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Worldwide Fiscal Progressivity: What can we Learn from Subjective Wellbeing Economics?

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Abstract: The link between fiscal progressivity and subjective well-being at global level is an issue that has hardly been considered in the literature on the Economics of Happiness. Oishi *et al.* (2012) is almost the only work in this field, and they concluded that those countries which had more progressive income tax systems were also happier. Our work use their definition of progressivity as the difference between the upper and lower marginal rate on income, in order to prove its relationship with subjective well-being (SWB), but we have observed that such indicator is not very significant for a sample of 111 countries. Besides, we conclude that the fact that a country's maximum income tax rate is high turns out to have a strong influence on the declared subjective well-being of its citizens. One possible explanation for it could be that they are countries with a high GDP per capita in which disposable income after taxes remains high. However, it must be taken into account that in our work we have managed to isolate the influences that the GDP per capita variable could have using the principal component analysis method.

Keywords: progressivity; subjective well-being; taxation; quality of life; happiness.

JEL classification: A13; H20; I31.

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1. INTRODUCTION

In the last years there has been a blooming of works about economy focus on subjective well-being and happiness[1]. Among these studies there is a branch aim at public economy, but they are very scarce works, on the other hand, those relating subjective well-being and paying taxes. This could be due to the difficulty of the relationship between both concepts as they have two types of effects.

Direct effects, in other words, if just the act of paying produces satisfaction or discomfort. Discomfort would be the product of the decrease of the available net worth, while satisfaction could be produced by moral, cultural or ideological values (as far as they sneak as the Estate in each individual freedom)[2].

Indirect effects are much more obvious as taxes are used to finance public commodities (health, education, infrastructure...) and to redistribute wealth (grants, subsidies...), they produce satisfaction upon those receiving or discomfort when citizens consider that wealth has been misused (waste, corruption...)

All of these relationships may produce many interesting microeconomic studies where factors that encourage an individual to improve or worsen his subjective well-being at paying a specific tax could be explored. However, that is not the aim of this project. In this essay we want to analyse the relationship between fiscalization and well-being at a country level. And more specifically, a fundamental aspect of taxpaying as it is fiscal progressivity, which, at a first instance, is only consider part of nations with higher levels of equality.

Our work wants to cover up a very important hole in academic literature about this topic, as practically, with the only exception of Oishi *et al.* (2012), in economy literature nobody has cover in depth the relationship between fiscalization and subjective well-being at a global level.

With that aim in mind, a sample of 111 countries was taken, to which their progressivity is calculated for 2019, using the higher and lower tax upon wealth of natural persons. In addition, the relationship that the higher and lower tax rate has with well-being will be also analysed.

Subjective well-being was obtained from the Gallup survey for 2019. This variable was one of which was taken into account to calculate the World Happiness Index (WHI in advance) produced by United Nations. It measures the average of the individual perceptions of how good life is depending on the country.

Also, from the construction of WHI we took other variables that act as control variables in our model: GDP per capita, social support, life expectancy, freedom of choice, inequality, perception of corruption, trust in national governments and generosity.

The issue with these control variables is the strong correlation existing among them. Problem that has been solved using the analysis of main components. That way, three components related with subjective well-being of countries have been identified: the "apparent quality of life", the one referring to "institutions and ethics" and the "fiscal progressivity" (FP) or "higher tax rate" (HTR) and "lower tax rate" (LTR).

Upcoming, these three dimensions have been used as variables determining subjective well-being. As we justified in the econometric strategy, we use the method if ordinary least squares, from which we obtain that the coefficient with mayor statistical significance up to be the "apparent quality of life". The "fiscal progressivity" or "higher tax rate" component has a mayor importance than "institutions and ethics" whose effect when introducing other control variables almost disappears.

This work is also relevant for public politics as, more than just confirm the results about progressivity obtain by Oishi *et al.* (2012), we find that the fixation of the higher tax rate is quite determining on the satisfaction at a country level. However, not the same thing happens with lower tax rate. On the other hand, we understand that a very important input of this project consist on isolating the effect that other different variables have upon subjective well-being, that could cause interactions and feedback on the studied variable. Furthermore, another added value of this work is that we offer a systematization of the scarce literature relating taxpaying and well-being.

