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THE CLIMATE DIMENSION OF FISCAL POLICY SUSTAINABILITY: BEST PRACTICES IN GREEN BUDGETING AND LESSONS FOR PORTUGAL

Carlos Marinheiro
Amílcar Sousa
Ana Pinheiro

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The climate dimension of fiscal policy sustainability: best practices in Green Budgeting and lessons for Portugal

Carlos Marinheiro[*], Amílcar Sousa[†], Ana Pinheiro[†]

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Abstract[‡]

The Green Budgeting technique is being adopted by an increasing number of countries and has the potential to align fiscal policy objectives with climate and environmental goals. Given that the (financial) sustainability of public finances and environmental sustainability are intrinsically interconnected with each other, this paper argues that the traditional public debt sustainability analysis should be expanded to encompass climate and environmental sustainability considerations. Other key elements of a proper budgetary framework, such as fiscal transparency should also be broadened to include the disclosure of the environmental and climate impacts of fiscal policy. Green Budgeting is a growing technique that can be used to expand the scope of such usual fiscal concepts. One of the main tools for its adoption is Green Budget Tagging, which enables citizens to assess the environmental and climate impacts of fiscal policy, on both the tax and spending sides of the state budget. It enables to capture both the positive and negative impacts of fiscal policy. Additionally, it provides more visibility to the amount of resources countries allocate to climate and environment goals and to mitigation and adaptation policies, while allowing the assessment of whether such goals are attained. A proper working fiscal framework, including the adoption of accrual accounting and performance programme budgeting, seems to be instrumental in this domain along with strong political commitment.

Portugal already took a few steps, such as recently enacted Climate Law, but still has a long way to go in terms of Green Budgeting. This paper proposes a roadmap for its adoption. To start with, both the completion of the public accounts reform and the full adoption of programme budgeting foreseen in the 2015 Budgetary Framework Law should be attained. The meeting of such two pre-conditions will then lay the foundations for the implementation of Green Budgeting and to disclose the climate and environmental impacts of policy measures, following the international best practices. The adoption of Green Budgeting might also pave the way to the emission of Green Bonds to finance specific environmental and climate related projects. Such bonds might be a cost-effective way to finance the substantial green investment needs in a highly indebted country while contributing to the decrease of global risk.

Keywords: green budgeting; sustainability; green tagging; green financing; budgeting; Portugal

JEL: H5; H61; H63; Q58; Q51

[*] Conselho das Finanças Públicas (Portuguese Public Finance Council, CFP) and University of Coimbra, Faculty of Economics.
[†] Conselho das Finanças Públicas (Portuguese Public Finance Council, CFP).
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Resumo

A técnica do Orçamento Verde tem vindo a ser adotada por um número crescente de países e tem o potencial de alinhar os objetivos da política orçamental com as metas climáticas e ambientais. Dado que a sustentabilidade (financeira) das finanças públicas e a sustentabilidade ambiental estão intrinsecamente interligadas entre si, este documento defende que a análise tradicional da sustentabilidade da dívida pública deve ser alargada de modo a abranger considerações sobre o clima e a sustentabilidade ambiental. Outros elementos-chave de um quadro orçamental apropriado, tais como a transparência fiscal, devem também alargar a sua abrangência para incluir a publicação dos impactos ambientais e climáticos da política orçamental. A orçamentação verde é uma técnica cada vez mais utilizada para expandir o âmbito dos conceitos orçamentais habituais. Um dos principais instrumentos para a sua adoção é o "Green Budget Tagging", a classificação das despesas e receitas de acordo com o seu impacto climático e ambiental ou "classificação orçamental verde", que permite aos cidadãos avaliar os impactos ambientais e climáticos da política orçamental, tanto do lado da receita como do lado da despesa do orçamento do Estado. Esta classificação permite captar tanto os impactos positivos como negativos da política orçamental. Além disso, dá uma maior visibilidade à quantidade de recursos que os países atribuem aos objetivos climáticos e ambientais e às políticas de mitigação e adaptação, permitindo simultaneamente avaliar se tais objetivos estão a ser ou não atingidos. Um enquadramento orçamental adequado, incluindo a adoção de contabilidade de exercício e da orçamentação por programas, afigura-se essencial neste domínio, juntamente com um forte compromisso político.

Portugal já tomou algumas medidas, como a recentemente promulgada Lei do Clima, mas ainda tem um longo caminho a percorrer em termos de Orçamentação Verde. Este documento propõe um roteiro para a sua adoção. Para começar, tanto a conclusão da reforma da contabilidade pública como a adoção integral da orçamentação por programas prevista na Lei de Enquadramento Orçamental de 2015 deverão ser concretizadas. Quando estas duas pré-condições estiverem reunidas poder-se-á lançar então as bases para a implementação da Orçamentação Verde e para a revelação dos impactos climáticos e ambientais das medidas de política económica, seguindo as melhores práticas internacionais. A adoção do Orçamento Verde poderá também abrir caminho à emissão de Obrigações Verdes para financiar projetos específicos relacionados com o ambiente e o clima. Tais obrigações podem ser uma forma custo-eficaz de financiar as necessidades substanciais de investimento verde num país altamente endividado, contribuindo simultaneamente para a diminuição do risco global.

1 Introduction

The sustainability of public finances is a central issue in recent economic policy debate (Marinheiro, 2006). Although, at first glance, the economic intuition points to a simple definition of sustainability considering that a sustainable policy must ultimately avoid government bankruptcy, in practice as pointed out by (Balassone & Franco, 2000) despite such clear economic intuition, there are serious difficulties in both the analytical and operational definition of fiscal sustainability. Besides the usual discussion regarding the limits to the public debt accumulation (Hamilton & Flavin, 1986), in the present juncture characterised by a climate and environment emergency (European Parliament, 2019) the assessment of sustainability must also include the climate and environment dimensions. As a matter of fact, if fiscal policy should contribute to achieve a sustainable development of the economy, such climate and environment dimensions must be taken into account. This is clear when we retain the Brundtland Commission definition of sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations General Assembly, 1987).[1] A sustainable policy should try to reconcile economic development with the protection of social and environmental balance. As a central part of public policies, fiscal policy should contribute for the goal of sustainable development.

In our opinion there is a clear and direct relationship between the "traditional" sustainability of public finances and environmental sustainability: only financially sustainable public finances can provide the resources needed for counteracting the adverse effects of climate change, and only a sustainable environment can preserve the sustainability of the public finances. A degraded environment would likely increase the frequency and dimension of natural catastrophes (Radu, 2021) which would imperil the health of public finances. According to this author, "conservative estimates show that the current trend in global warming could result in an additional annual loss of at least € 170 billion (1.36% of EU GDP)." The consequent damage to public infrastructures and the role of the Government as a sort of insurer of last resort can take a heavy toll on public finances.

In what directly concerns climate action and fiscal policy there are two interconnected dimensions: on one hand fiscal policy should provide the financial resources needed to tackle mitigation and adaptation policies; and on the other hand, the environmental impact of the remaining fiscal policy decisions, of the tax system and of the public expenditure should be assessed. This is exactly where green budgeting fits in: it's in the light of the role that fiscal policy should have in the achievement of the broader goal of sustainable development that green budgeting stands out as a powerful tool.

