

Article



How Taxes Relate to Potential Welfare Gain and Appreciable Economic Growth

Sorana Vatavu^{1,*}, Oana-Ramona Lobont¹, Petru Stefea² and Daniel Brindescu-Olariu²

- ¹ Finance Department, Faculty of Economics and Business Administration, West University of Timisoara, 300115 Timisoara, Romania
- ² Management Department, Faculty of Economics and Business Administration, West University of Timisoara, 300115 Timisoara, Romania
- * Correspondence: sorana.vatavu@e-uvt.ro; Tel.: +4-0256-592-570

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Abstract: This paper investigates new insights into the effect taxation has on the welfare state, using Granger causality analysis, and focusing on both economic growth and human development as welfare components. Moreover, Granger causality allows us to determine whether or not there is a bidirectional causal relationship between taxes, growth, and human development. The analysis is based on a comparative study between part of the Central and Eastern Europe (CEE) countries and the richest European Countries, over the period 1995–2015. Taxes are illustrated by different types of tax revenues to GDP ratio, economic growth is defined by gross domestic product and gross national income, while the human development index (HDI) included in the analysis is a composite measure used to rank countries based on their social and economic development level. Results confirm the fact that taxes support economic growth, but their impact on human development is rather limited. However, in countries with higher HDI, an increase in tax revenues is expected, but over long-term. This study confirms that taxes are an important instrument for governments, and should be used in economic growth. In addition, taxes are closely related to well-being, as citizens from countries with large HDI values are more likely to pay higher taxes over time. Therefore, practical tax reforms should imply an equilibrium between equity and a decent standard of living that supports life expectancy, increased tax revenues, and efficiency.

Keywords: tax revenues; economic growth; Human Development Index; welfare; Granger causality

1. Introduction

Nowadays, the concept of the welfare state has become more popular, enclosing the protection role of the state by promoting equal opportunities and equitable distribution of public resources and responsibilities for its citizens. As long as taxation represents the most important means of gathering public resources, it is expected that an advanced welfare state would be associated with higher taxation. Accordingly, sustainable growth and development are based on taxation, and therefore tax policy may be an essential tool for governments. Over time, unpopular taxes caused various protests or riots and, in extreme cases, even regime changes. Taxes are often used in political campaigns, in order to increase popularity among voters. However, studies still search for the best tax system, in which the loss of economic welfare is minimized while the redistribution of wealth is most efficient. In order to ensure economic growth and human development, governments should effectively collect taxes and provide infrastructure, social welfare, healthcare benefits, and other essential public services.

Despite country differences in the tax structure, the majority of European countries gain most of their tax revenues through personal and corporate income taxes, consumption taxes, and social contributions. But, as opposed to the richest states in the European Union in terms of GDP, over time, CEE countries seem to apply more flat tax rates, especially in terms of corporate and personal income. Regardless of the tax structure promoted, countries may consider changes in taxes in order to promote sustainable economic growth. For instance, if labor taxes such as personal income tax would be reduced, consumption and capital taxes should be simultaneously increased. This way, losses from one type of tax revenues are compensated by another type of taxes. Anyway, taxes tend to have both negative and positive effects on citizens and government. For example, low levels of tax on personal income represent for individuals an incentive for saving or even working more, while high personal income taxes demotivate citizens. On the other side, through higher taxes, governments dispose of higher revenues to sustain economic development. Essentially, taxes are means of transferring resources from private to public sector, in order to accomplish the development of the society, economically and socially.

As most previous studies focused on the economic factors affected by the level of taxation, and very few on the impact taxes have on human factors, the aim of this study is to underline the relationships between tax revenues and well-being, focusing on both economic growth and human development in different European countries. These two are the basic components of the dynamic social development, reflecting the economic and social policies of the society, and ensuring sustainability through welfare. In order to also discuss a series of policy implications, more details on the relationships will be obtained by analyzing the tax structure (different types of tax revenues) and its effect on welfare, in countries where taxation is one of the highest in Europe, and in some CEE countries where, although tax regimes faced important changes over time, they are still low, especially in terms of direct taxes.

By mixing taxation with the quantitative concept of economic growth and the qualitative concept of human development we will emphasize the impact taxes have beyond the economy, on citizens' well-being, supporting the idea of the welfare state. As this mix reflects the novelty of the paper, results will prove that citizens are willing to pay higher taxes for a better quality of life, providing more tax revenues which, spent correctly, will ensure better public services, the welfare of the society, and sustainable growth over the long term.

In order to achieve the objective of this study, the next section of the paper will present the main findings of the relevant literature, being followed by a description of the data and methodology used. Section 4 presents the empirical results and the last one concludes.