Apart from this introduction, the present article offers in its 2nd Section with a revision of the recent literature closer to our object of study. The 3th Section is dedicated to the theoretical framework that constitutes the base to implement the later empirical work. The 4th Section is used to define data and the 5th portrays the econometric model. On the 6th and 7th Sections we analyse the results obtain and, eventually, in the 8th Section our conclusions are gathered.

2. REVISION OF LITERATURE ABOUT TAXPAYING AND WELL-BEING

We could take as a starting point in this literature Mirrlees approach (1971) of a model of uniform tax over the wealth, in which the individual with different skills to earn maximise a utility function in consumption and leisure. The government pretends to redistribute the income of people with better skills among those with a worse range of them, but these creates an information problem as it is possible to clearly see income but not skills. In this way people with better skills can avoid taxpaying over their income working less.

Oswald (1983), just like Layard already did (1980), takes the standard utility model (according consumption and leisure) whose maximisation determines the work offer adding as a third variable the worry due to others' consumption (defined as the weighted sum of the consumption of every other individual in our society). This variable represents altruism if utility increases as others' consumption does. Or, on the other hand, envy (if utility diminishes as others' consumption increases).

In their own view, van Praag and Ferrer-i-Carbonell (2004), devote a chapter in their book to the relationship between taxpaying and well-being. They create a tax over the wealth from the idea of the "function of well-being of income" from Leyden[3] school of thought, to which some "sacrifice rules" are applied. Equally, they use the same theoretical framework for the construction of a tax over intelligence quotient (IQ) and education. After its application over a specific amount of data, they conclude that its application wouldn't result to a much more different fiscal system than the one we currently have.

Gruber and Mullainathan (2005) analysed the effects of the tax over tobacco in consumers' well-being. They concluded that increasing taxes also increase happiness among smokers. Under the model of rational addiction, tax over cigarettes worsen the situation of regular smokers. However, under alternative models non persistent throughout time, smokers benefit from taxes as they provide a valuable self-control source.

Layard (2006) analyse implications of the optimal imposition according to the well-known adaptation[4] and social comparison[5], ideals took from economic happiness literature. He concluded that taxes have an extra function, apart from financing public services and wealth redistribution, and it is to discourage excessive work aim at being more wealthy than out neighbour.

Weisbach (2008) does a whole revision of the literature relating optimal taxpaying and happiness. Said literature has in common that it tries to introduce social status as an aspect to take into account when designing a specific tax. The conclusion gathered by the author is that findings about happiness may have the potential to change fiscal politics, but, for that to occur, it would be necessary that the investigation came closer to those questions related with the normative sphere of economy.

Different from previous approaches, in our work we want to study the fiscal progressivity, not from the designing point of view, but from an evaluating perspective. This way, it would be analysed how decisions about taxpaying at a country level influence in the average well-being of their citizens.

Following this idea, Lubian and Zarri (2011) created numerous indexes to measure the moral aspect of taxpaying or fiscal honesty and they find a correlation in them with individual subjetive well-being. The authors understand that the fact that some individuals pay taxes, even when the fines for non-payment are so low that it could be beneficial not paying taxes, is due to the fact that taxpaying may be satisfactory in itself.

Akay *et al.* (2012) investigate the effect of taxpaying upon individual happiness. Studying different alterations that occurred in the tax system of German households, they find evidence that a significant and positive effect of taxpaying over well-being, according to net income (maintaining an individual constant life level). Said relation, they believe, it is not only because taxes finance public commodities and fiscal moral from contributors, but also because of the preference of citizens to the redistributors role of the Estate, being because of solidarity or believe in the role of the Estate, or due to" more self-centered behavior, such as risk aversion and the preference for a tight social safety net in case of a shock such as unemployment (a 'veil of ignorance' motive)".

Grimes *et al.* (2016) study the relationship between subjective well-being and tax politics of 35 countries and 130 years-country, resulting in a sample over 170.000 people. They find out that, even though distorting taxes (like tax over wealth) are associated with a slower economic growth, nevertheless they have a higher correlation with well-being that non-distorting taxes (such as VAT). That being said, non-distorting taxes have a lesser impact on well-being for the wealthier classes than for the more disadvantaged classes.