Besides summarizing the state of the art on this domain, this paper adds to the literature the view that the new "green dimension" to fiscal policy can be seen as an extension to the existing principles of fiscal sustainability and fiscal transparency, and its main instrument of "green tagging" as a required addition to a proper Public Financial Management (PFM). It also outlines what needs to be done for Portugal to catch up with the best practices.

[1] This widely used definition is the one retained in the glossary of summaries of the European Union's law, EUR-Lex (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:sustainable_development), and sustainable development has formally became one of the European Union's long-term goals under Article 3(3) of the Treaty on European Union, which states that "The Union shall establish an internal market. It shall work for the sustainable development of Europe based on balanced economic growth and price stability, a highly competitive social market economy, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment. It shall promote scientific and technological advance."

The remaining of the paper is organized as follows. Chapter 2 describes the concept of Green Budgeting, its context and the most common tools used to implement this practice (with special emphasis in Green Tagging) and also includes a brief description of Green Bonds. In Chapter 3 the case study of the adoption of Green Budgeting by France is analysed. In Chapter 4 we shift the attention to Portugal, describing the steps that were already taken and the lessons to be learned from those best practices. The main conclusions of this paper are presented in Chapter 5.

2 Green Budgeting

2.1 Definition, context and tools

There is no universal definition of Green Budgeting. According to the European Commission, "Green budgeting means using the tools of budgetary policymaking to help achieve climate and environmental goals." In a more extended version, the European Commission also states that "Green budgeting is a process whereby the environmental contributions of budgetary items and policies are identified and assessed with respect to specific performance indicators, with the objective of better aligning budgetary policies with environmental goals". In the opinion of the OECD, "Green budgeting is a practice which uses the tools of budgetary policy-making to help achieve "green" objectives, i.e., those relating to the climate and environmental dimensions such as biodiversity, air quality and water. (…) While by itself green budgeting does not change existing policies, it provides decision-makers with a clearer understanding of the overall environmental and climate impacts of budgeting choices. It brings evidence together in a systematic and co-ordinated manner to allow more informed decision-making on how to optimise revenue-raising and resource allocation in order to fulfil national and international commitments" (OECD, 2021c).

In our own view, Green Budgeting can be seen as another layer of budget transparency. Budget transparency is mainly related with the full disclosure of all relevant fiscal information in a timely and systematic manner to enable the public to understand the fiscal policy decisions, or simply meaning "being fully open with people about how public money is raised and used" (OECD, 2017). The Green Budgeting practice adds to this financial dimension yet another layer disclosing the impact of the budget on the environment, reinforcing the accountability of decision makers in relation to the achievement of climate goals and therefore contributing to an informed, evidence-based debate on sustainable growth.

As mentioned by (Petrie, 2021) the concept of green budget has been evolving over time, having its roots in the 1987 Brundtland Commission report (United Nations General Assembly, 1987, Chapters 12, paragraph 27) that called for "an annual report and an audit of changes in environmental quality and in the stock of the nation's environmental resource assets are needed to complement the traditional annual fiscal budget and economic development plans". The boost to the adoption of what now is known as "Green Budgeting" was driven by key international commitments on climate change and on inclusive development, particularly the 2015 Paris Agreement which commits countries to keep the average rise in global temperature below 2 degrees Celsius this century, preferably to limit it to 1,5 °C above pre-industrial levels, and the adoption of the United Nations Sustainable Development Goals (SDG) also in 2015. In December of 2019, the European Union Green Deal, presented by the (European Commission, 2019), included an explicit commitment to

foster green budgeting practices in the EU: "A greater use of green budgeting tools will help to redirect public investment, consumption and taxation to green priorities and away from harmful subsidies. The Commission will work with the Member States to screen and benchmark green budgeting practices. This will make it easier to assess to what extent annual budgets and medium-term fiscal plans take environmental considerations and risks into account, and learn from best practices".[2]

There are some international platforms that currently provide technical support to countries in the process of green transition, including the implementation of green budgeting practices:

i. The OECD Paris Collaborative on Green Budgeting was launched in 2017 to help countries develop budgetary tools to progress towards national commitments on climate change and the environment. This platform provides technical support to align national policy frameworks towards lower greenhouse gas emissions and environmentally sustainable development;
ii. The EU Technical Assistance Instrument is a program managed by DG-REFORM, which provides training to help Member States acquire technical capacity to develop a Green Budget framework at national level, seeking to align national Green Budget practices with national recommendations of the European Commission in this matter. In 2021, an online training course on the Green Budget was started for 23 EU Member States, including Portugal, in which the perceptions of experts from the European Commission and from green budget professionals from the OECD were presented;
iii. The Coalition of Finance Ministers for Climate Action, created in 2019, brings together finance ministers and policymakers from over 70 countries, including Portugal. The work of this Coalition is built around the Helsinki Principles, which underpin the commitment of Finance Ministers to align policy actions with the Paris Agreement; promote capacity building, and mutual exchange of knowledge and expertise; integrate climate change in macroeconomic management and public finance; mobilize private climate finance and develop a financial sector that recognizes mitigation and adaptation;
iv. The IMF and Climate Change supports its members to address the challenges of climate change for which fiscal and macroeconomic policies are an important component of the appropriate policy response. The IMF also publishes research on the economic implications of climate change and provides policy advice on mitigation, adaptation, and transition strategies to help them capture the opportunities of low-carbon, resilient growth.

Although there is no common methodology yet for the implementation of a Green Budget, several countries initiated this process through differentiated methods, with distinct priorities, using several instruments. A recently published joint work by the EC, IMF, and OECD (Battersby et al., 2021) describes several tools currently used to implement the Green Budget, namely: i) the inclusion of a green perspective in medium-term plans, integrating climate forecasts in macro-fiscal government forecasts; ii) introducing climate change and environmental degradation in the assessment of fiscal risks to the sustainability of public finances, using sensitivity analysis to quantify the impacts of unanticipated environmental shocks, as well as of gradual transformation environmental shocks; iii) ex-ante and ex-post evaluation of the impact of environmental policies and systematic use of this information for budget decision making; iv) adoption of a green perspective in the spending review exercise, ensuring its alignment with environmental and climate policies; v) green accounting

[2] There are also additional resources om the European Green Deal in a dedicated part of the Europa portal: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.

balances, through the standardization of definitions and classifications, producing reports that facilitate international comparisons; vi) institutional design based on a legislated green budgeting process, providing a basis for defining the responsibilities and requirements of the government and other intervening entities, focusing on: the role of the Ministry of Finance, the inclusion of the State-Owned Enterprises and the need for evaluation by independent entities and; vii) budget tagging of "green" and "brown" elements (discussed below).

Recognizing the need to integrate the challenges to fiscal sustainability posed by climate change some Independent Fiscal Institutions already incorporated in their latest Sustainability Reports some work on such risks. In a non-exhaustive way, it was the case of the UK (Office for Budget Responsibility, 2021), and Portugal (Conselho das Finanças Públicas, 2021).

2.2 Green tagging

Originally, budget classification methodologies were developed with the support of the United Nations Development Program and the World Bank, based on the experience acquired in the areas of poverty, gender equality, international development goals, and climate (World Bank, 2020). The standardization of the green budget classification was significantly accelerated by the creation of the Rio markers in 1998 by the OECD Development Assistance Committee. The Rio Markers constitute a system for evaluating budgetary policies that allow the statistical monitorization and reporting of the development of financial flows on topics covered in the Rio Conventions, namely biodiversity, desertification, climate change mitigation and adaptation to climate change. There are three possible values for the Rio markers, assigned according to the context, objectives and results, and activities analysed: zero indicates not targeted; one for a significant objective; and two for a principal objective of fiscal policy. Depending on the value attributed, fixed percentages of the overall budget are considered relevant for the respective themes. The EU has decided to use 0%, 40% and 100%, respectively.

