INSTITUTE OF PUBLIC POLICY

LISBON

POLICY PAPER 32

Tax Effort, Tax Capacity and Tax Potential in Portugal

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1. Introduction

Taxation plays a pivotal role in modern economies, serving as the primary means by which governments finance their expenditure on public goods and services, infrastructure, social programs, and the overall functioning of the state. The importance of taxation extends beyond mere revenue collection, encompassing economic stabilization, redistribution of wealth, and influencing economic behavior.

Tax revenues provide the financial resources required for the development and maintenance of essential public services such as education, healthcare, national defense, and public safety.[1] These services are fundamental to societal well-being and economic stability (Bird and Zolt, 2008a, 2008b). Furthermore, taxation is a critical tool for income redistribution (Bird and Zolt, 2014).[2] Tax policy can also be used to influence economic behavior and allocate resources more efficiently.[3]

For developed countries like Portugal, characterized by high tax burdens and significant public debt (cf. section 2), effective taxation is crucial for several reasons. First, high tax burdens reflect the extensive provision of public goods and services, including comprehensive social welfare systems and public healthcare, which are valued features of developed economies (OECD, 2019). Maintaining these services requires sustained revenue streams, primarily derived from taxation. Second, in countries with high levels of public debt, the role of taxation extends to fiscal sustainability. Efficient tax collection is essential to service debt and prevent unsustainable increases in debt levels, which can undermine economic stability and growth. Taxation provides the fiscal space needed to manage and reduce public debt over time, ensuring the country's long-term financial health (Reinhart and Rogoff, 2010). Third, the structure and efficiency of the tax system in such countries are vital for economic competitiveness and

[1] The Addis Ababa Action Agenda, adopted at the Third International Conference on Financing for Development in 2015, underscores the critical importance of domestic resource mobilization (DRM) in achieving sustainable development goals (SDGs). The Agenda recognizes that enhancing DRM is crucial for countries to gain financial independence and sustainability, thereby reducing reliance on external aid and increasing their ability to invest in their own development priorities. This approach aligns with the principle of "leaving no one behind," aiming to ensure equitable access to essential services and opportunities for all segments of society (United Nations, 2015).

[2] Through progressive tax systems, where higher income earners pay a larger proportion of their income in taxes, governments can reduce income inequality and fund social safety nets that protect the most vulnerable populations (Piketty and Saez, 2013). Additionally, excessively high taxes can have counterproductive effects as they can exacerbate inequalities if high earners are more able to avoid or evade taxes, leaving a disproportionate burden on middle- and lower-income earners (Alstadsæter et al., 2019).

[3] For example, taxes on harmful products like tobacco and alcohol can discourage consumption and address negative externalities associated with their use. Similarly, tax incentives for investment in renewable energy can promote sustainable economic practices (Stiglitz, 2000).

attractiveness to investment.[4] High tax burdens can potentially deter investment and economic activity if not accompanied by efficient public services and a favorable business environment.[5] Thus, tax policy must strike a balance between revenue generation and economic growth, ensuring that taxes do not unduly burden individuals and businesses or impede innovation and productivity (Mendoza et al., 1994).

Against this backdrop, this policy paper aims to provide and discuss empirical estimates of tax effort, tax capacity and tax potential in a comparative perspective with an emphasis on Portugal´s placement within the group of advanced economies. A careful discussion of the concepts of tax effort, tax capacity, and tax potential is particularly important as these offer valuable insights into the efficiency and sustainability of the tax system, providing a basis for informed fiscal policy decisions that can impact economic growth, fiscal stability, and social equity. Tax effort and capacity analysis allows for an assessment of the efficiency of a country's tax system and its ability to mobilize domestic resources. In the context of Portugal, where the tax burden is already high, understanding whether the current level of tax collection is close to its maximum capacity is crucial. If the tax effort is significantly below the tax capacity, it may indicate that there is room to enhance revenue collection through better compliance, broadening the tax base, or improving tax administration without necessarily increasing tax rates (Bahl and Bird, 2008). This is particularly relevant for ensuring fiscal sustainability and reducing reliance on debt financing. Analyzing tax capacity and potential helps identify opportunities for reforming the tax system to make it more efficient, equitable, and growth friendly. For a country like Portugal, where public debt is a concern, optimizing the tax system can provide a more sustainable revenue base to service debt and fund public expenditures. Understanding the tax potential can guide policymakers in implementing reforms that minimize economic distortions while maximizing revenue, such as reducing tax evasion and avoidance, rationalizing tax expenditures, and enhancing the progressivity of the tax system (Mansour and Rota-Graziosi, 2020).

The remainder of the policy paper is organized as follows. Section 2 elaborates on the topic of tax burden around the world. Section 3 provides a conceptual discussion on

[4] Excessive taxation can have detrimental effects on economic growth. High tax rates can discourage investment, both from domestic and international investors, by reducing the after-tax return on investment. Empirical studies, such as Barro´s (1990), have highlighted the negative impact of high tax rates on economic growth, suggesting that there is an optimal level of taxation that maximizes revenue without significantly hindering growth.
[5] High corporate taxes can reduce the resources available for businesses to invest in research and development, ultimately affecting productivity growth (Aghion and Howitt, 1992).

the topic of tax effort, capacity and potential. Moreover, it provides estimates in a comparative manner for multiple countries with a focus on Advanced Economies and Portugal in particular. Section 4 looks at tax revenue productivity and the last section concludes.