According to fiscal progressivity, Oishi *et al.* (2012), taking 54 countries from Gallup's survey for 2007, finds out that progressivity is related in a positive way with subjective well-being. Furthermore, they prove that this positive effect comes from citizens' satisfaction with public commodities like education and public transport. However, public expenses and taxpaying in general do not result in happiness. Therefore, it is not the idea of a "big government" the one associated with a better well-being, but the role of a fair redistributors of wealth through taxes[6]. These same authors, in a more recent article, show a relationship that turns out to be key: a more progressive taxpaying predicts less inequality of income, which means a greater sense of trust and equity that derives in a higher degree of happiness[7].

Our work estimates progressivity[8] using the two previous articles same method: calculating the difference between higher tax rate and lower tax rate in the tax over income. But, apart from doubling the sample and offering more current data available to this date, we introduce a model of multiple regression in which we achieve isolating the effect that other variables may have on progressivity, to determine the satisfaction with life or subjective well-being of citizens.

3. PROGRESSIVITY AND SUBJECTIVE WELL-BEING: THEORETICAL FRAMEWORK

From a theoretical point of view, according to subjective well-being, the standard economic analysis infers the utility from behaviour (choices) of individuals (revealed choices). That way, Kahneman *et al.* (1997) coined the term "utility of choice" as "the utility of the results and the characteristics used during the decision making process" and the "experimented utility", which is the hedonic quality of such choice.

The subjective approach to the "experimented" utility supposes a complementary point of view profitable to study said well-being for two separated reasons. First, it offers a quite important tool in economy when allowing measuring individual well-being in a direct way from the measures claimed subjectively by the questioned individuals. When the question is about general satisfaction with life, we obtain a quantitative approximation of the individual's well-being. From the average of the answers in a specific country we will obtain a variable that would portray the well-being attainable there. Second, happiness is for most people a main aim, in other words, citizens do not want an income and other vital aspects only by themselves. They want them to increase their odds of being happy.

In this analytical context we consider the judgement of subjective well-being as an ordinal indicator if the individual's utility. The judgements of satisfaction with life are identifiable with subjective well-being. In that manner, as an alternative to standard analysis we could use subjective well-being data as a direct measure of the utility.

According to the previous ideas, we could present a model in which individual utility is represented by its subjective well-being (its "satisfaction with life"), defined by the following equations:

$$subjective\ well-being_i = a_0 + \alpha * fiscal\ progressivity_i + \beta * Zi + \varepsilon_i \quad (1)$$

$$subjective\ well-being_i = a_0 + \alpha * higher\ tax\ rate_i + \beta * Zi + \varepsilon_i \quad (2)$$

$$subjective\ well-being_i = a_0 + \alpha * lower\ tax\ rate_i + \beta * Zi + \varepsilon_i \quad (3)$$

where subjective well-being is the dependent or endogenous variable to the model. As independent variables we took fiscal progressivity and higher tax rate or lower tax rate, just like other explanatory variables (Z), which are most of the variables used for the construction of the IMF[9]: GDP per capita, social support, life expectancy, inequality, the perception if corruption, freedom, trust in national governments and generosity. The definition of all of these variables can be found in the fourth part if this article. The epsilon is used to represent the term of error.

4. DESCRIPTION OF DATA

In our analysis we took into account an amount of data of a transverse nature for 2019, took (except of the variables associated to fiscal progressivity) from the base of IMF's data, created by the United Nations Organization, in its 2020 edition.

For 2019 observations[10] of 137 countries were offered, even though countries with lack of data in any or some of the variables were eliminated for homogeneity purposes, resulting in a total of 111 countries.

The variables used in the study are the following:

Fiscal progressivity, higher tax rate and lower tax rate in tax over income.

First, the fiscal progressivity variable has been constructed according to the methodology used by Oishi *et al*. (2012)[11], in the following manner:

$$Fiscal\ progressivity\ (FP) = higher\ tax\ rate\text{-}lower\ tax\ rate \quad (4)$$

Specifically, in our study we took the difference between the tax rate in the higher and lower levels in taxpaying over income of natural persons (residents) in the different countries, not including social security. For those countries that count with a minimum exempt in taxes, we took as the minimum the first taxpaying type applicable.

The highest and lowest tax rates have as sources the web pages of the different global tax administrations, just as the use of the fiscal guides from the consultants PKF and Deloitte.

On Table no. 1A in our Annex, we detailed the fiscal progressivity, the higher tax rate and the lower tax rate.

