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Milton Luiz Soares Lupchinski

Supervisor: Jean François Brun

Co-supervisor: Christian von Haldenwang

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**The key challenges of Environmental Taxes for a greener and more progressive economy:
the case of Plastic Packaging Taxes arising in the European Union**

Milton Luiz Soares Lupchinski

Supervisor: Jean-François Brun

Co-supervisor: Christian von Haldenwang



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DECLARATION

I hereby declare that this thesis entitled "*The key challenges of Environmental Taxes for a greener and more progressive economy: the case of Plastic Packaging Taxes arising in the European Union*" is the outcome of my own work except where citations indicate otherwise.

This study has been composed as a prerequisite for the completion of the *Erasmus Mundus Joint Master Degree in Development Studies and Foresight – specialization in Global Development Policy*, program named as *GLODEP*. All sources used are referenced.

Milton Lupchinski
Milton Luiz Soares Lupchinski

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Environmental taxes are included in a set of measures that governments can apply to encourage a shift in economic activities or behaviours from more pollutant to more eco-friendly solutions. It mainly considers the problems from nature's limit to growth and it is strongly tied to the concept of sustainable development established more than 30 years ago. The present paper aims to look into the effects of environmental taxes in production and consumption behaviour.

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Vedoucí diplomové práce: **Jean-Francois Brun**
University of Clermont Auvergne

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L.S.

doc. RNDr. Martin Kubala, Ph.D.
děkan

doc. RNDr. Pavel Nováček, CSc.
vedoucí katedry

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ABSTRACT

Creating a historical timeline with past and ongoing internationally environmental debates, this study explains the urgent need of nations to set goals combating plastic pollution, which significantly started in 1972 during the United Nations Conference held in Stockholm. Since the European Union commenced to charge its Member States a contribution based on non-recycled plastic packaging levels as a new revenue source for the period of 2021 to 2027, the research question of this paper takes the case of Plastic Packaging Taxes to explain how they can address the process of development to a greener and more progressive economy beyond only indirectly fundraising the European Union revenues. Therefore, this thesis takes both Italian and Spanish legislations, which have already established the tax to be in force in January 2023, to analyse likely impacts and key aspects to be taken into account for future policy adjustments and improvements. Moreover, it is expected that other Member States use these published legislations as reference to formulate their own laws tackling plastic waste levels during the following years. Considering that taxes based on consumption are often regressive, which affects low-income households in higher proportions, this study argues that nations must take care of demand elasticity, incidence and the target players among the plastic chain when designing the new tax reform. Although introducing a new tax is normally not well accepted among society, governments must also provide transparency and sense of fairness to expect a behaviour change that improves environmental conditions and promotes an inclusive and sustainable economic growth.

Keywords: Environmental Taxes. European Union Revenue Plan. Plastic Packaging Taxes.

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LIST OF ABBREVIATIONS

CO ²	Carbon Dioxide
EC	European Commission
ET	Environmental Taxes
ETS	Emissions Trading System
EU	European Union
GDP	Gross Domestic Product
MACSI	<i>Manufatti con Singolo Impiego</i> (Single use manufactured goods)
PET	Polyethylene Terephthalate
PPP	Purchasing Power Parity
PPT	Plastic Packaging Taxes
SDG	Sustainable Development Goal
UK	United Kingdom
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America
VAT	Value Added Taxes

1. INTRODUCTION

A growing concern about climate change and its implications for the environment has led nations to set new policy agendas and targets to achieve during the following years. Taking the case among European countries, environmental taxes have been used as one measure to tackle environmental impacts while also being a new revenue source for the economies. Despite the development of these taxes through years of trials and experiences, here are still some key challenges to address regarding the sustainability promoted to environment and to economic growth in addition to which selected characters the tax burden levy on.

Although environmental taxes are a broad concept and can be applied in a diverse range of products or services, they can be defined as taxes *“whose tax base is a physical unit (or a proxy of it) that has a proven specific negative impact on the environment. Four subsets of environmentally related taxes are distinguished: energy taxes, transport taxes, pollution taxes and resources taxes.”* (Organisation for Economic Co-operation and Development 2005). Therefore, taxes applied in any product or service from those main subsets which offers damage or loss for the environment can be labelled as an environmental tax. This is a category that covers taxes for non-renewable energy sources, intense pollution industries and harmful consumption of natural resources, such as fossil fuels and plastic packages. One thing to note is that the definition of environmental taxes does not proportionally relates the tax to the size of the environmental damage, instead it only refers to the tax base for the appliance. Despite the disclaimer from the formal definition, it is often understood that those taxes aim to align tax rates with the marginal external costs produced (Braathen et al. 2017).

Regarding the environmental impacts through climate change and with the intention of bringing a new perspective about plastic consumption and waste management, European governments are slowly introducing Plastic Packaging Taxes in their list of revenue sources, hereinafter referred to as PPT. This new fiscal policy makes authorities to tax single-use or non-recycled plastics used for packaging across industries and imports. They aim to achieve a higher environment consciousness with this measure, which the surcharge is prone to start a change in production and consumption behaviours of plastic packaging. While there are many different players among the plastic industry, it is more effective to think in a set of taxes

applied differently throughout the chain instead of a single tax that would maximum promote a change at just one level.

In Europe, the United Kingdom (UK), Spain and Italy already have structured plans and legislations to implement the PPT and other countries are still discussing the topic to implement it in the future. While the UK is applying the tax from April 2022, Spain and Italy planned to start it before in January of the same year, but both postponed to January 2023. This aligned movement between different countries comes from a new measurement taken by the European Union (EU), for the case of Spain and Italy, which set a contribution to be paid by its Member States based on their individual non-recycled plastic packaging waste as a new revenue source to the 2021-2027 EU budget (The Council of the European Union 2020). As the focus of the present research is under the EU umbrella, the case from the UK will no longer be discussed hereinafter.

That being the case, this paper went through both the Italian and the Spanish legislations as creators of the PPT in the EU, capturing the way they work and filling the gaps of what to expect with a new taxation and the key issues that governments might want to overcome to not compromise the environment and their economies. Legislations that may be developed and adjusted through time, but that they have certainly built the ground for other nations to create similar policies considering their local specificities.

As a very new-born fiscal policy around Europe, this paper goes into an analysis of other areas affected by the measure beyond the main plan of being one more funding source to the EU budget. This develops into a research question that seeks to answer how PPT can address the process of development to a greener and more progressive economy beyond only indirectly being a new revenue source for the EU. The main key issue for the topic is adding a new tax on consumption without increasing the regressivity of the tax system, which levies the tax burden on poor people with a higher rate than on wealthier citizens when considering their income levels.

It is also important to note that there are some limitations of writing about Plastic Packaging Taxes, such as the non-availability of some laws in English, the numerous legislative changes and amendments over time and the lack of data to run an impact evaluation due to the abbreviated time since those policies have been implemented. Although it is not able to

be an extensive research over the topic, it instead makes an effort to gather up-to-date information and to connect the historical background of environmental taxes to provide a new baseline of plastic packaging taxes for further research papers.

In order to review the main concepts and to go deeper into the subject considering a suitable structure, the definition of environmental taxes and PPT is covered here along the introduction, where it also exhibits the research question and its main approach. The second chapter shows the background behind environmental taxes, with the chronological approach of the EU dealing with climate change since the 1990's decade and the historical use of natural resources and negative externalities for the environment, using data from Eurostat for the analyses. Concomitantly, international conferences are sewed up to create a comprehensive timeline on environmental topics, which it helps to explain the main actions promoted by the EU and to guide the reader to the most recent sketched resolution on plastic pollution, the United Nations (UN) global plastic treaty. In sequence, the third section presents the new EU Revenue Plan for 2021-2027, the PPT and its related legislations arising in Spain and Italy for combating plastic waste.

While until the third chapter the present paper explains the historical concept of environmental taxes, the different approaches taken by some European countries and the UN and make comments on likely PPT impacts, the fourth section covers specifically the key issues and challenges for governments to implement taxes on plastic packaging without damaging the economy in other aspects. A new tax on consumption can harshly impact people's income, so the section brings different measures as suggestions to be taken by governments to avoid regressivity in the tax system. Moreover, a tax in a particular input can turnover into a behavioural change among consumers and producers, so the sustainability of this revenue source should also be taken into consideration since public authorities might face a steadily decline in collections for the product bearing the new tax burden. Finally, there is a last section for conclusions with an effort to recover and answer the research question and to summarize the main concepts and key issues presented along the paper, while also providing a background for next studies in the subject.

2. THE BACKGROUND BEHIND ENVIRONMENTAL TAXES

Environmental taxes are just one of many tools that can be used by governments to comply with environmental agreements or with Sustainable Development Goals (SDGs), which makes them able to control the usage and consumption of natural resources in a healthy way, adopting a compromise with next generations' well-being. They are usually introduced (i) to change behaviour of consumers and business to demand a less pollutant resource, (ii) to internalise the damage caused by polluters, moving out from society the costs associated with environmental damage to charge specifically those that pollute or (iii) to raise revenue for public spending (Powell 2018).

Instead of forbidding the use and management of limited natural resources, taxing shall be used to discourage the producer or consumer with the surcharge applied, therefore providing economic incentives for a behavioural change that chooses a more sustainable alternative. Those measures are closely related to climate change issues managed by public authorities, so for understanding the reason of administrations progressively adopting environmental taxes it is necessary beforehand to understand what made most governments around the world to converge efforts into a unified target, aiming to reduce global warming.

2.1. The starting point of environment as a topic for the international debate

Around fifty years ago a new threshold for the international environmental debate was set. The United Nations Conference on the Human Environment in Stockholm was in 1972 the first world conference considering the environment as a main issue. As stated in its report, the meeting considered the need for *"(...) common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment (...)"* (United Nations 1973). It is even clearer their concerns with the environment reality at that time when they proclaimed the following:

Man has constantly to sum up experience and go on discovering, inventing, creating and advancing. In our time, man's capability to transform his surroundings, if used wisely, can bring to all people the benefits of development and the opportunity to enhance the quality of life. Wrongly or heedlessly applied, the same power can do incalculable harm to human beings and the human environment. We see around us growing evidence of man-made harm in many regions of the Earth: dangerous levels of pollution in water, air, earth and living beings; major and undesirable disturbances to the ecological balance of the biosphere; destruction and depletion of irreplaceable resources; and gross deficiencies, harmful to the

physical, mental and social health of man, in the man-made environment, particularly in the living and working environment. (United Nations 1973, p. 3).

Thus, the conference was in such a way presenting the harms brought by the fast-paced development of western countries after the Second World War, citing the USA, Canada and Western Europe as the major actors of this economical movement. To illustrate, figure 1 shows the Gross Domestic Product (GDP) per capita measured in PPP rising strongly for those countries during the post-war, which was the scenario faced by the agents during the UN Conference in 1972.

