

Catarino, João Ricardo; Moraes e Soares, Ricardo

Article

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Restructuring the European VAT tax system: advantages and disadvantages of the adoption of a single-rate model - a study based on the Portuguese case

João Ricardo Catarino^a

Ricardo de Moraes e Soares^{b*}

^a Institute of Social and Political Sciences, University of Lisbon

^b Institute of Social and Political Sciences, University of Lisbon

* Corresponding author at: rsoares@iscsp.ulisboa.pt

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Abstract. The common VAT system adopted by EU member states comprises a set of various rates, which differentiate the goods and services subject to this tax. However, from a technical and management point of view, it would be preferable to adopt a single tax rate as it reduces distortions and facilitates tax compliance and management. This research seeks to analyse the benefits and disadvantages of adopting a single VAT as a means of simplifying the European VAT model. It takes Portugal as a case study. The main objective of this research is to contribute to the academic debate around the theme of the single rate of VAT versus differentiated rates, through the achievement of a series of analyses and statistical tests to revenues and percentages of GDP that they correspond, in the three scenarios considered in the study: differentiated rates, single rate of 17% and single rate of 21%. In the empirical part, hypotheses were developed, the effects on tax revenue of a differential collection system were analyzed and compared to a possible single rate regime on consumption to verify which one would be more efficient. Data comparison permits to verify that the estimated revenue of the single rate of VAT is higher than the values obtained by the system of differentiated rates, in any of the proposed models (17% or 21%). The results of this research are valid for all countries that adopt VAT or general tax transactions.

Keywords. Consumer Tax, Fiscal Policy, Single VAT rate, Value-added Tax, Tax Equity, Tax System.

JEL codes. E62; H21; H25; H30; O23

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1. Introduction

Not only doctrine and tax authorities agree on the need to simplify tax systems, at the same time, increasing revenues¹. That represents, besides, a form to develop the taxpayer's warranties (Catarino, 2009). One former finance minister of Portugal has already admitted: "*the tax structure needs to be simplified. The tax reform, which will begin to be debated in 2014, should take place in the VAT, the largest source of current revenue: it gives more than 14 billion euros of annual revenue*" (Ribeiro, 2012). As a result, Portugal has already reformed income

¹ See the study on reduced VAT rates applied to goods and services in the EU member states (Organization for Economic Co-operation and Development (2009). *Economic Perspectives of Latin America 2009*. Paris: OECD Publishing).

taxes on legal entities, through Law No. 2/2014 of January 16 (Portugal, 2014a), and on the income of individuals, through Law No. 82-E/2014, of December 31 (Portugal, 2014b), with evident gains of simplification.

The changes to VAT, which is a European Union common model tax basically had the objective of tax neutrality, the simplification of accessory operations as well as important changes at the level of the location of taxable transactions, largely adopted in the VAT Directive (European Union, 2006/112/CE Directive, November, 28). However, scarcely anything has been done the past years, to make the tax simpler, less costly and more accessible to taxpayers. The adoption of a single rate to tax all economic operations subject to VAT would greatly simplify tax management firstly by clarifying the rates applicable to all transactions subject to tax.

To the economist Peter Weiss, *"Portugal and other countries have exhausted the efficiency margin and must move towards a single VAT rate"* (Ribeiro, 2012). And, according to IMF economists Ruud Mooji and Michael Keen, *"there is scope for more effective VAT development as a tool for consolidation, especially where [...] the normal rate is already at such a high level that additional increases are problematic"*, therefore, there is a *"strong argument in the advanced economies for a single VAT rate"* (Ribeiro, 2012).

In the Green Book about the future of VAT, the European Commission *"questioned the effectiveness of this recovery method"* and *"In 2009 release a viability study on way to improve and simplify VAT collection"* (European Union, 2010). Nevertheless, the European Commission in 2010, makes clear that it wants to make VAT charging more efficient, to increase tax revenue within the common market, and at the same time, to design a VAT system that is considerably simplest, to reduce *"operating costs for taxpayers and for tax administrations by increasing net income"* (European Union, 2010). The main objective of the European Commission in the area of indirect taxation is to implement a *"VAT system with a broad incidence base, preferably with a single rate"* which may allow *"to minimize costs"* (European Union, 2010). And, of course, increase revenue and respond, this way, to the challenge of international tax competitiveness (Catarino, 2015).