Subjective well-being

It is a continuous variable, took from Gallup's Global Survey, covering from 2005 to 2019. Unless we specify otherwise, it is the national average answer to the following question: "Please, imagine a staircase, with steps numbered from 0 (lower step) to 10 (higher step). The highest point of the staircase represents the best possible life for you and the lowest part the worst life possible. On which step on the staircase would you say personally that you are right now? This measure is also known as the Cantril life staircase or, simply, Life Staircase.

GPD per capita

It is defined as the neperian logarithm of the GDP per capita of the country un Purchasing Power Parity (PPP). This variable continues, the GDP is expressed in «real volumes», adjusting the numbers to the differences of prices between countries. The dollar is used for this to date November 28th, 2011, according to the update in 2019 of the World Development Indicators (WDI)

Life expectancy

It is a continuous variable that groups the expectations about the number of years of healthy life when born and it is based in data obtain from the World Health Organization (WHO), that offers data up to 2016. Therefore, the data used are those extrapolated by United Nations for the confection of the IMF.

Social support

Social support (having someone to count on when problems arrive) is the average of binary answers (0 or 1) to the question in Gallup's survey: "If you had problems, do you have relatives or friends that you can count on every time you need it or you do not?".

Freedom of choice

It is a continuous variable resulted from the national average of answers to the question in Gallup's survey: "Are you satisfied or unsatisfied with your freedom to choose what you can do with your life?"

Inequality

GINI index from the Global Bank. It represents in its lowest value (0) the highest level of equality and in its highest value (1 or 100%) the highest level of inequality.

Perception of corruption

Its measure is the national average of the answers to two separated questions from Gallup's survey: “Is corruption generalised in the government or it does not?" and "Is corruption generalised inside companies or it does not?". The general perception is only the average of both answers 0 or 1. In case that there is a lack in the perception of governmental corruption, the perception of corporate corruption is used as the general perception.

The perception of corruption, at a national level, is only the average answer of the general perception at an individual level. In that way, with a scope from 0 to 1, the countries with the highest results are the ones where corruption is perceived in a more generalised way.

Trust in the government

It consists of the national average of answers to the question from Gallup's survey about one's trust in the government, being 0 equivalent to no and 1 equivalent to yes.

Generosity

Generosity is the rest of calculating the regression of the average of the answers to the question in Gallup's survey: "Have you donated money to a charity organization during the last month?" over the GDP per capita.

Variables have been normalised[12], as this is the adequate procedure when counting with different measuring scales.

5. ECONOMETRIC STRATEGY

According to the condition method, it has been proven the existence of multicollinearity between variables. Said correlations between variables make difficult distinguishing the real effect of each one of them upon subjective well-being, as they interact between them and they feed-back, which may bring problems in the estimations and little reliable results when using a multiple regression model[13].

To avoid multicollinearity we use the regression over main components method from Kendall (1958). With this method, original variables change in a new group of non-correlated variables called main components. For this, it is done, in the first place, an analysis of the main components, obtaining three components that encompass the different independent variables. As main components have the trait of being orthogonal, now it is appropriate to do a multiple regression analysis over the dependent variable.

In this analysis it is frequent to start with the consideration of the dependent variable as ordinal, which would demand the use of models such as Logit or Probit in order. However, Ferrer-i-Carbonell and Frijters (2004) - also check out van Praag and Ferrer-i-Carbonell (2006) - have proven that estimation by MCO does not cause important differences in the results. Furthermore, this facilitates the interpretation of coefficients.

In this way, going deeper in the relationship between variables we can establish a multiple lineal regression in which subjective well-being is the dependent variable or

endogenous from the model and taxpaying progressivity (or in their case higher tax rate or lower tax rate) the key independent variable. The other two components, that later would be defined, act as control variables.

$$Subjective\ well-being_i = a_0 + \beta_1 Life\ quality\ (apparent)_i + \beta_2 Institutions\ and\ ethic_i + \beta_3 Variable\ associated\ with\ progressivity_i + \varepsilon \quad (5)$$

6. RESULTS

Established the origin of the application of the main components method[14], we can check through the chart of communalities[15], that the progressivity variable is explained at a 95,3% by common factors, the higher tax rate at an 85,6% and the lower tax rate at an 87,1%.