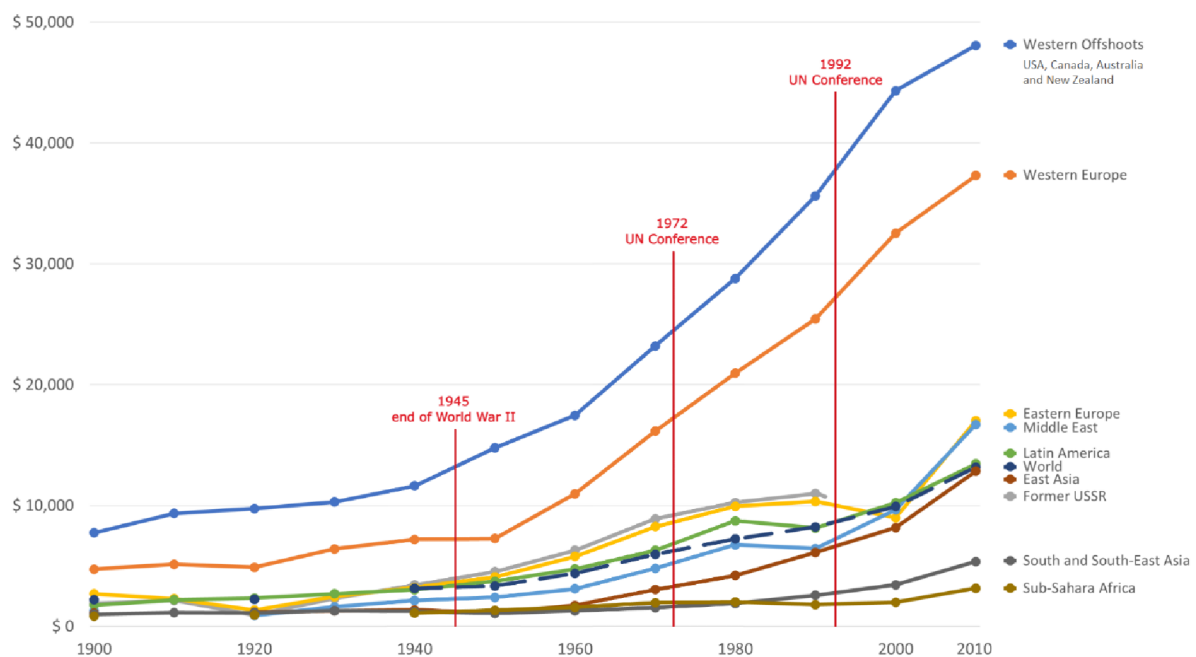


Figure 1. GDP per capita from 1900 to 2010, PPP (international-\$ in 2011 prices). Graph by author, data from the Maddison Project Database, version 2020 (Bolt and Luiten Van Zanden 2020).

Associated with the high economic activity, levels of Carbon Dioxide (CO²) emissions were also reaching higher marks year after year. An historical amount of those worldwide emissions in billion tons of CO² is presented below by figure 2, which the emissions in 1972, when the UN Conference was attended in Stockholm, were more than three times the level from the end of World War II in 1945. Therefore, both figures are necessary to understand the concerns around the environment focused by politicians at that time in Stockholm.

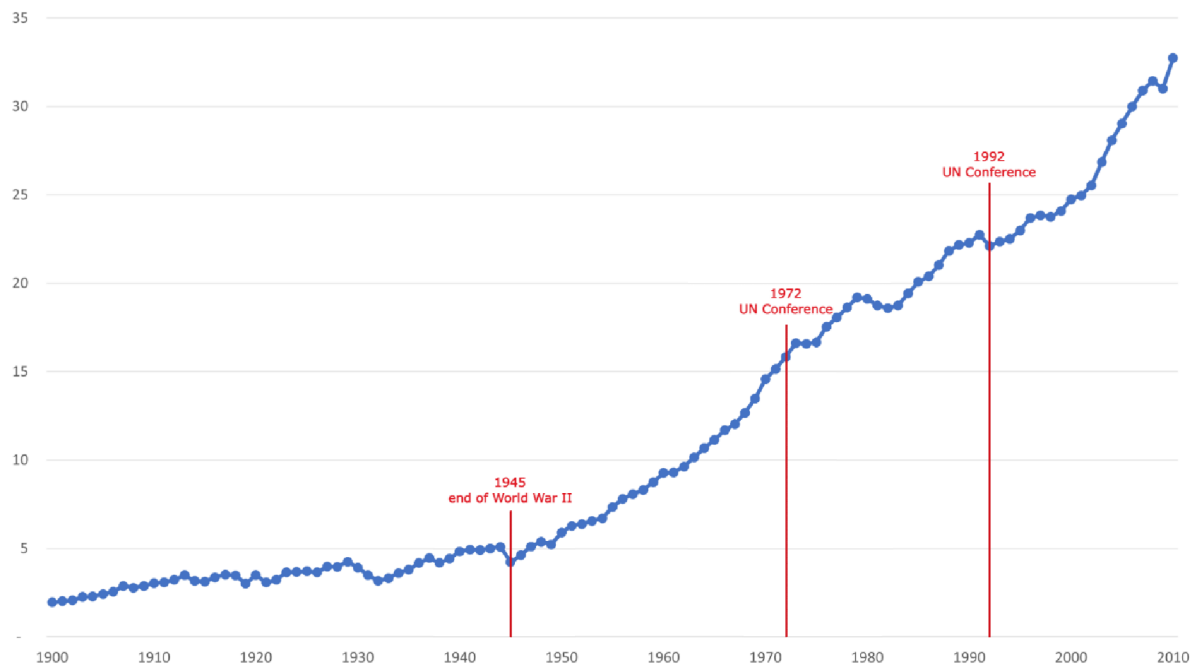


Figure 2. Annual worldwide CO₂ emissions from 1900 to 2010 measured in billion tons from the burning of fossil fuels (coal, oil and gas) for energy and cement production. Graph by author, data from the Global Carbon Project (Andrew and Peters 2021).

Succeeding the first major international meeting focused on the human impact on the environment, 20 years later the United Nations Conference on Environment and Development was held in Rio de Janeiro, Brazil, providing a different and original approach for the international discussion. It was based on the then new concept of sustainable development from the report *“Our Common Future”* released in 1987, which shifted to an approach relied on the protection of the environment and the advancement of development. Considering the principles agreed for the Conference Report, environment protection should play a vital role for the development process in order to achieve sustainable development (United Nations 1993). Moreover, the same report evokes the need of an international integration for environmental protection considering the discrepancies of economies at that time, as presented in Figure 1.

Only three decades later, in 2022, that a first draft for a global plastic treaty was historically announced by the UN under the United Nations Environment Programme. From one side it reaffirms the Rio Declaration from 1992 and highlights the fast and subsequently increased levels of plastic pollution as a *“serious environmental problem at a global scale, negatively impacting the environmental, social and economic dimensions of sustainable development”* (United Nations 2022a), showing growing concerns about the ongoing

economic activities that excessively exploit nature. On the other hand, the draft document published calls, at the end, all 193 UN Member States to combat plastic pollution with measures that promote sustainable consumption and production, considering ways that 'close the loop' for enhancing circular economy. It also claims for the development and implementation of national action plans for controlling plastic waste, which may foster the globally environmental approach while taking into consideration national circumstances and capabilities (United Nations 2022a).

The plastic pollution resolution is an output from the fifth session of the United Nations Environment Assembly taken in Nairobi, Kenya, between February and March 2022. Heads of State, environment ministers and other representatives from 175 nations advocated there for the resolution, addressing the full lifecycle of plastic and its impacts on environment. At this stage they have already established an Intergovernmental Negotiating Committee, which will be in charge of forwarding the resolution further from the second half of 2022, aiming to complete the work by the end of 2024 (United Nations 2022a; 2022b). Even though, it is expected to more international partnerships being agreed during these next two years, making environmental progress with the spirit of collaboration as plastic pollution is a threat for the entire planet.

2.2. How the European Union reacted to the international discussions on climate change

The European Union was developed from a set of laws and treaties since 1945 aiming to launch a post-war cooperation in Europe. Later on, it was officially established by the Maastricht Treaty, which entered into force on November 1st, 1993, just one year after the second environment-driven UN Conference. As a way of enhancing the cooperation between States, this treaty intended to promote European political and economic integration unifying currency, policies and citizenship rights (Gabel 2022). Since this move, the EU could align and unify political efforts to drive action for the environmental goals in discussion globally, such as with pollution and waste management.

To this end, in 1994 was issued the European Parliament and Council Directive 94/62/EC on packaging and packaging waste, showing the EU concerns about the rising amount of waste and its impacts for the environment. When having a look to its first

objective, it is clear the closer relation and connectivity with the UN Conference aims accorded in Rio de Janeiro just two years before:

This Directive aims to harmonize national measures concerning the management of packaging and packaging waste in order, on the one hand, to prevent any impact thereof on the environment of all Member States as well as of third countries or to reduce such impact, thus providing a high level of environmental protection, and, on the other hand, to ensure the functioning of the internal market and to avoid obstacles to trade and distortion and restriction of competition within the Community. (The European Parliament and The Council of the European Union 1994, p. 6).

Therefore, considering the archived documents, this Directive from the EU established a first and personalized reaction for the UN environment concerns to the State Members. And it so well created a baseline for the later creation of Plastic Packaging Tax.

In the sequence, the Kyoto Protocol was adopted in 1997, however it entered into force only by 2005. As an international treaty, it gave at that time a first commitment for its members to limit greenhouse gas emissions and consequently to reduce climate change. A total of thirty-seven industrialized countries and economies in transition and the European Union have agreed to an average 5 percent emission reduction compared to 1990 levels over the first commitment period, from 2008 to 2012 (United Nations 2008).

Facing this Protocol and the emission caps set, in 2003 the European Parliament reacted publishing the Directive 2003/87/EC which established a scheme for greenhouse gas emission allowance trading within the Community and in 2005 it came into force as the world's first international emissions trading system, called the EU Emissions Trading System (ETS). This Directive on emission allowances states that it aims to promote reductions of greenhouse gas emissions in a cost-effective and economically efficient manner (The European Parliament and The Council of the European Union 2003), so it works as another measure taken to tie environmental protection with the advancement of economies' development. Moreover, its efficiency could be proved by the reduction of about 35 percent in emissions between 2005 and 2019 for installations covered by the ETS (The European Parliament and The Council of the European Union 2020) and the system is being used as a guideline for other countries to launch similar trading schemes.

Following the targets by the UN among sustainability and climate change, the Paris Agreement was adopted in 2015 aiming to keep the global temperature rise during the 21st

century below 2 degrees Celsius above pre-industrial levels. Its ninth article states the need of developed countries to take the lead in providing financial resources to assist developing countries that are less capable and more vulnerable to promote a structural change (United Nations 2015), so that is where the EU should play a vital role of leading the global transition for a reduction in greenhouse gas emissions. Furthermore, the financial support is necessary to fund the large-scale investments when significantly mitigating emissions and when adapting the economy to the adverse effects of a changing climate (United Nations 2015).