With regard to Portugal, the efficiency² of charging consumption tax in 2011 was only 51% (Ribeiro, 2012). This can be justified by the inefficiency of tax charging, mainly due to the existence of a strong presence of the parallel economy and marked tax evasion (Portugal, 2011). However, in the opinion of the European Commission, the inefficiency of charging result from the absence of *"modern technologies and/or financial intermediaries"* (European Union, 2010) with the ability to effectively charge VAT. As an instrument to combat the parallel economy and tax evasion, the Portuguese Government, in the year 2012, conceived and implemented a series of fiscal measures which aim at promotion of efficiency in tax revenue collection. The principle tax measures of the Strategic Plan to Combat Tax and Customs Evasion and Avoidance for the 3-year period 2012-2014, were aimed to combat tax evasion,

² The efficiency of a tax is the relationship that is established between the taxable facts occurred and those that a given tax effectively taxes. The higher this ratio is, the more the tax is said to be effective. We assume, based on A. Mitchell Polinsky's teaching, that "Efficiency" is the "relationship between the benefits and the aggregate costs of a situation."

fraud and the parallel economy. The Government wanted to end tax evasion and reinforce sustainability of public finances (Catarino et al., 2013). Thus, a plan was approved for the first time, reinforcing operational means to monitor taxpayers' compliance with tax obligations. Regarding VAT, three major measures have been taken:

1. The compulsory use of billing programmes certified by Tax Authority for all economic operators. This measure was intended *"to ensure greater transparency when paying for goods and services, particularly as regards the clearance and settlement of VAT"* (Portugal, 2011).

2. The mandatory communication of the invoicing to Tax and Customs Authority. It was established the obligation to communicate by computerised means in the portal *e-invoice* of all invoices issued by the economic agents. The reported data are crossed with the VAT declarations issued by the companies, in order to *"detect differences, situations of under-invoicing and parallel economy"* (Portugal, 2013).

3. The mandatory communication by electronic means of the transport documents issued to accompany the goods in circulation before the start of the transport operation. The regime of goods in circulation has been amended to establish new rules to ensure the integrity of transport documents and ensure more effective control of the documents by the Tax and Customs Authority, hindering subsequent adulteration or concealment (Catarino et al., 2015; Gomes et al., 2013). The documents communicated can be consulted through the official *e-invoice* website.

However, despite the creation and implementation of a strategic plan against the parallel economy and tax evasion, no VAT fund reform has yet been carried out. The aim of this study is to observe the possible adoption of a single VAT rate by analysing statistical data on the evolution of revenue and the advantages/disadvantages of such a solution.

2. Methodology

As mentioned, the European Commission argues that the single VAT rate is the best economic option. However, for this research, it is important to verify the economic consequences of the application of a single VAT rate in public revenue. This study uses the statistical data provided by the Tax and Customs Authority of Portugal³. However, it should be noted that there is no official statistical data that identifies the total amounts of VAT revenue by rates, reduced, intermediate and normal in each year, being the figures available on the website of the Finance Portal corresponding to amounts accumulated. As a consequence, approximate consumption breakdowns of 29%, 11% and 60%, respectively, were applied to the calculation (Tomaz, 2012). Taking into consideration the mentioned above percentage values, the tax values produced for each of the differentiated rates were calculated. Subsequently, these were compared to the estimated revenues resulting from two single rate scenarios: 17% and 21%. For each year considered, this estimate was obtained by means of the following expression:

³ Available at http://info.portaldasfinancas.gov.pt/pt/dgci/divulgacao/estatisticas/Estatisticas_IVA.

$$Vat\ Revenue_{Single\ Rate} = \frac{c \times b_r}{a_r} + \frac{c \times b_i}{a_i} + \frac{c \times b_n}{a_n} \quad [1]$$

where “c” corresponds to the proposed single rate, b_r , b_i and b_n correspond to the total revenues from differentiated rates (reduced, intermediate and normal), and a_r , a_i and a_n correspond to the differentiated rates of VAT (reduced, intermediate and normal, also respectively).

The main objective of this research is to contribute to the academic debate around the theme of the single rate of VAT versus differentiated rates, through the achievement of a series of analyses and statistical tests to revenues and percentages of GDP that they correspond, in the three scenarios considered in the study: differentiated rates, single rate of 17% and single rate of 21%.

Data on 18 years of revenue and its share of GDP were used, corresponding to the period 1996 to 2013, for each of the three scenarios considered.

In order to make a comparison between the models, the values of the differentiated rates are insufficient since it is necessary to estimate the possible revenue values that the State could have obtained had he chosen for the single rate model, and then, comparisons between actual and estimated values were made. To test the presence, or not, of equality of revenue averages and their respective percentages of GDP in the three scenarios under study, the ANOVA test (Fisher, 1918) was used. This test of variance analysis was preceded by the validation of suppositions required for its application: normality and homoscedasticity of revenue distribution and percentages of GDP in each of the scenarios, respectively, using the Shapiro-Wilk normality test (1965) and the Levene test (1960). Subsequently, Scheffé's test (1959) was used to determine if the average levels of revenue and percentage of GDP of the various scenarios which may or may not be considered all different. The significance level used was, in all statistical tests, 0,05 (5,00%).