Using as criteria of extraction said analysis of the main components method; we obtain[16], for taxpaying progressivity as higher and lower tax rate, three different components catalogued, depending on their composition, in the following way:

Component 1. Life quality (apparent): It covers the variables GDP per capita, life expectancy and social support. To a lesser extent it also contains freedom of choice and inequality. Freedom of choice in the case of the lowest level of taxpaying appears as the second component.

Component 2. Institutions and ethic[17]: It comprehends the variables perception of corruption, trust in the government and generosity.

Component 3. Progressivity or higher or lower tax rate; any of these variables are isolated, meaning they do not group with any other variable inside a component.

Using these three components, the normalized results of the estimation of subjective well-being are presented, using ordinary least squares. Shall we have in mind that each of the columns represents a different regression analysis, depending on the use of variables related to taxpaying progressivity.

Table no. 1 – Estimation MCO of subjective well-being at a country level

	Subjective Well-being		
	Fiscal Progressivity	**Higher Tax rate**	**Lower Tax rate**
(Constant)	2,148E-15	2,155E-15	2,181E-15
	(0,053)	(0,053)	(0,053)
Life	0,827***	0,813***	0,822***
Quality (apparent)	(0,053)	(0,054)	(0,053)
Institutions	0,012	0,026	0,134**
	(0,053)	(0,054)	(0,053)
Variables referring to	0,100*	0,175***	0,054
progressivity	(0,053)	(0,054)	(0,053)
R-fitted squeare	0,685	0,684	0,688
No.	111	111	111

Note: Regressions MCO with standard errors between brackets (they are the same by design of the orthogonal matrix). *p<0,1. **p<0,05. ***p<0,01.

Source: own elaboration; compilation based

We can observe that the institutions and ethics component (perception of corruption, trust in the government and generosity) does not have a significant effect upon subjective happiness,

except when the variable that is used as measure of progressivity is the minimum taxpaying type (Table no. 1). The effect is not present either in the lower tax rate. Progressivity has certain effect, but slightly significant and the coefficient indicates that a 1% increase in progressivity would increase subjective happiness 0,1%. While the maximum taxpaying type has a mayor effect as an increase of 1% in it would involve an increase in happiness of 0,18%, etc.

7. DISCUSSION

7.1 Life Quality (apparent)

We can put together a group of indicators in an "apparent" life quality, which ends up having the highest statistical meaning. We now analyse each of the grouped variables:

Referred to GDP per capita, according to : "Higher incomes are associated with a mayor satisfaction in life, but with decreasing performance as the income increases.

Because of this, Díaz Vázquez *et al.* (2011), consider that income constitutes one of the main determiners of what they name, as a synopsis, "life quality". The analysis they do for social capital also includes that the power of nets and trust in the citizens and in the institutions are also determining for citizens' life quality.

According to the life expectancy variable, it has been proven in the academic literature that its relationship with satisfaction with life functions in a double meaning that could produce distortions: on one hand longevity produces satisfaction with life, and on the other hand, those individuals with a more positive vision of their lives end up having a longer life[18].

About social support, it turns out to be a proxy variable of those called relational goods[19]. These have been studied in great depth in Latin America, where they have vital importance[20].

About the freedom variable, Abdur Rahman and Veenhoven (2018), distinguish inside the term between real freedom and the perception of freedom. In that manner, they place the formulated question from Gallup's survey inside the second group classifying it as a "satisfaction with freedom", correlated in a positive way with satisfaction with life.

About the relationship between inequality in income and the subjective well-being of a country: "not only the level of said incomes are relevant, but also the distribution of said incomes, including reach as well as tendency, which influence in subjective well-being" Diener (1984, p. 554).

The relationship between social equality and subjective well-being is encouraged in the following way: *"* "*First, it seems likely that a greater percentage of individuals will be able to achieve their goals in nations where there is relatively more equal nations. Second, in those places in which inequality is higher inequality conflicts and social justice are more likely to arise"* (Diener *et al.*, 1995, p. 853).

7.2 Institutions and ethics

According to the estimation of the subjective well-being equation, this component of institutional ethics ends up having the least statistical meaning.

As our data reflects, the correlation between the perception of corruption and trust in the government with the GDP is strongly significant[21]; and, also, the same phenomenon happens with the correlation of lack of corruption and subjective well-being[22], but not with the relationship between trust in the government and subjective well-being[23].