Then tethering both approaches and efforts to combat air and earth pollution, the European Commission (EC) delivered in 2015 its first Circular Economy Action Plan, aiming to promote Europe's conversion towards a circular economy which would *"(...) boost global competitiveness, foster sustainable economic growth and generate new jobs."* (The European Commission 2015a). Both the environment and the economy would benefit from the proposed actions, which the fostered recycling and re-usage of products would close their lifecycles into sustainable loops, saving energy and reducing greenhouse gas emissions from non-needed new manufactured packages, for example. Considering the difficulties of not only incentivising a more sustainable way for the economy, but moreover for changing the behaviour of producers and consumers or totally reshaping the market, the EU with this Action Plan shows globally its straight efforts for tackling the impacts of climate change and the targets set on the last UN agreements.

Moreover, the Circular Economy Action Plan introduced a several of legislative revision proposals on waste management for creating a long-term path of waste reduction and recycling promotion. To illustrate it, in late 2015 one proposal for a Directive of the European Parliament suggested a minimum reuse and recycling target for municipal waste of 60% to be achieved by 2025 and of 65% by 2030, using the weight as measure (The European Commission 2015c). Also, as a consequence of the former EU Action Plan, there was one proposed amendment for the sixth article of the Directive 94/62/EC, which stated clear targets for reducing packaging waste and, more specifically, plastic packaging:

- (f) no later than 31 December 2025 a minimum of 65% by weight of all packaging waste will be prepared for reuse and recycled;
- (g) no later than 31 December 2025 the following minimum targets by weight for preparing for reuse and recycling will be met regarding the following specific materials contained in packaging waste:
 - (i) 55% of plastic;

- (ii) 60% of wood;
 - (iii) 75% of ferrous metal;
 - (iv) 75% of aluminium;
 - (v) 75% of glass;
 - (vi) 75% of paper and cardboard;
- (h) no later than 31 December 2030 a minimum of 75% by weight of all packaging waste will be prepared for reuse and recycled. (The European Commission 2015b, p. 11).

Setting the minimum rate of 65% of reuse and recycling for all the EU packaging waste requires a strong effort and management for the achievement of all 27 Member States by 2025, which was later not fully appreciated for the amendment, but it introduced the biggest step in legislation already done by the EU on the topic. The final recycling rate for plastic packaging was set in a minimum of 50% until 2025 and of 55% until 2030 (The European Parliament and The Council of the European Union 1994). As presented, the aim was to increase the rate of recycled packages in a second phase for meeting even closer the EU Circular Economy Action Plan principles.

On the other hand, the EU was also concerned about its revenue collection after the United Kingdom's withdrawal from the bloc, movement well-known as the Brexit. The UK could raise almost 13.8 billion euros as contributions for the EU during 2017, while the EU had around 6.3 billion euros of expenditure for the UK during the same year, which reaches a net British contribution of 7.4 billion euros (The European Commission 2018b). This revenue loss prediction of around 7 billion per year was one of the major factors for discussing new ways of funding the EU budget for future years, so it came in 2018 with the proposal to apply a contribution based on plastic packaging and this policy measure will be more elaborated along the next section of the present paper.

In 2019 the EU adopted a new strategy to tackle the environmental challenges. They presented the European Green Deal, a roadmap for turning Europe as the first climate-neutral continent by 2050, taking into consideration an economic growth that gives back more than it takes away. Its actions were grounded on principles to boost the efficient use of resources with clean and circular economy, to accelerate the shift to sustainable and smart mobility, to stop climate change, to preserve and restore biodiversity and to introduce a zero-pollution ambition for a toxic-free environment (The European Commission 2019). This roadmap was later in 2021 reinforced by a package of proposals aiming to revise the EU climate legislations under the European Green Deal, which was called as the 2030 Climate Target Plan.

The European Commission pretended therefore to, with the 2030 Climate Target Plan, set the feasibility of the climate neutrality goal for 2050 establishing a lower-level milestone for 2030, stimulating a faster approach change to be held by the EU Member States. The concern was communicated stating that *“A balanced, realistic, and prudent pathway to climate neutrality by 2050 requires an emissions reduction target of 55% by 2030.”* (The European Commission 2020), using 1990 as comparison.

All those environmental proposals and policies taken since the official European Union foundation as a unified political and economic bloc were clearly a direct response for the discussions already being held in an international level. Moreover, it can equally be seen as an ambition to show political strength for being the first continent to address global climate challenges and for running to climate neutrality, while encouraging other nations to take similar actions at the same moment.

2.3. Historical use of natural resources and the negative externalities for environment

The massive and unsustainable use of natural resources in Europe, mainly during the post-war recovery, was for a long time understood as needed to maintain a positive GDP growth rate and to develop economies, but this principle is currently being outdated by more politicians adopting a development project based also on long-term visions of sustainability. This new project approach generally takes into consideration factors of environment capacity, scarcity of resources and their ability of regeneration. As a reflection of the production and consumption system that used to rely on the extractivism of natural resources, the European Union faced a scenario of increasing amounts of packaging being wasted year by year. An illustration of the packaging waste and the plastic packaging share on the total waste reported by the 27 Member States of the EU from 2005 to 2019 is shown in figure 3, measured in million tonnes. The packaging waste counts distinct types of packaging materials disposed, such as paper, cardboard, wood, metal, aluminium, steel, glass, plastic and others, but this paper elaborates more on the plastic input (Eurostat 2022).

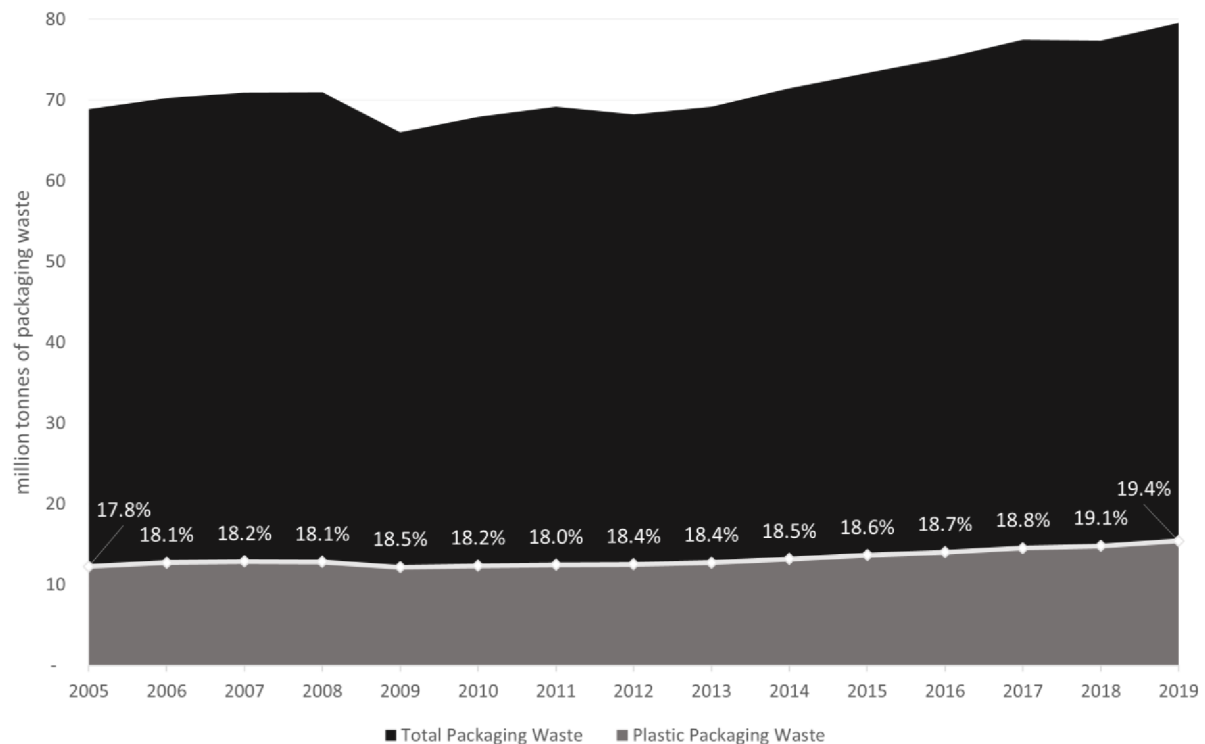


Figure 3. Total packaging waste and plastic packaging waste generated by the 27 Member States of the European Union from 2005 to 2019, measured in million tonnes. Data was estimated from 2005 to 2011 due to lack of report from some countries. Graph by author, data from Eurostat (2022).

The graph above reveals in particular a packaging disposal amount of 68.9 million tonnes in 2005 by the EU, which in fourteen years could have this number raised to 79.6 million, resulting in a waste increase of more than 15% from 2005 to 2019. There was a significant waste reduction only in 2009, possibly connected with the 2008 financial crisis started in the USA that quickly spread negative effects on production and consumption to a high number of economies abroad. Despite the continuous rise of the total packaging waste during that period, there was also an increase of the plastic packaging waste, both in absolute and relative terms. While the general packaging waste got increased by 15.5% during the fourteen years in analyse, plastic packages were 25.8% more disposed in absolute numbers, from 12.3 to 15.4 million tonnes. In relative terms, the plastic packaging represented 19.4% of the total package waste in 2019, against 17.8% during 2005.

On the other side, the goal established by the EU in 2015 is to enhance a circular economy, where waste is reduced and covered by a high recycling level, depleting less the environment and allowing a sustainable development path to enhance. As shown in figure 4, the ratio of packaging recycled in the EU keeps roughly around two thirds of the total packaging waste during 2010's decade. Even if the recycling was getting increased in absolute

terms after the 2015 EU Circular Economy Action Plan, it dropped from 67% to 64% in relative terms since more waste was produced in a faster pace during the same period.

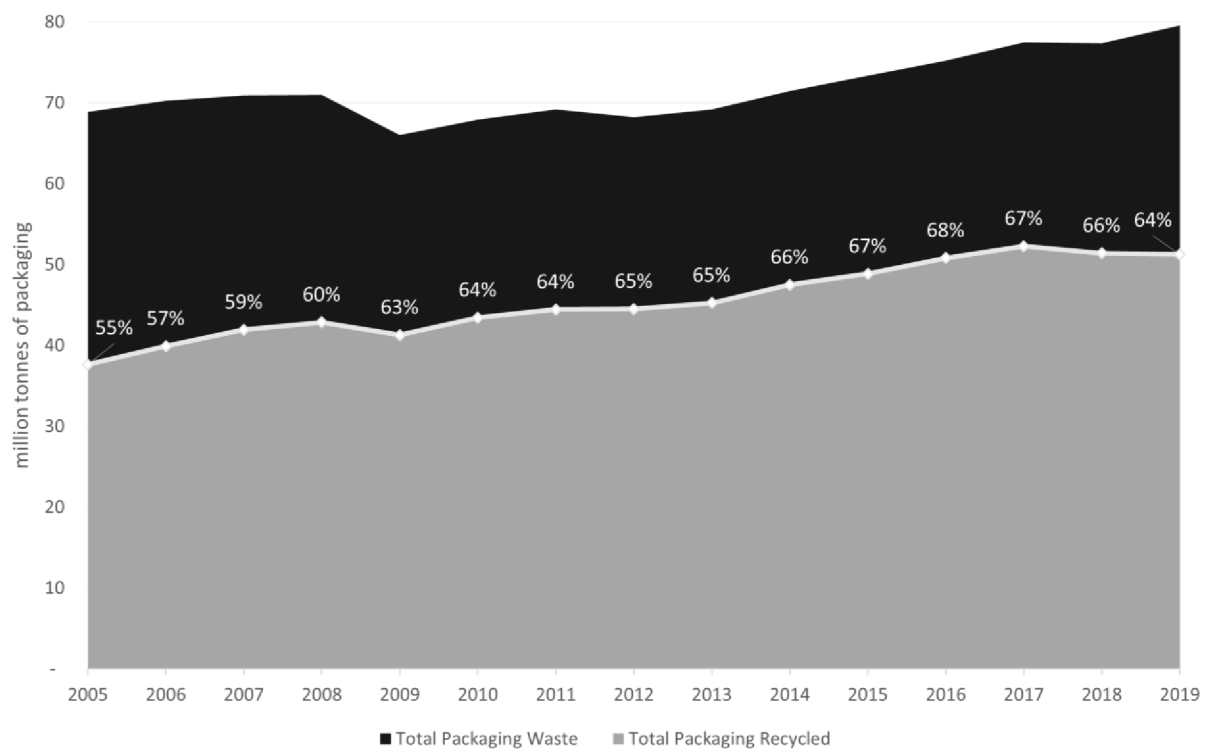


Figure 4. Total packaging waste and total packaging recycled by the 27 Member States of the European Union from 2005 to 2019, measured in million tonnes. Data was estimated from 2005 to 2011 due to lack of report from some countries. Graph by author, data from Eurostat (2022).

