illustrate the development of plastic waste imports in the period 2007-2021. The findings here will illustrate that even though these high-income economies are some of the top-20 importers, they have not increased their imports significantly after 2018. As this thesis aims at explaining who the new importers of plastic waste after China's ban are and why these exact countries have increased their imports, it will not be relevant to research these high-income economies even though they also have high levels of plastic waste imports.

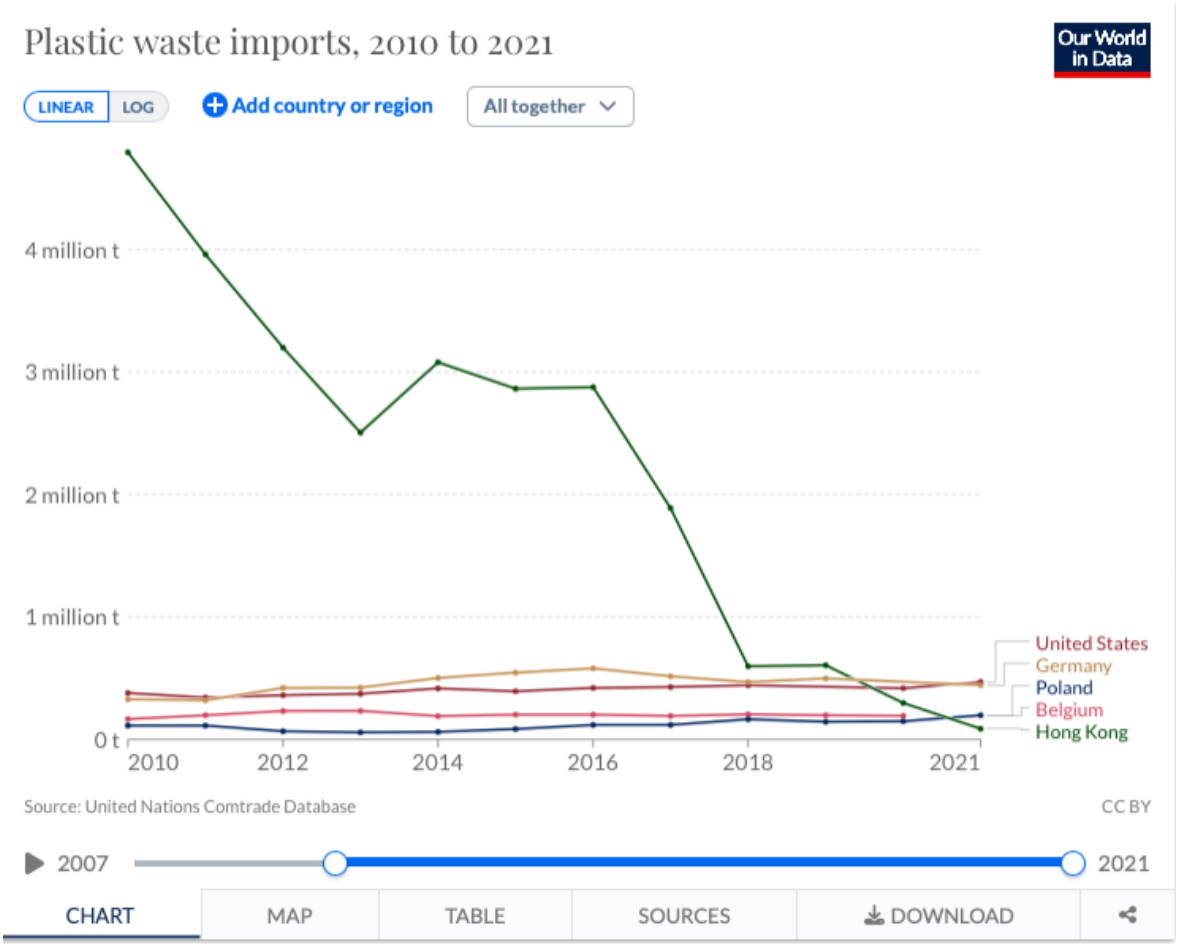


Figure 4: The development of plastic waste import in the developed countries U.S., Germany, Poland, Belgium, Hong Kong (Ritchie, 2022).

As mentioned above, the research presented by UNCTAD, illustrated in Figure 3, found among others the countries presented in Figure 4 (U.S, Germany, Poland, Belgium and (Hong Kong)) as top-20 importers of plastic waste. Figure 4 provided from OurWorldInData illustrates the aforementioned argument that these countries have not increased their plastic

waste imports significantly as a consequence of China's ban. Because of their decrease rather than increase of plastic waste after 2018 they will not be part of this thesis further research.

Data presented by OurWorldInData concerning plastic waste is based on information gathered from the UN Comtrade dataset on global trade of plastic waste. More specifically, the dataset "3915-Waste, parings and scrap, of plastics" from the UN's Comtrade Database. OurWorldInData´s research presents the development of plastic waste imports from 2007 to 2021 (Ritchie, 2022). As this thesis researches the impacts from China's ban, the data will concern the time-period 2017-2019, however an illustration (Figure 5, 6 and 7) of the plastic waste imports from 2010 to 2019 will be presented to illustrate the overall development of plastic waste within the cases. The decision to look at the time-period of 2017, 2018 and 2019 is grounded in the fact that it is likely that not all relocations happened immediately within the first year of China's ban and therefore it will give a better picture of the impacts by looking at this three-year period. On the other hand, it could have been insightful to look at the years 2020-2022 as well, however COVID-19 had major impacts on global trade, consumption and lifestyle during those years and it would impact the results of this research.

After illustrating that the high-income economies did not experience a significant growth in plastic waste imports after China's ban, it is time to conduct the same research of the developing countries presented by the UNCTAD research. This concerns the countries, Malaysia, Thailand, Vietnam, Turkey, and Indonesia. In addition to these countries, I added the countries presented in part 2.4.1 of the paper. The goal is to illustrate countries plastic waste import developments after 2017, and furthermore to be able to justify that these countries have been selected as cases based on the fact that these countries have, and have not, increased their imports significantly. These countries will later be used in the comparative analyses to research if any independent variables are statistically significant in causing increased import of plastic wastes.

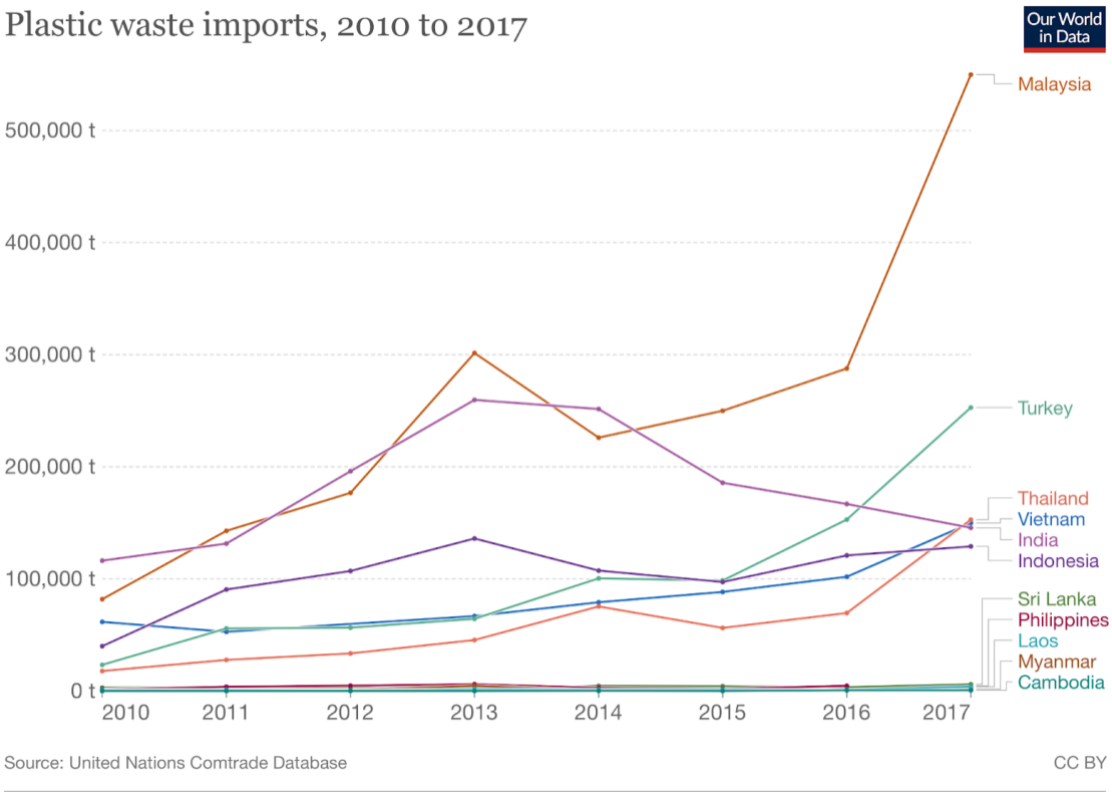


Figure 5*:* The development in volume of plastic waste imports in the case of selected countries in the period 2010-2017 (Ritchie, 2022).

In Figure 5, we can see an illustration of countries' plastic waste imports in 2017 based on total volume of imports. As clearly evident from this figure, there is significant differences between the levels of imports between the countries selected as cases within this research. Malaysia had clearly experienced a significant growth in the volume of imports from 2016 to 2017. Moreover, the countries Turkey, Thailand, Vietnam, and India also had import values higher than 100.000t in 2017. On the other hand, the countries Cambodia, Myanmar, Laos, Philippines, and Sri Lanka had all clearly lower levels of import volumes compared to the previously mentioned countries. Nevertheless, it is clear that the import levels also before 2018 differed significantly between the different countries. For this reason, an overview of the plastic waste import growth will be presented in relative changes later on.

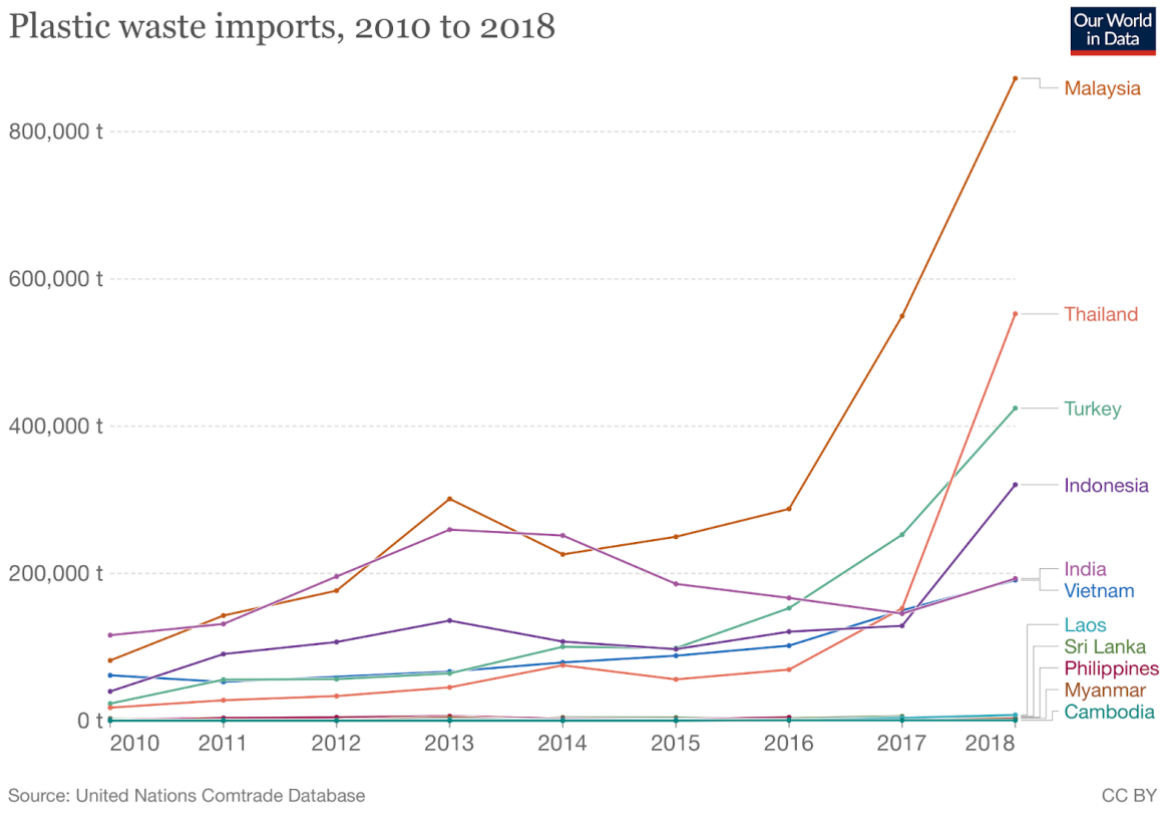


Figure 6*:* The development in volume of plastic waste imports in the case of selected countries in the period 2010-2018 (Ritchie, 2022).

This figure (Figure 6) illustrates the different significance of plastic waste imports between the selected countries in 2018. Both Malaysia, Thailand, Turkey, and Indonesia experienced a significant increase in the volume of plastic waste imports in 2018. Vietnam and India experienced a slightly smaller growth, whereas Laos, Sri Lanka, Philippines, Myanmar, and Cambodia experienced a small growth in the volume of plastic waste imports in 2018.