When studying the coincidence between these institutional variables and subjective well-being through the regression line, we observe that there is no coincidence between them. This may be due to the fact that effect that the lack of corruption had over subjective well-being was not direct, as it happens because the least corrupted countries are also the richest ones.

About generosity, in the measure of this variable we assume that at a higher GDP, the amount of donations would be higher, due to a greater purchasing power. That way, in its calculus the idea is that generosity would be the donated part not because we have more, but because of kindness. For this reason is why it is interpreted as the rest of the regression of the influence of GDP over the donations. Therefore, the component where it belongs is not the same as the GDP.

7.3 Variables referring to progressivity

We started with the results from Oishi *et al.* (2012), that found a correlation between the differences between the higher tax rate and the lower tax rate (this is, progressivity) with subjective well-being. However, the results of this study, with an extremely big sample of several countries, show that the variable that really has a strong correlation is the higher tax rate.

A possible answer to why in countries with the highest taxpaying types exist higher level of subjective well-being, may be that, in any case, we are talking about countries with a high GDP where the available income is still high. However, we should have in mind that in our study we have isolated the influence that this variable may have.

The measure of progressivity as the difference between the higher tax rate and the lower tax rate may be the target of criticism, as it does not take into account the income section neither the existence of an exempt minimum. Being or not a good progressivity measure, in this study we have proven that it does not have a significant correlation with subjective well-being. It does have a strong correlation with the higher tax rate, an indicator took by the source not being the calculus strictly required and subject to interpretation, and so in the taxpaying academic literature sometimes it is used as an indicator of progressivity[24].

8. CONCLUSIONS

The relationship between income and satisfaction with life has been one of the fields that more interest has awakened among studies about the economy of happiness. For this reason, it is strange that the relation between taxes and happiness has not been studied in greater depth. Inside fiscal matter, progressivity in a key question, as it defines to what extent a nation compromise to act in a collective way to eradicate inequality.

This article supports a whole revision of the academic literature that analyse the effects of taxpaying in our well-being. This literature was quite unfocussed, as it was a matter between disciplines such as economy, fiscal law and sociology.

About the way of calculating taxpaying progressivity, for this study, we took 111 countries, to which the difference between higher and lower taxpaying type over income was calculated.

A great leap forward compared to other similar articles is that we achieved isolating the effect of progressivity, from the "noise" that other variables could have caused that are also related with satisfaction with life, through the analysis of main components method.

As for the results, we observe the importance of the dimension of the "apparent" life quality that involves variables quite relevant like GDP per capita, life expectancy, relational goods, freedom or inequality.

Nevertheless, it is obvious that the correlation of taxpaying progressivity as it has been calculated, over subjective well-being, is superior to the component that involves variables as important as the perception of corruption or trust in the government.

A very important contribution from our work is finding out the strong influence that the fixation of a higher tax rate in taxes over income has over subjective well-being. No relationship was found between lower tax rate and well-being. This brings the conclusion that the effect of progressivity is the product of the fixation of taxes in the higher levels of income that is relieved when during the analysis the lower tax rate is subtracted.

A possible explanation to why the higher taxpaying types over income for natural persons have such a strong influence upon subjective well-being could be found in a Eurostat publication: "Taxation trends in the European Union": Direct taxes allow for a better redistribution as it is impossible introducing progressivity in indirect taxes. Therefore, "the recourse to direct taxes, which are more 'visible' to the electorate, tends to be greater in the countries where tax redistribution objectives are more pronounced; this usually results also in higher top personal income tax rates." (Eurostat, 2014, p. 20). For this reason, it is suggested that higher tax rate influence in subjective well-being as far as it is a manifestation of the compromise of a country when redistributing its wealth.

That the maximum taxpaying type of a country is high ends up having an extremely significant effect upon subjective well-being, so we hope that with this work in a near future more interest would be awakening about its use as an indicator of the progress of a specific nation.

Finally, it should be mentioned that are multiple the possibilities extensions of this analysis. First, the relationship between taxes and happiness through the exploitation of micro data should be studied; trying identifying through which channels taxes achieve to produce happiness. For example, the public commodities that produce the most well-being to citizens could be analysed (health, education...) and if it is only the act of paying for those commodities what produces said happiness. Also, temporal series could be used to determine if events that make citizens happier when paying taxes exist ("Are citizens happier paying taxes after COVID-19 as they have seen the importance of collectively financing public services?"). Moreover, other data bases could be used, other countries consider or taking other more sophisticated indicators to measure taxpaying progressivity or social inequality. Ultimately, a huge field of study exist for a discipline that, despite its importance, still slightly studied nowadays.