Unfortunately, the recycling ratio of plastic packaging is much lower and it can get unnoticed when considering all packaging materials together for the analyses. In 2019 the total packaging recycled represented 64% of almost eighty million tonnes of packaging waste as seen in figure 4, whereas the plastic packaging represented isolated only 41% for the same ratio, according to figure 5.

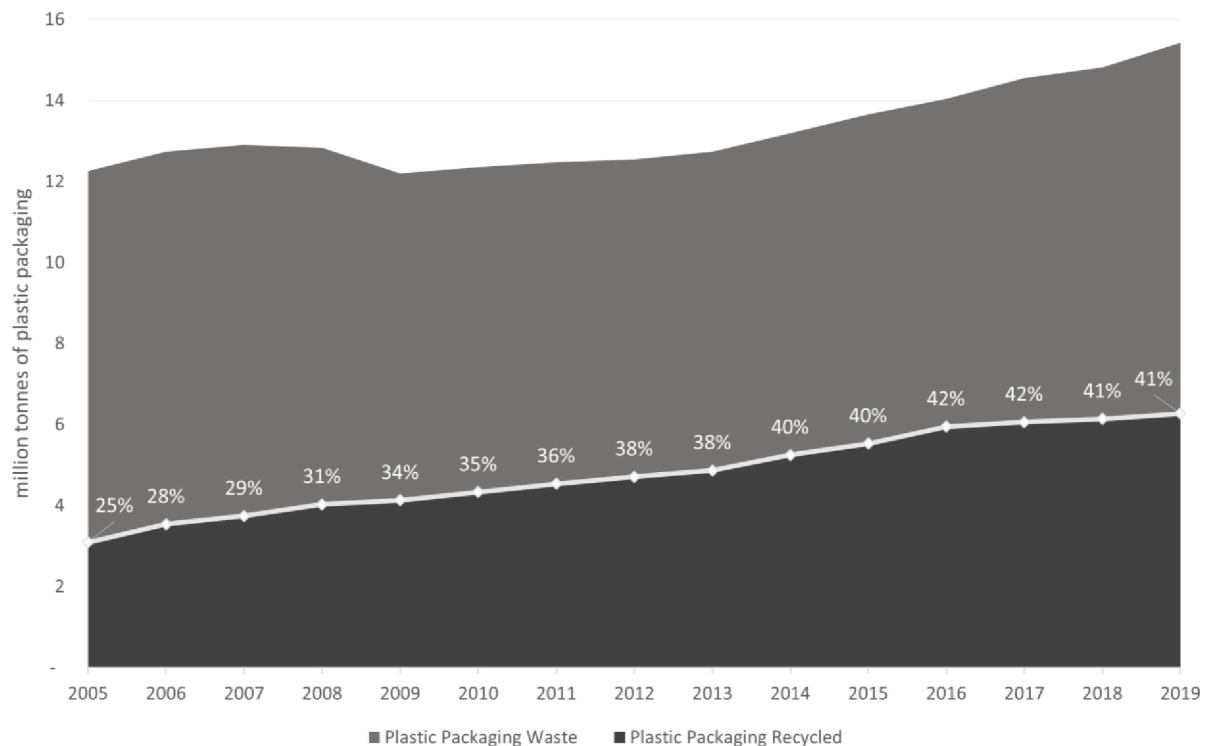


Figure 5. Plastic packaging waste and plastic packaging recycled by the 27 Member States of the European Union from 2005 to 2019, measured in million tonnes. Data was estimated from 2005 to 2011 due to lack of report from some countries. Graph by author, data from Eurostat (2022).

From one side, the plastic packaging had a significant increase in its recycling from 2005 to 2019, but it should also be boosted even faster to reach and attend the recycling levels targeted by the EU for the next years. Taking into consideration this huge gap between plastic and other packaging materials, a focused policy was then introduced specifically for plastic packaging.

3. THE EUROPEAN UNION REVENUE PLAN FOR THE PERIOD OF 2021 TO 2027 AND THE PLASTIC PACKAGING TAX ARISING IN EUROPE

In view of the revenue loss of the UK withdrawal from the EU and the specific discrepancy of plastic packaging recycling levels compared to other packaging materials, there was a movement inside the EU to forward both issues into a single solution. Another reason for politicians giving more importance on plastics than other packaging materials is based on the time of degradation, while can take around 2 to 6 weeks for a paper and 2 months for a cardboard to entirely break down in landfills, a plastic bottle has an average time of 450 years to fully decompose in the environment (L. Andrew 2022).

Therefore, a new EU Revenue Plan for the period of 2021 to 2027 was set and it was published in the end of 2020 an Own Resources Decision that introduced a contribution based on single-use plastic packaging waste:

1. Revenue from the following shall constitute own resources entered in the Union budget:
(...)
(c) the application of a uniform call rate to the weight of plastic packaging waste generated in each Member State that is not recycled. The uniform call rate shall be EUR 0,80 per kilogram. An annual lump sum reduction for certain Member States as defined in the third subparagraph of paragraph 2 shall apply. (The Council of the European Union 2020, p. 4-5).

The Decision was set to be in force starting on January 1st, 2021 and the contribution is being calculated considering the difference between the weight of plastic packaging waste generated in a Member State and the weight of plastic packaging waste recycled in the same year. As a measure of preventing an overly regressive impact on national contributions, Member States with a GNI per capita in 2017 below the EU average are benefiting of an annual lump sum reduction in their contributions as an adjustment mechanism. The reduction was agreed as a result, in euros, of 3.8 kilograms multiplied by the population in 2017 of the Members concerned (The Council of the European Union 2020).

Furthermore, the waste and recycling data already being collected and provided by Member States under reporting obligations for Eurostat, so the EU could even make revenue projections based on that. Since Eurostat is a database which provides the exact data in July of the year N+2, the contributions will be calculated based on forecasts until July 2023, when the final data will be available and contribution adjustments shall be made.

Besides this new contribution being one more tool to fundraise the EU revenue after the British contribution loss and the high expenditures due to COVID-19 pandemics, it also plays as a surcharge and a pressure for Member States annual budgets. With the data from the last year available on Eurostat and considering the contribution rate and its reductions stated in the Official Journal of the European Union (The Council of the European Union 2020), it is possible to analyse the amount of contribution to be paid in 2019 by each country if the legislation had been applied for that year.

Firstly, it is important to differ both figures between the ranking of recycling rate among Member States and the ranking of contribution levels calculated. Besides the fact that figure 5 was presenting the EU recycling average, figure 6 gives the same data, but sorted by

country and it is clear the huge divergences within the EU. While Lithuania, holding the first position with 70% of plastic packaging recycled, Malta holds the last position with a rate of only 11%, much far from the targets set by the EU Circular Economy Action Plan. Even if Malta is not considered for the analyses regarding its low significance in the EU Revenues, there is France just behind it with 27% plastic packaging recycling rate, which may impact much more for the EU pursuing one of the biggest economies among the Member States.

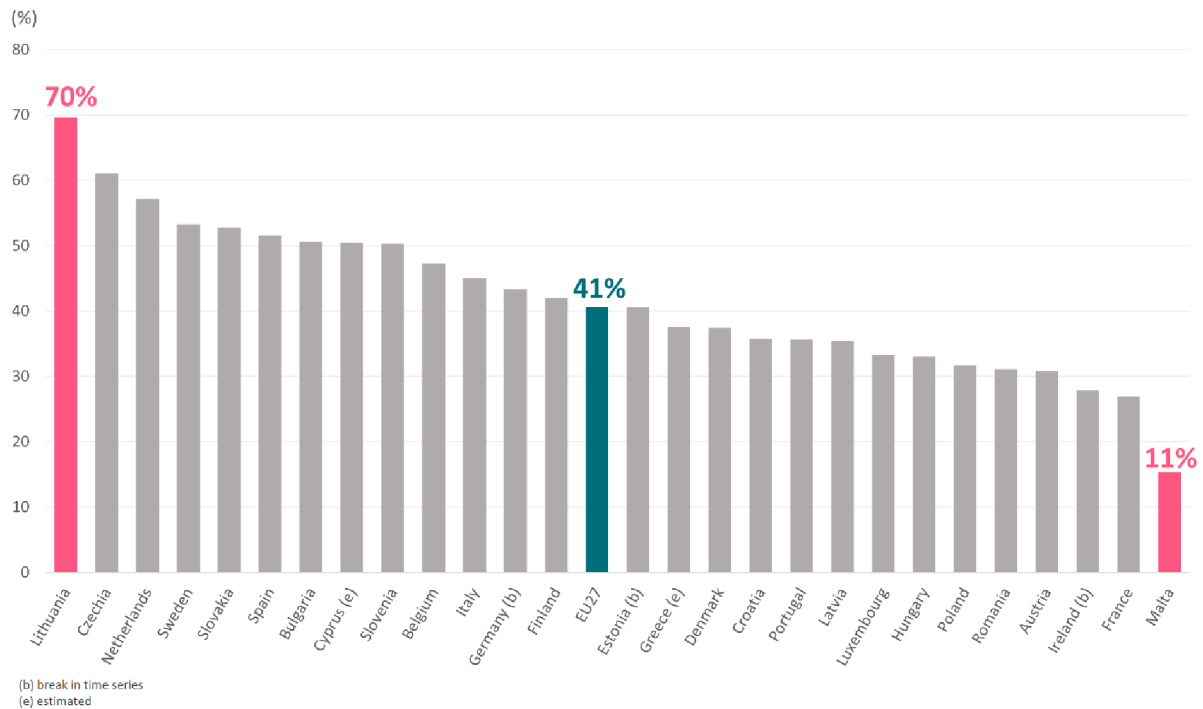


Figure 6. Plastic packaging recycling rate in 2019 by the European Union Member States. Graph by author, data from Eurostat (2022).