In recent years, various countries have adopted some degree of Green Budget tagging, in a heterogeneous process. In many cases, this process is adaptive and takes a restricted form at an early stage, covering a limited number of budget activities and sectors, determined by each country. Thus, with the goal of facilitating the comparison of progress made and finding the means to progressively move towards tagging the budget as comprehensively as possible, a joint effort has been made by the main international institutions in defining the different stages of the budget tagging process.

The European Commission presented two lists[3] that serve as basis for the budget classification at the national level, defining the budget elements that should be classified as "green" (with a favourable impact on the climate or in the environment) or "brown" (adverse impact on climate or environment). These lists are updated on an annual basis on the EC platform for Green Budgets. There are also other entities that apply some degree of climate or environmental classification, with special emphasis for the United Nations that developed the System of Environmental-Economic Accounting (SEEA), which applies the principles of national accounting to the classification and reporting of activities, products, expenses, and other environmental transactions, being compatible with most national budget systems, facilitating its application by all national authorities in the

[3] Lists available at: *https://economy-finance.ec.europa.eu/economic-and-fiscal-governance/green-budgeting-eu_en#tools*

future. In what regards the procedural steps, the OECD summarizes the Green Budget tagging implementation methodologies in four phases (OECD, 2021a):

> i) Definition of relevant climate and environmental expenditure (what is green?): use of international or national definitions, taking into account national climate and environmental change policy documents;
>
> ii) Definition of the scope of the analysis (which sectors? which elements to rank?): several countries have started by implementing an adaptive strategy, in which the ranking is applied to few budget elements. After this first phase, the number of elements analysed increases, along with the capacity for analysis and training of the human resources involved. In particular, the process generally involves the central government and some key institutions, and may, at an early stage, and due to the lack of sufficient resources, exclude some sectors, such as the SOE. It is also common to start by classifying only the activities related to climate change and, later, to extend this classification to other environmental areas, as is already practiced in Italy and France (more detail in chapter 3);
>
> iii) Development of a classification system: on projects that indicate climate and environmental change as an objective (binary system), classifying their entire budget, or on activities with climate and environmental relevance, assigning a "climate or environmental weight" to the fraction of that activity that will be related to the climate or the environment (scale system);
>
> iv) Identification of information needs: countries that adopt the binary system do not need as detailed information as those that adopt the scale system. In the former system, countries tag items according to their favourable or unfavourable contribution to green objectives, while in the latter system budget items are tagged according to the extent to which they promote green objectives

The biggest advantage of the budget tagging lies in the transparency and transmission of relevant information that it provides. Indeed, this method promotes discussion and knowledge sharing among civil society, instilling greater responsibility and commitment on the government and agencies involved in the process, as well as greater visibility of their actions. In this sense, the effectiveness of the budget classification could also benefit from an alignment with other tools that are still little used, such as the addition of a green dimension to the assessment of budgetary performance (OECD, 2021a), namely in the debt sustainability analysis exercise. A study by (Pizarro et al., 2021) argues that any climate and environmental classification methodology is strengthened if connected to the broad existing statistical framework, namely to public sector financial accounts and the System of Environmental-Economic Accounting, being consistent with statistical standards currently in use, such as the Government Finance Statistics Framework and the System of National Accounts.. Otherwise, the methodology may identify climate actions and their expenditures adequately but may not be consistent, comparable, or be of limited use for analytical purposes.

Despite the progress made so far there a still significant challenges to Green Budgeting regarding:

- *Ex-ante impact:* in what concerns resource allocation and project design, the impact of tagging does not yet seem to be of great importance, since it is usually assigned only after the project approval. However, the existence of the classification *per se* could motivate greater environmental and climate awareness on the investment decision making process, providing access to the information allowing the alignment of new projects with climate and environmental objectives. There are still some aspects to be improved in the

implementation of this system, which may be overcome after the initial implementation phase, such as i) the significant omissions of the sectors covered (in several cases, public companies, tax expenditure, or external financing); ii) the need to tag not only activities with a favourable impact on the climate or environment, but also those with an unfavourable impact, which is still little used; iii) functional limitations and costs related to the budget process itself (limited resources and technical capacity); and iv) a greater focus on expenditure than on revenue (taxes on carbon, on fossil fuels, permits on resource exploitation, etc.), whose funds could be channelled towards climate and environmental expenditure, demonstrating a link that is generally of simple communication to civil society and; v) greater granularity in the classification of budget elements could promote a more accurate calculation of the respective impacts;

- *Ex-post impact:* it is difficult to quantify the impact of budget tagging, in part due to the inability of this system to consider simultaneously and adequately the three dimensions of the evaluation of results, namely the i) political alignment; ii) efficiency, and; iii) the effectiveness of climate and environmental policy measures. The simple classification of this methodology does not allow a global consideration of the macro-fiscal impact of climate and environmental policies in all its aspects, focusing only on the analysis that is easier to quantify - the allocation of resources through the budget expenditure. According to the World Bank, countries rarely do systematic post-monitoring of budgeted climate and environment-related expenditures. The lack of assessment of the results achieved by policies adopted makes it difficult to use this information later in the preparation of future budgets (OECD, 2021a).

However, a word of caution should be added when an unfavourable expenditure is found as a result of the tagging process. As duly noted by the French Government, which is systematically applying green tagging, finding a "brown" expenditure does not necessarily mean that it should be eradicated: "tagging an expenditure as unfavourable is not enough to conclude it needs to be eliminated; it may respond to the requirements of another policy deemed to be a priority, such as public safety, balanced local development, equitable access to public services, or the availability of basic necessities. The value of green budget tagging is that it highlights such priorities, raises questions about the right policy tools and, if environmentally unfavourable expenditures need to be maintained, it may lead to efforts to mitigate their impact. In most cases, mixed expenditures are investment expenditures that have a favourable impact in the medium term regarding climate goals, even though construction may harm the environment in the short term. This is the case for major mass transport infrastructure projects, for example." (France Gouvernement, 2021, p. 12)

2.3 Green bonds

Green bonds are defined as debt securities issued by an entity that is committed to earmark the invested funds to projects focused on climate and environmental sustainability (energy efficiency, pollution prevention, non-polluting transports, water management). The first principles for a Green Bond were defined by the International Capital Markets Association (ICMA, 2018), focusing in the eligibility of the projects to which the funds are allocated and in the reporting transparency. At the same time, the Climate Bonds Initiative developed more restrictive criteria, which were less disseminated. These criteria included a taxonomy defining green activities, alongside with a

certification and approval by green bonds external auditors. Afterwards, it was recognized the need for uniformization and regulation in the green bond market. In 2019 the EC made a recommendation for the adoption of the EU Green Bond Standard and, in 2020, two lists of activities considered sustainable in the EU were approved by the EC, in the delegated acts published in December 2021 and February 2022. In June 2020 the EU Taxonomy Regulation (Regulation (EU) 2020/852 of 18 June 2020) was published in the Official Journal of the European Union, entering into force in the following month, with the goals of "creating security for investors, protect private investors from greenwashing, help companies to become more climate-friendly, mitigate market fragmentation and help shift investments where they are most needed"[4], according to the EC.