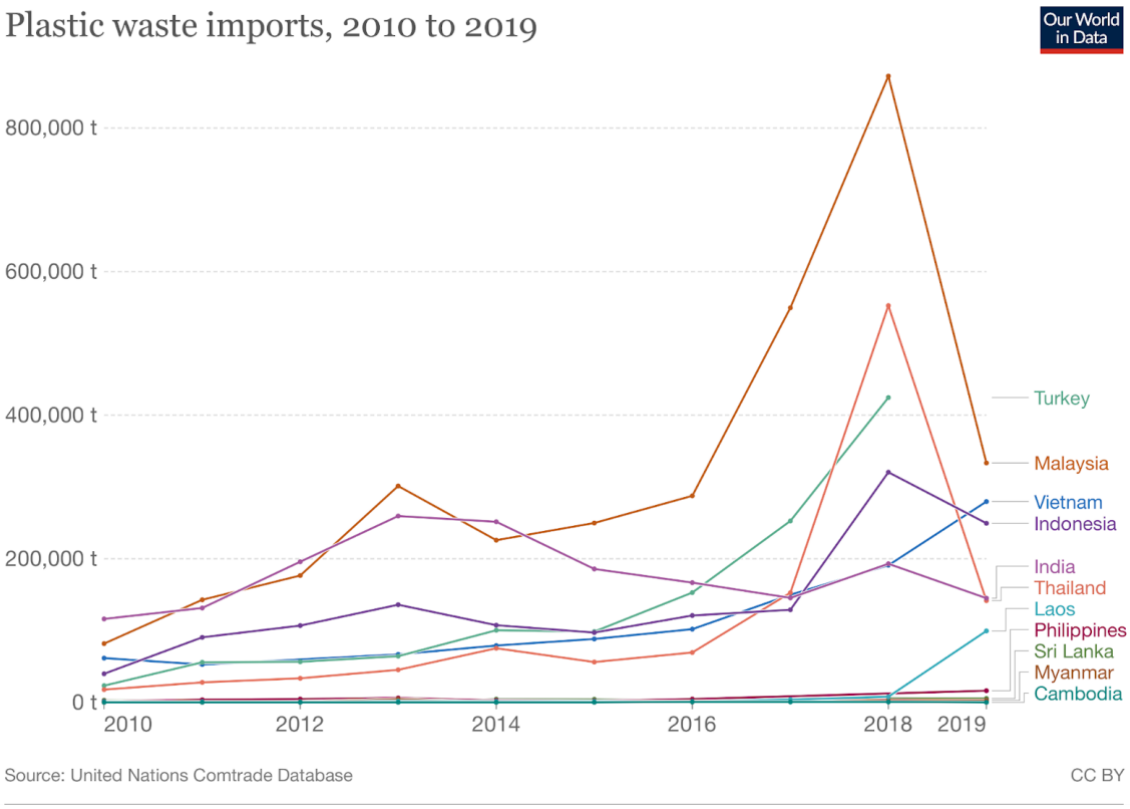


Figure 7*:* The development in volume of plastic waste imports in the case of selected countries in the period 201-2019 (Ritchie, 2022).

The figure (Figure 7) presenting the plastic waste imports in 2019 have some notable differences in the graphs representing Malaysia, Thailand, Indonesia, Vietnam, Turkey, and Philippines compared to Figure 6. Both Malaysia, Indonesia, and Thailand experienced a return to previous values of waste that year. On the other hand, Vietnam, Turkey, and Laos experienced a continued growth in the volume of plastic waste imports. The reason behind this increase and decline will be further researched in the following research part of the thesis.

As seen in the Figure 5-7, Turkey had a stable increase in the volume of imported plastic waste. The high growth of imports of plastic waste by Turkey can be seen in relation to the fact that the European Union has implemented their own restrictions on plastic waste. These restrictions are the 14th conference of the Parties of the Basel Convention, the Delegated Regulation (EU) 2020/2174, and new entries for shipments within the OECD (AC300) and the EU (EU48 and EU3011) have also been introduced into the EU Waste Shipment Regulation (The European Commission, 2020). These regulations are among others banning

the export of hazardous waste and plastic that is hard to recycle from the EU to non-OECD countries (European Parliament, 2023). Turkey, an OECD member, have experienced a significant increase in plastic waste imports (Figure 7), possible as a reason of these new EU regulations.

As seen on the figures already presented (figure 4-7) there are major differences between the countries when it comes to volume of imports. One group of countries, Cambodia, India, Sri Lanka, and the Philippines have significantly lower imports than the other countries. The next two tables will present the imports of plastic waste in the different countries in the years 2016, 2017, 2018, and 2019. The year 2016 will be used as a baseline for the imports before China's ban and how the imports are affected after China's ban in 2017. By presenting both the table concerning the volume of plastic waste and the percentage of import development (relative change) it will be possible to illustrate the new importers of plastic waste based on different variables.

Countries	Waste tonnes 2016	Waste tonnes 2017	Waste tonnes 2018	Waste tonnes 2019	Average imports ++
Turkey	152 869 t	252 835 t	424 616 t	No data	185 856 t
Malaysia	287 673 t	549 786 t	872 535 t	333 499 t	296 600 t
Vietnam	101 906 t	149 927 t	190 966 t	279 717 t	104 964 t
Indonesia	120 978 t	128 924 t	320 519 t	249 561 t	112 023 t
Thailand	69 507 t	152 737 t	552 726 t	141 783 t	212 908 t
Laos	1 180 t	3 909 t	7 880 t	99 446 t	37 007 t
India	166 859 t	145 580 t	193 040 t	145 051 t	-5 635 t
Sri Lanka	3 355 t	5914 t	No data	5 365 t	2 284 t

Cambodia	646 t	369 t	584 t	71 t	-304 t
Philippines	4 650 t	No data	No data	16 330 t	11 680 t
Myanmar	687 t	1854 t	3 299 t	2 691 t	1 927 t
China	8 801 639 t	5 828 749 t	51 414 t	896t	-6 841 286 t

Figure 8: Imports of plastic waste in volume (tonnes) (Ritchie, 2022).

Figure 8 presents the plastic waste imports from the point of view of the total volume of their imports. China and the 11 countries selected as cases are presented in this table. China's imports will not have a big role in this research; however, it can be interesting to see China's development in imports after their own ban. Moreover, China's data can also be used as an illustration of how big volumes of plastic waste had to be relocated. In addition to showing the volume of plastic waste imports in the selected countries, Figure 8 also presents the overall import changes. This is calculated by averaging the value of plastic waste imports for the three years after China's ban (2017, 2018 and 2019), and subtracting the value of plastic waste imports before China's ban (2016). With this approach it is possible to account for the differences in plastic waste imports between countries before the ban, and to illustrate the changes in plastic waste imports once China's ban has been in place for several years, allowing more time for the ban to take effect.

Countries	Relative change 2016-2017	Relative change 2016-2018	Relative change 2016-2019	Average relative change
Turkey	+65%	+178%	No data	+121%
Malaysia	+91%	+203%	+16%	+103%
Vietnam	+47%	+87%	+174%	+102%
Indonesia	+7%	+165%	+106%	+92%
Thailand	+120%	+695%	+104%	+303%

Laos	+231%	+568%	+ 8,328%	+3042%
India	-13%	+16%	-13%	-3.3%
Sri Lanka	+76%	+76%	+60%	+70%
Cambodia	-1%	-10%	-89%	-33%
Philippines	No data	No data	+251%	+251%
Myanmar	+170%	+380%	+292%	+280%
China	-34%	-99%	-100%	-77%

Figure 9*:* Relative change of plastic waste imports in percentage between 2016-2017, 2016-2018 and 2016-2019 (Ritchie, 2022).

It is difficult to justify which of these measurements of plastic waste imports is most appropriate to determine which are the new importers of plastic waste, therefore, both statistics are presented. On one hand one could say that the most important variable is the total volume of plastic waste, as this will impact countries' waste management systems, mismanagement of plastic waste and the economy more than the countries with significantly lower volumes of plastic waste imports. However, there are also significant differences both when it comes to the country's economy and size of population that can explain the difference between countries' volume of imported plastic waste. On the other hand, it can also be argued that the relative change of plastic waste imports is a better way to illustrate the real impact of China's ban. As the relative changes present the changes of plastic waste import before and after China's ban and it takes into account that some countries had different volumes of imports also before the ban.

As seen in the already existing research presented in the literature review, different researchers presented different countries within Southeast Asia as new importers of plastic waste. One explanation for this can possible be because they have used different measurements to conduct their research.

According to the conducted and presented data in Figure 8, the countries that imported the most plastic waste and therefore can be seen as the new importers of plastic waste are Turkey, Malaysia, Vietnam, Indonesia, and Thailand. All these five countries had a change in the volume of plastic waste import greater than 100 000t, when taking the average of imports between 2017 and 2019 subtracted by the number of imports in 2016, before China's ban.

A quite different picture of which countries are the new importers of plastic waste is illustrated when we look at the relative changes of countries' plastic waste imports in Figure 9. Based on the data analysed and presented in Figure 9, the countries emerging as new importers of plastic waste include Laos, Myanmar, Turkey, Thailand, and the Philippines. Notably, all these nations witnessed a substantial surge in plastic waste imports, surpassing a remarkable 120% increase.

4. The reasons behind countries' levels of plastic waste imports

In this section of the research, the presented data and its conceptualization will be discussed. The conducted data will further be applied in the multiple regression analysis.

In order to conduct a research covering the imports of plastic waste in the most accurate way possible, the decision to use four dependent variables was made. The dependent variables that have been used are,

1. *Average amount of plastic waste imported by the countries in the period 2017-2019*, measured in tonnes.
2. *The average of relative change in plastic waste imports in the period before China's ban (2016) compared to the period after the implementation of the ban (2017, 201,8 and 2019).* Values shown in percentages.
3. *Country's plastic waste imports relative to the country's Gross Domestic Product*. Numbers used to calculate this dependent variable are the total volume of plastic waste imports relative to the country's GDP.
4. *Country's volume of plastic waste based on the amount of imported plastic waste after China's ban minus the amount the countries imported before the ban (2016), measured in tonnes*

As illustrated by the four different dependent variables, all four of the variables are covering the topic of countries' plastic waste imports. However, there are some clear differences between the dependent variables.

4.1 Dependent variables

The first dependent variable "Average amount of plastic waste imported by the countries in the period 2017-2019" is created to illustrate the countries' average plastic waste imports in the period after the Chinese ban (2017-2019). The justification for creating this variable, is that there were considerable differences in the imports of these countries throughout these three years. To make the variable as accurate as possible, it was necessary to calculate the average imports of each country for the three years during and after the ban. The data used to calculate the average can be seen in figure 4-6, where it is also clear that there are considerable differences in the countries' imports from one year to another. To calculate the average plastic waste imports, the data of one country's plastic waste imports from 2017 to 2019 was summed together and divided by three. This first dependent variable is pure data on the countries plastic waste imports, without any adjustments according to population, GDP, or other variables.

The second dependent variable "The average of relative change in plastic waste imports in the period before China's ban (2016) compared to the period after the implementation of the ban (2017,2018 and 2019)" is being applied on the grounds that the average change is an effective way to illustrate the impact of Chinas ban and the countries individual changes of plastic waste imports as a reaction to this ban. The relative change is calculated by taking the amount of plastic waste import in the countries in 2016 (before the ban) and then further comparing that to the amount in the year 2017, 2018 and 2019 and taking the average of these three results. In the same way as the first dependent variable, this variable illustrates the average relative change of the period 2017-2019. As illustrated in Figure 4-6, and briefly mentioned before, there are significant differences in the countries' volumes of plastic waste imports. As these differences were present already before the Chinese ban, a calculation of countries relative change can be helpful when distinguishing the real impact of China's plastic waste import ban. By calculating the relative change of plastic waste imports, it is possible to present the impact of the Chinese ban independent of the importance of the total

volume of import. This dependent variable is a better way of illustrating the import changes in the countries that also experienced lower volume of imports but have experienced a relatively large change relative to their own plastic waste imports.

The third dependent variable "Country's plastic waste imports relative to the country's Gross Domestic Product" is chosen based on the ground that there are major differences when it comes to both the plastic waste imports and the GDP between the researching countries. As some of the countries are bigger, have a larger economy, and different development levels than the others, a variable that calculates the import volume of plastic waste relative to the country's GDP aims to reduce these differences. By doing so, this variable can provide a more distinct picture of the reality of a country's plastic waste imports. As the two other dependent variables, also this variable is calculated by taking the average plastic waste imports of the countries in the period 2017-2019 and divided by the country's GDP.

The last dependent variable is "Country's volume of plastic waste based on the amount of imported plastic waste after China's ban minus the countries imported before the ban (2016)". The reason behind creating this dependent variable is to provide data that presents the different countries volume of plastic waste in the period after the Chinese ban, but with consideration of their level of imports before the ban. As already mentioned, there are great differences between the volume of plastic waste imports of the countries both before and after the ban so by subtracting the amounts of the plastic waste imports before Chinas ban, it presents clearer data on the actually changes in volume of plastic waste imports.

4.2 Independent variables

Concerning the independent variables applied in this research, they are all selected based on the four hypothesis, the four dependent variables, and moreover selected with the goal of finding the best possible answer to the research question of this thesis.

4.2.1 Social justice

Social justice is a broad term, and scholars have agreed that the definition of the term social justice depends on the context in which is being used (Taylor & Francis, n.d.). The term has had several definitions over the years. In this research social justice is seen in relation to fairness, equality, and development. By researching countries HDI, percentage of population

living in poverty, human rights, press freedom, and political situation the research aims to statistically test if a country's social justice has a significant impact on the level of plastic waste imports.

Human Development Index (HDI)

HDI has been chosen as an independent variable as HDI is a way to measure the development of the population within a state. The measurement of HDI ranges from 0 to 1 where the closer to 1 the higher the development is in the country. HDI is calculated based on three dimensions: a long and healthy life, access to education, and a decent standard of living (Roser, 2014). HDI has been applied in this thesis to gain a better understanding of whether a country's HDI can have a significant impact of the country's level of plastic waste imports. As HDI is a complex measure consisting of different factors (Nations, 2023), it can be one of the independent variables that differ between countries that otherwise have pretty similar values on other independent variables.

Poverty

Two other independent variables that has been applied to analyse the differences in social justice between countries is poverty. It is the World Bank that sets the International Poverty line. This poverty line is used to estimate the share of population living within the scope of international poverty. By researching which part of the population that lives under the two different poverty lines,[2] $1.90 a day, and $3.20 a day (Hasell, 2022), we can distinguish not only the economic income in countries but also the economic differences within a country and which part of the population that is having a very difficult financial situation. A higher number of the population living in poverty can be an illustration of a people in need, that have other more pressing problems in their lives than plastic waste imports and pollution. A larger share of people living within poverty can also be an illustration of a people that are in need of the financial gains of the plastic waste imports.