Having the ranking of most recyclers in percentage reflected, figure 7 confirms the hypothesis about the French representativeness showing a ranking of estimated contributions if the legislation would be applied for 2019. For obtaining the data shown, it was used the amount of plastic packaging not recycled in tonnes reported to Eurostat, transformed into kilograms, multiplied by 0.80€ and then applied the reductions provided under the legislation from The Council of the European Union (2020).

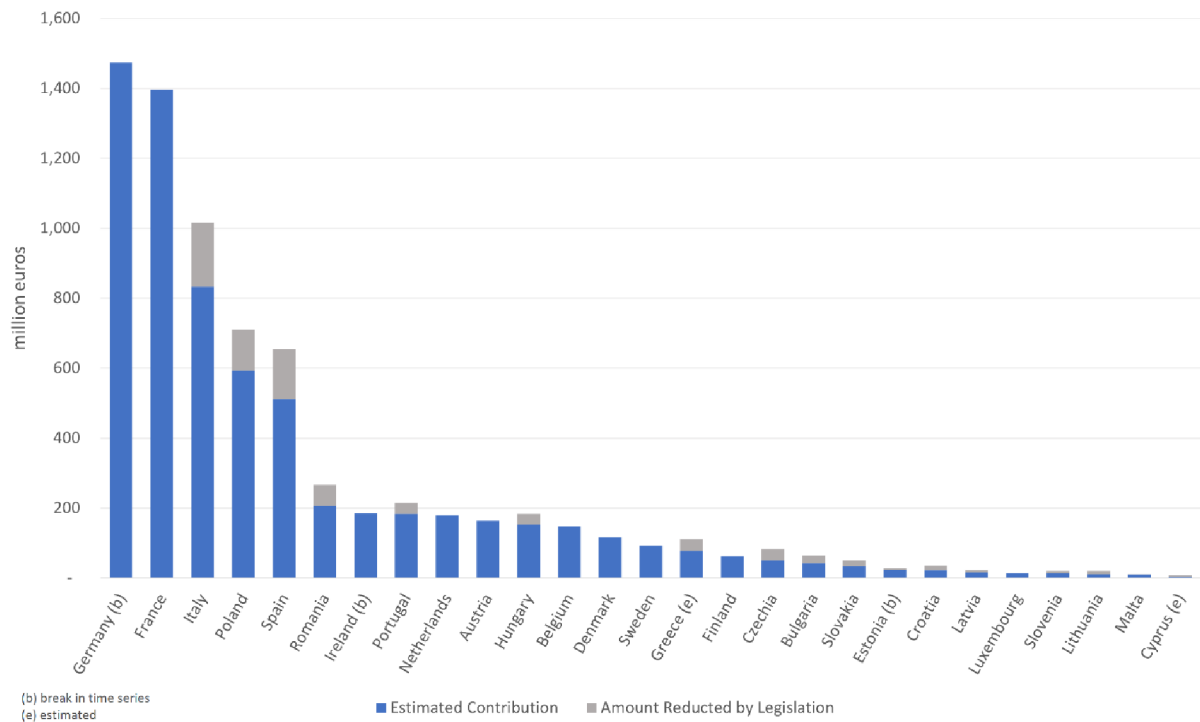


Figure 7. Estimated contribution over plastic packaging not recycled reported by Member States in 2019. Price of 0.80€/kg and reductions from current legislation considered. Graph by author, data from Eurostat (2022) and (The Council of the European Union 2020).

Germany and France astonishingly lead the list being both extremely far from the third position. Also considering Italy, Poland and Spain together, the top five Member States would cover around 73% of the EU collection for this specifically contribution, which in total would give around 6.6 billion euros per year for the Union as a new revenue source. Despite the potential of this contribution to raise the EU revenues, it is still not able to cover the monetary loss after the British withdrawal from the bloc, which was calculated as a positive net contribution of 7.4 billion euros in 2017 (The European Commission 2018b).

Moreover, the sustainability of the contribution based on single-use plastic packaging is doubtful regarding its secondary principle. Besides the primary aim of fundraise the EU budget, the plastic packaging contribution acts as an incentive to promote a higher level of recycling, which Member States may think worth to afford high investments and structural changes to increase the recycling ratio, therefore reducing payments to the EU. In conclusion, the policy might be good for the environment enhancing waste management and promoting a circular economy, but not that good as a revenue source in the long-term.

From the perspective of the Member States, the contribution limits even more the political flexibility to finance other projects due to budget constraints. In order to minimize

the monetary impact from these new remittances to the EU, two countries have already set legislations to forward the contribution burden – at least in part – to the actors whose responsibility of generating plastic packaging waste more relies on.

3.1. The case of Plastic Packaging Tax as a new environmental tax in Europe

Italy and Spain were the first countries among the Member States to establish a measure of collecting part of the contribution to be paid to the EU, which was after named as Plastic Packaging Taxes. According to the estimate in figure 7, they would be respectively the third and the fifth biggest contributors in both cases, even with or without the reductions provided under the law.

Moreover, it is also worth taking into consideration that the application of Value Added Taxes (VAT) is responsibility of national tax authorities according to the EU VAT regulation, which is one of the reasons why the EU did not apply a widespread tax on non-recycled plastics and started to charge a contribution from Member States instead. Although each nation can decide the design of their own VAT, there are some standard EU rules that all Members need to follow and to comply with (The Council of the European Union 2006).

3.1.1. The Plastic Packaging Tax in Italy

In face of this prominent level of estimated contribution, Italy set the so-called plastic tax with the law number 160/2019, which introduced a tax on single-use plastics such as packaging and containers for foods and goods, but it did not concern compostable plastics and some health products. It is a tax that was envisioned exclusively in a type of plastic to be reduced, the single-use and non-compostable one (Gualtieri 2019), this variety hereinafter referred to as MACSI.

The legislation obliges different actors to pay the tax referred depending on the transaction characteristics. The tax obligation goes to the manufacturer when the MACSI is produced in Italy, to the person or entity who purchases when the MACSI comes from another EU Member State and to the importer when it comes from third countries. At least for the first phase of the tax appliance, a value of 0.45 euro per kilogram of plastic material contained in the MACSI will be covered by the value chain with the plastic tax, while the other 0.35 euro

will be added by the Italian government to complete the total contribution of 0.80 euro set by the EU (Conte and Gualtieri 2019). This means that Italy would reduce the burden of the contribution from its administration in 56.25% from the original amount, not yet considering the reduction previously mentioned. This goes in line with the polluter pays principle, which is a *“commonly accepted practice that those who produce pollution should bear the costs of managing it to prevent damage to human health or the environment.”* (Ward and Hicks 2012).

Considering the estimated contribution using waste and recycling data from 2019, the new tax would be able to recover to the Italian public treasury an amount of 571.7 million euros from the contribution charged by the EU in a period of one year, or a real return rate of 68.7% thanks to the mentioned contribution reductions. Moreover, the law sets penalties for the non-compliance by tax obliged parties, which can be two to ten times the amount of tax evaded in case of failure to pay, but in any case not less than 500 euros. In the event of delayed payment of the tax, an administrative sanction equal to 30% of the tax due is applied, but not less than 250 euros. Finally, a delayed declaration or any other violation to the law might be succeeded by a sanction from 500 to 5000 euros (Conte and Gualtieri 2019).

Even if the Italian law provided in advance the expected plastic tax operation, there were much pressure by the industry to make it postponed or even cancelled at all, basing on assumptions of huge corporate financial impact and asking more time for adaptation. It already had four postponements since the first date set for the tax to enter into effect in July 2020. After that, the tariff was expected to be applied starting on January 2021, then July 2021, followed by January 2022 and now the next expected date is January 2023 (Ernst & Young 2021; The Local Italy 2021). After so many edits, it is still unclear if the new date shared would be respected or if the market would expect more delays.

3.1.2. The Plastic Packaging Tax in Spain

In the same direction, the Spanish government published in April 2022 the Law number 7 after a first draft from June 2020 concerning the compliance with the new waste goals provided in the EU Circular Economy Action Plan. It introduced a special tax on non-reusable plastic containers, much similar to the first European tariff for plastic packaging established by Italy, and it was also deferred for entering into force in January 2023, after one year of postponement. The purpose of the tax is to promote the prevention of the waste

generation as well as the promotion of the recycling of plastic waste. Beyond the non-reusable plastic containers, the scope of the tax also applies to semi-finished plastic products intended for obtaining the containers already mentioned or to allow the closure, marketing or presentation of them (Pérez-Castejón 2022).

In addition, the tax obligation will occur at the moment in which the first delivery is made for the purchaser in Spanish territory for the case when the packaging is manufactured. In the case of importation of non-reusable plastic containers, the tax will be obliged at the time that the import duties would have taken place. For intra-community acquisitions, the tax will accrue 15 months after the dispatch or transport of the products to the purchaser. In all instances, the taxpayer is either the legal person or entity who carry out the manufacture, import or intra-community acquisition of the aforementioned products in Spanish territory (Pérez-Castejón 2022).

Analogous to the Italian fee, the Spanish government established a tax amount of 0.45 euro for every kilogram of non-recycled plastic contained in the products mentioned by the legislation (Pérez-Castejón 2022), so the public body will also cover the other part of 0.35 euro to complete the 0.80 euro of contribution to the EU, per kilogram. Considering the estimated contribution using once again waste and recycling data from 2019, the new tax would be able to recover to the Spanish public treasury an amount of 367.6 million euros from the contribution charged by the EU in a period of one year, or a real return rate of 71.9% thanks to the mentioned contribution reductions.

Moreover, the law sets penalties for the non-compliance by tax obliged parties, which is fixed in 1000 euros when there is a lack of registration of the non-reusable plastic containers in the Territory Registry or when there is a lack of appointment of a representative by taxpayers not established in Spain. A false or incorrect certification of the amount of recycled plastic contained in the products subject to the plastic tax would also incur in a fine of 50 percent of the amount of the tax that could have been left unpaid, but in any case not lower than 1000 euros. Simultaneously, an undue use by purchasers of products exempted from the mentioned tax with an effective destination not stated in legislation will be subjected to a fine of 150 percent of the tax benefit unduly enjoyed, again with a minimum amount of 1000 euros. Finally, a fixed penalty of 75 euros is applied for each invoice or certificate issued

not mentioning the amount of the tax instalments accumulated, the amount of non-recycled plastic contained in the products or the article stating the tax exemption used (Pérez-Castejón 2022).

3.2. Likely impacts of a tax on plastic packaging

Even if Italy and Spain are until today the only Member States with already published legislations for handling plastic waste, there are other European countries also internally discussing on the topic, which it makes both Italian and Spanish legislation a reference for further policy measures to be taken by local governments. In practical terms, a plastic tax is able to deal with different approaches in benefit of the country and the environment. Aside from the monetary aspect of the tax on plastic packaging, which covers partially the annual contribution to be paid to the EU and reduce the budget constraints of a specific Member, the levy on different actors can promote a structural and behavioural change in the economy. It is also possible to expect not only a widespread incentive of plastic reuse and recycling, but also a reduction in the overall level of plastic use in the economy with this policy being applied.