2. Tax Burden Around the World

The tax burden reflects the share of national income claimed by the government through taxation and has significant implications for economic behavior, growth, and equity. Theoretical discussions on tax burden often revolve around finding the optimal balance that maximizes social welfare without unduly hindering economic growth. One foundational model in this context is the Laffer Curve, introduced by Arthur Laffer in the 1970s. The Laffer Curve posits that there is an optimal tax rate that maximizes government revenue; beyond this point, higher tax rates can lead to lower revenue due to decreased economic activity and increased tax evasion (Laffer, 1981). This model underscores the potential negative effects of a high tax burden on economic incentives and the importance of setting tax rates that do not stifle growth. In the realm of optimal taxation theory, economists like Mirrlees (1971) and Ramsey (1927) have contributed foundational models that explore how taxes can be designed to achieve revenue goals with minimal distortion to economic decisions. Mirrlees' model, in particular, delves into income taxation and the trade-offs between equity and efficiency, highlighting how high tax burdens can impact labor supply and savings decisions.

In what follows, we compute two measures of tax burden based on the seminal works of Frank (1959) and Bird (1964). The two measures are still relevant today, despite recent attempts to define more comprehensive indices by also including economic development and the degree of openness (Lotz and Morss, 1967), foreign trade (Bahl, 1971), the intensity in the use of specific taxes (Bahl, 1972; ACIR, 1988), and frontier production possibilities (Aigner et al., 1977). Frank (1959) proposed a “tax sacrifice” measure, which captures the effects of differences in population and personal income. In Equation (1), the measure of tax burden begins with the tax-to-GDP ratio in the numerator and then accounts for the ability to pay taxes:

$$Frank_{it} = \left[\left(\frac{T}{Y}\right) \div \left(\frac{Y}{P}\right) \right] \times 100 \qquad (1)$$

where, T denotes tax revenues, Y is the Gross National Product (GDP), and Y/P scales the GDP by population (P).

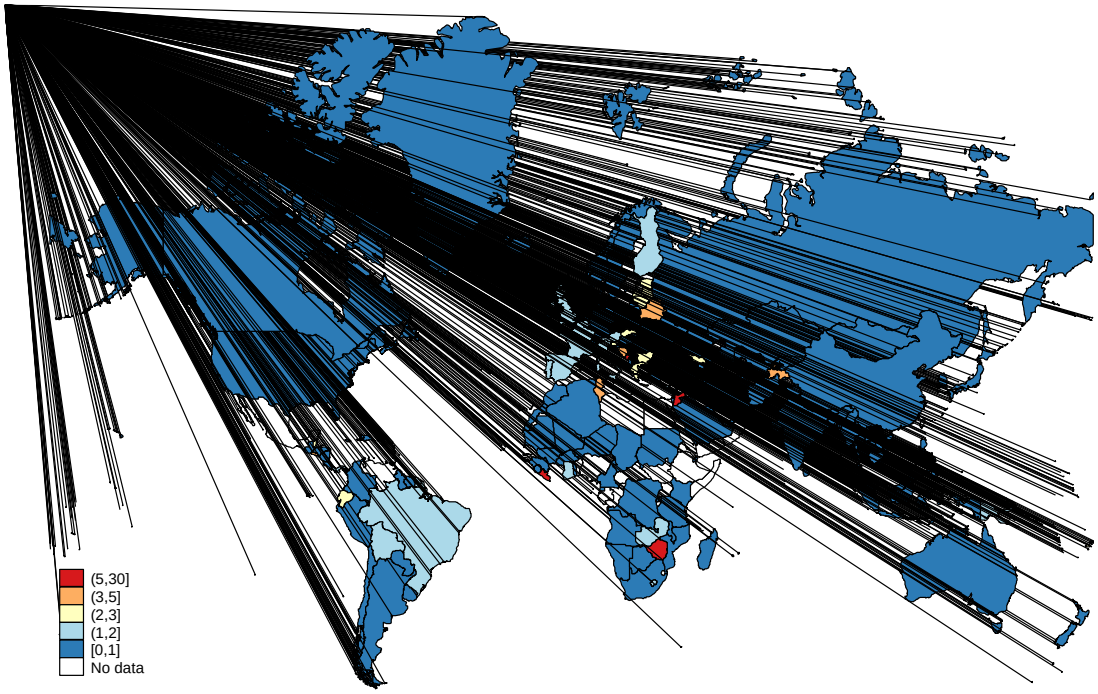
The first studies on the topic, computed the “tax burden” solely as T/Y without taking account of the level of economic development. Frank (1959) aimed to overcome this limitation and introduced a “tax burden” measure that adjusted for per capita purchasing power. Later, Bird (1964) asserted the need to adjust the measure to

improve international comparisons of the tax burden, adding that the numerator in Frank's measure failed to consider the effort required to produce the income. In addition, Bird (1964) challenged Frank's inclusion of gross national product rather than gross domestic product – which better assesses performance in open economies. Nevertheless, the formulation of Bird's index changed only the numerator part. The measure was first labeled as "tax sacrifice". Since then, it has evolved into the "tax effort" measure that we highlight in this study (Reddy, 1975; Ahmad and Stern, 1989; Bird et al., 2008). The index proposed in this research uses disposable income to compute the Bird index:

$$Bird_{it} = \left[\left(\frac{T}{Y-T} \right) \div \left(\frac{Y}{P} \right) \right] \times 100 \qquad (2)$$