Press Freedom

The next independent variable used to analyse the level of social justice in a country is the level of press freedom in the country. By researching press freedom in the country, it will be

[2] Calculated with international dollars and 2011 prices.

possible to find the differences in the level of information sharing in the countries. This can also be used to look at the public knowledge about the topic plastic and plastic waste. Reporters Without Borders presents an overview about press freedom globally. Press freedom as presented by Reporters Without Borders is based on "the ability of journalists as individuals and collectives to select, produce, and disseminate news in the public interest independent of political, economic, legal, and social interference and in the absence of threats to their physical and mental safety" (RSF, 2021). Divided on a range from 1-100, where 100 is the best possible score, there are clear differences between the research countries' levels of press freedom. It is reasonable to expect that a higher level of press freedom in a country contributes to a better quality and quantity of information, public knowledge and a higher level of social justice, possibly influencing regulations on plastic waste management and ultimately levels of plastic waste imports. This is justified by the fact that a higher level of press freedom would lead to a higher level of public knowledge about the issue and thereafter most likely a higher pressure on the country's government.

Human rights

Human rights are a broad term that includes several factors. Based on Herre et al., human rights includes both physical integrity rights, civil rights, and political rights (Herre et al., 2013). It is clear that human rights are better protected in some countries than others, and by researching the human rights among the cases of countries the goal is to see if the level of human rights have an impact on the level of plastic waste imports. A higher level of human rights would mean a higher level of both political and civil rights, that can be related to the countries policies and attitude towards the import levels. The research of human rights is conducted from OurWorldInData that base their research on Civil Liberties Index by the varieties of Democracy (V-Dem) project (Herre et al., 2013).

Furthermore, social justice can be researched by analysing the political systems in a country. By researching the political systems and countries' democracy level the research aims to distinguish whether countries with less democratic political systems are more likely to increase their imports of plastic waste.

When it comes to the democracy level of the countries the data have been conducted from democracymatrix and OurWorldInData. The two sources present some different results concerning the democracy level of the states, therefore both sources have been presented in this research.

Level of electoral democracy

Democracymatrix base their data of democracy (level of electoral democracy) on three dimensions, freedom, equality, and control. Furthermore, these dimensions "can be combined with the five institutions procedures of decision, regulation of the intermediate sphere, public communication, guarantee of rights, and rules settlement and implementation, so that 15 matrix fields come into being, which are relevant for the investigation of democracy quality, and which are analysed by the democracy matrix" (Hasell, n.d.). This level of analysis of democracy is as already written based on a wide range of different variables, contributing to a realistic picture of the real situation. The reason why this variable has been analysed in relation to countries level of social justice is because a country's level of democracy arguably can have an impact of the country's plastic waste imports. A higher level of democracy reflects a higher level of freedom of public opinions. Facilitating for a situation where the government has to prioritize which topics to put on the agenda according to the public opinions. Shorty summarized, countries with higher level of democracy are more likely to have stricter regulations on plastic waste imports and therefore limited increase of plastic waste imports after China's ban.

Democracy

The other independent variable concerning democracy is conducted from a research by Herre et al., presented by OurWorldInData. This analysis of democracy focuses on to "which extent political leaders are elected under comprehensive voting rights in free and fair elections, and freedoms of association and expression are guaranteed. It ranges from 0 to 1 (most democratic)" (Herre et al., 2013). In relation to the other independent variable on democracy, the reason behind analysing this independent variable is grounded on the same arguments. A higher level of free elections of politicians puts pressure on the politicians to prioritize topics that concern the overall population, and it is likely that the negative impact of plastic waste imports could have been one of these topics.

Political regime

Lastly, another way to look at countries level of social justice is to analyse their type of political regime. Herre et al., (2013), have defined countries political regimes by using "the World classification by political scientists Anna Lührmann, Marcus Tannenberg and Staffan Lindberg". This classification distinguishes between closed autocracies, electoral autocracies, electoral democracies, and liberal democracies (Herre et al., 2013). By analysing the country's political regime, it is possible to answer if the assumptions that a more democratic political regime will lead to less imports of plastic waste. The argument behind this is the same as the two other independent variables. That more democratic regimes, leads to more power to the public opinion and a greater likelihood that government figures are taking actions on this topic.

4.2.2 Economic development

As the other hypothesis, the hypothesis concerning economic development embraces several different possible independent variables. As it can be hard to predict which of the measures of economic development that is best suited for this thesis, there has been applied different economic measures.

GDP

The first independent variable applied in the multiple regression analysis concerning economic development is Gross Domestic Product (GDP). GDP is known as a countries "monetary value of final goods and services – that is, those that are bought by the final user – produced in a country in a given period of time" (Callen, n.d.). Today, GDP is one of the most widely used indicators to measure economic activity and the size of a country's economy. By analysing the country's GDP, it can illustrate the different domestic economic situations between the countries being research in this thesis. As the hypothesis states that countries that have a higher level of economic development are less likely to increase their plastic waste imports after China's ban.

GDP per capita

The next selected independent variable is GDP per capita. GDP per capita is another way to measure a countries economic development. GDP per capita breaks down a country's economic output per person. GDP per capita is used to measure how countries economic

development is based on their economic growth per capita, calculated by dividing the country's GDP by its population. Usually, the view is that the higher the GDP per capita is, the higher the economically developed the country is (The investopedia team, 2023b). The data used in this independent variable is based on research conducted by OurWorldInData. They present the country's GDP per capita development from 1990 to 2018, both in economic growth and in relative growth (percentage). The GDP per capita values here have been adjusted according to the cost of living in the countries as well as inflation. Moreover, this independent variable aims to illustrates if the difference in the economic development between the countries selected in this research are having a significant impact on the country's plastic waste imports.

GNI

Gross National Income (GNI) is another variable that has been researched in connection to countries' economic development. GNI is the total income earned by a country's population over a set time. Furthermore, GNI "calculates the total income earned by a nation's people and businesses, including investment income, regardless of where it was earned. It also covers money received from abroad such as foreign investment and economic development aid" (The investopedia team, 2023a). The data of GNI is collected from the World Bank. The World Bank divide between low-income economies, lower-middle income economies, upper middle-income economies and high-income economies.[3] However, for the relevance of this research, only the values of the countries GNI has been analysed, not their categories of economic development in addition. The GNI measurement has been applied as an independent variable as GNI reflects the country's size of economy. Countries with higher GNI are more likely to have larger economies, and therefore, perhaps, less likely to import plastic waste.

GNI per capita

In the same way as with the GPD, it is possible to analyse the economic development from the per capita perspective of GNI. GNI per capita is the country's total income divided by

[3] In 2023 the World Bank presented these definitions of the different economies "for the current 2023 fiscal year, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of $1,085 or less in 2021; lower middle-income economies are those with a GNI per capita between $1,086 and $4,255; upper middle-income economies are those with a GNI per capita between $4,256 and $13,205; high-income economies are those with a GNI per capita of $13,205 or more" (World Bank, 2023).

the population of the country. The GNI per capita provides an insight into the country's average income per inhabitant, and therefore, the country's economic development. In connection to GNI, a higher level of GNI per capita indicates a higher economic development as well as higher standard of living.

4.2.3 Trade relations hypothesis

As the aim of this thesis is to research imports, one of the two major components of a country's level of trade is trade relations. The major arguments for applying trade as one of the hypothesis and thereafter trade indicators as independent variables is based on the fact that high levels of trade with foreign countries indirectly suggests that there are potentially many empty containers available that can be filled with waste on return to the origin country.

FDI

Foreign Direct Investment (FDI) serves as an independent variable in this study due to its role as an indicator of the extent of foreign investments entering the country's economy. Additionally, FDI is explained as a situation where an entity based in one country exercises control or exerts significant influence over the management of an industry situated in another country. This means that they have at least a 10 percent ownership or more of the shares of voting stock in the enterprise located abroad (Macrotrends, 2023a). As FDI illustrates the level of foreign investment in the country, it has been applied in this research to establish the level of investment openness in the country's economy, further pointing to the level of trade openness a country has. The data used to calculate countries Foreign Direct Investments (FDI) is retrieved from the webpage Macrotrends (Macrotrends, 2023a), a webpage presenting countries FDI development over time, based on data from the World Bank.

Trade openness

Another indicator of country's trade relations is the independent variable trade openness. Trade openness is calculated by taking the "sum of exports and imports divided by the GDP at current prices" (Ortiz-Ospina et al., 2018). Trade openness has been selected as one of the indicators to illustrate a country's trade relations, as trade openness illustrates the degree of a country's participation in international trade. It is reasonable to expect that countries that have a higher involvement in international trade have a higher likelihood of importing more

plastic waste. On the other hand, is also possible to use trade openness to look at the country's trade liberalization and to see if a higher level of trade liberalization is leading to higher of lower levels of plastic waste imports. The data on trade openness is based on the Trade openness Index of 2018 from OurWorldInData, shown in percentage (Ortiz-Ospina et al., 2018).

Trade balance

The last independent variables applied in the research to distinguish the countries trade relationship is trade balance. According to Macrotrends where the data is collected from, trade balance can be explained as "external balance on goods and services (formerly resource balance) equals exports of goods and services minus imports of goods and services (previously nonfactor services)" (Macrotrends, 2023b). Simplified, trade balance is presenting the differences between a country's levels of imports and exports. There might possibly be a significant difference in the plastic waste imports depending on if the country research is experiencing a trade surplus or a trade deficits. The data is based on the current U.S dollars.

4.2.4 Environmental standards

Also, the level of environmental standards present in a country can be measured in several different ways. Based on the available data and time limits of this thesis the independent variables chosen within this hypothesis focus on government policies related to plastic waste, and moreover government policies related to the imports of plastic. Further this section will present the waste management systems in the countries, as greater waste management systems can be correlated with enlarged focus and resources devoted to the environment, and stronger environmental regulations.

Government policies

As government policies are not presented through statistics the data conducted of countries government policies have not been implemented in the multiple regression analysis. This data has been analysed manually, as the sources here are of a qualitative manner. The research, analysis, and the result of countries government policies will be further elaborated in the next part of this thesis analyses.

In an ideal world, the trade of plastic waste and other wastes would be exported to those countries that have the best resources and systems to take care of this waste in the best possible way. However, this does not appear to be the current reality. As already shown throughout this thesis, the new importers of plastic waste are Southeast Asian countries. This part of the research is focused on the different countries waste management systems to illustrate if there is a correlation between countries waste management systems and their level of imports of plastic waste.

As the majority of available data concerning countries waste management systems are of a qualitative character, it was decided to find another angle to research countries waste management systems to be able to apply this data in the multiple regression analysis. One way to research countries plastic waste management systems is to look at the volume of mismanaged plastic waste, the volume of mismanaged plastic waste per capita, the volume of plastic waste emitted to the ocean and the volume of plastic waste emitted to the ocean per capita. It was only possible to retrieve relevant data on this topic from the year 2019. The data is collected from the webpage OurWorldInData.

Mismanaged waste

The data on mismanaged waste is analysed and presented as a variable that can be applied to illustrate the waste management systems in the countries. A higher level of mismanaged waste can be seen in relation to a poor waste management system. As stated above, the reason behind analysis of the level of mismanaged waste is to see whether there is a correlation between new importers of plastic waste and their waste management systems. It should have been those countries with the best waste management systems and resources to deal with the imported plastic waste that increased their imports of plastic waste the most after China's ban, however the data shows another reality.

Mismanaged waste per capita

As there are major differences between the density of the population in the selected countries, it is important to look at the mismanaged waste relative to the population. By taking the mismanaged waste divided by the population we are left with more representable data concerning the volume of waste that is not managed properly in the state. As a greater population, represents a higher number of people producing and wasting trash and plastic,

this adjustment is crucial. Most likely there will be differences when comparing the results of country's mismanaged plastic waste and the mismanaged plastic waste per capita.

Plastic waste emitted to the ocean

Another way to research countries waste management systems is by analysing their levels of plastic emitted to the ocean. By researching the amount of plastic emitted to the ocean it is possible to evaluate how good countries waste management systems are functioning. Higher levels of plastic waste emitted to the ocean is related to poorer waste management systems. This can be both locally, regionally, and domestically. Waste management system is used as a variable under countries environmental standards as governments with higher focus on environment protection would have prioritized resources on the country's waste management systems and hereunder show as lower levels of plastic waste emitted to ocean. Even though the main focus of this variable is to establish countries environmental standards, it is also important to mention that countries can experience major differences in their levels of waste emitted to the oceans also on the grounds of the country infrastructure, division of population and economic development.

Plastic waste emitted to the ocean per capita

Plastic waste emitted to the ocean per capita is also being research to distinguish the level of plastic waste emitted to the ocean per capita in the country. Using the same justification as the abovementioned independent variables looking into the phenomenon from the perspective of per capita, the main reason also here is to remove the countries differences in population numbers to get a more realistic picture of the actual amount of plastic waste emitted to the ocean. A higher level of population is often correlated with a higher level of distribution of plastic and production of plastic waste, leading to a higher level of plastic waste emitted to the ocean.

4.3 Research groups

Further, seven different combinations of independent variables have been created. There are in total 19 independent variables that have been arranged together in different groups and patterns within these seven research groups. The main argument for making seven different groups with different combinations of independent variables is that some of the independent

variables are based on the same data. The fact that these independent variables are based on the same data leads to correlation problems. When two or more independent variables that correlate are put into the same multiple regression analysis it is impossible to understand which of these independent variables affects the dependent variable the most. So, to avoid these correlations there has been created seven different analyses for all four dependent variables.

The main issue in the beginning of the research process was that GDP per capita and GNI per capita could not be analysed in the same multiple regression model. As a result of this discovery, a linear regression analysis was conducted on the different independent variables to distinguish which of the variables correlate, and therefore, which of the variables could be placed within the same multiple regression model.

A multiple regression model provides results on several aspects of the data applied. For the aim of this research, there was especially four elements of the multiple regression models that was important for this research.

First of all, the R^2 value from regression statistics is of importance for this research. R^2 is the coefficient of Determination, an indicator of the variables fit (Cheusheva, 2023). This number range from 1 to 0, where the closer this number is to 1 the better it is. This number represents the goodness or fit of the independent variables. That would say, the R^2 illustrates how well the independent variables are describing the dependent variable. The R^2 value indicates the proportion of the dependent variable explained by the independent variable, representing the percentage of variance in the dependent variable accounted for by the independent variable. For instance, an R2 value of 0.81 suggests that approximately 81% of the variation in the dependent variable can be attributed to the independent variable.

The second crucial element of the multiple regression analysis is to analyse the coefficient value. This value can either be positive or negative, depending on how the independent and dependent variable is correlated. If the value is positive, it signifies that a one-point increase in the independent variable corresponds to a proportional upward movement in the dependent variable, as determined by the coefficient.