The first green bond – a Climate Awareness Bond - was issued by the European Investment Bank (EIB) in 2007. It was followed by the World Bank in 2008, in an operation with the participation of Scandinavian pension funds looking to finance the transition to lower carbon emissions. Other entities started issuing green bonds, such as investment banks, public enterprises, financial institutions, and sovereigns: according to the (OECD, 2021b), more than USD 130 billion of green bonds were issued until end-2020, by 19 different sovereigns.

Particularly since 2017, there is evidence of a fast growth of the green bond market, explained through the larger demand by socially and environmentally committed investors. In some sense, green bonds changed the investors rational, offering them the possibility to choose to what type of projects their funds are allocated (Reichelt & Keenan, 2017). Traditional debt management goals – access to budget efficient financing and building of a liquid yield curve – seem to have been adapted to accommodate green bonds programmes. In an enquiry to sovereign issuers conducted by the Climate Bonds Initiative (CBI) on the motivation for issuing a green bond over a traditional, the respondents referred the attainment of new objectives related to green bonds, such as reputational benefits, investors demand and mitigation of climate change (Harrison & Muething, 2021). Additionally, issuers state that the international commitments assumed under the scope of fighting climate change have contributed favourably to the decision of issuing green bonds. Until the end of March 2021, ten EU countries had issued sovereign green bonds, completing a total amount of €82 billion.

Table 1 – Sovereign green bonds issued by EU countries by the end of March 2021 (€ bn)

	Most recent issuance	Accumulated amount	Total number of issuances	Maximum maturity (years)
Poland	2016	4	3	30
France	2017	27	1	22
Hungary	2020	2	1	15
Ireland	2018	5	2	12
Holland	2019	12	1	20
Belgium	2018	6	1	15
Lithuania	2018	0	1	10
Sweden	2020	8	2	10
Italy	2021	9	1	24
Germany	2020	12	2	10
Total		**82**	**15**	

Source: (Domínguez-Jiménez & Lehmann, 2021) | Note: the sum of the parcels may not coincide with the total due to rounding effects.

[4] https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-taxonomy-sustainable-activities_en

Recently, the Next Generation EU contributed largely to green bonds dynamism: from the global envelope of €750 billion available in response to the pandemic crisis, 30% (roughly €250 billion) will be financed thought this type of securities (to be issued by the European Commission). In October 2021, the EC, representing the EU, performed the largest green bonds issuance so far, and the first under the scope of Next Generation EU, amounting to €12 billion with redemption in 2037. Additionally, all SURE bonds were issued as 'social' bonds. Those qualify, respectively, under the Green Bond Principles and Social Bond Principles established by the ICMA.

Growth in green bons market reflects the main advantage of this type of securities: the signalling of the associated commitment with climate and environmental objectives. Hence, given the extent of the maturities and end-loaded payment structure of typical infrastructure projects, these instruments are expected to be crucial for financing the energy transition process (Lehmann, 2021). However, some relevant limitations to this market persist. Due to the absence of a group of rules and directives, these debt instruments i) can have a negative impact in the process of compliance with sovereign debt management principles (Domínguez-Jiménez & Lehmann, 2021) since they are not issued efficiently, implying a time and resource-consuming report and ii) the impact of the green investment is difficult to quantify. More information and transparency are still needed, ensuring that green investments are correctly directed to new sustainable projects, and not to other ongoing expenditures – greenwashing – due to the fungibility of financial resources.

Table 2 – Global green bonds issuance 2014-2021 (USD billion)

	Total	Supranational
2014	37	9
2015	46	8,3
2016	85	10,2
2017	160	9,5
2018	173	12,7
2019	269	14,4
2020	298	13,5
2021	509	13,3

Source: Climate Bonds Initiative database (available at www.climatebonds.net/market/data).

The issuance of green bonds implies additional costs vis-à-vis a traditional sovereign bond issuance, due to the need of identifying the project(s) to be financed, the need of elaborating regular reports providing performance indicators of the objectives to be attained by such project(s), and a less liquid and less deep market. Therefore, it is relevant to know whether such kind of bonds give a premium (called «greenium») to the issuers, through a lower yield compared to traditional bonds. In recent years, several authors studied the presence of a green bond premium. The green bond premium can be defined as the difference in yield between thematic bonds and regular bonds of similar maturity, based on the rational that investors are willing to pay a superior amount for a bond with sustainable impact (D'Incau et al., 2022). According to the same United Nations blog post, there are several technical arguments that support the existence of a greenium: i) the sustainability factor associated to a green bond is credit positive, since it implies lower global risk, resulting in a lower yield

relatively to a vanilla bond and, therefore, in a higher price for investors; ii) excess demand for (sustainable) bonds results in higher prices for investors, and iii) the sustainable features result in a willingness from investors to accept a lower return for a thematic bond.

While in the past some studies suggested mixed evidence on the existence and signal of the greenium (Bachelet et al., 2019; Harrison & Filkova, 2019), most recent data supports a positive green bond premium (Baker et al., 2018; D'Incau et al., 2022; Harrison, 2022). In general, there is an agreement on the existence of a greenium mainly driven by the simple fact that demand outpaces supply. The CBI found that the premium on green bonds is evident globally and is particularly strong for U.S. dollar denominated debt, with savings for borrowers ranging between 1 basis point and 10 basis points on a global basis (Harrison, 2022). Moreover, the finding that Green Bonds including external evaluations can contribute to increase the premium on green bonds (Gutsche & Zwergel, 2020) supports the recognition of the value of the bond sustainable features have for socially responsible investors. In fact, investors accept larger premiums (up to 5 basis points) in cases where there is a substantial environmental agenda, externally validated, reducing information search costs and uncertainty (Dorfleitner et al., 2022). This recognition by investors of the need to implement green perspectives in public financial management, given that the achievement of climate and environmental goals contribute to the decrease in global risk, supports the case for the inclusion of such tools into debt sustainability analysis.

3 The case study of the adoption of Green Budgeting by France

Although, to this date, only very few countries have some form of green budgeting in place, some of them have already made considerable advances in Green Budgeting. In recent paper, (Bova, 2021) makes a first review of Green Budgeting practices in the EU. (Petrie, 2021) also presents experiences from developing economies that are not part of the OECD. For the sake of brevity, in this chapter we will focus our attention on France that can be seen as one of the best practices in Europe.

France presented its first Green Budget Report in 2020 included within the global fiscal process and an appendix to the budget bill published in the first week of October. Article 179 of the 2020 Budget Act 2019-1479 of 28 December 2019, stipulates that the government submits to Parliament, as an appendix to the budget bill, a report on the environmental impact of the budget. It resulted from the OECD initiative, the "Paris Collaborative on Green Budgeting," launched at the One Planet Summit in December 2017. The report, called "Rapport sur l'impact Environnemental du Budget de L'État", presents the tagging of budget appropriations, earmarked revenue and some tax expenditures as favourable, neutral, or unfavourable for the environment and their share of total central government expenditure. The more recent edition introduced methodological refinements including a finer tagging of certain expenditures and clearer differentiation between expenditures tagged as neutral and the year's expenditures that have not been tagged because of methodological difficulties (France Gouvernement, 2021). Besides the Report there is also an open data website that represents the data in an interactive way, showing the aggregate figures, and a break down by mission.[5]

The classification identifies the impact of expenditures on impact of expenditures on six environmental objectives that were inspired by the European taxonomy of activities: fighting climate

[5] https://datavision.economie.gouv.fr/budget-vert/

change; Adapting to climate change and preventing natural risks; Water management; Transition to the circular economy, waste management, man-made risk prevention; Fighting water, air, and soil pollution; and conservation of biodiversity, protection of natural, agricultural and forest areas. A score of -1 to +3 is given to each expenditure for each of the environmental objectives according to the environmental impact of the expenditure. To facilitate communication the Green Budget Report aggregates the scores into the colours green, for favourable expenditures, grey for neutral ones, and brown for unfavourable expenditures. The Report retains only the aggregated colour, being the detailed numerical scores only available in the mentioned website.