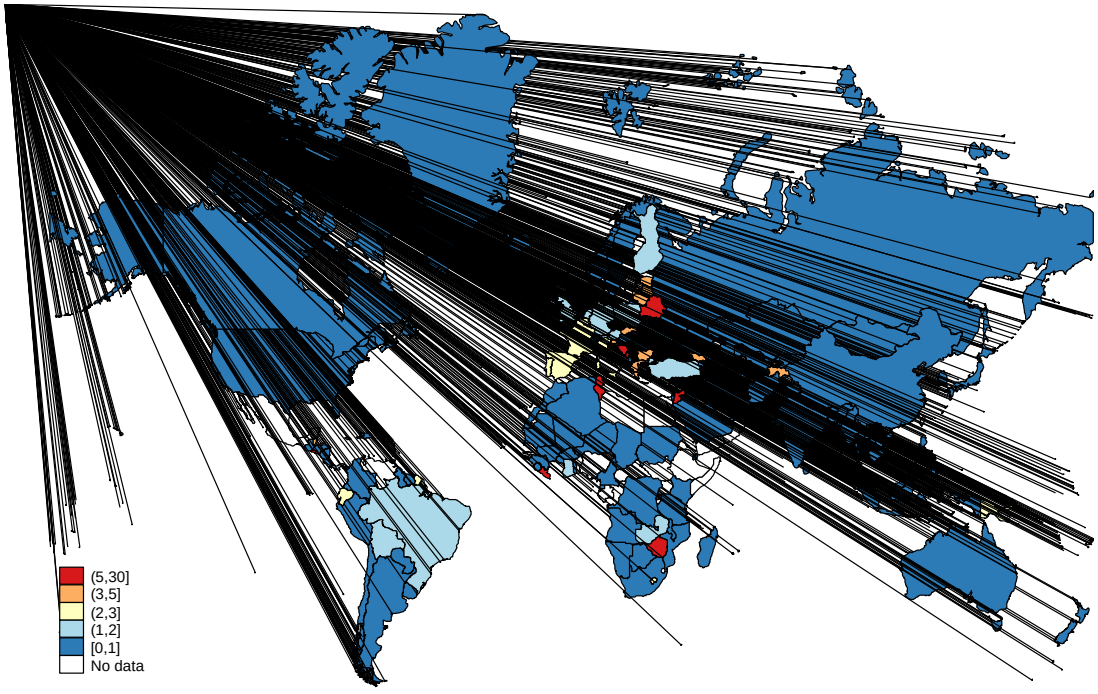
Figures 1.a and 1.b illustrate the level of tax burden worldwide, ranked from 0 to 30. While most advanced economics lie within the 0 to 1 range, Europe shows greater variability, especially when looking at the Bird Index. This measure captures the burden to produce income, and it shows that, the southern European countries (Italy, Portugal, Spain, Greece), Belgium and France exhibit above average values. The Baltic countries and some countries in the Balkans underperform. Asia shows no relevant variability in tax burden levels.

Figure 1.a Tax Burden across the world, 2017 (using the Frank Index)



Source: Barros et al. (2023)

Figure 1.b Tax Burden across the world, 2017 (using the Bird Index)



Source: Barros et al. (2023)

3. Tax Effort, Tax Capacity and Tax Potential

Taxable capacity as a concept is much debated and yet, of great practical importance. Tax capacity (or the tax frontier) is defined as the theoretical maximum amount of revenue a government can raise, given its economic structure, tax base, and administrative capabilities. This concept is grounded in the economic and demographic characteristics of a jurisdiction, such as GDP, income levels, the size of the formal sector, and the composition of economic activities. The Laffer curve is a related theoretical concept that illustrates the relationship between tax rates and tax revenue, suggesting that there is an optimal tax rate that maximizes revenue without overburdening the economy (Laffer, 1981). The tax capacity is influenced by factors like economic development, sectoral composition, and the administrative efficiency of the tax system (Bird and Zolt, 2008a, 2008b).

The ratio of actual tax revenue to tax capacity is labeled as tax effort. Tax effort measures the extent to which a government exploits its tax capacity. A high tax effort indicates that a government is making significant use of its available tax base, while a low tax effort suggests underutilization of the tax capacity. The concept of tax effort highlights the choices and policies of governments in tax administration and enforcement, reflecting not just economic factors but also political will, governance quality, and policy priorities (Bahl and Bird, 2008).

The difference between current revenue and tax capacity can be interpreted as the tax potential, which reflects policy factors, such as low tax rates and narrow tax bases (i.e., high level of tax exemptions and deductions) or inefficient tax collection (i.e., a high level of noncompliance). Of course, policy factors could also reflect societal preference for a small government and low provision of public goods (Fenochietto and Pessino, 2013). This concept is closely related to tax gap analysis6, which estimates the difference between potential and actual tax revenues. Identifying and tapping into untapped tax potential requires understanding the structural and behavioral aspects of the economy, as well as investing in tax administration and compliance efforts (Mansour and Rota-Graziosi, 2020).

[6] See, e.g., https://www.imf.org/en/Publications/TNM/Issues/2021/08/27/The-Revenue-Administration-Gap-Analysis-Program-460749

In what follows, we will compute country-specific estimates of tax effort and tax capacity using a panel dataset of 156 countries from 1980 to 2021 and then zoom-in the sub-sample of Advanced Economies to focus on Portugal. The larger sample is used to maximize degrees of freedom as discuss below. We are using data from the IMF World Economic Outlook and World Bank World Development Indicators. Moreover, we do this exercise in a static manner relying on a stochastic frontier model proposed by Aigner et al. (1977). A panel version of this model can be written as:

$$ln\tau_{it} = \alpha + \beta^{\pi} x_{it} + v_{it} - u_{it} \quad (3)$$

where u_{it} represents the inefficiency, a non-negative random variable associated with country-specific factors which contribute to country i not attaining its tax capacity at time t. $u_{it} > 0$. τ_{it} represents the tax revenue to GDP ratio for country i at time t. x_{it} is a vector that represents independent variables affecting tax revenue for country i at time t; β^{π} is a vector of unknown parameters. v_{it} is the residual, a random stochastic variable. We assume that v_{it} has a symmetric distribution, such as the normal distribution, and v_{it} and u_{it} are statistically independent of each other. We then define tax effort (a value between zero and one) as:

$$TE_{it} = \frac{\tau_{it}}{\exp(\alpha+\beta^{T} x_{it}+v_{it})} = \frac{\exp(\alpha+\beta^{T} x_{it}+v_{it}-u_{it})}{\exp(\alpha+\beta^{T} x_{it}+v_{it})} = \exp(-u_{it}) \quad (4)$$