2. Literature Review

The literature studying the level of taxation associated with economic growth presented over time a series of contradictory opinions. Some researchers found that higher levels of economic growth are linked to low tax rates [1,2], while others stated that economic growth is supported by an increase in tax rates [3,4].

There is also evidence of a mixed impact on economic growth, depending on the type of tax. For example, in order to increase economic growth, tax rates related to consumption should be high, while income tax rates should be low. But findings reflecting a negative impact from direct taxes towards economic growth are also divided, depending on the type of tax analyzed. Some studies only confirmed a significant negative influence from the corporate tax side, but not from personal income tax [1]. However, the reduced significance of the results associated with personal income tax may also be due to an analysis of the immediate influence of taxes on economic growth. A better view may be observed by separating the dynamics of the relationships over the short and long term. This way, a statistically significant negative relationship between labor taxes and economic growth over the long run was evidenced [5].

The analysis of developing countries from different continents and OECD member countries suggested that developing countries, including those from OECD, face challenges related to poor tax administration, high variation in the average total tax to GDP ratio, limited understanding from taxpayers towards keeping accounts, and relatively small shares of wages in the national income. All of these are reflected into reduced tax sources, with reliance on the taxes from international trade and

limited income taxes. The researchers stated that personal income tax is, in general, a fiscal instrument for the government, revealing a commitment to social justice and to gathering political support [6].

Labor income tax also has an indirect effect on economic growth, as higher taxes imply higher shadow price of capital, which will eventually increase labor supply, but also lower consumption. Less consumption would have more economic implications, through a fall in tax revenues. In order to reduce this fall as much as possible, tax systems tend to rely on value-added tax (VAT) when it comes to consumption taxes, rarely implementing other sales tax, above VAT rate. In addition, a simple way to reduce distortion in consumption taxes is by broadening the tax base. In addition, using VAT as the main consumption tax is a fiscal measure that reduces evasion, as businesses apply it in every stage of the production, being liable only for the added value of their products.

In terms of general welfare in the society, a permanent combination between progressive taxation and government expenditures would ensure the transfer of income from richer to poorer. Therefore, tax progressivity would be one of the important instruments associating taxation to citizens' well-being [6–8]. Recent studies prove that countries promoting higher tax rates and more tax brackets present higher values of economic growth and development. But in countries with no tax progression, low tax rates are associated with higher values of growth and development index [9].

After studying how taxes influence welfare and economic growth in the United Kingdom, it was suggested that whenever countries support the welfare state idea, which considers an equal distribution of wealth, changes in the tax system would imply increasing labor and consumption taxes while reducing capital taxes [10]. These changes are risky especially when taxes are progressive, as citizens will face a reduction in wages or other types of income, which may actually induce an increase in unemployment. In addition, through the welfare state, the government offers support to citizens who do not provide for themselves, while cutting the public budget.

In terms of social contributions, in general, a good tax system is one that does not involve employers in labor taxes. Otherwise, the process may breach transparency and neutrality by separating the official incidence from the real one [11]. Moreover, sometimes taxes on employers raise the total costs of employing labor.

Taxes on wealth are different from the rest of the taxes as they breach the convenience principle. They are levied regardless of the fact that a taxpayer disposes of any source of income to pay them. In addition, these taxes create a distortion between savings and immediate consumption. As long as savings or investments are taxed separately, the process is discouraged in favor of consumption, which leads to a reduction in productivity [11]. Therefore, apart from stopping or delaying economic growth, these wealth taxes might have an important impact on the human development index, discouraging savings and investments, and affecting taxpayers with no income who need to cover their tax obligations.

In terms of human development, its relationship with taxes and economic growth is expected as long as governments may introduce fiscal policies that increase social and cultural investments to enhance citizens' well-being. The highest level of human development index is registered in Scandinavian countries and Switzerland, countries where government spendings on education and other public services are high. More specifically, Norway practices a dual income tax system, with progressive taxes for labor income and flat tax rates for capital income. Although focused on high revenues and income redistribution, economic development is not affected by these fiscal policies. Similarly, the Swedish government also focuses on the redistribution of income, providing top services for citizens in terms of education, healthcare, and retirement plans [12,13]. Sweden and Norway are the main examples for the modern welfare states, providing social and economic benefits for all its citizens, but heavily taxing high incomes in order to reduce income disparities.

Sustainable social welfare should be based on democracy and market economy in order to avoid an excessive capitalist system. Therefore, a welfare state should ensure the equal distribution of capital, progressive taxation of income and wealth, under conditions of full employment, integrating the citizens with lower incomes in order to increase supply and demand. All of these would converge towards sustainable social development.

Facing these diverse and contradictory results and opinions, authors were motivated to analyze the relationship between the level of taxes, economic growth, and human development, in different European countries, focusing on developed and emerging countries, in order to identify whether or not taxation does represent one of the most important instruments that ensure growth and development.