This means that when the independent variable, representing the level of countries trade openness increase with one point, then the level of countries plastic waste imports will also increase. If the value of coefficient is negative, it will be the other way around. An increase in the independent variable will be correlated with a decrease in the dependent variable. This is important to analyse, as it is crucial to understand which part of the independent variable are affecting countries levels of plastic waste imports.

Lastly, and most importantly for this research is the P-value present in the multiple regression analysis. This number also range from 0-1, however in this section, the lower this number is the better it is. So, the lower the P-value is, the more statistically significant the independent variable is. Moreover, the lower this number is the higher level of impact it has on the independent variable, stating that it has an impact on the result of the dependent variable. In this thesis, independent variables with low P-values can be said to have significant impact on the results of countries plastic waste imports after China's ban. I have chosen to divide the P-values into four categories, depending on the significance of impact on the result. The first category is a P value over 0.1, this means that the independent variable is not significantly important for the outcome on the dependent variable. Further, the next category is up to 0.1, meaning that there is 90% likelihood that the independent variable is statistically significantly impacting the dependent variable and that it is only 10% chance that this effect happened by a coincidence. The last two categories are based on the same arguments as the first two categories, the values of the last categories are 0.05 and 0.01.

Now combining all four elements of the analysis it is possible to distinguish if the choice of independent variables are good indicators of the dependent variable and moreover, which of the independent variables that have an impact on the level of plastic waste imports in the different countries.

As mentioned, seven groups of independent variables have been created. These seven groups that have been tested on the four dependent variables are,

1. GINI, Mismanaged waste, democracy level, trade openness, and HDI
2. GDP, Mismanaged waste per capita, political regime, trade balance, and Poverty Line
3. GDP Per capita, GDP, Plastic in the ocean, poverty line, electoral democracy, and FDI
4. GNI per capita, GNI, Plastic in the ocean per capita, poverty line, FDI, and Press freedom

5. GNI, GNI per capita, Mismanaged waste, press freedom, trade openness, and Electoral democracy
6. FDI, GDP per capita, GDP, Mismanaged waste per capita, human rights, Trade openness, and poverty line
7. GDP, GDP per capita, Plastic in the ocean, HDI, FDI, Political regime, and press freedom

5. The conducted Multiple Regression Analysis

As mentioned above, there has been undertaken several multiple regression analyses as part of this thesis. To begin with, I would like to give attention to the research processes. Four multiple regression models were run with the seven independent variables presented above. The multiple regression analysis was run in RStudio. With the use of this package, it was now possible to present all seven multiple regression analysis of one dependent variable in the same table.

There were some expected outcomes of the research as well as some unexpected outcomes. The most intriguing finding from the multiple regression analysis is the apparent weakness of several independent variable groups, as evidenced by their notably low R^2 values. This suggests that these variables might not have sufficient explanatory power to outline the factors influencing a country's approach to plastic waste imports. When looking at the overall R^2 value presented for the four multiple regression models some of the independent variable was statistically better fit to the dependent variables than the others. The unexpected finding was that only a few independent variable groups demonstrated a strong association with the dependent variable, despite all of them being based on the same data on plastic waste imports, albeit with various adjustments.

5.1 Multiple regression analysis of all four dependent variables

Dependent variable 1: *Average amount of plastic waste imported by the countries in the period 2017-2019*.

Table 1 Summary of results: Effects of states' characteristics on the amount of plastic imported

	Dependent variable:						
	Amount of plastic waste imported in tonnes (2017-2019)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Gini Coefficient	5,451.380						
	(21,880.930)						
Mismanagement of Waste	0.007				-0.025		
	(0.016)				(0.035)		
Democratic Level	-2,919.160						
	(2,976.672)						
Trade Openness	2,081.552				2,094.758	630.686	
	(1,537.233)				(3,986.632)	(1,906.900)	
HDI	1,352,461.000						-1,267,064.000
	(854,295.600)						(434,476.000)
GDP per Capita			55.335*			53.247*	78.077**
			(15.527)			(19.819)	(11.238)
GDP		0.00000	-0.00000			-0.00000	-0.00000**
		(0.00000)	(0.00000)			(0.00000)	(0.00000)
Mismanagement of Waste per Capita		7,904.975				-4,205.666	
		(6,315.422)				(3,704.584)	
Political Regime		-41,656.100					-55,593.950
		(97,778.280)					(40,901.780)
Trade Balance		0.00001					
		(0.00000)					
Plastic Emitted to Ocean			-0.0005				-0.0004
			(0.0004)				(0.0002)
GNI per Capita				53.179**	41.414		
				(13.673)	(15.064)		
GNI				-0.00000	0.00000		
				(0.00000)	(0.00000)		
Plastic Emitted to Ocean per Capita				-16,983.290			
				(36,287.020)			
Human Rights Index						179,162.000	
						(195,452.600)	
Poverty Line		-5,580.846	4,417.504	1,789.853		4,829.094	
		(11,653.070)	(10,031.780)	(8,056.379)		(9,695.210)	
Elected Democracy			284,977.000		157,363.300		
			(325,761.300)		(948,652.900)		
Foreign Direct Investment			37,623.900	22,393.440		17,554.230	42,128.320**
			(18,717.870)	(16,641.620)		(25,956.860)	(7,494.631)
Press Freedom				2,733.745	2,093.327		4,268.560
				(5,000.471)	(22,534.160)		(2,132.674)
Constant	-876,081.100	53,474.220	-317,313.500	-324,823.900	-447,395.300	-270,207.100	445,442.500
	(671,196.200)	(196,953.900)	(224,566.300)	(304,892.400)	(677,339.300)	(169,933.900)	(327,315.200)
Observations	10	10	9	10	9	11	10
R^2	0.624	0.659	0.920	0.896	0.946	0.912	0.985
Adjusted R^2	0.155	0.232	0.679	0.689	0.786	0.706	0.931
Residual Std. Error	174,564.900 (df = 4)	166,425.500 (df = 4)	114,080.700 (df = 2)	105,961.400 (df = 3)	93,165.750 (df = 2)	100,542.800 (df = 3)	50,050.200 (df = 2)
Note:							*p<0.1; **p<0.05; ***p<0.01

Figure 10: Independent variables impact on the average amount of plastic waste imported by the countries in the period 2017-2019.

As seen on Figure 10, individual variable group 3 -7 have R^2 values that show a pretty good fit. Group 3 have 92% fit; group 4 have 89% fit, group 5 have a 94% fit, group 6 have 91% fit and group 7 have a 98% fit. From group 3, GDP per capita have a P-value below 0.1, showing that GDP per capita has a 90% significant influence on the dependent variable.

From group 4, GNI per capita have a P-value below 0.05, showing that GNI per capita has a 95% significant influence on the dependent variable. From group 6, GDP per capita have a P-value bellow 0.1. From group 7 both FDI, GDP and GDP per capita have a P-value bellow 0.05, showing that all these variables have a statistically significant impact on the dependent variable.

Dependent variable 2: *The average of relative change in plastic waste imports in the period before Chinas ban (2016) compared to the period after the implementation of the ban (2017, 2018 and 2019).*

Table 2 Summary of results: Effects of states' characteristics on plastic waste import relative change between 2017 and 2019

	Dependent variable:						
	Plastic waste import relative change in percentage (2017-2019)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Gini Coefficient	-14.386						
	(19.217)						
Mismanagement of Waste	-0.00001				0.0001		
	(0.00001)				(0.00004)		
Democratic Level	0.253						
	(2.614)						
Trade Openness	-0.308				-11.619	-16.953	
	(1.350)				(4.682)	(20.368)	
HDI	535.648						860.301
	(750.290)						(1,421.477)
GDP per Capita			-0.023*			0.090	-0.021
			(0.006)			(0.212)	(0.037)
GDP		-0.000	0.000			-0.000	0.000
		(0.000)	(0.000)			(0.000)	(0.000)
Mismanagement of Waste per Capita		2.064				-34.029	
		(4.474)				(39.569)	
Political Regime		40.202					152.771
		(69.269)					(133.819)
Trade Balance		-0.000					
		(0.000)					
Plastic Emitted to Ocean			0.00000*				0.00000
			(0.00000)				(0.00000)
GNI per Capita				-0.015	0.036		
				(0.017)	(0.018)		
GNI				-0.000	-0.000		
				(0.000)	(0.000)		
Plastic Emitted to Ocean per Capita				17.120			
				(44.749)			
Human Rights Index						-3,722.802	
						(2,087.638)	
Poverty Line		-11.443	-24.730**	-16.167		9.629	
		(8.255)	(3.675)	(9.935)		(103.555)	
Elected Democracy			-512.838*		-2,692.559		
			(119.354)		(1,114.025)		
Foreign Direct Investment			-0.583	5.721		156.885	-14.471
			(6.858)	(20.523)		(277.246)	(24.520)
Press Freedom				2.865	59.670		3.726
				(6.167)	(26.462)		(6.977)
Constant	304.863	86.788	548.060**	99.506	-1,284.106	3,775.361	-833.438
	(589.482)	(139.527)	(82.278)	(375.994)	(795.415)	(1,815.072)	(1,070.879)
Observations	10	10	9	10	9	11	10
R^2	0.210	0.533	0.970	0.570	0.798	0.649	0.550
Adjusted R^2	-0.777	-0.051	0.882	-0.291	0.190	-0.170	-1.027
Residual Std. Error	153.313 (df = 4)	117.900 (df = 4)	41.797 (df = 2)	130.672 (df = 3)	109.407 (df = 2)	1,073.903 (df = 3)	163.750 (df = 2)

Note: *p<0.1; **p<0.05; ***p<0.01

Figure 11: Independent variables impact on the average of relative change in plastic waste imports in the period before Chinas ban (2016) compared to the period after the implementation of the ban (2017, 2018, and 2019).

As seen on Figure 11, only independent variable 3 and 5 has a R^2 that shows a pretty good fit, 97% and 79%. From the individual variable group 3, GDP per capita, Plastic emitted to the ocean, Poverty line and Electoral democracy have a statistically significant P-value. GDP pr capita, plastic emitted to the ocean ad electoral democracy have a P-value bellow 0.1. Poverty line have a P-value lower than 0.05.

Dependent variable 3: *Countries plastic waste imports relative to the country's Gross Domestic Product*.

Table 3 Summary of results: Effects of states' characteristics on plastic waste import relative to GDP

	Dependent variable:						
	Plastic waste import relative to GDP (tonnes and billions)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Gini Coefficient	18.483						
	(42.731)						
Mismanagement of Waste	-0.00000				0.00002		
	(0.00003)				(0.0001)		
Democratic Level	-12.513*						
	(5.813)						
Trade Openness	10.046**				6.345	-2.214	
	(3.002)				(12.927)	(18.488)	
HDI	2,666.084						-3,797.594
	(1,668.349)						(3,409.297)
GDP per Capita			0.143			0.146	0.205
			(0.065)			(0.192)	(0.088)
GDP		0.000	-0.000			-0.000	-0.000
		(0.000)	(0.000)			(0.000)	(0.000)
Mismanagement of Waste per Capita		15.048				-30.587	
		(22.435)				(35.917)	
Political Regime		76.434					-134.781
		(347.355)					(320.953)
Trade Balance		0.000					
		(0.000)					
Plastic Emitted to Ocean			-0.00000				-0.00000
			(0.00000)				(0.00000)
GNI per Capita				0.117	0.106		
				(0.059)	(0.049)		
GNI				-0.000	0.000		
				(0.000)	(0.000)		
Plastic Emitted to Ocean per Capita				17.155			
				(157.183)			
Human Rights Index						-1,231.197	
						(1,894.964)	
Poverty Line		-21.964	15.709	3.026		14.574	
		(41.397)	(42.297)	(34.897)		(93.998)	
Elected Democracy			1,085.471		244.358		
			(1,373.508)		(3,076.031)		
Foreign Direct Investment			127.862	86.837		90.318	141.861
			(78.920)	(72.086)		(251.659)	(58.810)
Press Freedom				7.290	34.202		13.248
				(21.660)	(73.068)		(16.735)
Constant	-1,746.934	4.575	-1,022.134	-867.680	-2,789.661	968.882	1,309.169
	(1,310.775)	(699.674)	(946.839)	(1,320.686)	(2,196.289)	(1,647.554)	(2,568.416)
Observations	10	10	9	10	9	11	10
R^2	0.815	0.444	0.801	0.749	0.921	0.454	0.877
Adjusted R^2	0.584	-0.250	0.202	0.246	0.685	-0.821	0.448
Residual Std. Error	340.907 (df = 4)	591.223 (df = 4)	480.999 (df = 2)	458.987 (df = 3)	302.092 (df = 2)	974.789 (df = 3)	392.740 (df = 2)
Note:							*p<0.1; **p<0.05; ***p<0.01

Figure 12: Independent variables impact on countries plastic waste imports relative to the country's Gross Domestic Product.

As seen on Figure 12, independent variable group 1, 3, 4, 5 and 7 has a R^2 value high enough to support a good fit of the independent variables towards the dependent variable, 81%, 80%, 92% and 87%. Both democracy level and trade openness have a statistically significant correlation to the dependent variable in independent variable group 1. Trade openness has a P-value bellow 0.05 and democracy level have a P-value lower than 0.1.