To allow more generality into the stochastic frontier model, while guarding against distribution misspecification, a variety of one-sided distributions have been proposed for modeling u_{it}. We use two different specifications of the stochastic frontier tax function: the first assumes a half normal model (HN)[7]; the second a truncated normal model (TN). Half normal and Truncated Normal models differ on the distributional assumption of the "u" term (the "v" term does not change between the two models).[8]

Table 1 reports the model parameter estimates for all countries.[9] Under the two models most coefficients and the lambda factor[10] are statistically significant at 1 percent level and have the expected signs. These findings are in line with those from Mawaejje

[7] The normal-half normal model can be obtained through maximum likelihood estimates.
[8] While the half normal distribution is a truncated version of a normal random having zero mean and variance σ2u, the Truncated Normal model relaxes an implicit restriction in the normal-half normal model assuming that the mean of the underlying variable is μ.
[9] Cross-section estimation techniques, whether in the context of the peer analysis or of stochastic frontier analysis, cannot fully capture the effects of country-specific circumstances and may bias estimates of the revenue gaps or tax effort. Given these and other data imitations, results should be interpreted with caution.
[10] *Lambda* ($\sigma ui / \sigma vi$) provides information of the relative contribution of v_{it} and u_{it} to the total error term.

and Sebudde (2019) (c.f Table 2 in their paper).[11] Consistent with previous studies, countries with a higher level of public expenditure on education and per-capita GDP are near their tax capacity (Lotz and Mors (1967). Also, in line with prior evidence, the size of the agricultural sector and the Gini coefficient are also highly significant variables with an inverse relationship with tax capacity and tax effort (Davoodi and Grigorian, 2007; and Lotz and Mors, 1967). All coefficients are statistically significant (different from zero) at the 5 percent level and have the expected signs. Moreover, in both models the coefficients are quite similar (they include the same explanatory variables). λi (σui /σvi) the lambda parameter is quite large (greater than 2.8) and statistically significant.

Table 1. Parameter Estimates of the Stochastic Frontier Tax Function – all countries, 1980-2021

	Half Normal (HN)		Truncated Normal (THN)	
Variable	**coefficient**	**St.error**	**coefficient**	**St.error**
Constant	-2.295***	0.879	-2.496***	0.876
Real GDP per capita	1.750***	0.106	1.848***	0.110
Real GDP per capita square	-0.096***	0.006	-0.102***	0.006
Agriculture share in total value added	-0.048***	0.015	-0.041***	0.015
Public expenditure in education	0.041***	0.004	0.038***	0.004
Trade openness	0.093***	0.020	0.094***	0.020
Gini index	-0.560***	0.189	-0.586***	0.188
Inefficiency				
Lambda 1/	7.039***	0.064	0.959	0.008
Sigma (u) 1/	1.009***	0.065	0.483	0.104

Note: ***, **, * denote statistical significance at the 10, 5 and 1 percent levels, respectively. 1/ parameters for compound error. The parameter lambda (λ) indicates the share of technical inefficiency in the total error variance, and the parameter gamma (γ), which is similarly reparameterized, indicates the share of total variance accounted for by inefficiency.

Measuring the tax performance of countries is both theoretically and practically challenging. Calculating tax effort and actual tax collection benchmarks allows us to classify countries into four groups: (i) low tax collection, low tax effort; (ii) high tax collection, high tax effort; (iii) low tax collection, high tax effort; and (iv) high tax collection, low tax effort. This classification is based on the global average of tax collection and a tax effort index of 1, corresponding to a country where tax collection is the same as estimated taxable capacity. We argue that countries at various stages of development and with different initial levels of tax collection and effort should rely on different strategies for tax reforms.

Table 2 presents the estimation of tax capacity, tax effort, and tax potential for Advanced Economies for which data are available over the period 1980–2021. It shows

[11] Note, however, that the tax effort, tax capacity and tax potential figures obtained in their Table 4 are not comparable with those in this note. While Mawaejje and Sebudde (2019) used a sample of 150 countries to apply the stochastic frontier method and while the sample size is similar different time periods were used.

that half the countries have space to increase revenue (but not Portugal). With a few exceptions, results are in line with priors and previous estimates (see e.g. IMF, 2011). According to the truncated normal model, the difference between tax capacity and current revenue is 4.7% of GDP on average. According to the half normal model, this difference is 4.8% of GDP. There are wide variations across countries with a standard deviation of tax potential of around 2.8% of GDP in both models. Countries with similar revenue levels can have very different levels of tax effort. This is the case for Italy and The Netherlands or Canada and Korea, for example. Portugal, in particular, is placed within the rectangle of high tax collection and high tax effort (highlighted in red). That said, according to our estimates, there is still appears to exist untapped potential (4.3% of GDP). Moreover, to further increase tax capacity, results for Portugal hint at tax policy and administration reforms. What our results do not shed light on, however, is precisely how this capacity can be increased.