3. Results

Based upon the data on VAT revenue and the methodology described, it is possible to find in Table 1 the amounts of tax revenue actually collected for each of the differentiated rates, as well as estimated revenues at a single rate of 17% and 21%, between the years 2000 and 2017.

Data in Table 1 allows concluding that there is growth in VAT revenue between the years 2000 and 2003 and between the years 2004 and 2008. The value of the tax collected reduce in the years 2004 and 2009, compared to the years 2003 and 2008, respectively. From that moment on the revenue remained, approximately, the same as in 2008. The data show that the peak in VAT revenue collection occurred in 2017, reaching a total value of 16.001,40 m€. However, the maximum amount of revenue collected as a percentage of GDP took place in 2012, in value 8,28%. But, as mentioned above, in order to make a comparison between the models, the values of the differentiated rates are insufficient since it is necessary to estimate the possible revenue values that the State could have obtained had he chosen for the single rate

model, and then, comparisons between actual and estimated values were made.

In order to compare the calculated values and the actual values, the VAT revenue was estimated based first on a single general rate of 17% and later, a single rate of 21%. Figure 1 allows immediate comparison of the estimated surplus value for single rates of 17% and 21%, in light of the differentiated rates model. As can be seen, the annual values of the estimated revenue, applying single rates of 17% and 21%, exceeded, in each year, the values of the effective revenue. Therefore, it seems to be evidence of a greater capacity for revenue collection, i.e., evidence of potential⁴ revenue that the State would have raised if he had if already opted for a single VAT rate system.

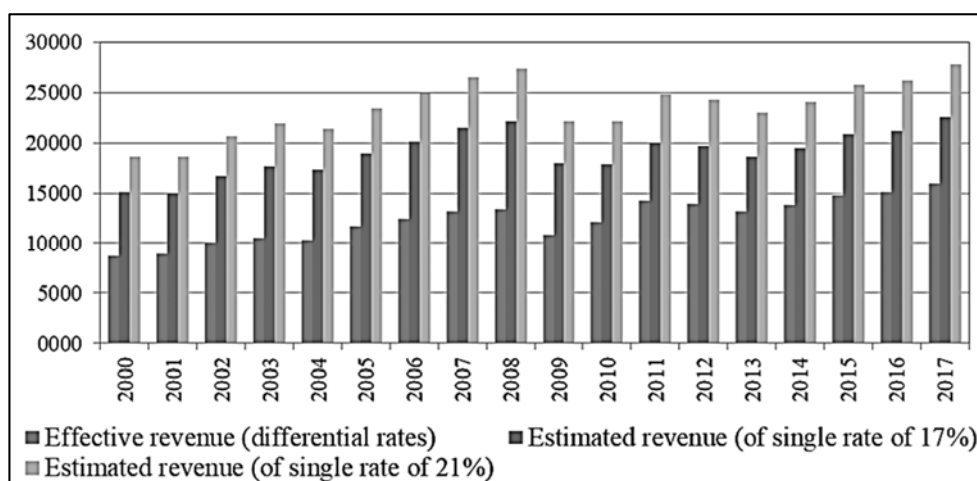


Figure 1. Effective VAT revenue with differentiated rates and estimated VAT revenues with a single rate of 17% and 21% (in M€). *Source:* Own elaboration.

By keeping the system of differentiated rates in the VAT instead of the single rate model, the opportunity cost associated is the loss of collection efficiency of tax revenue. In this case, the State loses net value of revenue by the option of a model based on several tax rates aiming to alleviate tax burden on basic consumptions (with a lower tax rate), to the detriment of a model strictly based on the tax revenue.

It should be noted that one of the underlying assumptions of this study is that single rate models of 17% and 21% cannot cause revenue losses for the state coffers. These models should, at least, ensure the amount of revenue that the State would collect with the application of differentiated rates. The implicit idea is based on the search for simplification of the system of taxation on consumption in the European Union and Portugal, without causing revenue losses to the public coffers (Oliveira, 2010).

⁴ Note: Potential revenues are the difference between the estimated total value and current revenues.

Table 1. Effective VAT revenue with differentiated rates and estimated VAT revenues with single rates of 17% and 21%.