3.2.1. Lower competitiveness for the plastic industry

Environmental taxes are capable to highly increase costs for some sectors or industries once they are applied and this consequence is even more present for the case of the most polluter actors. According to Sanz, Sora, and Puig (2018), *“the goal of such policies is reducing the environmental problems caused by the targeted products or sectors, and on some occasions the reduction of such problems goes parallel to the reduction of the economic activity that causes them.”*. Thanks to this, the appliance of similar tariffs on plastic packaging is prone to impact economically the specific sector that overproduces non-reusable plastics, for instance.

Differently, a plastic packaging tax can make markets more efficient while reducing environmental impacts (Sanz, Sora, and Puig 2018), thus developing economies. Since the environmental destruction is often related to external costs from industry activity (Field and Field 2017), adding an extra cost to the products that promotes overconsumption of natural resources and a high waste level may reduce the negative externality. When considering just

private costs, the industry is essentially using a productive input that it is not paying for. The unpaid input is the services of the environment, which have to deal with more plastic waste disposed on landfills and to absorb the greenhouse gas emissions from the production of new plastic packages. Although it may be cheap for the firm to do this instead of covering recycling and circular economy actions, it may not be cheap for society, who needs to bear all external costs from the private overproduction (Field and Field 2017).

Furthermore, environmental policies have the potential to enhance innovation and generate new economic opportunities for industries. For Porter and van der Linde (1995), *“companies must start to recognize the environment as a competitive opportunity – not as an annoying cost or a postponable threat. (...) Once environmental costs are measured and understood, the next step is to create a presumption for innovative-based solutions.”*. There are opportunity costs on wasted resources of foregone productivity that can be better used, for example. So environmental policies can function as a spark for innovation that promotes both environmental and industrial competitiveness, shifting the overall mindset from pollution control to resource productivity (Porter and van der Linde 1995).

3.2.2. Behavioural change for plastic usage and consumption

As previously anticipated, another likely impact is a behavioural change in production and consumption of plastic packaging. This change is much more connected to the demand elasticity for prices set to different materials than to any other factor (Sanz, Sora, and Puig 2018). If there is a tax elasticity for PPT, then it is possible to affirm that the demand for plastic packaging is overly sensitive to its price, which means that the tax burden added to the product price would reduce the demand in a greater proportion than the value raised.

Therefore, considering a positive demand elasticity for the proposed tax, producers and consumers would be keen to search for substitute products, shifting their choices to recycled plastics or even to packages that are manufactured using other materials, which are more durable or less pollutant than the ones with the tax burden laid on them. From the beginning, the tax might not affect so much the market, but elasticity generally increases in the long term because some of the alternatives that appear as a response to price rises need time to develop, such as technological improvements (Sanz, Sora, and Puig 2018).

On the other hand, the elasticity of plastic products relies differently upon their substitutes. A case of tax applied in Washington estimated a 2.8% to 5.9% drop in bottled water consumption with a tax rate of between 6.5% and 9.5%, which implies that demand for bottled water did not hold a proportionally greater change than the price increased with the tax, being inelastic for this case (Berck et al. 2016). Plastic bottled water is inelastic because there are not suitable substitute materials for Polyethylene Terephthalate (PET) bottles that do not increase substantially the final product price (Sanz, Sora, and Puig 2018), which is different to other beverages with more value added, such as juice or milk. Interestingly, there was another case in South Africa with plastic bags that faced an initial sharp fall in usage after a levy introduction, however the demand slowly rose to its historical levels in the long run. The abruptly reduction was a result of loss aversion rooted in an endowment effect since bags were for a long time provided for free, but the demand increased after consumers became used to pay for them (Dikgang, Leiman, and Visser 2012).

In conclusion, increasing plastic packaging price with a new tax gives us no clue in terms of demand elasticity if all plastic products and products containing plastics are considered as one single good, besides theoretically, it can be expected to be positive (Sanz, Sora, and Puig 2018). Parallely, the same works for behavioural change in the plastic production and consumption.

3.2.3. Climate change mitigation

The tax will definitely impact the environment and the level of waste generated or recovered by recycling, but it will depend on the type of product analysed as explained in section 3.2.2. The more elastic the demand is, the more reduction in plastic consumption is expected with the tax being applied on it. Likewise for a shift to other substitute materials that impact less the environment (Sanz, Sora, and Puig 2018).

Taxing plastic packaging also makes companies to rethink their product design, because the pressure to reduce plastic packaging usage is not just coming from environmentalists, but also from customers and even shareholders. During the last years, some manufacturers have been taking lightweighting initiatives to not only reduce the amount of plastic used in packaging, but to also to waste less fuel and generate less greenhouse gases during the distribution of products. Lighter goods save fuel to transport

since they weigh less and the more compact the product is, the lower is the number of vehicles needed to carry the same amount of product when shipping (Sanchez 2019; Sanz, Sora, and Puig 2018). Even further, the change may also be done through a product improvement, and not only relying the responsibility on the package itself. A small measure of moving to more concentrated liquid products as detergents, or even totally absent of water for a rehydration at home, saves a significant amount of packaging materials and makes supply chains more efficient (Capper 2020).

One foreseen scenario is plastic packaging being substituted by other material as aluminium or glass that would provide better economic performance. For cases with inelastic demand, when there is no other suitable substitute for plastic, the tax would promote research and development to reshape products in order to reduce the overall consumption of virgin resins, but the effects would not be significant in the short term since they require more time to manage. Besides the likely reduction in plastic consumption, the environment impact could occasionally be shifted to the substitute packaging materials, for cases where the demand is more elastic. This should be considered when designing the tax policy, which might be better if applied to not only plastic externalities, but to externalities of all other raw materials (Sanz, Sora, and Puig 2018).

Ultimately, improvements in the European recycled materials market and in the current waste collection systems are essential for fostering a reduction in plastic littering (Sanz, Sora, and Puig 2018). This action would be able to avoid part of the approximately nine billion tonnes of plastic packaging not recycled in 2019 ending in European landfills or rivers, as seen in figure 5.

4. KEY ISSUES

Although the new EU Revenue Plan for the period of 2021 to 2027 sets clearly how the contribution for single-use or non-recycled plastic packaging, it also brings gaps about what its primordial aim is, if it is purely economic or it also leans forward to a draft of environmental policy. Furthermore, the response of Member States may hugely vary, but in all cases the contribution imposes a new constraint in each country budget, even when considering the financial reductions provided by the EU legislation.

Taking Italy and Spain as examples of measures already forwarded to deal in part with the new budget constraint, it is possible to expect other nations using their published laws as reference for similar tax policies on plastic sector. Thus, with the data and information currently available from the EU and Member States, there are important key challenges of how the appliance of PPT in economies can play for sustainability and tax progressivity.

4.1. Is plastic packaging contribution a sustainable mechanism to fundraise EU revenues?

The EU published in 2020 the contribution as a new revenue source based on the weight of plastic packaging not recycled at a call rate of 0.80 euro per kilogram to not only raise funds, but also to *“provide an incentive to reduce the consumption of single-use plastics, foster recycling and boost the circular economy.”* (The Council of the European Union 2020). However, if the reason behind was mostly economic to raise EU revenues after the budgetary impact by the British withdrawal from the bloc and by the COVID-19 pandemics, it is barely possible to sustain it for the long-term.

Considering an expected decrease in plastic use for packaging, with more innovative, thinner or reusable containers, the contribution base might soon be eroded and the revenues for the EU therefore diminished. While it can foster a bottom-up environment-based approach giving power to Member States deciding the best for nature considering local characteristics, others also state that the *“alleged environmental purpose is mainly an attempt to greenwash an unpopular fiscal measure”* (Reichert et al. 2021), so the new contribution is not able to greener the economy only by its own.

To increase the complexity of the real purpose, the European Commission has projections of a stable revenue from the plastic contribution until 2026 and a slightly decline only afterwards in 2027 (The European Commission 2018a). Taking into account that the contribution proposed based on non-recycled plastic packaging was part of the EU revenue plan for 2021 to 2027, the previous knowledge of a virtual stability for the period might affect the main supported reason of improving the environment. From the perspective of the negative monetary impact from the preceding years, giving the reasons stated before, the national plastic contribution is prone to be more a greenwashed measure to cover financial gaps than a developed environment policy to combat climate change effects. In addition, the

new revenue *“is in no way designated to be spent predominantly or even solely on measures for the reduction of non-recycled plastic packaging”* (Reichert et al. 2021), such as for implementing the European Green Deal or the circular economy (Deutscher Bundestag 2020).

Thus, thinking only about the period of the EU Revenue Plan from 2021 to 2027, the plastic contribution can be seen as a mechanism to fundraise EU revenues, but it is not sustainable for the long-term or even for a successor period. Mechanism that is also able to internalize waste management for the Member States as stated by the European Commission, however time is needed for local governments to discuss further environment legislations and for the plastic industry to develop its products design or to invest in innovation to create a suitable substitute material for packaging. Even if the contribution is argued as an indirect incentive for Member States to improve plastic recycling in order to reduce their financial commitment to the EU, it is *“at best merely complementary to the direct legal incentives already set up under EU environmental law.”* (Reichert et al. 2021).

4.2. How to actively promote a behavioural change in plastic packaging production and consumption that boosts circular economy?

The EU could not only charge the amount of plastic packaging non-recycled from Member States, but also use the revenue obtained to promote incentives for the production and consumption of recycled or reusable goods. With the current legislation, that through the principle of subsidiarity it gives power to each nation to take the most suitable measure to reduce the level of single-use plastics and to foster recycling, the behavioural change also depends on the capability of each Member State actions and the results are likely to be widely spread.

Moreover, in cases where a tax on plastic packaging is applied such as in Italy and Spain, the behavioural change is closely related to the demand elasticity of each product, to the willingness of each actor to pay a price surcharge or not and to the industry resilience of adapting to new rules. It is also difficult to measure the elasticity of taxes if there are no standard rules such as within EU VAT that provides a minimum rate to be followed by all Member States. The effect of competition can make companies moving to other nations with lower or even inexistent tax rates for plastic packaging, so instead of encouraging a

behavioural change to the industry, the tax appliance might shift part of the economic activity out of the country, thus reducing revenues and job opportunities.

Despite improvements in the recycling systems, it is even more important playing actions that promote the reuse of already manufactured goods, taking into consideration the benefits from a circular economy and the scarcity of natural resources. A packaging material able to be reused for a few more times can help to not only reduce the amount of waste going to landfills or incineration, but also to save energy needed for recycling processes or for manufacturing new products.

For all the reasons stated above, the EU could be sponsoring a widespread policy among Member States to avoid more tax competition and to really promote the behavioural change that is essential for achieving the environmental goals set for next years. The economy can only turn into circular shape when actions are taken to break the common linear process that leads plastics from production to consumption and ends them at the disposal level.