Dependent variable 4: *Countries volume of plastic waste based on the amount of imported plastic waste after China's ban subtracted the amount the countries imported before the ban (2016).*

Table 4 Summary of results: Effects of states' characteristics on plastic waste import comparaison between 2016 and 2017-2019

	Dependent variable:						
	Plastic waste import comparaison between 2016 and 2017-2019						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Gini Coefficient	145.734						
	(11,386.590)						
Mismanagement of Waste	-0.002				-0.004		
	(0.008)				(0.015)		
Democratic Level	-922.219						
	(1,549.027)						
Trade Openness	952.391				-823.043	-448.668	
	(799.959)				(1,701.520)	(1,030.506)	
HDI	877,576.000						-356,311.500
	(444,566.000)						(265,624.500)
GDP per Capita			28.556**			35.555**	36.228**
			(6.079)			(10.710)	(6.871)
GDP		0.00000*	-0.00000*			-0.00000	-0.00000**
		(0.00000)	(0.00000)			(0.00000)	(0.00000)
Mismanagement of Waste per Capita		5,075.687				-2,413.304	
		(2,492.511)				(2,001.992)	
Political Regime		-22,026.590					4,357.449
		(38,590.210)					(25,006.020)
Trade Balance		0.00000**					
		(0.00000)					
Plastic Emitted to Ocean			-0.0003				-0.0002
			(0.0002)				(0.0001)
GNI per Capita				30.268***	28.195**		
				(5.118)	(6.429)		
GNI				-0.00000*	0.00000		
				(0.00000)	(0.00000)		
Plastic Emitted to Ocean per Capita				-17,959.030			
				(13,582.810)			
Human Rights Index						10,177.280	
						(105,624.400)	
Poverty Line		-2,828.581	-843.457	-57.706		2,976.777	
		(4,599.122)	(3,927.682)	(3,015.630)		(5,239.382)	
Elected Democracy			34,230.220		-453,534.500		
			(127,543.300)		(404,891.200)		
Foreign Direct Investment			22,805.170*	16,725.570*		19,693.160	19,954.180**
			(7,328.489)	(6,229.224)		(14,027.330)	(4,581.973)
Press Freedom				2,706.135	11,608.950		3,261.117
				(1,871.756)	(9,617.727)		(1,303.847)
Constant	-522,926.600	18,478.460	-95,702.010	-239,384.800	-462,766.900	-68,563.830	-60,908.890
	(349,283.000)	(77,731.910)	(87,923.030)	(114,126.000)	(289,092.800)	(91,833.860)	(200,109.900)
Observations	10	10	9	10	9	11	10
R^2	0.691	0.839	0.963	0.956	0.970	0.919	0.982
Adjusted R^2	0.305	0.637	0.851	0.868	0.882	0.731	0.921
Residual Std. Error	90,841.620 (df = 4)	65,683.260 (df = 4)	44,665.290 (df = 2)	39,663.020 (df = 3)	39,763.740 (df = 2)	54,334.290 (df = 3)	30,599.060 (df = 2)

Note: *p<0.1; **p<0.05; ***p<0.01

Figure 13: Independent variables impact on countries volume of plastic waste based on the amount of imported plastic waste after China's ban subtracted the amount the countries imported before the ban (2016).

As seen on Figure 13, several of the independent variables have an R^2 value that indicates a good fit between the independent and dependent variable. GDP is statistically significant in three instances with a P-value 0.1, 0.1 and 0.05. GDP per capita is statistically significant in three instances, with P-values bellow 0.05. GNI per capita has one instance with a P-value bellow 0.05 and one instance of P-value bellow 0.01. GNI has one instance of P-value bellow 0.1. FDI is significant in three instances, with P-values bellow 0.1, 0.1 and 0.05. Trade balance has a P-value bellow 0.1 at one instance. Both GDP, Trade balance, and GNI have a coefficient very close to 0, what this indicates will be explained later on in the thesis.

As illustrated by Figure 10-13, the majority of the groups of independent variables have a good fit to the dependent variable illustrated R^2. However, only a few of the independent variables have a significant impact on the depend variable. To summarize the results from these four multiple regression analyses, the economic variables dominated the group of statistically significant independent variables. GDP per capita has statistically significant P-values seven times, with a P-values 0.1, 0.1, 0.1, 0.05, 0.05, 0.05 and 0,1 (-). GNI per capita has statistically significant P-values four times, with a P-value 0.05, 0.1, 0.05 and 0.01. GDP has statistically significant P-values three times, with a P-value 0.1, 0.05 and 0.01. FDI has statistically significant P-values two times, with a P-value 0.1 and 0.01. Trade openness was statistically significant one time as well, with a P-value 0.05. Democracy level was statistically significant one with a P-value bellow 0.1 and a negative coefficient (-) Then independent variable plastic emitted to the ocean, poverty line, electoral and electoral democracy (-) was statistically significant in one instance each with a P-value of 0.1.

The outcomes of the four multiple regression analyses did not demonstrate a strong statistical significance overall, as only a few independent variables were found to be statistically significant, except for the economic variables. Therefore, it was necessary to analyse different compositions of the independent variables. First, to use the same groups of independent variables as already run in the multiple regression analysis, but without the economic variables GNI, GNI per capita, GDP, GDP per capita and FDI. As a result of dependent variable 1 and 2 being used to distinguish the new importers of plastic waste, it is most relevant to continue with these variables. However, dependent variable 1 has a better overall R^2. Having the strongest overall R^2 values and concerning the time limits of this research, I decided to continue the new multiple regression models based on this variable.

Table 1.1 Summary of results: Effects of states' characteristics on the amount of plastic waste imported

	Dependent variable:						
	Average of plastic waste imported in tonnes (2017-2019)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Gini Index	5,451.380				30,337.920		
	(21,880.930)				(32,242.670)		
Mismanagement of Waste	0.007				0.010		
	(0.016)				(0.025)		
Democracy Level	-2,919.160						
	(2,976.672)						
Trade Openness	2,081.552				-2,189.942	1,063.841	
	(1,537.233)				(7,923.306)	(1,312.946)	
Human Development Index	1,352,461.000						1,457,459.000*
	(854,295.600)						(632,975.000)
Mismanagement of Waste (per capita)		2,720.664				2,685.791	
		(7,610.713)				(5,906.307)	
Political Regime		25,898.830					50,986.720
		(120,797.800)					(85,037.610)
Trade Balance		0.00000					
		(0.00000)					
Human Rights			-0.0002				-0.0003
			(0.001)				(0.001)
Plastic Emitted to Ocean				20,258.160			
				(65,277.290)			
Plastic Emitted to Ocean (per capita)						105,782.500	
						(349,102.700)	
Poverty Line		-13,350.210	-17,461.480	-17,308.830		-15,273.570	
		(14,454.680)	(13,082.780)	(12,637.200)		(12,015.940)	
Electoral Democracy			-245,031.000		-1,189,648.000		
			(491,102.400)		(2,186,703.000)		
Foreign Direct Investment				5,227.136		5,355.099	3,399.994
				(6,001.891)		(5,340.966)	(4,781.618)
Press Freedom				1,799.849	33,307.050		
				(6,551.903)	(49,854.280)		
Constant	-876,081.100	149,790.700	373,318.000	79,115.640	-2,220,693.000	-13,381.030	-991,596.700*
	(671,196.200)	(250,370.000)	(227,542.600)	(359,914.500)	(2,369,170.000)	(269,492.200)	(487,956.500)
Observations	10	10	9	10	9	11	10
R^2	0.624	0.272	0.283	0.337	0.370	0.462	0.561
Adjusted R^2	0.155	-0.310	-0.147	-0.193	-0.680	-0.075	0.209
Residual Std. Error	174,564.900 (df = 4)	217,377.500 (df = 5)	215,540.300 (df = 5)	207,395.400 (df = 5)	260,800.200 (df = 3)	192,347.200 (df = 5)	168,870.400 (df = 5)
F Statistic	1.330 (df = 5; 4)	0.467 (df = 4; 5)	0.658 (df = 3; 5)	0.637 (df = 4; 5)	0.353 (df = 5; 3)	0.860 (df = 5; 5)	1.596 (df = 4; 5)
Note:							*p<0.1; **p<0.05; ***p<0.01

Figure14: Social Justice, Trade and Environmental regulations impact on countries volume of plastic waste imports.

Figure 14 presents the same independent groups as used in Figure 10-13 but without the economic variables GDP, GDP per capita, and GNI per capita. However, FDI that can be seen both as an economic variable and a variable presenting trade is still part of this multiple regression analysis. The results found in this multiple regression mode is that only independent variable HDI has a statistically significant P-value in one instance.

Table 1.2 Summary of results: Effects of states' characteristics on the amount of plastic waste imported

	Dependent variable:						
	Average of plastic waste imported in tonnes (2017-2019)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Gini Index	5,451.380				30,337.920		
	(21,880.930)				(32,242.670)		
Mismanagement of Waste	0.007				0.010		
	(0.016)				(0.025)		
Democracy Level	-2,919.160						
	(2,976.672)						
Trade Openness	2,081.552				-2,189.942	956.701	
	(1,537.233)				(7,923.306)	(1,309.168)	
Human Development Index	1,352,461.000						1,432,472.000*
	(854,295.600)						(605,400.700)
Mismanagement of Waste (per capita)		2,720.664				2,694.720	
		(7,610.713)				(5,908.908)	
Political Regime		25,898.830					57,930.470
		(120,797.800)					(80,919.850)
Trade Balance		0.00000					
		(0.00000)					
Human Rights			-0.0002				-0.0003
			(0.001)				(0.0005)
Plastic Emitted to Ocean				13,821.460			
				(63,538.840)			
Plastic Emitted to Ocean (per capita)						168,571.100	
						(343,591.700)	
Poverty Line		-13,350.210	-17,461.480	-15,516.220		-13,345.060	
		(14,454.680)	(13,082.780)	(12,214.940)		(11,866.230)	
Electoral Democracy			-245,031.000		-1,189,648.000		
			(491,102.400)		(2,186,703.000)		
Press Freedom				1,205.999	33,307.050		
				(6,383.833)	(49,854.280)		
Constant	-876,081.100	149,790.700	373,318.000	174,382.200	-2,220,693.000	18,071.870	-943,224.900*
	(671,196.200)	(250,370.000)	(227,542.600)	(335,917.400)	(2,369,170.000)	(267,778.400)	(462,855.800)
Observations	10	10	9	10	9	11	10
R^2	0.624	0.272	0.283	0.237	0.370	0.354	0.516
Adjusted R^2	0.155	-0.310	-0.147	-0.145	-0.680	-0.076	0.274
Residual Std. Error	174,564.900 (df = 4)	217,377.500 (df = 5)	215,540.300 (df = 5)	203,178.500 (df = 6)	260,800.200 (df = 3)	192,432.200 (df = 6)	161,763.400 (df = 6)
F Statistic	1.330 (df = 5; 4)	0.467 (df = 4; 5)	0.658 (df = 3; 5)	0.621 (df = 3; 6)	0.353 (df = 5; 3)	0.823 (df = 4; 6)	2.135 (df = 3; 6)
Note:							*p<0.1; **p<0.05; ***p<0.01

Figure 15: Social Justice, Trade and Environmental regulations impact on countries volume of plastic waste imports (without FDI).

Figure 15 presents the same independent groups as used in Figure 10-13 but without any variables representing the economic factors. As seen in the Figure 14 and 15, the R^2 values in this multiple regression analysis is lower. This is expected as economy is a major explanatory part of this dependent variable. However, the decision to make these changes in the multiple regression analysis is to see which of the other independent variables that might have a statistically significant relationship now that the economic variables are no longer part of the analysis. Unfortunately, the multiple regression analysis (Figure 14 and 15) is not contributing to any major changes of the results from the previously multiple regression analysis. The only variable that seems to have a statistically significant impact on the

dependent variable now that the economic factors are removed is Human Development Index. The HDI variable has a P-value lower then 0.1, at least a 90% significance.

Another variant of multiple regression analysis that was conducted to get a broader perspective of the causes of countries' plastic waste imports was a multiple regression analysis conducted on each group of the different independent variables who represents each hypothesis, with exception to the economic variables. The reasons for this are that the economic variables are based on much of the same data, so there is a too high level of correlation between the variables to be able to analyse them within the same multiple regression model. This part of the research was conducted to see if any of the independent variables within the same research group had a stronger statistical significance than the others. The research was first run on the dependent variable "*Average amount of plastic waste imported by the countries in the period 2017-2019*". This showed itself not to be very successful. In this multiple regression analysis only one independent variable of all the independent variable had a statistically significant impact on the dependent variable. This independent variable is "Plastic waste emitted to the ocean" that had a P-value bellow 0.1. The variable is one of the environmental regulation's independent variables.

Table 5 Summary of results: Effects of states' group characteristics on the average of plastic waste imports

	Dependent variable:		
	Average of plastic waste imported in tonnes (2017-2019)		
	(1)	(2)	(3)
Mismanagement of Waste	0.004		
	(0.016)		
Mismanagement of Waste (per capita)	5,991.746		
	(11,427.020)		
Plastic Emitted to Ocean	-0.002		
	(0.001)		
Plastic Emitted to Ocean (per capita)	196,390.700		
	(145,134.100)		
Democracy Level		-9,943.674	
		(8,821.316)	
Political Regime		-43,909.150	
		(278,508.900)	
Poverty Line		17,074.340	
		(24,411.210)	
Press Freedom		-11,689.790	
		(32,513.590)	
Human Rights		511,316.500	
		(1,930,219.000)	
Human Development Index		2,254,568.000	
		(1,398,415.000)	
Electoral Democracy		-1,905,567.000	
		(2,017,454.000)	
Foreign Direct Investment			11,487.750
			(6,891.460)
Trade Balance			0.00000
			(0.00000)
Trade Openness			26.987
			(1,347.227)
Constant	80,990.570	806,077.800	69,240.210
	(141,609.300)	(2,434,989.000)	(149,490.600)
Observations	10	10	10
R^2	0.462	0.746	0.396
Adjusted R^2	0.032	-0.143	0.094
Residual Std. Error	186,846.700 (df = 5)	208,577.400 (df = 2)	180,812.500 (df = 6)
F Statistic	1.074 (df = 4; 5)	0.839 (df = 7; 2)	1.309 (df = 3; 6)
Note:			*p<0.1; **p<0.05; ***p<0.01

Figure 16: Independent variables groups based on hypothesis of social justice, environmental standards and trade on the dependent variable volume of plastic waste imports.

As the previous multiple regression analysis showed itself not to provide a high level of insight into the effect of the cause, the same multiple regression analysis was applied to the dependent variable "*Countries plastic waste imports relative to the country's Gross Domestic Product*" to determine if it was just the results of one dependent variable or if it would result in a similar outcome for all the dependent variables.