Year	Effective revenue with differentiated rates						Estimated revenue with a single rate of 17%		Estimated revenue with a single rate of 21%	
	GDP (M€)	Reduction Rate (29%) (M€)	Intermediate Rate (11%) (M€)	Normal Rate (60%) (M€)	VAT Revenue (M€)	% do GDP	VAT Revenue (M€)	% do GDP	VAT Revenue (M€)	% do GDP
2000	128.466,30	2.515,10	954,00	5.203,66	8.672,77	6,75	15.106,52	11,87	18.661,00	14,53
2001	135.827,52	2.600,14	986,26	5.379,60	8.965,99	6,60	15.050,99	11,08	18.592,40	13,69
2002	143.631,42	2.887,40	1.095,22	5.973,93	9.956,56	6,93	16.713,82	11,64	20.646,49	14,37
2003	146.158,28	3.062,99	1.161,82	6.337,21	10.562,02	7,23	17.730,20	12,13	21.902,01	14,99
2004	152.371,56	2.998,81	1.137,48	6.204,43	10.340,72	6,79	17.358,71	11,39	21.443,12	14,07
2005	158.652,59	3.384,76	1.283,87	7.002,94	11.671,57	7,36	18.996,04	11,97	23.465,70	14,79
2006	166.248,72	3.596,31	1.364,12	7.440,64	12.401,07	7,46	20.183,33	12,14	24.932,35	15,00
2007	175.467,72	3.826,96	1.451,60	7.917,84	13.196,40	7,52	21.477,77	12,24	26.531,36	15,12
2008	178.872,58	3.893,98	1.477,03	8.056,50	13.427,50	7,51	22.179,99	12,40	27.398,81	15,32
2009	175.448,19	3.156,19	1.197,17	6.530,04	10.883,40	6,20	17.977,56	10,25	22.207,58	12,66
2010	179.929,81	3.527,10	1.337,86	7.297,44	12.162,40	6,76	17.945,78	9,97	22.168,31	12,32
2011	176.166,58	4.128,06	1.565,82	8.540,82	14.234,70	8,08	20.056,57	11,39	24.775,76	14,06
2012	168.397,97	4.045,50	1.534,50	8.370,00	13.950,01	8,28	19.655,43	11,67	24.280,24	14,42
2013	170.269,33	3.842,24	1.457,40	7.946,46	13.249,10	7,78	18.667,86	10,96	23.060,30	13,54
2014	173.079,06	4.006,09	1.519,55	8.288,46	13.814,10	7,98	19.463,94	11,25	24.043,70	13,89
2015	179.809,06	4.304,85	1.632,87	8.906,58	14.844,30	8,26	20.915,49	11,63	25.836,78	14,37
2016	186.480,45	4.373,93	1.659,08	9.049,50	15.082,50	8,09	21.251,11	11,40	26.251,37	14,08
2017	194.613,47	4.640,41	1.760,15	9.600,84	16.001,40	8,22	22.545,83	11,58	27.850,73	14,31
Accumulated value		---	---	---	223.416,51	---	343.276,96	---	424.048,01	---
Difference in the Revenue: estimated at a single rate of 17% and effective at differentiated rates									119.860,45 M€	+53,65%
Difference in the Revenue: estimated at a single rate of 21% and effective at differentiated rates									200.631,50 M€	+89,80%
Difference in the Revenue: estimated at a single rate of 21% and estimated at a single rate of 17%									80.771,05 M€	+67,39%

Source: Own elaboration, based on statistics from PORDATA.

In this respect, it should be noted that the management of VAT rates by the State always presupposes a planned action in order to prevent the possible risks and deviations that may affect the balance and consolidation of public accounts. The fiscal planning of revenues throughout the year is fundamental in the formulation and implementation of fiscal policies. Plan previously the effects of the application of a uniform rate makes its execution more precise and simple for the Tax and Customs Authority, allowing the identification of the resources necessary for effective control and evaluation of the desired results (Pereira, 2003).

The surplus values obtained through the proposed models can be confirmed by checking the variation of the revenue values at the bottom of table 1. Any of the single rate options obtains higher revenues than the system of differentiated rates along the 18 years under analysis: a difference in order of 119.860,45 m€ (or + 53,65%) in the single rate model with VAT at 17% and a difference in the order of 200.631,50 m€ (or + 89,80%, almost twice the value) in the single rate model with VAT at 21%. The application of a single rate of 21% allows for a 67,39% increase in revenue compared to the 17% rate, corresponding to a total value of over 80.771,05 m€ along the 18 years.

The question, therefore, arises as to whether the differences in revenue and the respective percentages of GDP for the three scenarios under study are statistically significant or whether they are purely random. To do this, and checking the applicability, through the assumptions of normality and homoscedasticity of each of the data sets, we used the ANOVA test (Fisher, 1918)⁵. Table 2 shows that for both revenue amounts and percentages of GDP, the p-value observed in the ANOVA test (Fisher, 1918) was equal to 0,000 (less than 0,05), implying the rejection of the null hypotheses and the acceptance of the alternative hypotheses according to which the average values of the revenue amounts and the average values of the percentages of GDP for the three scenarios considered are not all the same.

Table 2. ANOVA test results.