4.3. How to overcome the challenge of society bearing the burden of a new tax?

A new tax is generally not well accepted by society, even in cases when the tariff is made looking for a noble cause, such as improving environmental standards. The common sense is a fear of a further reduced purchasing power after the tax implementation, that in most cases acts as a surcharge for goods and services and diminishes the average real income. The lower popularity is to an extent unavoidable, especially when the tax aims to reduce a particular damaging activity that is being played.

At first stage, tax should be designed in a way that it provides a perception of fairness. The purpose of the tariff must be transparent, stating who it is being levied upon and the reasons why, where actors can easily know what is needed to do in order to stop being charged. In the case of PPT, it should be clearly mentioned if the burden would laydown on the manufacturers or consumers of plastic packaging, for instance. Additionally, a tax on consumption would have a far wider base than a tax on production, which can be not proportionally focused on few localities or Member States that produces plastics the most (Powell 2018).

Competitiveness should be also taken into account, hence some adjustments in border tariffs might be essential to not create an undue advantage of international companies over the domestic production that would bear the new tariff. In sequence, the tax can follow the 'polluter pays' principle, which levies the responsibility – and the tariff – on those that really cause the environmental damage (Powell 2018). Without the tax directed to polluters, the plastic industry keeps profits privately and shares costs of pollution and waste management with the whole society, not being fair for those parties that follow and promote a sustainable value chain. Since it is hard to target the polluter itself on the individual basis, the overall understanding is that manufacturers hold joint and several liability as they offer to the market the items that are later disposed, making them also responsible for supporting and enhancing a circular economy.

4.4. Is it possible to avoid a regressive tax design or even increase progressivity on the average tax system?

Environmental taxes are able to change not only consumption and production behaviours or revenue levels, but also to affect deeply the income and purchasing power per capita. It depends much on the specificity of the tax in analysis, which can be by nature either direct or indirect. Buchanan (1970) distinguishes both considering that *“direct taxation is defined as taxation imposed upon the person who is intended to be the final bearer of the burden of payment. Indirect taxation is defined as taxation imposed upon others than the person who is intended to bear the final burden.”* For this reason, tax on income is direct because it targets the final party, whereas tax on transaction is often indirect as the final consumer indirectly pays the tax charged over the supply chain, being upon the manufacturer, the reseller or any other intermediary.

A big challenge of managing tax systems is how to balance the level of direct and indirect taxes in order to not significantly affect equity or growth rate of the economy. While *“direct taxes may be adjusted to the individual characteristics of the taxpayer”* (Atkinson 1977), such as by different earning levels, *“indirect taxes are levied on transactions irrespective of the circumstances of buyer or seller”* (Atkinson 1977), making no difference for the tax burden between high- or low-income people in absolute terms. Although the main

problem relies on relative terms, where representativity of taxes on income might be widely diverse among society.

To differentiate progressive and regressive taxes, Varela (2016) considers the former a “*tax where the average tax rate, or the total amount of tax paid as a percentage of income, increases as the taxpayer’s income increases*” and the later the opposite, “*where the average tax rate (...) decreases as income increases.*”. For the case of plastic packaging, it is important to notice that a higher tax load on consumption affects mostly the poor, who spends the majority part – or the total – of its earnings purchasing basic need goods and services for living. Without any measure of adjustment when designing the tax system, a surcharge on prices would be financially worsening the situation of individuals, thus increasing overall poverty in economy. This is a scenario of a deeply regressive tax that at its best should be avoided to secure fairness in economy and sustainable growth. Sections 4.4.1. to 4.4.4. elaborates more on factors that may reduce the regressive effect after a new tax introduction or that may even increase the overall progressivity on tax system.

4.4.1. Explicitly charging polluters

One measure to alleviate the tax burden from low-income people is to design such taxes that recover and internalise external costs upon businesses. A tax policy with this target makes external costs to be borne by the polluter considering the ‘polluter pays’ principle, rather than by society or individuals. For Groothuis (2014), “*internalisation of external costs means that the full economic, social, health and environmental costs are covered by the price of a product or service*”, which would financially relieve the situation of the poor.

An important definition to clarify here is about incidence. Of course, the level of tax rate is overly important for raising government’s revenues, but the challenge for tax administrators is also to carefully choose the appropriate tax base (The World Bank 2019). Fullerton and Metcalf (2002) define the expression of tax incidence being “*the study of who bears the economic burden of a tax.*”, but there are two distinct types of incidences to discuss about. On one hand, there is the direct tax incidence, which is borne by the legal payers of the tax, called statutory incidence. On the other hand, the indirect tax incidence, which is normally the case of final customers bearing taxes through consumption expenses, is called as economic incidence (Fullerton and Metcalf 2002).

Therefore, when discussing about tax regressivity, it is much more important to analyse the economic incidence rather than the statutory one in order to reduce negative distributional income effects. Since poor households often do not receive formal earnings, financially living with cash transfers, donations or informal activities, they also do not collect taxes for tax authorities based on income. Contrastingly, their consumption expenses represent a large share of their earnings and thus they frequently pay proportionally more taxes than wealthier families do. As a consequence, governments may be concerned about the real incidence of the taxes being applied to not imply a negative effect on equity levels and inclusive economic growth. A clever tax design is important here to induce producers to invest in innovative materials, improve waste management and promote circular economy, preventing a behavioural inertia that passes and indirectly levies the tax burden on the final consumer, increasing tax regressivity.

Governments also often struggle to internalise external costs, since they are hesitant of changing legislations that might affect businesses and economic activity (Grootuis 2014), however support is being more frequently provided with the internationally environmental discussions from the EU and UN, such as with the resolution sketched this year in Nairobi. Local tax authorities shall then overcome the initial barrier from the industry to update its legislation and to load tariffs upon environment damaging activities, being transparent about the purpose of the changes and making clear how companies can adapt themselves to be out of the tax burden. After the implementation, it would be possible to reduce tax regressivity in the medium-term since the measure would increase the ratio between tax paid and income as the taxpayer's income increases as well.

4.4.2. Updating the overall tax system

Bearing in mind that taxes on consumption are often regressive, it might not be feasible to ensure that PPT would be progressive by itself, nevertheless changes in other parts of the tax system could be introduced to keep the overall impact broadly progressive. Designing a better and more equitable tax system, however, requires improved efficiency of tax administrations and up-to-date tax legislations that meet new society concerns.

Firstly, one alternative to promote progressivity is to implement enforcements by tax administrations that are able to raise the overall tax collection without raising tax rates. In

order to ensure equity and efficiency, tax authorities shall minimize at most tax avoidance and evasion (Abdel-Kader and de Mooij 2020), reducing opportunities for tax arbitrage and facilitating tax processes to increase the number of taxpayers willing to comply with the rules. Since low-income households indirectly pay taxes when consuming goods and services, normally they are not the responsible actor for delivering taxes to authorities, hence not being so much present in tax evasions. All this considered, stronger enforcements would then increase the amount of tax paid from households pursuing a higher income, boosting progressivity.

Secondly, some taxes could be reduced or even eliminated to balance the PPT introduction and to promote progressivity through the 'double dividend' hypothesis, but in this case not raising the overall tax burden on society. This hypothesis suggests that revenues from PPT could generate a double benefit, on one hand from an environmental improvement and on the other hand from lowering distortions of other taxes already established on the tax system (Jaeger 2013). Taxes based on consumption of substitute packaging materials, for instance, could be exempted from VAT in a level of not reducing the government's revenues. This measure has several likely benefits for the environment, the society and the economy. The act of exempting – or reducing – taxes of substitute goods consumption has the potential to induce a quickly demand shift from taxed products to non-taxed ones, as could happen from non-recycled plastics to recycled plastics, saving negative environmental impacts. On the other hand, the society would face a suitable option to spend less on daily consumption when choosing non-taxed goods instead of those with the PPT applied on, therefore expanding the purchasing power of the poor with a less regressive tax system.

Lastly, the affected businesses would be prone to spend more on human capital and to create new job opportunities for searching innovative ways to develop their manufactured goods in such a way of escaping themselves from the new tax umbrella. More job vacancies offered would then likely result in an economic growth. Although all these actions are able to generate benefits for a community in distinct aspects, the second scenario of exempting other taxes is barely probable if the government design a PPT aiming only to fundraise its revenues instead of providing a solution for reducing poverty level and environmental impacts.

4.4.3. Plastic Packaging Tax not as a unique tax, but as a set of taxes

There are several levels along the plastic packaging value chain, so the PPT shall provide different approaches to expect a behaviour change from the different actors throughout the process. Since a single tax is not able to fully target all parties with efficiency, a suite of taxes may be needed for the best results (Powell 2018). Fullerton, Leicester, and Smith (2010) also assume that *“a combination of taxes may generate better targeted environmental incentives than any one isolated instrument.”* Although it is less administratively complex to tax manufactures, which they compose a narrower tax base to control, the closer to the consumer is the tax levied, the more visible and efficient it is (Powell 2018). This is very much connected with where the economic incidence is being laid on. Governments often proceed very cautiously – if not sometimes struggling – when creating a balance between tax incidence and tax efficiency.

Moreover, the elasticity of each player and product within the plastic chain should be accounted when establishing the tax rates. Some parties might have a stronger willingness to pay higher rates rather than others and some products might have such a unique function that it cannot be replaced by a suitable substitute material. The levy needs then to be designed in such a way that it does not either discourage taxpayers from participating in the tax compliance system or promote a shift of formal activities to informal ones (The World Bank 2019).

In practical terms, a plastic packaging tax requires to be designed in a complexity as same as the environmental impacts targeted to be reduced are. It shall be conceived in a multi-level approach, having considered the specificities of each individual or business among the plastic chain to pursue a higher response for behavioural change in packaging consumption and production. The PPT might then not be seen as a unique tax, but as a multi-layered one that considers not just the difference between final consumers or producers, but also taking other characteristics to establish varied rates depending on firm sizes, for example. A high tax rate applied upon small businesses might develop into a movement to the informal sector or the shutdown of operations (The World Bank 2019) instead of changing environment behaviour, thus reducing employment opportunities and increasing regressivity

upon the tax system. This shows how complex PPT can be and how many adjustments it may need for providing the best environmental and economic outcomes.

4.4.4. Shifting the tax burden from labour to pollution

Another way of avoiding tax regressivity is shifting the tax burden that levies on wages and employment benefits to natural resource use and consumption, a measure that uses the ‘polluter pays’ principle to alleviate the taxes paid by employees (Groothuis 2014). The revenues collected through PPT can be used to reduce the tax burden on labour and to increase social spending in order to improve distributional aspects of income and consumption. The purchasing power of the poor is then likely to significantly improve if the social spending is targeted for income-tested compensations or lump sum transfers that mitigate adverse impacts of increasing taxes on consumption of specific materials, for instance (Braathen et al. 2017).

The weighted average tax revenue by tax base through the 27 Member States of the EU is presented in figure 8, where it is possible to see an appliance of almost the double of taxes on labour than taxes on consumption, of 52% and 28%, respectively. This shows how highly potential is the shift proposed of taxes from labour to natural resources use and consumption if well designed by local governments. While a tax shift is considered budget neutral for tax administrators, it on the other hand fundamentally changes the operation margins of businesses and consumers (Groothuis 2014) and can be cleverly used for reducing tax regressivity.