Table 5.1 Summary of results: Effects of states' group characteristics on plastic waste imports relative to GDP

	Dependent variable:		
	Plastic waste imports relative to GDP (tonnes and billions)		
	(1)	(2)	(3)
Mismanagement of Waste	-0.00001		
	(0.00004)		
Mismanagement of Waste (per capita)	7.600		
	(24.940)		
Plastic Emitted to Ocean	-0.00001**		
	(0.00000)		
Plastic Emitted to Ocean (per capita)	750.568*		
	(316.763)		
Democracy Level		8.830	
		(38.664)	
Political Regime		454.266	
		(1,220.701)	
Poverty Line		8.504	
		(106.994)	
Press Freedom		-184.621	
		(142.507)	
Human Rights		11,432.180	
		(8,460.125)	
Human Development Index		353.160	
		(6,129.233)	
Electoral Democracy		-4,526.075	
		(8,842.476)	
Foreign Direct Investment			14.803
			(18.508)
Trade Balance			0.000
			(0.000)
Trade Openness			4.065
			(3.618)
Constant	198.848	4,142.903	-116.126
	(309.070)	(10,672.530)	(401.484)
Observations	10	10	10
R^2	0.670	0.675	0.438
Adjusted R^2	0.405	-0.463	0.157
Residual Std. Error	407.803 (df = 5)	914.192 (df = 2)	485.604 (df = 6)
F Statistic	2.533 (df = 4; 5)	0.593 (df = 7; 2)	1.557 (df = 3; 6)
Note:			*p<0.1; **p<0.05; ***p<0.01

Figure 17: Independent variables groups based on hypothesis of social justice, environmental standards and trade on the dependent variable plastic waste imports relative to GDP.

As illustrated by Figure 16, independent variable Plastic emitted to the ocean per capita, and Plastic emitted to the ocean has statistically significant impact on the dependent variable. This indicates that researching the independent hypothesis groups can hold some relevance. While the results might not have been exceptionally robust in this research, it serves as an illustration of the utility of employing this type of multiple regression analysis.

5.2 Manually analysis, government policies

In addition to this multiple regression analysis, a manual analysis of countries government policies has been conducted. As briefly mentioned, this data was only available in qualitative

manner, so it would be very hard to transform the data into statistics and further apply it into the multiple regression analysis.

The decision to go through with this part of the research even though it was not possible to apply into the main type of analysis is based on the fact that the topic of plastic waste is an aspect of environmental policy concern. Pollution and environmental problems are mainly regulated by government policies or international regulations. Moreover, environmental problems were one of the major explanations behind China's import ban, and environmental standards is also one of the main arguments of Pollution Haven Hypothesis.

The data collected concerning government policies related to plastic waste are governmental policy databases as primary sources of data, scientific literature as secondary sources, and media resources where it was not possible to find information from any of the other sources.

In the period after 2000, 28 global policies have been developed that aim to deal with plastic waste pollution, however these policies are based on "soft law" and are not legally binding for the participating parties, illustrated in Table 18. One of these policies is the *United Nations Sustainable Development Goal (UN SDG) 14* that aims to "prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution" (Karasik et al., 2020, p. 35) by the year 2025. By 2020 there was still no global, binding and measurable targets agreed upon to reduce global plastic pollution (Karasik et al., 2020). However, it is important to outline that there has been an upward trend in policies on the national level (Karasik et al., 2020, p. 8). These national policies have mainly been driven by high-and upper-middle income countries (Karasik et al., 2020, p. 73).

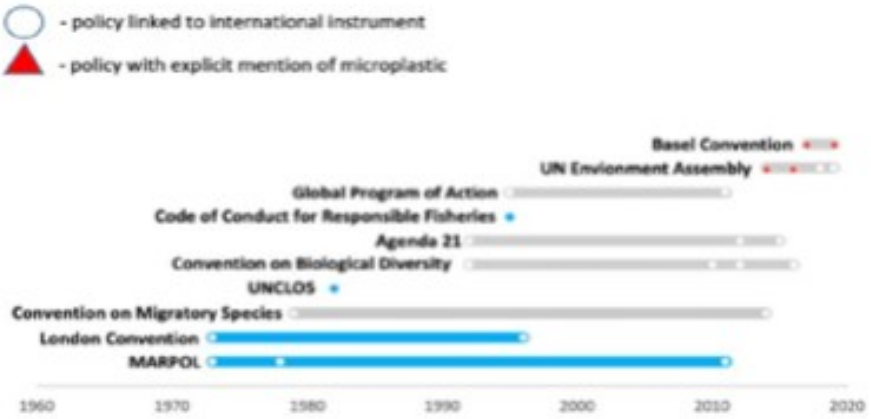
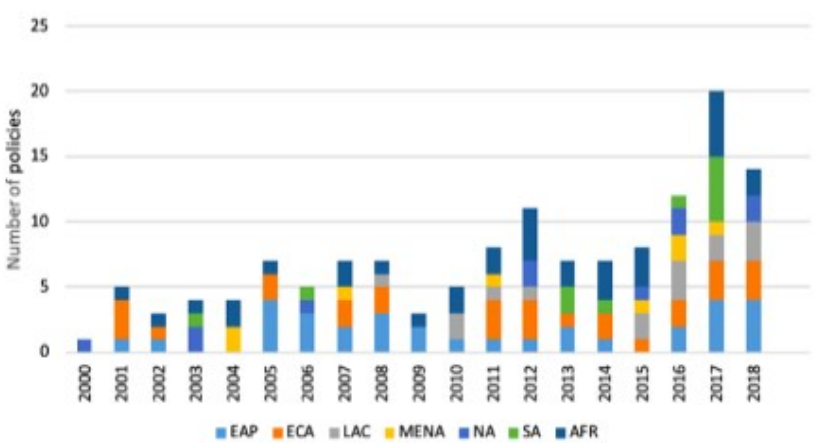


Figure 18*:* Timeline of Key International Policies Applicable to or Addressing Plastic Pollution (Karasik et al., 2020, p. 37).

A research conducted by Duke University, more precisely Nikolas Institute for Environmental Policy Solutions (Karasik et al., 2020), looked at the government responses towards global plastic pollution problem. This research (Karasik et al., 2020') found that many countries have regulations concerning plastic bags and/or some single use plastic. Even though these regulations show a growth of public knowledge and concern about plastic waste they are, however, not especially relevant to the plastic waste import and management as being researched in this thesis.



AFR = Sub-Saharan Africa
EAP = East Asia and the Pacific
ECA = Europe and Central Asia
LAC = Latin America and the Caribbean
MENA = Middle East and North Africa
NA = North America;
SA = South Asia

Figure 19: Number of national plastic policies documents analysed in research by Karasik et al., (Karasik et al., 2020, p. 58).

Furthermore, as illustrated in this figure by Karasik et al., (2020) South Asia (SA) have not been the most prominent countries when it comes to plastic policies, however it is possible

to see a significant increase in national policies in 2017, most likely correlated to Chinas ban presented this same year. As mentioned above, these "National Plastic Policies" implemented in 2017 are mainly concerning plastic bags and domestic use of plastic waste, not concerning the trade and import of plastic waste.

The Asian Network for Prevention of Illegal transboundary Movement of Hazardous Wastes have an annual workshops, and in 2021 the topic of the workshop was plastic waste. This workshops concerned both countries' general revisions of regulations, plastic amendments, and implementation of the Basel Convention (Ministry of the Environement, 2021). They presented an overview of government regulations concerning plastic waste in each country in the time period up to November 2021 (Table can be found in Attachment 2). The overview presents that there was no law against plastic waste imports in the time-period 2017-2019. There are however laws and regulations on plastic bags and other single-use plastics.

From the analysed data it is not clear that any of the countries researched managed to create and implement any regulations directly concerning plastic waste imports in the period of this research (until 2019). With respect to government policies concerning plastic waste trade and imports, research (Uhm, 2021) finds that Southasian countries have reacted to the increased trade flows of plastic waste. Both Thailand, Malaysia, Vietnam and the Phillipines have introtroduced regulations concerning plastic waste imports, however these regulations were not implemented before the period of analysis of this thesis. Some examples is that Thailand aims at restricting imports of foreing plastic waste by 2021, Vietnam will stop accepting scraps of plastic from 2025, Malaysia aims at tighten requirements for permits of plastic waste imports (Uhm, 2021, p. 10).

6. Discussion

The relocations within the global trade network of plastic waste happened fast and studently after China's ban in 2017. As China has experienced increased economic growth over the last decades, it has affected their industrial composition in the country. Industries like textile and clothing industry, electronic assembly, toy manufacturing, plastic, and rubber production got relocated to other lower developed countries. The motivations underpinning this relocation could have encompassed considerations such as labour rights, increased

working conditions, labour costs, less favourable tax conditions or increased environmental regulations.

The relocation of plastic waste diverged significantly from the patterns observed in other industrial relocations, owing to China's implementation of an import ban, which rendered exporting waste to China infeasible. Nevertheless, it was still considered relevant to research the same variables mentioned in the relocation of other industries, to see if they applied to the new import countries motivations.

The outcome of the conducted research showed itself not to result in as strong evidence as hoped for when constructing the research. However, the research conducted is based on good amounts of literature and previous research, and some statistically significant results have been outlined throughout this paper.

By applying Mill's method on Agreement to the analysis of the results from the multiple regression analysis, it is possible to distinguish the cause (independent variable) of the effect (countries levels of plastic waste imports after China's ban). The independent variables that showed itself to be most relevant, meaning the independent variables that are statistically significant according to their P-value are mainly the economic independent variables. Mainly adjusted according to the number of population, GNI-and GDP per capita.

As with the majority of research within the field of IR, the economic variables are a strong indicator, which in this case, are the variables that affected the countries' level of plastic waste imports the most. However, there are some aspects of the economic variables statistical results that are surprising and go against most of previous research on plastic waste trade and theories of global trade.

This research finds that in 13 out of 14 cases, the economic variables are statistically significant with a positive coefficient, meaning that overall, when a country's economy increase, it is likely that their level of plastic waste imports also increase in this dataset. The majority of previously research states that it should be the other way around, that less developed countries with lower economy should have an increased level of imports. Qu et al., supports the claims that there are developing countries which are becoming the new importers of plastic waste (Qu et al., 2019). According to Majaski et al., a country's level of development is calculated by the country's per capita wealth seen in a country's per capita

GDP, the country's level of industrialization, living standards and level of technological infrastructure (Majaski et al., 2022).

When looking at the research, the positive coefficient of the economic variable is strongest when applying the independent variables to the dependent variable concerning countries' volume of plastic waste imports (Figure 10). In this case, it is understandable that countries with a higher economy are also the countries with the highest volume of plastic waste imports, as a higher economy is correlated to higher levels of global trade and so on. On the other hand, looking at the economic variable applied to the dependent variable concerning countries levels of relative changes of plastic waste (Figure 11), the statistically significant economic variable had a negative coefficient, but with a low coefficient, telling us it's not a very strong indicator. However, it is interesting to look at how the economic variables are correlated to the dependent variables in different ways, when researching different aspects of countries plastic waste imports.

Even though previous research, industrial relocations, and the pollution haven hypothesis would indicate that developing countries would have the highest increase of plastic waste, it is important to keep in mind that all the countries selected as cases for this research are developing countries. A research conducted by the World Bank presents countries' economic levels, divided between four different income categories[4]; low, lower-middle, upper-middle and high income (World Bank, n.d.)

Low- income economies (World Bank)	Lower-middle income economies (World Bank)
Vietnam Malaysia Thailand Indonesia Myanmar Philippines	Turkey India Sri Lanka Laos Cambodia

Figure 20: Countries income levels (World Bank, n.d.)

[4] "For the current 2023 fiscal year, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of $1,085 or less in 2021; lower middle-income economies are those with a GNI per capita between $1,086 and $4,255; upper middle-income economies are those with a GNI per capita between $4,256 and $13,205; high-income economies are those with a GNI per capita of $13,205 or more" (World Bank, n.d.).

Out of the four different global income levels, all the countries being researched are part of the two lowest categories. Based on this, we could still say that the previous research and theories are correct in some ways. Moreover, if we look at China as an example, China has dominated the global trade network of plastic waste for decades. They have used plastic waste as a supplement to new raw materials and this way built up their industry. Now, that China is no longer a developing country, but rather a country with strong and growing economy they implemented the ban. Perhaps a similar phenomenon is underway in the countries being research in this thesis as well. The countries with a stronger GDP per capita than other countries, are more likely to have already established industries that needs raw materials and more likely a higher connection to global trade. The years to come will show if this theory is correct, and if these countries that are now importing high levels of plastic waste will implement bans in the same manner as China once their economies have developed further.

The multiple regression analysis results tell us that the strongest correlation we obtain from this research is a strong correlation between countries economic situation and moreover, the countries development and their plastic waste import levels. This is very understandable, as the country's economic situation is affecting most other aspects of the country, as well as the independent variables applied in this thesis.

The Pollution Haven Hypothesis was presented earlier in this paper. Shortly summarized this hypothesis claims that industries with higher level of environmental impact will be relocated to countries with lower environmental standards, lower levels of industrialization, and lower income levels. When it comes to the claim about environmental standards, the research conducted did not find statistically significant results supporting this claim. Neither in the multiple regression analysis nor in the manually analysis of countries plastic waste policies. However, this does not mean that the analysis shows that there is no correlation between plastic waste imports and the countries environmental standards and policy regulation. It solely means, that this research was not able to find a correlation between these independent variables and the dependent variables. Likewise, government policies that regulate plastic waste imports have already developed significantly from the research timeline until today. As shortly mentioned in the literature review (Zhao et al., Liang et al.,) and in the research part (5.2), government policies were already underway to being created

at the time of this research but were still not implemented as the increase in plastic waste imports happened so suddenly as a consequence of China's ban.

Even though the economic independent variables were the ones that showed themselves to be statistically significant in most circumstances, there were also other independent variables that appeared to be statistically significant in several instances. Trade openness is according to the multiple regression analysis affecting the dependent variable, the countries levels of plastic waste imports. In two instances this independent variable had a statistically significant impact. The pollution heaven hypothesis also touches upon trade relations, whereas it claims that reduction in trade costs will lead to relocation of pollution heavy industries. Not only is the cost of transportation a very little part in the value chain in today's global trade, also the point about more trade relations can lead to more empty containers (McCormick et al., 2019) that can be filled with plastic waste without any major extra expenses is supporting the findings in the multiple regression analysis. Both times the trade openness independent variable was statistically significant, and it had a positive coefficient, illustrating that increased trade openness is correlated with higher levels of plastic waste imports.

Another independent variable relevant for countries trade relationships is trade balance. This independent variable was statistically significant in one instance, nevertheless the coefficient was very close to 0, so the real impact of the variable is little. In any case, it can contribute with additional support to trade openness.