Table 2: Tax Potential in Advanced Economies: Tax Capacity–Current Tax Revenue

(i) Low Tax Collection, Low Tax Effort					ii) High Tax Collection, High Tax Effort				
Countries	Current Tax Revenue (% GDP)	Tax Effort	Tax Capacity	Tax Potential	Countries	Current Tax Revenue (% GDP)	Tax Effort	Tax Capacity	Tax Potential
Canada	14.07	0.70	20.10	6.03	Australia	24.24	0.85	28.62	4.38
Czechia	18.01	0.72	24.98	6.97	Austria	26.61	0.93	28.76	2.15
Finland	19.87	0.80	24.95	5.08	Belgium	21.67	0.88	24.63	2.96
France	16.45	0.73	22.54	6.09	Denmark	34.87	0.99	35.30	0.43
Germany	10.44	0.57	18.29	7.85	Estonia	27.33	0.87	31.33	4.00
Japan	12.04	0.53	22.56	10.52	Greece	27.18	0.86	31.63	4.45
Latvia	16.06	0.63	25.35	9.28	Iceland	25.51	0.90	28.27	2.76
Lithuania	20.18	0.71	28.44	8.26	Israel	27.57	0.94	29.19	1.62
Singapore	12.77	0.66	19.26	6.49	Italy	24.14	0.82	29.45	5.31
Slovak Republic	19.24	0.72	26.88	7.64	Luxembourg	26.64	0.89	30.01	3.37
Slovenia	17.03	0.78	21.97	4.93	Malta	29.91	0.97	30.69	0.78
Spain	14.34	0.66	21.75	7.41	New Zealand	34.25	0.99	34.72	0.47
Switzerland	9.41	0.50	18.64	9.23	Norway	31.83	0.99	32.30	0.47
United States	9.86	0.60	16.52	6.66	**Portugal**	**24.52**	**0.85**	**28.84**	**4.31**
					Sweden	21.53	0.85	25.43	3.90
					United Kingdom	23.88	0.85	28.24	4.36
(iii) Low Tax Collection, High Tax Effort					**(iv) High Tax Collection, Low Tax Effort**				
Countries	Current Tax Revenue (% GDP)	Tax Effort	Tax Capacity	Tax Potential	Countries	Current Tax Revenue (% GDP)	Tax Effort	Tax Capacity	Tax Potential
Ireland	17.39	0.92	18.93	1.54	Netherlands	24.51	0.79	30.92	6.41
Korea, Rep.	14.71	0.83	17.75	3.04					
San Marino	15.79	0.94	16.85	1.06					

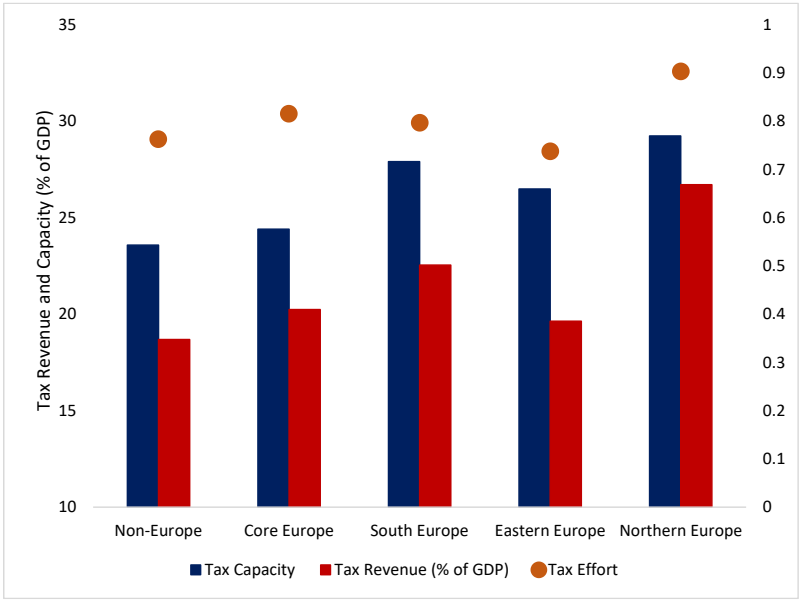
GDP = gross domestic product.
Notes:

1. Estimations based on International Monetary Fund tax and macroeconomic data for the period 1980–2021.
2. "Current tax revenue" includes social security contributions.

Figure 2 plots the average tax capacity, average tax revenue collected, and average tax effort for different subgroups within Advanced Economies. Note that Portugal is placed in Southern European countries. Non-European countries have the lowest tax capacity and actual tax collection, even though it is in Eastern Europe where the tax effort is the lowest. The Northern European region seems to have the highest tax effort and the highest tax capacity. These results suggest that tax potential (that is, the difference between actual tax collections and tax capacity) is the highest in Japan, Latvia, Lithuania and Switzerland and the lowest in Malta, New Zealand, Norway and Ireland.

Ultimately, policy-wise, countries with a low level of actual tax collection and low tax effort (e.g., Germany or Spain) may have more room to increase tax revenues to reach their taxable capacity without causing major economic distortions or costs. On the other hand, Advanced Economies with a low level of tax collection but high tax effort (e.g., Ireland or Korea) have less opportunity to increase tax revenues (without possibly creating distortions or high compliance costs). Note that these results should be interpreted with caution due to caveats in the modelling of tax capacity and effort. The foregoing panel analysis needs to be complemented with a detailed analysis of Portugal´s tax system (that is, tax policy instruments and revenue administration), taking into consideration the country's overall fiscal policy, public expenditure needs, and the overall level of development. This is beyond the scope of this policy note.