		Sum of the squares	Degrees of freedom	Average squares	F Statistic	P Value
Revenue	Between-group	1132286800,39	2	566143400,19	100,05	0,000
	Intra-group	288601473,73	51	5658852,43	---	---
	Total	1420888274,12	53	---	---	---
% GDP	Between-group	417,12	2	208,56	428,70	0,000
	Intra-group	24,81	51	---	---	---
	Total	441,93	53	---	---	---

Source: Own elaboration.

⁵ P-value of the Shapiro-Wilk normality tests (Shapiro and Wilk, 1965) greater than 0.05 in all data groups, denoting that each data group follows a normal distribution (p-value = 0.200 in all cases). P-value of the Levene homoscedasticity test (Levene, 1960) greater than 0.05 in all data groups, denoting that in each data group there is homogeneity of the variances (p-value = 0.230 for data on VAT and p-value = 0.651 for data on the percentage of GDP).

Table 3. Results of the Scheffé test. *Source:* Own elaboration. Note: The size of the categories is equal. The harmonic mean of the category size (18,000) is used.

	Models	Sample size	Subgroup for alpha = 0,05		
			1	2	3
Revenue	Differentiated Rates	18	70,521	---	---
	Single Rate of 17%	18	---	197,591	---
	Single Rate of 21%	18	---	---	32,024
	Scheffé Critical Point	---	6,358	6,358	6,358
% GDP	Differentiated Rates	18	304,758	---	---
	Single Rate of 17%	18	---	135,260	---
	Single Rate of 21%	18	---	---	3728,112
	Scheffé Critical Point	---	6,358	6,358	6,358

The subsequent application of Scheffé's (1959) test allowed us to conclude statistically that not only the averages of revenue and the percentage of GDP are not all the same, but are indeed all different among the three scenarios investigated (table 3). At the revenue level, the average annual rate for the differentiated rate model is around €12,412.03 million, for the single rate model of 17% is around €19 070,94 million and for the rate model of 21% is around €23 558,22 million euros. At the level of the percentage that this revenue represents in the GDP of each year, the annual average for the model of differentiated rates the average is about 7,43% of GDP, for the single rate model of 17% is about 11,40% of GDP and for the single rate model of 21% is about 14,20% of GDP. Consequently, from the comparison of the data, it appears that the estimated revenue from the single rate of VAT is higher than the values obtained by the differentiated rate system, in any of the proposed models (17% or 21%), in accordance with suggested by the doctrine. The same is to say that both rates are fiscally practicable.

4. Discussion

The simplification of Portuguese VAT system would allow greater efficiency gains, higher revenue levels, greater simplification of incidence and collection rules, and avoiding fraud resulting from the differentiation of tax (rates). The same seems to be possible as regards the common VAT model in use in the EU. To these essential aspects added the idea that one must take into account not only what "*is spent on taxes, should keep in mind what is spent, as well, to pay them*" (Nabais, 2010)⁶.

The VAT should generically be efficient but also the least onerous possible for companies. This point of view is supported by recent studies, which advocate the application of a single rate would enable to produce higher income levels and reasonably reduce the management fees by the Tax and Customs Authority, as well as business costs⁷. We could, therefore, say that VAT

⁶ The author refers: "Above all, to simplify the companies' taxation, so that they pay less and in an easier way, therefore economic competition, which is developed on a global scale, does not tolerate with ultra-complex systems as they are today."

⁷ See, for example: Sweden (2006). Compliance Costs of Value Added Tax in Sweden - Report 2006: 3B.

simplification brings a competitive advantage to the tax, i.e., the single tax on the goods and services provided is neutral, eliminating distortions in competition between equivalent goods or services. Neutrality is the characteristic of tax whose operation does not promote changes in the behaviour of taxpayers subject to it (Basto, 1991)⁸.

Another clear advantage of the single rate in Portugal as well as in the EU is to reduce reducing management and tax collection costs by the easiest application of the (single) rate to all economic operations. With the reduction of management and collection costs, the Tax and Customs Authority could reallocate part of its human capital to other more deficit areas. Simultaneously, companies would no longer devote about 30 per cent of their administrative staff to fiscal requirements (Albuquerque, 1991). On the other hand, the final consumer would also take advantage of this model. The first advantage, by reducing tax burden on the final price of goods and services, would lead to an increase in demand without adversely affecting public revenue. Second is due to a greater consumption-incentive. With the decrease of administrative burden and tax management, the government can displace financial resources for new public investments and enhance economic growth. The persons liable for VAT they can allocate resources to new investments, modernise their production system and expand the marketing of its products through resources spent in fulfilment of their tax obligations.

Therefore, it becomes clear that there are many associated advantages to the adoption of a single VAT rate for all involved, with obvious gains of an economic nature (Siqueira, 2001).