Some of the independent variables established to research social justice showed themselves also to have a statistically significant impact throughout the conducted research. These four independent variables were poverty line, democracy level, electoral democracy and HDI. Even though these variables only had a statistically significant impact on the dependent variable once or twice, it is possible to believe that this could happen more times if the research was constructed differently. As variables looking into how the differences in countries poverty, political regime and development are affecting the countries plastic waste imports, they indicate that countries with lower levels of poverty, countries with higher levels of democracy and countries with lower HDI are importing less plastic waste.

As higher levels of economic development have shown to be correlated with higher levels of plastic waste imports, countries with lower levels of poverty are more likely to import

more plastic waste. One could have thought that countries with higher levels of poverty have other more important concerns than the environmental impact of plastic waste imports and therefor higher levels of plastic waste imports. More importantly, as highlighted in theories such as the pollution haven hypothesis, countries facing higher poverty levels tend to be more receptive to industries with significant pollution impact. The higher level of poverty can also indicate that the industries in that country cannot afford to buy raw materials and therefore they also allow a higher level of plastic waste imports (Z. Chen & Tan, 2021). However, the result of this research indicates that the reality is the other way around.

The independent variables electoral democracy and democracy level is providing data on countries levels of democracy. Electoral democracy variable ranges from 0-1 where 1 is the highest possible level of democracy. As with the majority of the independent variables also this variable shows significant differences between the countries, whereas the best value is 0.61 and the lowest value is 0.13. The result of the research indicates that a lower level of electoral democracy, hence countries with more authoritarian regimes are more likely to import more plastic waste than countries with more democratic political systems.

On the contrary, the independent variable democracy level ranges from 1 to 176 where 176 is the worst case of democracy. As the coefficient of this variable also is negative, it means that the higher number of democratic levels, and therefore the higher level of authoritarian indicators, the lower the plastic waste will be.

To further support the findings from economic significance, HDI had a statistically significant impact on the dependent variable in three instances. The variable did not have the best R^2, however it had a P-value bellow 0.1 and a high number of coefficient. As one of the indicators for countries HDI is economy, this high correlation between a high level of HDI and higher levels of plastic waste imports further supports the economic variables.

As previously noted, there exists a general weak correlation between the independent variables and the dependent variables. However, it is crucial to emphasize the significance of the research and multiple regression analysis results. Although several independent variables may not have demonstrated statistical significance in influencing the dependent variable in many instances, this does not imply that the results are insignificant or that no relationship exists between the variables. There still could be a relationship there, but statistically speaking from the point of view of the selected data there is not strong enough

evidence to state that there is a relationship. There might be a possibility to create other outcomes with other groups of independent variables, or with new independent variables.

7. Conclusion and further recommendations

This thesis is written on the topic of global trade network of plastic waste in the period 2016-2019. The research conducted and the findings presented are based solely on this period of time. The research puzzle of this thesis was divided into two parts. First, who are the new importers of plastic waste after China´s ban, and secondly what can explain why these countries increased their plastic waste imports compared to similar countries that have not increased their import levels in the same manners. In the first place, this research finds that we can either state that this group of countries; Turkey, Malaysia, Vietnam, Indonesia and Thailand, or this group of countries; Turkey, Thailand, Philippines, Laos, and Myanmar are the new importers of plastic waste after China's import ban in 2017. Determining which group of countries can be more accurately described as the new importers of plastic waste depends on the specific data considered. The choice between utilizing the total volume of plastic waste imports and examining the relative changes in plastic waste imports subsequent to China's ban serves as a critical determinant. From an analytical standpoint, the relative change in plastic waste imports emerges as the clearer and more informative indicator for identifying the new importers of plastic waste. However, the research has been conducted using four distinct dependent variables, all of which pertain to countries' levels of plastic waste imports. Nevertheless, these variables are calculated using different indicators.

The research was successful in outlining the new importers of plastic waste, moreover the research found some explanatory variables of countries' plastic waste imports, while other hypothesis was not supported by strong enough data.

The research finds results that indicates that the hypothesis "Countries with lower economic development are more likely to become new importers of plastic waste compared to countries with higher economic development" is wrong from the point of view of this research results, and that this research is providing a different outcome. According to the conducted research, it is the countries with higher levels of GDP per capita and GNI per capita that are more likely to increase their plastic waste imports. This is an unexpected result compared to previous research, which points out that it is developing countries that becomes

new importers of plastic waste. However, as already pointed out, all countries selected as cases in this thesis are seen as developing countries with low and middle-low economies. Not taking into account that previous research and theories have compared different types of countries and found developing countries as more likely to import plastic waste, this hypothesis should have been formulated differently as all research objects are within the same group, i.e., developing countries.

In the hypothesis concerning environmental standards and government policies it is stated that "*Countries with lower environmental standards are more likely to become new importers of plastic waste compared to countries with higher environmental standards*". This research finds little results supporting this hypothesis. The majority of government policies concerning plastic waste and plastic waste imports have been implemented by the countries in the aftermath of the time period of this research. There is one instance where *volume of plastic waste emitted to the ocean* has a significant impact on the dependent variable, however the value of the coefficient is very close to 0, so this is not a strong enough result to state that this hypothesis is correct. The majority of the research did not indicate a correlation between countries' waste management systems and their level of plastic waste imports. To be able to state if this hypothesis is correct or not it will be necessary to look at the regulations implemented by the countries in the last couple of years and how these regulations have and will impact their volume of plastic waste import in the years to come.

The independent variables applied to research the correlation between countries levels of global trade and their plastic waste import had a few instances of statistically significant correlation to the level of countries plastic waste imports. There were two instances where trade openness had a statistically significant impact on the dependent variable, supporting the hypothesis that a higher level of global trade leads to a higher level of plastic waste imports, in addition to one instance of trade balance. Determining whether these three instances, out of all independent variables formulated for trade relations, provide sufficient support for the hypothesis is challenging to ascertain. It can be posited that there exists some evidence to suggest the plausibility of this claim, although affirming its statistical validity requires further investigation.

Most likely the global trade network of plastic waste has already undergone changes since the time period that this research is based on. These changes can be caused by the increased global focus on the problem concerning plastic waste. Underlined by the development of the new amendment of the Basel convention and the EU regulations that have been created in the last couple of years. These EU regulations are stating that it will be prohibited to export plastic waste from EU to non-OECD countries in the future (European Parliament, 2023).
Conceivably, the independent variables on social justice would have had a stronger correlation to the dependent variables if we were researching the same topic but with today's data. This is based on the argument that the research is conducted in the time immediately after China's ban, so the countries did not have time yet to react to these significant changes. Likely, countries with higher level of democracy and press freedom mentioned, are experiencing lower levels of plastic waste imports than countries with poorer social justice and economy. However, if this research was going to be conducted in more recent years, COVID-19 would have had a major influence on the data and moreover, it is not possible to conduct data for all these independent variables for such recent years.

Future recommendations

Following the completion of this research, a heightened appreciation arises for the significant relevance of comprehending the motivations underpinning the current industrial relocations. To understand the motivations for the new importers and maybe even more important, to understand the motivations for the exporters to relocate their industries.

Continued support from developed countries in form of knowledge sharing, technology, and resources, plays a crucial role in reducing the mismanagement of plastic waste. Especially in countries with high levels of domestic plastic production and with issues of overflowing waste management systems resulting from plastic waste imports in these nations.
Being able to get plastic production, consumption, and waste management into a circular economy where the plastic can be reproduced to its fully protentional is one of the approaches that is being developed right now. This approach will hopefully decrease the plastic waste in some ways, but most likely it will not be a long-term solution for the plastic wastes.

Concerning trade of plastic waste trade, regulations and laws are now being future developed. Plastic waste as a topic has more attention than ever, so conceivable we will witness several changes in the near future. However, much of the plastic waste is of a hazardous nature, so it is both time consuming and requires lots of resources to be dealt with in a responsible way. Anticipating that states both domestically and together with the use of international organizations will continue to invest in research and good waste management solution like pyrolysis. Furthermore, the optimal approach to reducing plastic waste and mitigating its environmental impact involves a global effort to decrease both production and consumption of plastic. Regulations on plastic bags and single use plastic is already implemented, both in developed and developing countries, but there is a need for stronger regulations also towards the producers and consumers.

8. Summary

This thesis aimed at answering *Who are the new importers of plastic waste after China's ban on import of plastic waste, and why have these specific countries increased their import of plastic waste when other countries have not?* In the introductory chapter, the significance of plastic waste within the domain of International Relations (IR) is emphasized, with economic, environmental, and social justice aspects being key factors influencing the global trade network of plastic waste. The research seeks to fill the gap in understanding the explanatory factors behind countries' increased plastic waste imports. Drawing from the literature review, four hypotheses were formulated to guide the research. Several independent variables were created and incorporated into multiple regression analyses alongside four dependent variables to investigate the research question. The findings revealed the significant impact of economic variables on the dependent variable, while other variables showed mixed results, with some demonstrating statistical relevance only in specific models. The results did not provide strong statistical evidence to support the hypotheses. The dataset covered a period shortly after the ban, and the overall response of the countries was still not evident. With COVID-19 affecting global trade in the years up to the data collection, the studied time period was limited. Despite the lack of robust statistical support for the hypotheses, the study successfully identified Laos, Myanmar, Turkey, Thailand, and the Philippines as the new importers of plastic waste after China's ban based on their relative change in imports before and after the ban. The thesis concludes that future research could benefit from conducting in-depth case studies of these new importers to gain

a comprehensive understanding of their approaches to global trade, economy, social justice, and the environment. In conclusion, this master's thesis offers valuable insights into the identification of new plastic waste importers and provides initial explanations for their motivations. While strong statistical evidence for the hypotheses was not obtained, the study presents significant indicators, particularly in terms of the economic impact on plastic waste imports in these countries.

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Master's Thesis Summary

This thesis aimed at answering *Who are the new importers of plastic waste after China's ban on import of plastic waste, and why have these specific countries increased their import of plastic waste when other countries have not?* In the introductory chapter, the significance of plastic waste within the domain of International Relations (IR) is emphasized, with economic, environmental, and social justice aspects being key factors influencing the global trade network of plastic waste. The research seeks to fill the gap in understanding the explanatory factors behind countries' increased plastic waste imports. Drawing from the literature review, four hypotheses were formulated to guide the research. Several independent variables were created and incorporated into multiple regression analyses alongside four dependent variables to investigate the research question. The findings revealed the significant impact of economic variables on the dependent variable, while other variables showed mixed results, with some demonstrating statistical relevance only in specific models. The results did not provide strong statistical evidence to support the hypotheses. The dataset covered a period shortly after the ban, and the overall response of the countries was still not evident. With COVID-19 affecting global trade in the years up to the data collection, the studied time period was limited. Despite the lack of robust statistical support for the hypotheses, the study successfully identified Laos, Myanmar, Turkey, Thailand, and the Philippines as the new importers of plastic waste after China's ban based on their relative change in imports before and after the ban. The thesis concludes that future research could benefit from conducting in-depth case studies of these new importers to gain a comprehensive understanding of their approaches to global trade, economy, social justice, and the environment. In conclusion, this master's thesis offers valuable insights into the identification of new plastic waste importers and provides initial explanations for their motivations. While strong statistical evidence for the hypotheses was not obtained, the study presents significant indicators, particularly in terms of the economic impact on plastic waste imports in these countries.

List of Appendices

Attachments:

Attachment 1: Data multiple regression analysis

Attachment 2: Summary of import regulation of plastic waste in Asian countries (As of November 2021) (Asian Network Secretariat, 2021)

	1	2	3	4	5	6	7	8	9
Cambodia	341	-304	-33	15.36	2.2194E+10	1365	3.21	$23,246,027,821.00	$1,533.00
India	162224	-5635	-3	62.61	2.5909E+12	1915	42.12	$2,673,994,353,406.00	$1,974.00
Indonesia	233001	112023	93	233.19	9.9918E+11	3732	18.91	$1,011,212,624,835.00	$3,902.00
Laos	37078	37007	3402	2114.53	1.7535E+10	2483	1.36	$17,355,921,381.00	$2,553.00
Malaysia	585270	296600	103	1676.07	3.4919E+11	11075	8.3	$347,619,005,972.00	$11,074.00
Myanmar	2615	1927	281	33.36	7.8395E+10	1459	1.77	$65,147,998,229.00	$1,274.00
Philippines	16330	11680	251	43.74	3.7338E+11	3500	9.95	$383,817,158,605.00	$3,194.00
Sri Lanka	5640	2284	71	62.6	9.0088E+10	4157	1.61	$92,095,788,074.00	$4,360.00
Thailand	282415	212908	306	626.84	4.5054E+11	6489	13.19	$482,208,064,326.00	$7,124.00
Turkey	338726	185856	122	342.62	9.8864E+11	12006	12.51	$766,527,975,167.00	$9,400.00
Vietnam	206870	104964	103	811.32	2.3473E+11	2456	15.51	$294,286,042,195.00	$3,267.00

1 Amount of plastic waste imported (2017-2019) tonnes
2 Average plastic waste imports minus pre ban values
3 Plastic waste import relatice change (2017-2019) %
4 Plastic waste imports relative to GDP (tonnes and billions)
5 GDP 2018
6 GDP per capita 2018
7 FDI 2018 (billions)
8 GNI 2018
9 GNI per capita 2018

10	11	12	13	14	15	16	17	18	19
152	124.9	2	17.8	37.9	54.1	0.37	0.59	-$419,478,610	0.21
85	43.4	2	10.01	35.7	54.33	0.57	0.65	-$101,665,623,511	0.49
77	43	1	4.38	38.4	63.23	0.75	0.71	-$1,113,964,477	0.61
162	78.91	3	7.14	38.8	35.51	0.15	0.61		0.13
95	130.43	2	0.02	41.2	63.26	0.74	0.81	$12,414,008,905	0.44
91	60.69	2	1.99	30.7	55.08	0.54	0.59	-$3,847,043,837	0.41
112	76.06	2	5.04	42.4	56.09	0.54	0.71	-$40,706,038,683	0.48
93	53.23	1	1.3	37.7	60.38	0.78	0.78	-$6,536,044,477	0.61
135	123.31	3	0.1	36.4	55.9	0.45	0.8	$44,768,370,360	0.16
137	62.55	2	0.36	41.9	47.1	0.33	0.84	-$1,935,384,807	0.29
145	208.31	3	1.23	35.7	25.07	0.4	0.7	$12,971,677,348	

10 Democracy level (1-176)
11 Trade openess Index (%)
12 Political regime (1-3)
13 Poverty line $1.5 (%)
14 GINI Index
15 Press Freedom
16 Human Rights (0-1)
17 HDI (0-1)
18 Trade balance
19 Electoral democracy (1-0)

20	21	22	23
247495	15.01	1134542	0.07
12994100	9.51	12448008	0.09
824234	3.05	56612404	0.21
814454	25.49	75121205	2.29
434432	8.04	2652010	0.05
4025300	37.23	362256653	3.3
155466	7.29	9811350	0.45
1361369	19.56	23531561	0.33
1656110	19.85	14191886	0.17
1112790	11.54	27775248	0.29

20 Mismanaged plastic waste (T)
21 Mismanged plastic waste per capita (kg)
22 Plastic waste emitted to the ocean (kg)
23 Plastic emitted to the ocean per capita

Summary of import regulation of plastic waste in Asian countries (As of November 2021)

The following table summarizes import regulation of dirty plastic waste (plastic waste not suitable for immediate recycling) of the Asian Network countries and do not cover import regulation of hazardous plastic waste. The table is prepared by the Asian Network Secretariat based upon available information (mostly from presentation materials of the past workshop). It will be updated on a regular basis and shared among countries in order to enhance mutual understanding of import regulation of plastic waste in the region.