Figure 2. Tax Effort in Advanced Economies by sub-group, Last Available Date



Note: Left axis corresponds to the tax revenue and tax capacity (% of GDP); right corresponds to the tax effort.
Source: author

4. Tax Revenue Productivity

In addition to tax ratios, a tax system´s performance can also be viewed across economies by contrasting the relative productivity of individual taxes, most often the VAT and the CIT. In what follows, we also include the PIT. There are several measures that can be used for this purpose, one of which is the productivity ratio, which measures how much each percentage point of the standard tax rate collects in terms of GDP.[12] Comparing the tax productivity ratio over time or across countries can be used to gauge the relative revenue performance of the a given tax. A low ratio is typically taken as evidence of weak design (for example, exemptions and/or reduced rates in the case of VAT) and/or weak enforcement (for example, in the case of PIT) (Slemrod and Yitzhaki, 2002). The measure does not, however, give insight into the relative contribution of these factors. In the context of Advanced Economies, where tax systems are typically more developed and complex, understanding and enhancing tax revenue productivity is essential for ensuring fiscal sustainability, promoting economic growth, and achieving social objectives. Several factors can influence tax revenue productivity in advanced economies, including:

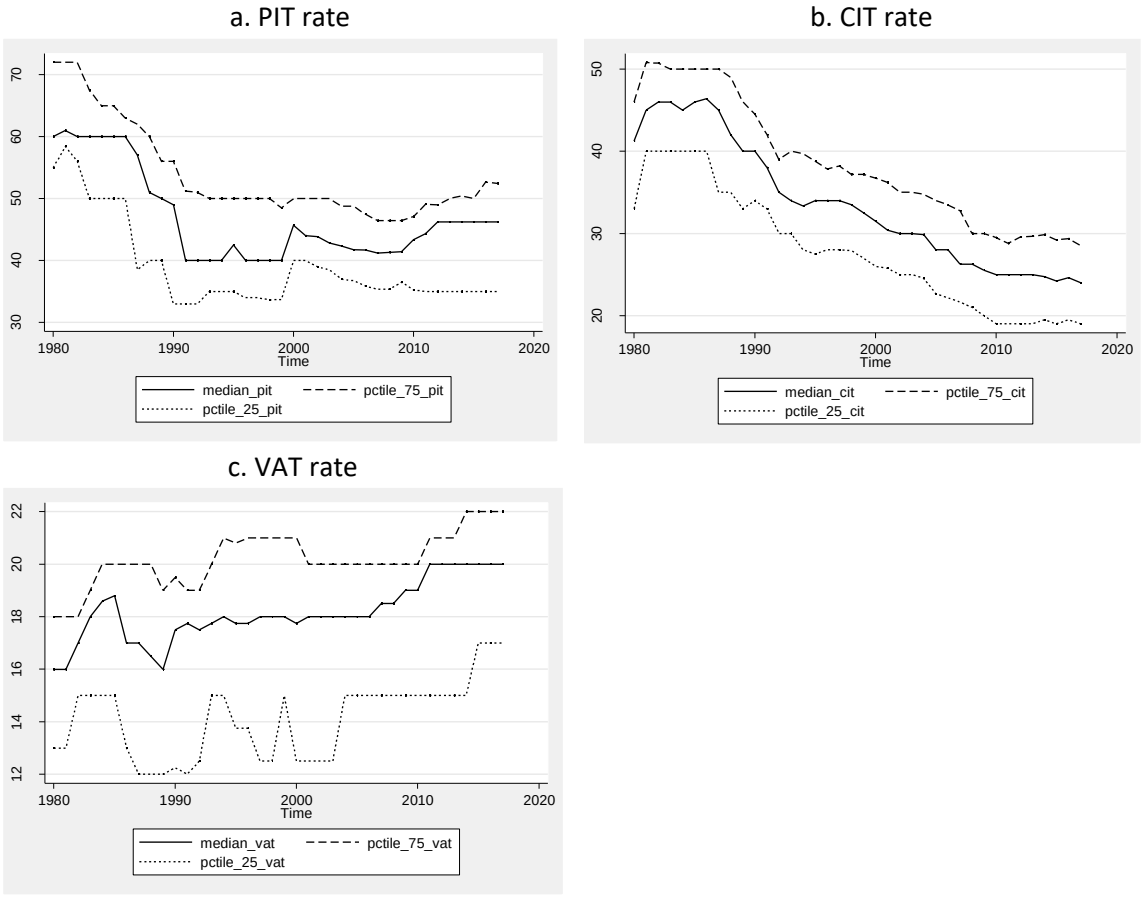
1. **Tax Base Broadening**: Expanding the tax base can enhance tax revenue productivity by spreading the tax burden more widely and reducing opportunities for tax avoidance.
2. **Tax Rate Structure**: The structure of tax rates, particularly the balance between marginal rates and average rates, can affect incentives for work, investment, and compliance. Optimal tax rate structures that minimize distortions while ensuring sufficient revenue can enhance tax productivity (Mirrlees, 1971).
3. **Tax Compliance and Enforcement**: Strengthening tax compliance and enforcement mechanisms, through better taxpayer services, use of technology, and targeted audits, can increase tax revenue productivity by ensuring that a larger proportion of the potential tax base is effectively taxed (Alm and Torgler, 2011; Alm, 2018).
4. **Simplification of Tax Codes**: Simplifying tax codes and regulations can reduce compliance costs for taxpayers and administrative costs for tax authorities, leading to higher tax revenue productivity by making it easier and less costly to collect taxes (OECD, 2010).
5. **International Cooperation**: In an increasingly globalized economy, international cooperation to combat tax evasion and avoidance, particularly by multinational corporations and high-net-worth individuals, is crucial for enhancing tax revenue

[12] The productivity of a given tax reflects how broad its tax base is.

productivity. Efforts such as the OECD's Base Erosion and Profit Shifting (BEPS) project aim to address these challenges (OECD, 2013).

In what follows, we begin by looking at the interquartile range of each of these taxes´ median rates (Figures 3a-c for PIT, CIT and VAT, respectively). It seems that the median PIT and CIT in Advanced Economies has been declining over time to reach the (median) value of 47 and 24 percent, respectively. In contrast, the VAT rate has been rising steadily over the period shown to reach a median of 20 percent. In addition, the dispersion across rates has not been markedly different over time in any of the taxes.