Clotilde Palma (2011) of the opinion against a possible application of a uniform rate in Portugal with the argument that *"the pernicious regressive effects of the tax, which weighs more on classes with the lowest incomes, are well known"*. The weight of IVA is higher for low-income families, as they cannot make replacement consumptions nor decide not to consume as they mainly consume essential goods and services. This author also expresses against the *"generalized mechanism of reverse charge, which would misrepresent the characteristics of the tax"* (Palma, 2012). However, it also recognizes the complexities of multiplicity of taxes, by noting that differentiated rates originate different readings and that the understanding given *"to certain concepts vary the scope of tax, causing significant distortions of competition, namely in cross-border situations [...] at consumption of food and fuel"* (Palma, 2012).

In strictly academic terms, the single rate model has some disadvantages. Fernando Albino (1991) mention that *"the ideal of a single tax is twofold [...] it represents a 25 years setback, to the times of the stamp duty [...] The opposition to such a tax [...] was that he did not know the economic reality underlying the transaction"*. This author raises the question whether the application of the single consumption tax model takes into account the economic reality of the

Skatteverket: National Tax Board. On the other hand, see the study carried out by Gastaldi F, Liberati P, Pisano, E, Tedeschi, S (2017). Regressivity Reduction of VAT Reform. *International Journal of Microsimulation*, 10(1): 29-72.

⁸ As Xavier de Basto teaches, "With VAT, in fact, the tax content of goods depends neither on the extent of the production processes in which they were obtained nor on the distribution of value added by the different operators. There is no encouragement or discouragement of vertical integration." This tax does not produce any cumulative effect, but gives neutrality to the different transactions occurring in that cycle without being distorted.

transactions carried out by agents. It should be noted, however, that VAT is not a personal tax such as the IRS, but rather a real tax that charges the whole demonstration of wealth by consumption, regardless of the personal characteristics of those who support it.

Another disadvantage of the single rate model is the "*constitutional status*" of the tax (Albuquerque, 2003). Albuquerque (2010) points out that some are "*against the search for solutions that walk towards perfecting the tax system*", there is a clear preference to keep everything as it is with the fear of losing revenue or withdraw the reduced rate status of certain goods and services. Further then the status question against tax there is another disadvantage linked with economic theory, which consists in the absence of stimulation to savings on the part of consumer (Braz e Cunha, 2009).

The reduction of the tax from 23% to a lower rate does not lead the consumer to feel the need to save since in principle, will be able to consume more goods, satisfying other needs and desires. According to Conceição Nunes and Pedro Nunes (2007), which used the example of the Estonian tax reform, the impact assessment of proportional taxes on tax revenues (IRS and VAT) allows us to conclude that "*the reduction of taxes has generated an inflation process, encouraging consumption in detriment of investment*" (Castro et al., 2011). Apart of the disadvantages of the single rate tax model, we have the disadvantages pointed out by the tax theory: if there is a higher revenue collection efficiency, an excess of human capital can be generated and allocated to the management of the tax, which in turn may lead to redundancies, either in the Tax and Customs Authority, or in taxable persons.

However, the major drawback pointed out to this model of indirect taxation on consumption is related to the social impact of the measure. Indeed, the tax systems have been called for redistributive role, variable and often postponed role, especially in times of financial crisis. The amendment or repeal of reduced and intermediate VAT rates leads to greater inequality in the burden of tax on lower-income classes, as they spend a proportionately larger slice of their income on essentials goods. Nevertheless, the genesis of the single rate of consumption model overlooks the social problems. VAT is, in a way, unrelated to that phenomenon, because it taxes the manifestations of wealth through the consumption, regardless of the economic capacity of the consumer. The social costs may be compensated with corrective measures from the regressive effects of consumption taxation on the IRS.

Therefore, while these income inequalities between individuals are understandable, they must be addressed through social policies or within the scope of the individual income tax and not necessarily within the scope of VAT.

The economist Arthur Laffer conceived in 1974, a curve to explain the elasticity of tax revenue, and how tax rates influence the amount of revenue. According to the author, when the tax rate is too high, a decrease in the rate leads to an increase in tax collection. The curve thereby demonstrated how tax revenue values progress as the state raises the rate, independently of the type of tax (Carvalho, 2005). According to Laffer, when the tax onus is low, the ratio between the tax and the tax revenue is direct, i.e. each additional unit of percentage increase in tax burden will provide a rise in total tax revenue. However, as successive increases

in the rate occur, it will increasingly approach the maximum point of tax collection and the curve undergoes circumflexion. If the tax continues to rise, there is a reversal in the evolution of revenue for each additional unit of rate increase. Laffer defends that the phenomenon of curve inflexion has as cause the fact that high tax rates result in tax evasion behaviour and incentive to parallel economies, which causes successive increments of discouragement in the formal economy, decreasing in this way, the base of tax incidence (Lima et al., 2006). For Laffer, the main objective of the curve was to incite to a *"critical reflection on distortions and the loss of incentives that tax rates create in the economy, and these rates, as they are increased, can reduce tax revenue"* (Lima et al., 2006)