Table 3 – Tags for expenditure at the more disaggregated level in the French case

Colour	Designation	Scores
Green	Favourable expenditures	**Score 3:** environmentally targeted expenditures or expenditures contributing directly to the production of an environmental good or service (green activity) **Score 2:** expenditures with no explicit environmental target, but with an indirect positive impact. **Score 1:** favourable but controversial expenditures with favourable short-term effects but a potential technology lock-in risk in the long term
Grey	Neutral expenditures	**Score 0**: expenditures with no significant impact on the environment
Brown	Unfavourable expenditures	**Score -1**: expenditures causing direct harm to the environment or creating incentives for environmentally harmful behaviour

Source: (France Gouvernement, 2021).

This classification is applied to the expenditures disaggregated by action or sub-action, and an overall tag is then calculated depending on the total scores for all the six objectives. Therefore, an expenditure may be tagged as:

- **favourable overall**: if impacts are favourable, or favourable and neutral, for all objectives;
- **unfavourable overall**: if impacts are unfavourable, or unfavourable and neutral, for all objectives;
- **mixed overall**: if impacts are simultaneously favourable and unfavourable and even neutral for different objectives;
- **neutral overall**: if impacts are neutral for all objectives.

In the latest edition of the Report neutral expenditures are distinguished from untagged expenditures, which are “expenditures where environmental impacts cannot be assessed reliably or no consensus can be reached, given the current state of scientific knowledge or a lack of available data”. The 2022 Report gives examples of neutral and untagged expenditures. Social transfers to households, most expenditure on central government payrolls and retirement pensions, and sovereign expenditures were tagged as neutral. Untagged expenditures were represented by a grey and white striped area in the budget mission ring charts and comprised “digital technology expenditures, the levy on revenue paid to the European Union, most of the financial support given to local governments, support for electricity-intensive industries exposed to international competition, some operating expenditure (see below), some property expenditures and some of the expenditures for the “Invest for the Future” Mission.”

Table 4 - Summary of Green Tagging of the expenditures covered by the Total Central Government Expenditures Target (ODETE) in France, 2022 budget (€bn)

	Expenditures	Tax expenditures	Total with tax expenditures	Weight on total
Environmental impact	42.0	11.4	53.4	9%
Favourable	34.8	3.4	38.2	7%
Mixed	4.0	0.4	4.5	1%
Unfavourable	3.2	7.6	10.8	2%
Neutral Impact	354.7	78.4	433.1	74%
Not tagged	98.5	1.6	100.1	17%
Total	495.1	91.5	586.6	100%

Sources: (France Gouvernement, 2021) and the data portal and own calculations. | Notes: The favourable expenditures include the "Recovery Plan" Mission (€5.7bn). The sum of the parcels may not coincide with the total due to rounding effects.

As documented in Table 4, the bulk of the French Central Government expenditures, including tax expenditures, were found to have a neutral impact on the environment (74%) and 17% were still not yet tagged. Of the expenditures with an environmental impact (9% of the total), almost ¾ were found favourable. The website informs that the largest budget appropriation with a favourable impact was the development of renewable energy, and the most relevant tax expenditure was the reduced VAT at 5.5% for the improvement of energy efficiency.

The 2022 Report envisages to go further in the future in what regards the inclusion of a more specific estimate of the adequacy of public financing of the country's climate objectives, and the adequacy of carbon pricing to achieve the climate objectives.

4 Portugal: steps taken and lessons to be learned

4.1 What has been done

Portugal already took some steps in relation to climate and environmental goals, but still has a long way to go in terms of Green Budgeting. First of all, it is important to mention that Portugal has shown full commitment to climate and environment matters and was even one of the first countries to prepare a Roadmap for Carbon Neutrality by 2050.[6] Other national commitments are the National Energy and Climate Plan 2021-2030[7] (under which Portugal has committed to reach, by the year 2030, 47% of renewable sources in final energy consumption and to reduce primary energy consumption through energy efficiency gains of 35%), the National Strategy for Adaptation to Climate Change[8] and the Action Program for Adaptation to Climate Change (2019-2030).[9]

Recognizing the climate emergency and following the best practices (the UK being the pioneer with its Climate Change Act of 2008, that served as a model for other countries) the Parliament approved the Portuguese Climate Law in the end of 2021 (Law no. 98/2021, of 31 December), which

[6] Approved by the Resolution of the Council of Ministers no. 107/2019.
[7] Approved by the Resolution of the Council of Ministers no. 53/2020.
[8] Approved by the Resolution of the Council of Ministers no. 24/2020.
[9] Approved by the Resolution of the Council of Ministers no. 130/2019.

recognizes citizens' right to climate balance and commits to achieve climate neutrality by 2050. This Law stipulates the creation of a Climate Action Council that will act as an independent advisory body with duties such as: issuing opinions on the State Budget and the State General Account with regards to climate action; comment on scenarios for the decarbonisation of the economy; presenting biennial recommendations on the development of energy and transport infrastructures and; if requested by the Government and the Parliament, comment about the elaboration, discussion and approval of legislative acts, reports and policy instruments public on climate action.

According to the Portuguese Climate Law, budgetary allocations for climate policy purposes should be consolidated into a specific account of the State Budget and climate scenarios should be integrated in the models underlying the macroeconomic scenarios that support the State Budget. The Law also determines that the Government must create a "Climate Action Portal" (free and accessible on the internet, to allow citizens to participate in the path of climate action and to monitor all the relevant information) and a new category of tax deductions ("Green Personal Income Tax") that benefits taxpayers that acquire, consume, or use environmentally sustainable goods and services, and therefore adopt an individual behaviour that defend the environment and reduce the ecological footprint.

In the opinion of (Mackaill-Hill & Mascolo, 2022), the Portuguese Climate Law lacks ambition in some chapters, such as the ban on the sale of combustion vehicles, lagging behind the EU's proposal in its Fit-for-55 package, or the end of subsidies for fossil fuels, planned only for 2030. Not all Member States have adopted national climate laws yet, and not all climate laws are equally strong. This means the European Climate Law adopted in July of 2021 [Regulation (EU) 2021/1119] will be implemented against a background of highly inconsistent standards of national climate ambition and governance enabling conditions (Mackaill-Hill & Mascolo, 2022).