Figure 3. Tax rates in Advanced Economies, 1980-2018



Note: PIT and CIT rates are the top combined marginal rates while for VAT is the standard combined rate. Median and top and bottom quartiles calculated on the basis of an unbalanced sample hence the possible awkward pattern at the beginning of the sample (e.g. VAT).
Source: own calculations using IMF´s Tax Policy Division.

Figures 4a-c present computations of the productivity ratio for the PIT, CIT and VAT, respectively, for the same grouping of Advanced Economies discussed earlier. Out of the three taxes the largest dispersion can be found in the revenue productivity for the PIT (0.10 percent standard deviation). This fact is clearly visible in panel a) where a PIT productivity of 0.070 for

Korea contrasts with a value of 0.46 for Switzerland. Turning to the revenue productivity for the CIT, the picture is the rosiest in terms of homogeneity; however, some dispersion within the group can be observed, particularly because of four outliers: Norway, Singapore, Cyprus and Hong Kong. Finally, median revenue productivity for the VAT ranges from 0.28 percent in Italy to 0.67 percent in New Zealand. With respect to PIT, Portugal appears to be placed in the lower sub-group of countries while it stands in the middle of the chart in the cases of CIT and VAT productivities, suggesting that more can be done to increase these figures.

Figure 4a. PIT productivity ratio (top combined rate)

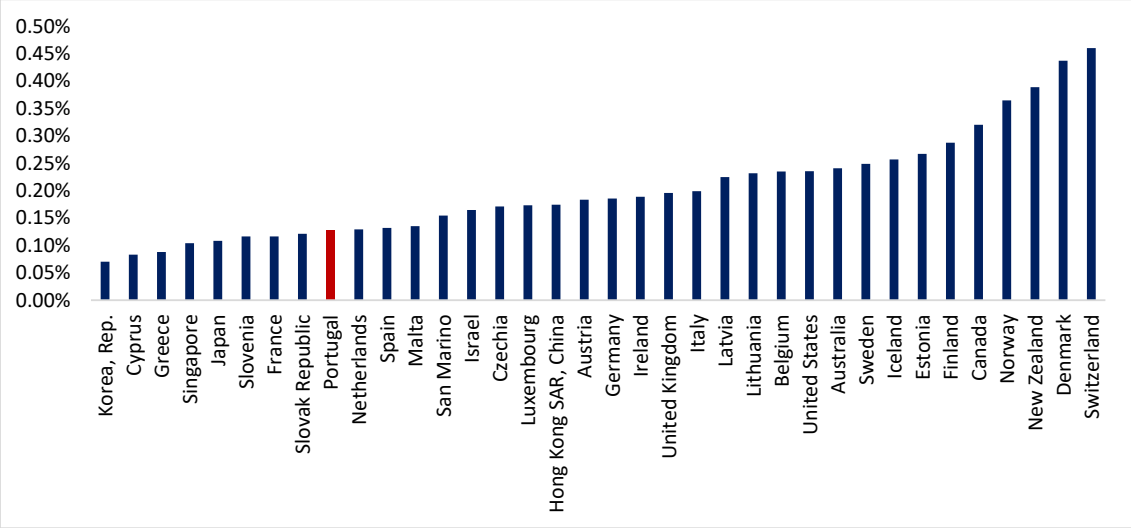


Figure 4b. CIT productivity ratio (top combined rate)

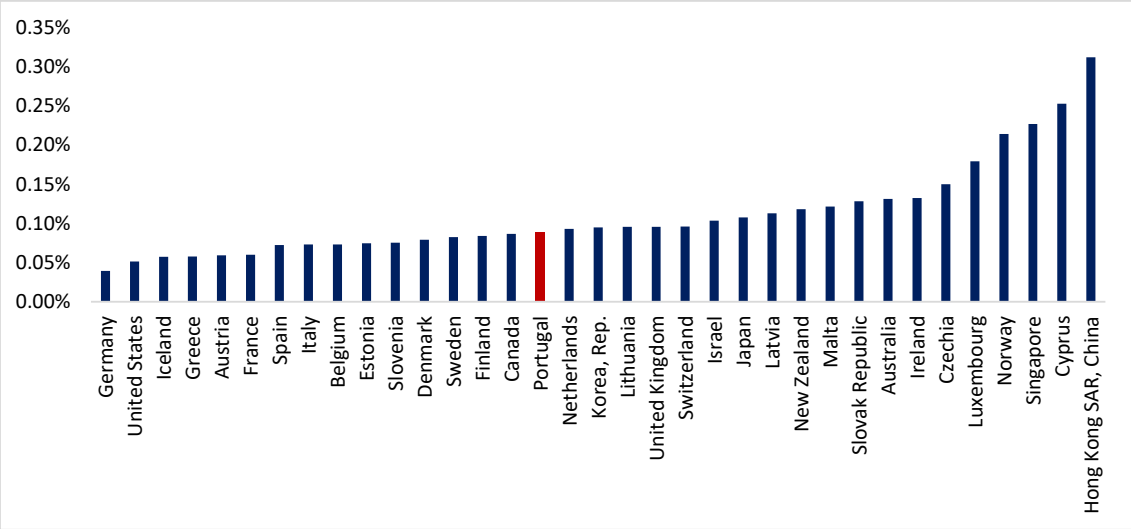
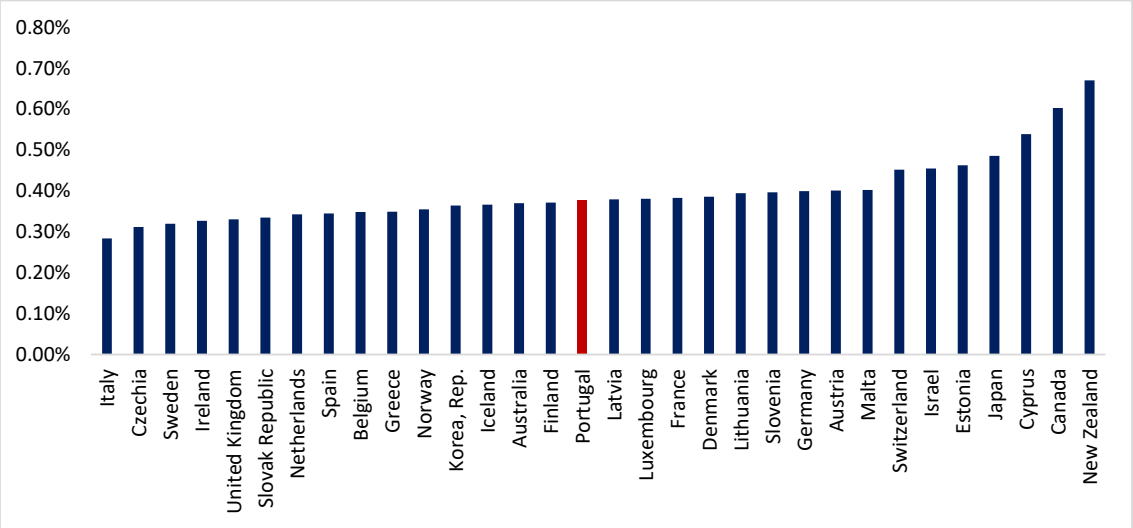