The curve has proved the existence of a limit for the collection of tax revenue, also depict, through a simple design chart, the possible consequences of fiscal policies on economic growth. The high levels of tax on goods and services tend to discourage the consumption activity of economic agents, and the impacts of changes in rates on tax revenues are strongly influenced by the effects of substitution and income, as a result in the behavioural adaptation of the subject to the taxation policies (Nunes, 2007). The Laffer effect depends on the variation of the taxable income declared by the taxpayers and the level of the tax rate, being that, as that rate increases, individuals tend to substitute the goods and services heavily taxed with those which taxation is more favourable (substitution effect). However, a decrease in disposable income will cause an increase in labour supply in the subjects, in order to achieve their initial disposable income levels (income effect).

It should also take into consideration that in Laffer's effect the impact of taxation on consumer choice is an important factor, because the existence of worsening VAT rates has direct consequences not only in the short term but also in the long term, mainly in the reduction of saving levels. The decline in savings will affect the available income of the economy and, consequently, will have impacts on tax revenues (Nunes, 2007). This effect, however, is not direct and immediate, i.e. it is not enough to reduce the tax burden for revenue to increase, and complementary growth policies are also required, such as stimulus to consumption and labour. Nevertheless, as a study tool and analysis of the evolution of tax revenue, the Laffer curve is a useful tool.

As it is well known, the Laffer curve presupposes the existence of an inversion point, from which any increase in the tax rate by effect decrease in revenue: the maximum tax efficiency of the tribute. From this point, any additional unit of rate increase causes a decrease in total revenue. If the marginal rate is higher than the curve maximum, there is inefficiency in revenue collection. The way to turn the situation around, according to Laffer, is to reduce the marginal rate, in order to stimulate labour supply and create an increase in production. On the other hand, if the marginal rate is inferior to the maximum curve, there is also fiscal inefficiency, in which case, can be enough to increase the tax rate to generate an increase in total revenue.

It should be noted that for a zero rate the state obtains zero revenue, and at the opposite end, where the rate is 100%, revenue is also zero because individuals are not willing to purchase goods or services in which the value of VAT is equal to the price. Note that when

rates are too high, the natural behaviour of individuals alters in the search for informal markets, since rates are the discouraging element of economic activity. Therefore, beyond the point of fiscal efficiency, fiscal revenue decreases and, even if rates increase, revenue continues to decline. At the limit, when a rate of 100% is applied, economic activity ceases to generate revenue due to the fact that producers are unable to dispose of their goods and services since consumers are no longer willing to buy those goods or services, because they believe the final price of the goods too high.

In terms of effectiveness of the proposed models, it is important to compare their fiscal efficiency with the tax efficiency of the uniform rate. Figure 2 represents the annual VAT revenue values of the three models. Revenue under the differentiated rate regime is real and estimated for single rate models. The Laffer Curve constructed from the effective values of VAT revenue in the years 2000 to 2017 shows its peak of maximum efficiency in the year 2017. That is, the year 2017 was the year in which the current model was able to generate a greater level of tax revenue. Figure 2 reveals that 2009 was the worst year for VAT revenues and that the years 2012 and 2013 are points of fiscal inefficiency because the increase in the tax rate generated a decrease in total revenue. This means that any additional unit increase to the tax rate will generate revenue losses for the state coffers.

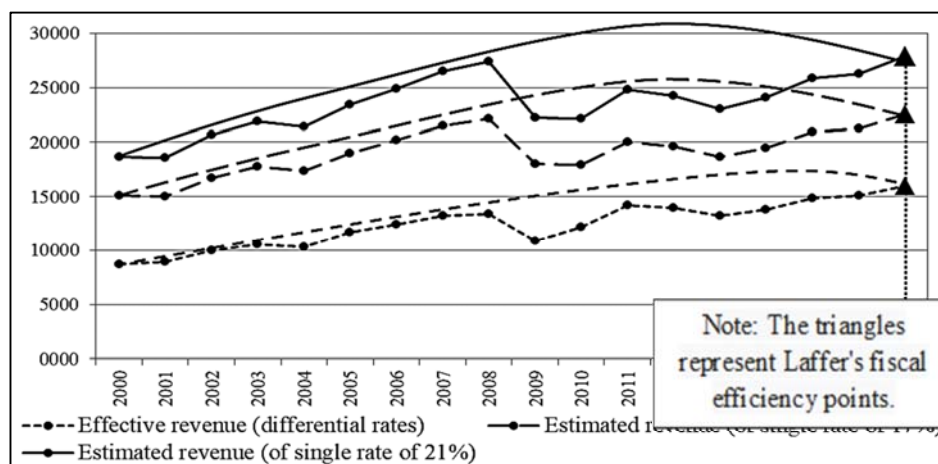


Figure 2. Laffer Curve for effective VAT revenue with differentiated rates and for estimated VAT revenues with single rates of 17% and 21% (in M€). Source: Own elaboration