Some other relevant decisions were taken previously by the Portuguese Government. In late 2014, a Green Taxation Reform[10] was introduced with the aim of simultaneously guaranteeing the balance of public accounts and sustainable growth. This reform revised and simplified taxation in the energy and transport, water, waste, urban planning and territorial planning, forests and biodiversity sectors, and introduced a tax regime for plastic bags and encouraged the scrapping of end-of-life vehicles. The Investment Tax Code was also approved in 2014, aiming at the review of the investment and capitalization benefit regimes through the establishment of the Tax Incentive System in Business Research and Development, which establishes that expenses related to R&D activities associated with ecological product design projects are considered at 110%.

In 2016, a carbon tax was introduced as a complement to the taxation on oil products, which, in 2021, was extended to the issuance of commercial passenger air transport tickets, departing from airports and aerodromes located in Portuguese territory, as compensation for the polluting emissions from the sector and other negative environmental effects.

Also in 2016, the Environmental Fund (*Fundo Ambiental*) was created[11] aiming at a more effective environment policy, concentrating the resources of existing funds (for this purpose, the Portuguese Carbon Fund, the Environmental Intervention Fund, the Water Resources Protection Fund and the Fund for the Conservation of Nature and Biodiversity were extinguished). This Fund's aim is to finance entities, activities, or projects that pursuit sustainable development objectives, contributing

[10] Established by the Law 82-D/2014, of December the 31st.
[11] Created by the Decree-Law 42-A/2016, of August the 12th.

to the fulfilment of national and international objectives and commitments, namely those relating to climate change, water resources, waste and the conservation of nature and biodiversity.[12]

Although Portugal hasn't adopted the Green Tagging technique yet, in the letter with instructions for preparing the State Budget, issued by the Directorate-General for the Budget, the public services are urged to use a specific measure to identify "Climate action initiatives" other than the ones included in the Recovery and Resilience Plan.

Finally, it should be noted that although the Recovery and Resilience Plans (RRPs) of most countries (including Portugal, as mentioned in Box 1) comply with the principle of climate integration defined in article 18(e) of the Recovery and Resilience Mechanism Regulation, few Member States have included measures to support the development and implementation of Green Budget practices in their RRPs (Battersby et al., 2021).

Box 1 – The Recovery and Resilience Plan in the context of climate objectives

The Recovery and Resilience Mechanism (RRM) is the main instrument of the Next Generation-EU. In order to align the use of RRM financial resources (€750 billion, at 2018 prices) with European priorities, the RRM Regulation determined that its scope should be focused on six relevant pillars, the first of which corresponds to the green transition.

According to the article 18(e) of the RRM Regulation, the Recovery and Resilience Plan (RRP) of each member state must contain a qualitative explanation of how the measures contained therein are expected to contribute to the green transition, including biodiversity, or to addressing the challenges resulting therefrom, and whether these measures correspond to an amount representing at least 37% of the total RRP allocation.

The RRP of Portugal was approved by the European Council in July 2021 with a total allocation of €16.6 billion (of which around €14 billion in the form of grants), directed to three dimensions: Resilience (€11.1 billion); Climate Transition (€3.1 billion) and Digital Transition (€2.5 billion). Portugal's RRP contains measures to support climate objectives that account to €6.3 billion, which represents 37.9% of the plan's total allocation (Table 5, according to the EC's Analysis of the RRP of Portugal, using the methodology for climate tracking set out in Annex VI of the RRM Regulation (Member States had to identify in advance whether the reforms and investments foreseen in their RRP contribute to supporting climate and environmental objectives in full [coefficient 100%], partial [40%] or if they have no impact on these goals [0%]).

The reforms and investments foreseen in Portugal's RRP are structured into 20 components, the majority (16) of which contribute to climate objectives. As would be expected, the structuring dimension related to the Climate Transition is the one with the highest percentage of investment allocation to climate requirements (95.2%), which will be channelled to each of its six components, with emphasis on investments aimed at promoting sustainable mobility (€967 million), the decarbonisation of industry (€715 million), the energy efficiency in buildings (€610 million). Within the scope of the structural dimension regarding Resilience (with an allocation of 30.3% to those requirements), its nine components have a complementary relevance in terms of contribution to the green transition, with emphasis on housing (€1220 million) and forests (€615 million).

[12] The role of this Environmental Fund as an instrument for climate transition is detailed in the section 5.5.5. of CFP's occasional paper no. 3/2022 "Climate change: macro-fiscal risks and challenges" (in Portuguese only).

Table 5 – Portugal's PRR: allocation to the climate requirement (EUR million)

Component	Cost	Climate contribution	% allocation to climate requirement
CLIMATE TRANSITION	**3 059**	**2 911**	**95.2%**
Sustainable mobility	967	967	100.0%
Decarbonisation of industry	715	715	100.0%
Energy efficiency in buildings	610	610	100.0%
Hydrogen and renewables	370	370	100.0%
Sea	252	110	43.7%
Bioeconomy	145	139	95.9%
RESILIENCE	**11 125**	**3 372**	**30.3%**
Housing	2 733	1 220	44.6%
Forests	615	615	100.0%
Investment and innovation	2 914	521	17.9%
National Health Service	1 383	315	22.8%
Water management	390	157	40.3%
Social responses	833	211	25.3%
Qualifications and skills	1 324	182	13.7%
Infrastructures	690	91	13.2%
Culture	243	60	24.7%
DIGITAL TRANSITION	**2 460**	**9**	**0.4%**
Digital public administration	578	9	1.6%
Other components	1 882	0	0.0%
TOTAL	**16 644**	**6 291**	**37.9%**

Source: European Commission (Analysis of Portugal's RRP, 16 June 2021). CFP calculations. | Note: the amount of the total estimated costs of the RRP (16 644 M€) is higher than the global allocation of the plan (€16.606 million), which corresponds to the financial allocation after deducting the proportional part of Portugal's proportional share of expenses under the terms of article 6 (2) of Regulation (EU) 2021/241, plus support in the form of a loan requested by Portugal under the mechanism.

European Commission's first annual report on the implementation of the RRM states that the expenditure on climate in all the 22 RRP that have already been approved amounts to €177.4 billion. Those plans include €16.3 billion of additional environmental expenditure, taking the total amount of expenditure that is tagged as contributing to either climate or environmental objectives to €193.7 billion (equivalent to 43.5% of the total expenditure foreseen in the RRP of those 22 member states). About two-thirds of these countries' expenditure to support the green transition is focused in the areas of sustainable mobility and energy efficiency.

The RRP implementation process should ensure compliance with all applicable environmental standards, but also ensure that all measures included in the RRP respect the principle of the "do no significant harm" to the following environmental objectives: i) climate change mitigation; ii) adaptation to climate change; iii) sustainable use and protection of water and marine resources; iv) circular economy; v) pollution prevention and control; vi) protection and restoration of biodiversity and ecosystems.

Only a few Member States have incorporated measures to support the implementation of Green Budgeting practices in their RRP (Battersby et al., 2021). Austria plans to create a structure in the Ministry of Finance that is responsible for implementing Green Budgeting standards in the budget process and conducting climate-related impact assessments. Spain plans to prepare a "green report" to accompany the annual budget, identifying "green" and "brown" expenditure items, and France intends to expand the spectrum of analysis to other expenditures. Italy plans to reclassify the State Budget, with reference to environmental expenditures, in line with the Sustainable Development Goals and 2030 Agenda targets, and Slovenia plans to develop and implement a methodology to assess the impact of each budget line. on environmental objectives in line with the EU taxonomy.