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ANNEX

Table no. 1A – Calculus of progressivity. Included countries

Country	TMI	TMS	PF	Country	TMI	TMS	PF	Country	TMI	TMS	PF
Albania	13	23	10	Greece	22	45	23	Nicaragua	15	30	15
Argentina	5	35	30	Guatemala	5	7	2	Níger	30	30	0
Australia	19	45	26	Guinea	5	40	35	Nigeria	7	24	17
Austria	25	55	30	Honduras	15	25	10	Norway	18,5	38,2	19,7
Azerbaijan	14	25	11	Hungary	15	15	0	Panama	15	25	10
Bangladesh	10	30	20	India	5	35,88	30,88	Paraguay	8	10	2
Belarus	13	13	0	Indonesia	5	30	25	Peru	8	30	22
Belgium	25	50	25	Iran	10	20	10	Filipinas	20	35	15
Benin	10	30	20	Ireland	20	40	20	Poland	17	32	15
Bolivia	25	25	0	Italiy	23	43	20	Portugal	14,5	48	33,5
Bosnia and Herzegovina	10	10	0	Côte d'Ivoire.	2	36	34	Rumania	10	10	0
Botsuana	5	25	20	Japan	5	45	40	Ruanda	20	30	10
Brasil	7,5	27,5	20	Kazakhstan	10	10	0	Senegal	20	40	20
Bulgaria	10	10	0	Kenya	10	30	20	Serbia	10	10	0
Burkina Faso	12,1	25	12,9	Kirguistan	10	10	0	Sierra Leone	15	30	15
Cameroon	5	35	30	Letonia	20	31,4	11,4	Slovakia	19	25	6
Canada	15	33	18	Libano	4	21	17	Slovenia	16	50	34
Chad	10	30	20	Lesoto	20	30	10	Sudafrica	18	45	27
Chile	4	35	31	Liberia	5	25	20	South Corea	6	42	36
Colombia	19	39	20	Lituania	20	32	12	Spain	19	45	26
Comoras	5	30	25	Luxembourg	8	42	34	Sri Lanka	4	24	20
Congo	1	40	39	Macedonia	10	10	0	Esuatini	20	33	13
Costa Rica	10	25	15	Madagascar	20	20	0	Sweden	30	52	22
Croatia	24	36	12	Malaui	15	30	15	Switzerland	0,77	11,5	10,73
Denmark	8	56,4	48,4	Malasia	1	28	27	Tanzania	9	30	21
Dominican Republic	15	25	10	Mali	3	3	0	Tailand	5	35	30
Ecuador	5	35	30	Mauritania	15	40	25	Togo	0,5	35	34,5
El Salvador	10	30	20	Mauricio	10	15	5	Tunez	1	36	35
Estonia	20	20	0	Mexico	1,92	35	33,08	Turkey	15	35	20
Ethiopia	10	35	25	Moldavia	12	12	0	Uganda	10	30	20
Finland	6	31,25	25,25	Mongolia	10	10	0	Ucrania	18	18	0
France	14	45	31	Montenegro	9	11	2	U.K.	20	45	25

Country	TMI	TMS	PF	Country	TMI	TMS	PF	Country	TMI	TMS	PF
Gabon	5	35	30	Mozambique	10	32	22	U.S	10	37	27
Gambia	5	25	20	Myanmar	5	25	20	Uruguay	10	36	26
Georgia	20	20	0	Namibia	18	37	19	Uzbekistan	12	12	0
Germany	14	45	31	Nepal	1	36	35	Zambia	25	37,5	12,5
Ghana	5	30	25	Netherlands	18,65	51,95	33,3	Zimbabue	20	45	25

Source: own elaboration

Table no. 2A – Communalities of progressivity variable

	Initial	Extraction
Zscore(Progressivity)	1,000	,950
Zscore: GPD Pc	1,000	,888
Zscore: Social Support	1,000	,777
Zscore: Life Expectancy	1,000	,863
Zscore: Freedom	1,000	,600
Zscore Generosity	1,000	,475
Zscore: Corruption	1,000	,728
Zscore: GINI	1,000	,340
Zscore: Government Trust	1,000	,796

Note: Extraction Method: analysis of main components.