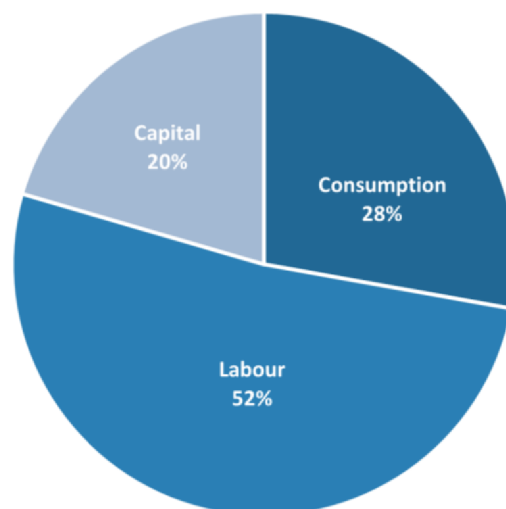


Figure 8. EU-27 tax revenue according to type of tax base in 2019. Weighted average as a % of total taxation. Graph by author, data from The European Commission (2021).

Therefore, the tax shift would promote an important impact on consumption patterns, as pricing of products and services would be better reflecting the external costs from non-recycled manufactured materials (Groothuis 2014). Low-income households would also be benefited with a higher threshold for personal income tax, which is able to reduce the tax burden from those that needs the most. On the other hand, this threshold should not be too high either, leading to a short tax base and to low revenues for tax administrators, which undermine their ability to redistribute income through taxation (Abdel-Kader and de Mooij 2020).

It is also important to note that a broader tax base helps to limit the size of the informal economy, bringing more individuals into the tax system and thus making it easier for governments to identify those in need for further policy adjustments (PwC and The World Bank Group 2020). That being the case, a higher threshold with free-tax allowance for those situated below the mark may not be the best scenario if not combined with a second boundary line. Governments might see better outcomes if they create one more group level for personal income tax progressivity, where the first tax rate is applied to people with higher incomes than before, leveraging the previous free-tax threshold, but instead of freeing those people with previously taxed income, charging them a very low – or even null – tax rate to keep them on tax system.

In conclusion, all these measures proposed for increasing the real income of less-wealthy individuals and for charging the natural resources use and consumption have the potential to increase job opportunities and to open space for innovation with a greater and more qualified human capital being spent on. Although to meet the maximum of the benefits, PPT must be seen as a multi-layered tax, with a specific approach to each party's characteristic and it has also to update the overall tax system to balance other economic aspects. It may be seen essential to internalise external costs that plastic manufacturing generates during production and that often let them to be borne by society as a common expenditure.

Actions that are budget neutral for governments funds, but of huge relevance to alleviate the tax burden from low-income households, to offer more job vacancies nationwide and to surcharge the non-recycled manufactured packages. As a consequence, the region

would face an improvement in tax progressivity, an inclusive economic growth and a stronger environmental conservation.

5. CONCLUSIONS

This paper has gone through the major historical milestones that introduced environmental taxes for worldwide debates, starting with the UN Conference in Stockholm, the first global conference to consider environment as a main global issue back in 1972, and covering most of the legislative and political approaches in Europe that later developed into a greater concern on plastic packaging waste. Environmental taxes have a double dividend idea that they can be used for reducing environmentally damaging activities (Jaeger 2013), but it has also the potential to improve tax progressivity promoting an inclusive economic growth if well designed and combined with other adjustments on tax system.

These taxes are set clearly aiming to secure a compromise with next generations' well-being, allowing people to live in a time where there is no more depletion of natural resources and there is an improved recycling system aligned with a good overall waste management. As showed by figures 1 and 2, economic growth and greenhouse gas emissions are following similar paths since the end of World War II, mostly in countries like the USA, Canada and those from west Europe, where the economic activity got a fast pace during several decades. For this reason, a structural change is urgently needed for turning economies into a sustainable development process, otherwise scarcity and economic failures will be present mining both population and economic growth for the future. As defended by Powell (2018), environmental taxes are made for changing behaviours, internalising damage by polluters and raising revenues for public spending, which are the visible effects from recent policies adopted by the European Union.

Firstly in 1994, with the Directive 94/62/EC, the European Parliament started to establish and keeps reviewing some measures to tackle packaging waste in the EU. At the time of release, this Directive was well connected with the environmental and development goals discussed two years before during the UN conference held in Rio de Janeiro, Brazil, demonstrating their ambition to internationally show political strength when addressing global climate challenges. As explicitly stated, the European Union wants to converge its

efforts for being part of the first continent running for climate neutrality, thus encouraging similar actions to be taken abroad by other economies and regions.

In sequence, there were the Kyoto Protocol, the EU Emissions Trading System and the Paris Agreement between 1997 and 2015, which all were set for, in such a way, limit greenhouse gas emissions and the global temperature rise that was promoting several disturbances for nature. Afterwards, also in 2015, the European Commission launched the Circular Economy Action Plan combined with countless legislative revisions visioning more competitiveness, new jobs and an enhanced sustainable economic growth (The European Commission 2015a), also setting targets for recycling rates of plastic packaging to be met by 2025 and 2030 of 50% and 55%, respectively. These marks have been used as significant milestones for the EU to achieve the carbon neutrality proposed for 2050, so it is all part of a broader strategy to tackle environmental impacts.

From the financial side, the EU faced an enormous gap in its revenues after the British withdrawal from the bloc, losing a calculated annual net contribution of around 7.4 billion euros in 2017, and the situation got severely worsened when hit by the COVID-19 pandemics that made social expenditures to rise as a rocket. Therefore, in order to cover the gap left, the EU added a contribution on single-use plastic packaging waste within its then new revenue plan for the period of 2021 to 2027, such measure that had controversy and doubtful aims. It was formulated on an environmentally based rhetoric that the contribution would indirectly incentivise Member States to reduce plastic consumption and to improve recycling and waste management, however some points are good to be highlighted.

To start, the new policy was created clearly to cover the financial gap in EU revenues, where there was no provision for the amount collected with the contribution to be spent on environmental improvements or in damage reductions, leaving all the social responsibilities dependant from the capabilities of each Member State. Secondly, when designing the fiscal policy, the European Commission had projections of a stable revenue from the plastic contribution until 2026 (The European Commission 2018a), so the previous knowledge of a virtual stability for the revenue plan period may compromise the main environmental purpose supported. Moreover, the indirect incentive for Member States improving plastic recycling is at best a reinforcement of what is already under shared obligations in the EU environmental law (Reichert et al. 2021), so in practice it does not bring any new incentive

for the mitigation of environmental impacts. Lastly, being an instrument to fundraise the EU revenues and, at the same time, to promote a lower usage and consumption of non-recycled plastics is not sustainable in the long-term, since a promotion for less plastic packaging in market would mine the revenue collections. Therefore, this contribution has many aspects to support the idea that it was “*an attempt to greenwash an unpopular fiscal measure*” (Reichert et al. 2021), not being the most suitable policy for a greening the economy.

As covered in section 3.1, the contribution imposed an unprecedented financial constraint in the EU Member States budgets since 2021 without providing any other assistance, so some countries have drafted internal policies to manage and cover – at least in part – the increased national expenditures, such as with the introduction of Plastic Packaging Taxes in Italy and Spain. Since they were the third and fifth biggest contributors for plastic packaging waste as calculated in figure 7, respectively, their need for a quick financial measure was greater than many other Members that may take more time to design such policies.

Although there are several aspects to take care when designing a tax appliance on consumption, the PPT is still likely to impact the plastic chain in three main ways: in lower market competitiveness in the short-term, in a behavioural change of plastic consumption and production and in a climate change mitigation over years. Some hardships may be faced by the plastic industry in a short-term period because producers need time to invest in research and development to reshape their products or to create them with innovative materials. On the other hand, the surcharge of the PPT imposed upon non-recycled plastics may be seen as a strong incentive to change behaviours, but the tax rate should not be high enough to enhance tax avoidance schemes, like illegal waste disposals or incinerations. A good and very well-planned tax design matters for improving a circular economy, recycling systems and thus reducing environmental impacts.

Moreover, the topic of environmental taxes is not recent at all, which its origin backs to the 1970's decade, but the best measures to manage the situation are still under construction – and will certainly get many more years to become a global environmental model. Since taxing plastic packaging is a complex task for governments, which they need to balance different economic aspects under the same scale, the present paper also takes care to mention in the fourth chapter common concerns that may appear during the PPT

implementation. Chapter that elaborates in several parts a structured answer for the research question of how PPT can address the process of development to a greener and more progressive economy beyond being only a new revenue source for the EU.

For reaching a greener economy, it is firstly essential to reduce the environmentally damaging activities through behavioural change in consumption and production of plastics. It is closely linked to the willingness of each actor to pay the tax, reflected by the tax elasticity, so the tax policy should be transparent and fair for all parties. As the 'polluter pays' principle reflects external costs into products prices, in a sense of fairness for society, consumers and businesses must know the reason they are paying a higher price, as well as what measures they can take to get out of the tax umbrella. Additionally, it must be clear to where the revenues obtained are being spent on, because a broader acceptance happens when people expect taxes collected to finance other policies back to society.

Border tariffs for non-European manufactures and a widespread EU tax policy guideline, as similar as the one for VAT that sets minimum rules, might also help to avoid tax competition among Member States and to secure domestic industry competitiveness, respectively. As a consequence, plastic packaging policies as the global plastic treaty drafted by the UN need to be internationally harmonized to avoid industry leakage, where a number of firms shift to countries with less strict environment guidelines and significantly undermine tax policy outcomes.

Now for preventing an increase in tax system regressivity after the PPT introduction, a set of measures might be taken by governments and tax administrators. Depending on the relevance and quality of the methods implemented, it might be possible to not only reduce an expected regressivity with the new tax applied, but to even go further promoting an overall progressivity, thus benefiting many low-income households with an inclusive economic growth. Initially, the tax should explicitly charge polluters with the internalization of external costs that are borne by society – inclusive by poor individuals that do not consume such manufactured products. Although both Italian and Spanish PPT were made as a single tax, a multi-layered tax or a suite of taxes may offer better outcomes, since each actor among the value chain responds to the tax policy in a unique way. Furthermore, perhaps the most important idea, is the execution of a tax reform, where the overall tax system is updated in order to alleviate the tax burden laid upon poorer households while also saving the

environment from damaging impacts. One way of action is through the shift of taxes on labour to taxes on consumption of non-recycled goods, which is able to create job vacancies and to promote innovative processes among businesses.

Although discussions concerning the negative impacts upon the environment backs fifty years in history, it was only during the last two or three decades that more significant actions were internationally developed for the topic. The EU revenue based on non-recycled plastic packaging might accelerate the process of other Member States creating similar taxes as the Italian and Spanish PPT, which may be a good impulse for the UN global plastic treaty planned to be concluded in the end of 2024 and internationally applied. To never forget that future generations have the same right of living in a sustainable world as we do.

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