In its analysis of Portugal's RRP, the European Commission underlines that Portugal does not use Green Budgeting practices, which could help fulfil national and international commitments on climate change and environmental protection.

4.2 What needs to be done: a possible roadmap

Portugal still misses the full implementation of a modern Public Financial Management system based on the adoption of accrual accounting and performance budgeting.

The incomplete adoption of accrual accounting, namely the absence of full financial balance sheet makes it more difficult the disclosure of the nonfinancial impacts of fiscal policy (Petrie, 2021, p. 77). Despite the progress made in the adaptation of International Public Sector Accounting Standards (IPSAS) by the different public services, the full adoption of accrual accounting is quite delayed, particularly in what regards the consolidation of the accounts, the creation of first balance sheet of the State and its use in the budget itself, which is still approved in cash accounting only.

Also the practice of performance budgeting supports green budgeting, as recognized by (Battersby et al., 2021, p. 18). When the budget is organised around budgetary programmes, and particularly in more advance case of performance budgeting it is easier to link inputs (public expenditure) with outcomes by the means of performance indicators. In 2006 Portugal started to introduce programme budgeting seeking to achieve performance budgeting (OECD, 2009, p. 79). However, the practical progress on that front has been so limited that the 2015 Budgetary Framework Law still calls for the adoption of programme budgeting, and even that has not yet been implemented.[13]

The provisions of the Portuguese Climate Law should also be incorporated into the Budgetary Framework Law in order to be applied to the budget process. As a matter of fact, the article 106 of Constitution of the Portuguese Republic requires that "The Budget Law shall be annually drawn up, organised, put to the vote and implemented in accordance with the applicable framework law". As a result, for the dispositions of the climate Law to have an impact on the budget process they should be necessarily included in the Budgetary Framework Law (BFL).

The accomplishment of all these essential pre-conditions will lay the foundations for the implementation of Green Budgeting in Portugal, but even after that a lot of work will have to be done. As suggested by (Gonguet et al., 2021), the process for a successful adoption of a Green Budget requires the elaboration of an action plan that foresees the role to be played by each of the institutions involved, the agents responsible for coordinating this plan and the deadlines to be met.

In view of the benchmark provided by the (OECD, 2021c) the following procedures are still missing in Portugal: i) Green tagging of budgetary items, in order to identify the favourable, unfavourable or neutral impact in climate and environmental terms; ii) Environmental cost-benefit analysis of the fiscal policy measures to be implemented; iii) Assessment of the State Budget's environmental performance from the point of view of the proportion of environmental policy objectives contained therein; iv) Auditing of the State Budget according to an environmental perspective by an independent entity such as the Court of Auditors or the Climate Action Council; v) Regular reviews of tax expenditure and subsidies according to their impact on climate and environment; vi) General Government spending review from a green perspective, in order to assess its contribution to the pursuit of defined environmental objectives; vii) Quantification of greenhouse gases associated with the State Budget and with each of the fiscal policy measures to be adopted; viii) Inclusion of climate

[13] Formally the Portuguese State Budget is organized as a programme budget, but with just one programme per Ministry (two for the Ministry of Finance), without any performance indicators associated, which in practice is not different from the previous "organic classification of expenditure".

and environmental considerations in long-term fiscal sustainability analyses; ix) Adoption of a green balance sheet, which includes assets and liabilities related to the country's natural resources.

In terms of the institutional framework on which the implementation of the Green Budgeting process in Portugal should be based, the following factors should be considered: i) All the procedural steps necessary for the preparation of a Green Budget (including green tagging of public expenditure and revenue) should be incorporated in the Budgetary Framework Law; ii) A coordinating entity for the green budgeting process should be designated based on the knowledge and technical capacity to implement it. In Portugal, the most suitable institution to carry out this mission seems to be the Directorate-General for Budget (DGO), notwithstanding it will need to work closely with the line ministries, particularly with the Ministry of the Environment; iii) Operationalization of the Climate Action Council (CAC), created by the recently approved Portuguese Climate Law. In our opinion, as the Portuguese independent fiscal institution, the Public Finance Council (CFP) should be represented in the CAC, given that CFP is responsible for assessing compliance with the established budgetary rules and the sustainability of national public finances.

According to the best international practices, namely those of the most advanced countries in Green Budgeting (Italy and France), the reporting of Green Budget information, should be based on the regular publication of the following documents: i) An annex to the State Budget Proposal including information about green tagging of the budgetary items by program and ministry, the ex-ante evaluation of the environmental performance of the budget regarding the pursuit of environmental objectives, the environmental cost-benefit analysis of the proposed policy measures, the forecast of tax expenditure according to its environmental impact, as well as the forecast of the impact of the state budget proposal on the emission of greenhouse gases; ii) An annual report about the execution of environmental expenditures and revenues in the previous year, in order to provide an ex-post assessment; iii) An Annex to the Tax Expenditure Reports, including the identification of tax expenditure and subsidies granted according to their favourable, unfavourable or neutral impact on climate and environment; iv) Publication of all relevant climate and environmental data in a public portal (as already envisaged in the Portuguese Climate Law).

5 Conclusions

Nowadays it is rather consensual that the financial sustainability of public finances and the environmental sustainability are intrinsically interconnected with each other. In fact, only sustainable public finances can provide the resources needed for counteracting the adverse effects of climate change, and only a sustainable environment can preserve the sustainability of public finances. Therefore, the traditional public debt sustainability analysis should be expanded to encompass the climate and environmental dimensions. In this context, greening national budgets is key for climate action and the green transition, because budgets are one of the main expressions of how a government intends to implement its political ambition.

Green Budgeting is a relatively new practice that is being adopted by a growing number of countries, based on its potential to align fiscal policy objectives with climate and environmental goals. One of the main advantages of Green Budgeting is to increase fiscal transparency: the disclosure of the environmental and climate (favourable, unfavourable, or neutral) impacts of fiscal policy on both the tax and spending sides of the State Budget, using the Green Tagging technique, allows policy makers to take more informed decisions (by knowing the environmental costs and benefits underlying their economic policy measures and by better identifying green financing needs) and contributes to a more informed debate on sustainable growth.

The adoption of Green Budgeting might also pave the way to the emission of Green Bonds to finance specific environmental and climate related projects. Such bonds might be a cost-effective way to finance the substantial green investment needs in a highly indebted country while contributing to the decrease of global risk.

In Europe, France and Italy stand out as the countries with best Green Budgeting practices. A proper working fiscal framework, including the adoption of accrual accounting and performance programme budgeting and the incorporation of climate and environmental risks into the fiscal risk statements, seems to be instrumental in this domain. It is important that in the near future the coverage of green budgeting practices can be expanded in order to include sub-national governments and other general government entities. Political commitment is also crucial for the implementation of Green Budgeting.

Portugal already took a few steps, the most recent being the approval of a Climate Law, but still has a long way to go in terms of Green Budgeting. First of all, the reforms of its public accounting should be completed, as well as the programme budgeting foreseen in the current Budgetary Framework Law, reformed in 2015. The fulfilment of these pre-conditions will lay the foundations for the implementation of Green Budgeting in Portugal, following the best international practices in terms of the procedures, the institutional framework and the way of reporting Green Budget information.

Finally, it is important to stress that the real challenge is to make sure that Green Budgeting represents more than just a theoretical exercise, and that concrete progress is made in taking the climate and environment dimensions into the design of public policies, which have their financial dimension in the elaboration and execution of the General Government Budget.