Source: own elaboration

Table no. 3A – Communalities of higher tax rate

	Inicial	Extracción
Zscore (Higher tax rate)	1,000	,856
Zscore: GPD Pc	1,000	,882
Zscore: Social Support	1,000	,778
Zscore: Life Expectancy	1,000	,857
Zscore: Freedom	1,000	,555
Zscore Generosity	1,000	,573
Zscore: Corruption	1,000	,761
Zscore: Government Trust	1,000	,791
Zscore: GINI	1,000	,406

Note: Extraction Method: analysis of main components.

Source: own elaboration

Table no. 4A – Communalities of lower tax rate

	Inicial	Extracción
Zscore(Lower tax rate)	1,000	,871
Zscore: GPD Pc	1,000	,872
Zscore: Social Support	1,000	,758
Zscore: Life Expectancy	1,000	,862
Zscore: Freedom	1,000	,564
Zscore Generosity	1,000	,596
Zscore: Corruption	1,000	,738
Zscore: Government Trust	1,000	,817
Zscore: GINI	1,000	,336

Note: Extraction Method: analysis of main components.

Source: own elaboration

Notes

[1] Regarding the equivalence of both terms, see Ferrer-i-Carbonell (2013).

[2] For an in-depth analysis of the origin of the State interfering in individual subjective well-being through public policies, see Bjørnskov *et al.* (2012).

[3] The Leyden approach or school consists of an economic current of measurement of well-being, which emerged in the seventies and eighties at the University of Leydenv.

[4] According to this author, it implies that: "Having once experienced a higher standard of living, we cannot revert to where we were before and feel the same as we did then" (Layard, 2006, p. 5).

[5] That is, the comparison of the income that an individual makes between his own and that of others.

[6] In this sense, Bjørnskov *et al.* (2007) empirically analyzed whether the size of government was favorable or detrimental to life satisfaction, in a cross section of 74 countries. The results showed that the average satisfaction with life decreases with the increase in public consumption.

[7] Oishi *et al.* (2018) find that the poorest 40% of Americans feel significantly happier when their taxes are more progressive (understanding that the level of progressivity depends on the difference between the upper and lower marginal tax rates); while the 20% of the richest do not see their happiness affected by it.

[8] "A tax is progressive when its rate is higher for the rich (...), and lower for the more modest", Piketty (2015, p. 668).

[9] The variables not used have been those for which data for the year 2019 are barely available (those related to trust) and neither the Gini index of family income reported in the Gallup World Poll, since inequality was measured with the index Gini of the World Bank.

[10] From the data and appendices section of the World Happiness Index for the year 2020 2020 (https://worldhappiness.report/ed/2020/#appendices-and-data) go to the table "data for Table 2.1" and there are selected the data for the year 2019.

[11] The robustness of the calculation of progressivity as the difference between tax rates was tested by Oishi *et al.* (2012, p. 87).

[12] Subtracting the mean and dividing by the standard deviation.

[13] See the reflection on this matter carried out by Martela *et al.* (2020, p. 3).

[14] The KMO index from Kaiser-Meyer-Olkin of simple adecuation (if it is close to 1 its meaning is high)is at 0,695 for progressivity, at 0,710 for higher tax rate and at 0,705 for lower tax rate and in the Barlett esferification test (being positive when being under 0.05) the three cases ar at 0.00.

[15] The communal charts are charts 2, 3 and 4 from the annex.

[16] According to the rotating components matrix.

[17] The idea for this denomination was taken from Layard (2020, p. 56).

[18] Search Diener and Chan (2011).

[19] "As relational goods we understand the expressive/affective dimension, non instrumental from the interpersonal relationships" (Iglesias *et al*, 2013, p. 577).

[20] Search Velásquez (2016) and Rojas (2018).

[21] Matching with Tavits (2008) who, using data for 68 countries, concluded that the effect of corruption eclipsed de ones from the rest of macroeconomic variables.

[22] Layard (2020, p. 229) points put a close relationship between happiness and the behaviour of governors.

[23] Tavits (2008) confirms that corruption conditions the effect of representation, in a way that having the chosen party governing increases well-being when they are transparent parties, but this does not happen when they are corrupted.

[24] Search as an example Piketty (2015, p. 680).