＜Legend＞

*Import control measure: (1) Import ban, (2) Allowed with conditions such as being homogeneous or clean with no residue contained, (3) Importer/exporter license is required for importation/exportation, (4) No regulation.

Country/ Region	Legal Basis	Focal point for inquiries	Overview of import regulation	Import control measure*				Note (e.g. conditions for import)
				(1)	(2)	(3)	(4)	
Brunei	No regulations	Department of Environment, Parks and Recreation, Ministry of Development	Currently, no specific regulation regarding plastic waste import is in place, however import of plastic waste is not administratively allowed. Consultation among the relevant government agencies on the said matter is on-going.				✓	–
Cambodia	Sub-Decree No. 36 on Solid Waste Management (dated 27 April 1999) Sub-Decree No.17 on the Enforcement of the List of Prohibited and Restricted Goods	Ministry of Environment (MoE)	Import of plastic waste is strictly prohibited. In case of domestic demand for production, certain types of plastic scrap is allowed to import. Import of plastic scrap is subjected to approval from MoE.	✓	✓	✓		Plastic scrap which can meet with condition is allowed to import as follow: It is clean, homogenous and ready to use as raw material without generating residual materials in the production process It must be free from contamination and not mixed with other waste
Hong Kong, China	Waste Disposal Ordinance (Cap. 354)	Environmental Protection Department (EPD)	Starting from January 1, 2021, any person who imports, exports or re-exports "regulated waste plastics" (i.e. waste plastics subject to control as “other waste” under the Basel Convention) into, from or via Hong Kong must apply for the relevant waste import/export permit in accordance with the Waste Disposal Ordinance (WDO) or obtain consent from the EPD in advance. As for importing, exporting or re-exporting "non-regulated waste plastics" (i.e. all other waste plastics outside of the scope of “regulated waste plastics”) into, from or via Hong Kong, a declaration form and relevant documents should be submitted before commencement of shipments to prove the shipments comply with the WDO[1] and the Basel Convention.		✓	✓		–
Indonesia	Ministry of Trade Regulation No. 84/2019 (Regulation above was partially amended by Ministry of Trade Regulation No. 92/2019amended by No.58/2020 amended by No.83/2020)	Ministry of Trade (MOT), in cooperation with Ministry of Environment and Forestry (MOEF) and Ministry of Industry (MOI)	Import of plastic waste should comply with the following requirements; Importation should be done by importer producer that hold Importer license from MOT Importation should be used directly by importer producer and could not be distributed to other company Importer producer should already have the facility and already operational by domestic scrap plastic product of the importer should be final product Every non hazardous waste importer should provide statement letter from the exporter to make sure non hazardous waste being imported is not hazardous waste Note: (i) Before getting importation permit from MOT, importer producer should get recommendation from MOEF and MOI. (ii) Pre-shipment inspection should be conducted at State of Origin and the report should be submitted. Only those surveyors authorized by MOT can conduct pre-shipment inspection.		✓	✓		Plastic scrap which can meet the following conditions are allowed to import according to MOT regulation. It is not generated from landfill It is not mixed with other waste It is not contaminated with hazardous material/waste It is homogeneous The types of plastic wastes (e.g, PP, PE, PET) are defined based upon HS code and listed in the Appendix of the MOT Regulation.
Japan	Japanese Basel Act Wastes Disposal and Public Cleansing Act	Ministry of the Environment	If plastic wastes fall under Y48 in Annex II of the Basel Convention, PIC (prior informed consent) procedure is necessary. If plastic wastes fall under B3011 in Annex IX of the Basel Convention, PIC procedure is not necessary.		✓			Criteria for distinguishing plastic wastes subject to control under the Japanese Basel Act from other wastes has been published.

[1] Full detail available from EPD webpage:
http://www.epd.gov.hk/epd/english/environmentinhk/waste/guide_ref/guide_wiec_tcs6.html

Country/ Region	Legal Basis	Focal point for inquiries	Overview of import regulation	Import control measure*				Note (e.g. conditions for import)
				(1)	(2)	(3)	(4)	
Laos PDR	Ministerial Instruction on Plastic Waste Processing Factory (No.0682/MOIC)	Department of Environment, Ministry of Natural Resource and Environment	The following types of plastic wastes are allowed to import (Section 5.2) ➢ In sheet or bar form, or plastic bag ➢ Clean ➢ At least 80% is recyclable as a product. Plastic wastes that do not meet the above criteria and have the following characteristics are not allowed to import (Section 5.3) 1) Contain or comminated by disease 2) Unclean and have odor 3) Contain toxic or hazardous chemical 4) Non-recyclable		✓			The following types of plastic wastes are allowed to import (Section 5.2) In sheet or bar form, or plastic bag Clean At least 80% is recyclable as a product.
Malaysia	Solid Waste and Public Cleansing Management Act 2007 (Act 672)	National Solid Waste Management Department (JPSPN), in cooperation with Department of Environment (DOE)	In principle, plastic waste import is allowed if it can contribute to upgrade local recycling industry. Importer is given quota for import (generally up to 70% of total capacity of facility). JPSPN controls plastic waste import and issues import permit (AP: Approved Permit). DOE issues a Compliance letter to JPSPN if importer complies with related environmental regulation.		✓	✓		There are 18 criteria for Import permit (AP). AP is not required for import of segregated single type plastic, pellet and flake. There are no legally defined criteria for conditions of plastic waste allowable for import, however, JPSPN has internal guideline to distinguish clean and homogenous plastic waste.
Myanmar	Notification 22/2019 by the Ministry of Commerce (Import Negative List)	Ministry of Commerce (MOC) in cooperation with Environmental Conservation Department under Ministry of Natural Resources and Environmental Conservation (ECD-MONREC)	Approval from MOC is necessary for import of plastic waste. ECD-MONREC gives recommendation for MOC for its consideration of approval.		✓	✓		Recyclable Plastic Scrap can be imported if; (a) it is clean, homogenous and ready to use as raw material without generating residual materials in the production process. (b) it must be free from contamination and other types of wastes (c) recycling facility or factory must have approval for environmental management plan or initial environmental examination or environmental impact assessment issued by ECD-MONREC. Notification of Import Prohibited List is ongoing development.
Philippines	DENR Administrative Order 2013-22: Revised Procedures and Standards for the Management of Hazardous Wastes	Department of Environment and Natural Resources - Environmental Management Bureau	Importers are required to register with the Environmental Management Bureau with all compliance documents i.e., Environmental Compliance Certificate (ECC); Treatment, Storage and Disposal (TSD) Registration Certificate, Permit to Operate (if applicable), Environmental Guarantee Fund (EGF), etc		✓	✓		Secure an Importation Clearance (IC) at least thirty (30) days prior to shipment's arrival
Singapore	Hazardous Waste (Control of Export, Import and Transit) Act	Chemical Control and Management Department, National Environment Agency (NEA)	A Basel import permit is required under the Hazardous Waste (Control of Export, Import and Transit) Act for the import of plastic waste classified under Annex II and VIII of the Basel Convention and they are subject to transboundary movement control under the Basel Convention. Plastic waste that are listed in B3011 in Annex IX of the Basel Convention are exempted. Notwithstanding, any plastic waste containing Annex I constituents to an extent causing it to exhibit Annex III hazardous characteristics will be subjected to the Prior Informed Consent (PIC) procedure under the Basel Convention and will require a Basel import permit for its importation.		✓	✓		Plastic waste can be imported if: (a) it is clean and not contaminated by hazardous waste or other waste; (b) it is homogeneous or single stream without mixture with other types of plastic (exception for mixtures consisting of polyethylene (PE), polypropylene (PP) and polyethylene terephthalate (PET)); and (c) it is destined for recycling in an environmentally sound manner.
Thailand	Notification of Ministry of Commerce regarding an import of goods into the Kingdom of Thailand (No.112) B.E. 2539	Department of Industry Works, Ministry of Industry (DIW) in cooperation with Pollution Control Department, Ministry of Natural Resources and Environment (PCD)	Under consideration by the Sub-committee on plastic waste and E-waste management.		✓			The conditions of plastic scrap that is allowed to import are as follows: Sorted into each type of plastic material Processed into small pieces of approximately less than 2 centimeters in length Applied directly into the production process without pre-washing step. Single type of plastic or segregated plastics scrap Not contaminated with heavy metal, chemical etc. Still in usable or recyclable condition No unwanted smell or bad odors

<table>
<tr><th>Country/ Region</th><th>Legal Basis</th><th>Focal point for inquiries</th><th>Overview of import regulation</th><th colspan="4">Import control measure*</th><th>Note (e.g. conditions for import)</th></tr>
<tr><th></th><th></th><th></th><th></th><th>(1)</th><th>(2)</th><th>(3)</th><th>(4)</th><th></th></tr>
<tr><td></td><td>Notification of the Ministry of Industry Re: Delaying consideration of importing into Thailand (2017)</td><td>Ministry of Industry</td><td>MOI decided to cancel import and delay the consideration of allowing the import of plastic waste or scraps and E-waste or UEEE by 2020 (temporary ban of import). Recycling of plastic waste locally generated will be promoted. Decisions will be made by the Subcommittee on plastic waste and E-waste management preside by Minister of Natural Resources and Environment</td><td>✓</td><td></td><td></td><td></td><td>-</td></tr>
<tr><td rowspan="7">Vietnam</td><td>Law on Environmental Protection (LEP) (55/2014/QH13)</td><td rowspan="7">Ministry of Natural Resources and Environment (MONRE)</td><td>All types of wastes are not allowed to import in accordance with LEP-1993. After amendment of LEP in 2014, certain types of scraps, including plastics, can be imported if they are used for production process.</td><td rowspan="7"></td><td rowspan="7">✓</td><td rowspan="7">✓</td><td rowspan="7"></td><td rowspan="7">PM Decision (73/2014) lists the importable plastic scraps as follows;
<table><tr><th>Type of plastic scrap</th><th colspan="3">HS code</th></tr><tr><td>PE</td><td>3915</td><td>10</td><td>10</td></tr><tr><td></td><td>3915</td><td>10</td><td>90</td></tr><tr><td>PS</td><td>3915</td><td>20</td><td>90</td></tr><tr><td>PVC</td><td>3915</td><td>20</td><td>20</td></tr><tr><td>PET, PP, PC, PA, ABS, HIPS, POM, PMMA, EPS, TPU, EVA,
Silicon resin is removed from the manufacturing process and has not been used.</td><td>3915</td><td>90</td><td>00</td></tr></table>
National Technical Regulation (QCVN32/2018/BTNMT) defines requirements on plastic scraps that are allowed to import including the followings;
Washed
Not dirty
Crushed/shredded
Segregated and not mixed with impurities</td></tr>
<tr><td>Decision No. 28/2020/QD-TTg dated September 24, 2020 of the Prime Minister promulgates the list of import scrap for using as production materials.</td><td>PM Decision No. 28/2020/QD-TTg listed types of importable scraps subject to production process.</td></tr>
<tr><td>Decree No. 40/2019/ND-CP dated May 13, 2019 of the Government on amendments to Decrees on guidelines for the Law on Environment Protection.</td><td>Government Decree No. 40/2019/ND-CP amended guidelines for the LEP in relation to scrap import and defines more stringent requirement for environmental protection and stipulates necessary procedures</td></tr>
<tr><td>Circular No. 25/2019/TT-BTNMT dated December 31, 2019 of the Minister of Natural Resources and Environment promulgates the implementation of a number of articles of the Government's Decree No. 40/2019/ND-CP</td><td>MONRE Circular No. 25/2019/TT-BTNMT focus on inspecting and certifying the eligibility for environmental protection in import of scrap for using as production materials</td></tr>
<tr><td>Directive No.27/2018/CT-TTg dated September 17, 2018 of the Prime Minister on a number of urgent solutions for enhancement of management of scrap import and use of imported scrap for production purpose</td><td>PM Directive No.27/2018/CT-TTg defines measures to ensure control on import of plastic scrap and use of imported scraps into production process (guidelines on inspection of illegal import is to be developed by the Government)</td></tr>
<tr><td>Decision No. 35/2019/QĐ-TTg dated December 19, 2019 of the Prime Minister for the Regulation on interdisciplinary coordination in the management of scrap import activities.</td><td>PM Decision No. 35/2019/QĐ-TTg provides for the principles, purposes, contents, modes and responsibilities of coordination among the Ministries: Finance, Natural Resources and Environment, Transport, Public Security, Defense, Industry and Trade, Foreign Affairs, Science and Technology and People's Committees of provinces and central cities in state management for the import of scrap from abroad into Vietnam.</td></tr>
<tr><td>Circular No.08/2018/TT-BTNMTdated September 14, 2018 of the Minister of Natural Resources and Environment promulgates the Circular for national technical regulations on environment.</td><td>National Technical Regulation on environment for imported plastic scraps for production (QCVN 32:2018/BTNMT)</td></tr>
</table>