6 References

Bachelet, M. J., Becchetti, L., & Manfredonia, S. (2019). The Green Bonds Premium Puzzle: The Role of Issuer Characteristics and Third-Party Verification. *Sustainability*, *11*(4), 1098. https://doi.org/10.3390/su11041098

Baker, M. P., Bergstresser, D. B., Serafeim, G., & Wurgler, J. A. (2018). Financing the Response to Climate Change: The Pricing and Ownership of U.S. Green Bonds. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3275327

Balassone, F., & Franco, D. (2000). *Assessing Fiscal Sustainability: a review of methods with a view to EMU* (pp. 21–60). Banca D'Italia. https://www.bancaditalia.it/pubblicazioni/altri-atti-convegni/2000-fiscal-sustainability/021-060_balassone_and_franco.pdf?language_id=1

Battersby, B., Blazey, A., Bova, E., Lelong, M., Pojar, S., Renterí, C., & Tim, T. (2021). *Green Budgeting: Towards Common Principles*. https://doi.org/10.2765/51675

Bova, E. (2021). *Green Budgeting Practices in the EU: A First Review* (No. 140; European Economy - Discussion Paper). https://doi.org/10.2765/94030

Conselho das Finanças Públicas. (2021). *Riscos Orçamentais e Sustentabilidade das Finanças Públicas 2021*. https://www.cfp.pt/pt/publicacoes/riscos-e-sustentabilidade/riscos-orcamentais-e-sustentabilidade-das-financas-publicas-2021

D'Incau, F., Mercusa, N., Wijeweera, K., & Zoltani, T. (2022). *Identifying the 'greenium': How UNDP is contributing to a more efficient cost of capital for developing countries*. https://www.undp.org/blog/identifying-'greenium'

Domínguez-Jiménez, M., & Lehmann, A. (2021). *Accounting for climate policies in Europe's sovereign debt market* (10/2021; Policy Contribution). https://www.bruegel.org/2021/05/accounting-for-climate-policies-in-europes-sovereign-debt-market/

Dorfleitner, G., Utz, S., & Zhang, R. (2022). The pricing of green bonds: external reviews and the shades of green. *Review of Managerial Science*, *16*(3), 797–834. https://doi.org/10.1007/s11846-021-00458-9

European Commission. (2019). *The European Green Deal, Communication form the Commission COM/2019/640 final*. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1576150542719&uri=COM%3A2019%3A640%3AFIN

European Parliament. (2019). *Climate and environmental emergency. European Parliament resolution of 28 November 2019 on the climate and environment emergency (2019/2930(RSP)*. https://www.europarl.europa.eu/doceo/document/TA-9-2019-0078_EN.pdf

France Gouvernement. (2021). *Report on the Environmental Impact of the Central Government Budget*. file:///C:/Users/CMARIN~1/AppData/Local/Temp/MicrosoftEdgeDownloads/42139152-aa9b-48cd-8109-478977bbd2f1/budget-vert-2021-EN (002).pdf

Gonguet, F., Wendling, C. P., Aydin, O., & Battersby, B. (2021). *Climate-Sensitive Management of Public Finances - "Green PFM* (2021/002; MF Staff Climate Note). https://www.imf.org/en/Publications/staff-climate-notes/Issues/2021/08/10/Climate-Sensitive-Management-of-Public-Finances-Green-PFM-460635

Gutsche, G., & Zwergel, B. (2020). Investment Barriers and Labeling Schemes for Socially Responsible

Investments. *Schmalenbach Business Review*, *72*(2), 111–157. https://doi.org/10.1007/s41464-020-00085-z

Hamilton, J. D., & Flavin, M. A. (1986). On the Limitations of Government Borrowing : A Framework for Empirical Testing. *The American Economic Review*, *76*(4), 808–819. https://doi.org/10.3386/w1632

Harrison, C. (2022). *Green Bond Pricing in the Primary Market H2 2021*.

Harrison, C., & Filkova, M. (2019). *Green Bond Pricing in the Primary Market July-December 2018*. https://www.climatebonds.net/files/reports/cbi_gb_pricing_2h2018_08052019.pdf

Harrison, C., & Muething, L. (2021). *Sovereign Green, Social, and Sustainability Bond Survey*. https://www.climatebonds.net/files/reports/cbi-sovereign-green-social-sustainability-bond-survey-jan2021.pdf

ICMA. (2018). *Green Bond Principles: Voluntary Process Guidelines for Issuing Green Bonds*. https://www.icmagroup.org/assets/documents/Sustainable-finance/2021-updates/Green-Bond-Principles-June-2021-140621.pdf

Lehmann, A. (2021). *The EU green bond standard: sensible implementation could define a new asset class*. Bruegel Blog, 12 July. https://www.bruegel.org/2021/07/the-eu-green-bond-standard-sensible-implementation-could-define-a-new-asset-class/

Mackaill-Hill, H., & Mascolo, F. (2022). *Climate Laws in Europe. Essential for achieving climate neutrality*. https://caneurope.org/content/uploads/2022/05/2022_04_Climate-laws-briefing-ENG.pdf

Marinheiro, C. F. (2006). The sustainability of Portuguese fiscal policy from a historical perspective. *Empirica*, *33*(2–3), 155–179. https://doi.org/10.1007/s10663-006-9013-0

OECD. (2009). OECD Review of Budgeting in Portugal. *OECD Journal on Budgeting*, *2009*(Supplement 1), 160. https://www.oecd.org/portugal/42007470.pdf

OECD. (2017). *OECD Budget Transparency Toolkit*. OECD Publishing. https://doi.org/10.1787/9789264282070-en

OECD. (2021a). *Green Budget Tagging: Introductory Guidance & Principles*.

OECD. (2021b). *OECD Sovereign Borrowing Outlook 2021*. OECD. https://doi.org/10.1787/48828791-en

OECD. (2021c). *Green Budgeting in OECD Countries*. OECD Publishing. https://doi.org/10.1787/acf5d047-en

Office for Budget Responsibility. (2021). *Fiscal risks report – July 2021*. https://obr.uk/frs/fiscal-risks-report-july-2021/

Petrie, M. (2021). The Evolution of Green Budgeting. In M. Petrie (Ed.), *Environmental Governance and Greening Fiscal Policy: Government Accountability for Environmental Stewardship* (pp. 61–108). Springer International Publishing. https://doi.org/10.1007/978-3-030-83796-9_4

Pizarro, R., Delgado, R., Eguino, H., & Lopes Pereira, A. (2021). *Climate Change Public Budget Tagging: Connections across Financial and Environmental Classification Systems*. https://doi.org/10.18235/0003021

Radu, D. (2021). *Disaster Risk Financing: Main Concepts and Evidence from EU Member States* (No. 150; European Economu - Discussion Paper, Issue October). https://doi.org/10.2765/504147

Reichelt, H., & Keenan, C. (2017). *The Green Bond Market: 10 years later and looking ahead*. https://thedocs.worldbank.org/en/doc/554231525378003380-0340022018/original/publicationpensionfundservicegreenbonds201712.pdf

United Nations General Assembly. (1987). *Report of the World Commission on Environment and Development: Our common future*. https://doi.org/10.1080/07488008808408783

World Bank. (2020). *Climate Change Budget Tagging: A Review of International Experience*. World Bank. https://openknowledge.worldbank.org/handle/10986/35174

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