Figure 4c. VAT productivity ratio (standard VAT rate)



Note: box-whisker diagrams calculated with data from the last available year; the bar charts calculated with average data between 1980 and the last available year.
Source: own calculations using IMF data.

In particular, to enhance tax revenue productivity, Portugal can consider several policy measures:

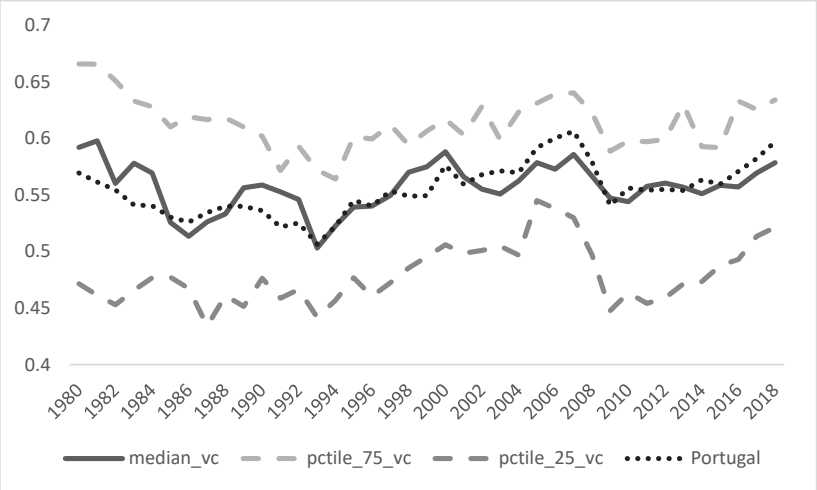
1. **Reforming Tax Expenditures**: Regularly reviewing and reforming tax expenditures, such as deductions, credits, and exemptions, can help ensure that they remain effective, efficient, and equitable, thereby enhancing tax revenue productivity.
2. **Investing in Tax Administration**: Investing in modern tax administration systems, including digitalization and data analytics, can improve efficiency in tax collection and compliance monitoring, increasing tax revenue productivity (OECD, 2019).
3. **Adopting Technology**: Leveraging technology for tax filing, payment, and audits can reduce compliance costs, improve accuracy, and deter evasion, enhancing tax revenue productivity (Alm and Torgler, 2011; Alm, 2018).
4. **Enhancing Legal Frameworks**: Strengthening legal frameworks to address tax evasion and avoidance, including regulations on transfer pricing and international tax treaties, can enhance tax revenue productivity by ensuring that taxes are fairly levied on all economic activities (OECD, 2013).

With respect to the VAT in particular, another important indicator of performance and effectiveness is the C-efficiency concept—which is the ratio of actual VAT revenues to the product of the standard rate and final consumption in GDP.[13] Figure 5 shows that the average

[13] Algebraically speaking, changes in VAT revenue as a share of GDP can be attributed to three factors: changes in the VAT standard rate, the share of consumption in GDP, and the C-efficiency ratio. Keen (2013) points out that changes in

C-efficiency score has remained broadly stable over time and that Portugal´s position has been with the median of the group.[14]

Figure 5. VAT C-efficiency, 1980-2018



Note: median, 25th and 75 percentiles together with Portugal´s level over time.
Source: own calculations using IMF data.

the C-efficiency ratio have been more influential than the changes in the standard rate and final consumption ratio to GDP in the evolution of overall VAT revenues in many countries.

[14] There is a strand of literature analysing the structural factors affecting the evolution of the C-efficiency ratio through tax compliance (e.g. Aizenman and Jinjarak, 2008).

5. Conclusion

For countries like Portugal, addressing the challenges of excessive taxation while ensuring fiscal sustainability requires a careful balancing act. Reforming the tax system to make it more growth-friendly, broadening the tax base, improving tax compliance, and enhancing the efficiency of public spending are potential strategies. Such reforms can help reduce the reliance on distortionary taxes and create a more favourable environment for economic growth, innovation, and social equity.

In conclusion, while taxation is essential for funding public expenditures and achieving social objectives, excessive taxation in developed countries with high tax burdens and debt levels, such as Portugal, can pose challenges to economic growth, competitiveness, and social equity. Careful tax policy design, aimed at optimizing the structure and levels of taxation, is crucial to minimizing these adverse effects while ensuring the necessary revenues for public services and debt management.

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IPP POLICY PAPER 32

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ISSN: 2183-9360

April 2024

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