The decrease in revenue by lowering the maximum VAT rate from 21% to 20% in the differentiated rate model, in 2009, indicates that the fiscal efficiency point had not yet been reached and the reduction was, in fact, counterproductive to revenue. In turn, the Laffer curves for estimated revenue amounts at 17% and 21% suggest that the peak of fiscal efficiency would be reached in the year 2008. This means that uniform rates would have reached their maximum value of revenue three years earlier than the model of differentiated rates. This anticipation of three years in achieving maximum fiscal efficiency could have been decisive for the way in which Portugal handled the economic and financial crisis of recent years.

5. Conclusions

In the empirical part of this study, we performed tests on the general tax model on single-rate consumption, and simulated hypotheses were placed use official statistical data, available by the Tax and Customs Authority of Portugal, during the analysed period. The importance of official data for the confirmation and/or refutation of models and hypotheses have been demonstrated.

The proposal to adopt a single VAT rate, with the consequent elimination of reduced and intermediate rates, constitutes an important transformation of the tax, generating significant impacts on revenue level, consumption and the social fabric. This hypothesis is confirmed in several scientific studies, referred to in this research, as a technically possible solution, able to achieve further efficiency gains in tax management and from the point of view of public revenue, necessary for public policy financing. Some other studies conclude in the opposite direction. Thus, the following conclusions are drawn from the research:

1. Although studies have pointed out that a simpler VAT model would be more efficient combating fraud, tax evasion and the parallel economy, in practice no fundamental reform was carried out with a view to simplifying the tax, in particular through single rate adoption. As this system leads to higher revenues and it is simpler, the obstacles to its implementation seem to be social and political in nature.

2. Although all the Member States of the European Union adopt multiple VAT rates, the European Commission advocates the application of a single rate for an economic (increase in revenue) and an administrative reason (simplification of incidence of tax and its collection), emphasising that the biggest obstacle to the application of a single rate within the common market is political. This problem also seems to affect the Portuguese model.

3. The adoption of a single rate for VAT is technically feasible and has considerable financial and administrative advantages for all agents involved (state and economic operators).

4. Non-adoption of the single rate model generates a loss of tax revenue. Besides the economic advantages resulting from this model, there are also advantages related to the simplification of the tax system in Portugal, as well as in the EU. The tests to the proposed models allowed concluding statistically that these would provide for higher tax revenue collection with greater ease of administration and compliance (gains of efficiency).

5. Since the single rate system cannot lead to revenue losses or, at least, it should be able to maintain revenue levels, otherwise it will not be feasible in the light of the principles of prudence and financial sustainability, which is essential for consolidation of public accounts, the choice of 21% VAT rate seems to be more appropriate (in line with that advocated by Catarino and Fonseca (2013)).

6. The data suggest that the proposed single rate model of 21% can generate more revenue, about 89,80% above that obtained with the differentiated rates of VAT adopted in Portugal. Testing for a single rate model of 17% shows that this rate would be sufficient not only to guarantee revenue levels but also to increase it by 50% to 60% above the differentiated rate system. The rate of 21% offers higher revenue levels, 67,39% higher than the rate of 17%.

Considering that Portugal faces excessive levels of public debt, with an increase in financing costs in the financial markets, it is necessary to achieve a considerable reduction of the debt burden in GDP and create financial surpluses to handle future shocks (Andrade, 2012, p. 138). Evidence suggests that a single VAT rate seems to be a possible solution to address these needs partly. The effective adoption of a model endowed with one of the rates used in this study is, however, an economic and fiscal policy issue, and it is up to the government to choose the level of tax rates that it considers to be the most appropriate, with due respect for the principle of legality, fiscal transparency, contributory capacity and relative equality (Gomes, 2008).

If the VAT model adopted in Portugal is simpler and clearer, compliance and management costs are lower, when comparing to any other EU country applying several tax rates. Thus, the possible application of a single VAT rate would simplify the process of applying the tax, settlement and collection laws (Gomes, 2008).

The choice of a rate of 21%, 17% or another rate should take into account the likely risks of deviations in revenue that may result from the application of the proposed model.

The single rate of VAT can generate negative social effects not insignificant, due to the known propensity for the regressivity of the tax with respect to the taxpayers of smaller incomes, since the tax of the consumption is proportionally heavier for these. These effects will have to be studied in autonomous and future research work. It is also suggested that similar studies be replicated, for an equivalent period of time, in European countries and in countries with historical and cultural proximity to Portugal, as is the case in Latin American countries.

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