As long as previous studies focusing on the relationships between taxes, growth and welfare analyzed large panels, comprising developed countries, as well as emerging or developing ones, we consider appropriate to analyze two distinct panels, one on developed countries (characterized by high tax revenues and large GDP per capita), and another one on emerging countries, more specifically the former communist countries from the Central and Eastern Europe. We expect to find differences between the panels in terms of the level of tax revenues, their potential impact on growth, as well as the influence on citizens' willingness to contribute to the economic development by paying taxes. Moreover, country differences in the tax structure would produce diverse effects on economic and social development. While the richest European countries gain the highest tax revenues from personal and corporate income taxes, using progressive taxation, the CEE countries apply flat tax rates, especially in terms of corporate and personal income. Our analysis will also reveal whether or not the welfare state specific to developed countries, where taxes are high, determines a sustainable human development along with significant economic growth.

3. Data and Methodology

The data used in this study refers to tax revenues to GDP ratio, economic growth and human development in different countries: the Central and Eastern Europe (CEE) countries database includes the Czech Republic, Estonia, Hungary, Latvia, Poland, Slovak Republic, and Slovenia, while the panel referring to rich European countries comprises Denmark, France, Germany, the Netherlands, Norway, Sweden, and the United Kingdom. Therefore, every panel includes seven countries, with annual data presented over the period 1995–2015.

All the data related to the taxes, measured as percentage level in GDP, was collected from the Organisation for Economic Co-operation and Development (OECD) website. More specifically, it refers to the % level in the GDP of tax revenues (TotTax), tax on income, profit and capital gains (TaxIPrC), social security contributions (SSC), tax on property (TaxProp), and tax on goods and services (TaxGS).

Data on Gross Domestic Product (GDP) and Gross National Income (GNI), both used to reflect economic growth, was collected from the World Bank website in the form of GDP per capita based on purchasing power parity (PPP), and GNI per capita, PPP (both in current international \$), and used to compute their annual growth rates from one year to another. Finally, the human development index (HDI) was available through the United Nations Development Program website.

In order to understand the data and compare the level of taxation, economic growth and citizens' well-being in CEE countries and in some of the richest European countries, we will first focus on the descriptive statistics and the evolution of indicators over the period analyzed, also observing the extent to which the financial crisis affected the level of the variables.

As a second stage of the analysis, a general approach of the Granger non-causality tests will be applied to both panels, referring to cointegration techniques with error correction models. In order to apply this method, each panel dataset needs to be tested for the unit root.

The panel model applied in this study is based on Dumitrescu and Hurlin's [14] test for Granger non-causality test, considering the following linear model:

$$y_{i,t} = \alpha_i + \sum_{l=1}^{K} \gamma_i^{(k)} y_{i,t-l} + \sum_{l=1}^{K} \beta_i^{(k)} x_{i,t-l} + \varepsilon_{i,t}$$

where lag order *l* are identical for all cross-section units (countries), *i* refers to the number of panel cross sections (*i* = 1, ..., 7 countries for every panel), *t* is the time period (*t* = 1, ..., 21 years over the period 1995–2015), $\gamma_i^{(k)}$ represent the autoregressive parameters, and $\beta_i^{(k)}$ are the regression coefficient slopes. It is important to mention that this model allows the autoregressive parameters and the coefficient slopes to differ across the cross-sections. $x_{i,t}$ and $y_{i,t}$ are the observations of two stationary variables, α_i are the individual effects, and $\varepsilon_{i,t}$ represents the individual residuals. Considering that $y_{i,t}$ is a variable of economic growth or HDI, and $x_{i,t}$ is the % level of different categories of tax revenues in GDP, we analyze whether or not taxes are an important cause of growth and human development. Testing the opposite direction of the causality is also possible, by considering tax revenues as the dependent variable (tax variables become the $y_{i,t}$ in the model).

We will also investigate the cross-sectional dependence in the two sets of panel data. This is an important stage before Granger causality analysis because the existence of cross-sectional dependency among countries would indicate a high integration among the countries observed [15]. Due to this fact, a shock occurring to a country would be easily transmitted to others included in the panel. The existence of cross-sectional dependency points out the suitability of the bootstrap panel causality approach, which means that the analysis should be realized for each country rather than analyzing all of them in a panel. A command was developed in Stata in order to test for Granger causality in heterogeneous panel datasets, using the method developed by Dumitrescu and Hurlin [14]. Their method assumed less strong assumptions than the ones from previous models, which referred to the homogeneity of cross-section units. Therefore, Dumitrescu and Hurlin's model is appropriate for heterogenous panels, accounting for fixed coefficients model with fixed individual effects. However, in order to decide on whether or not to employ the bootstrap panel causality analysis, we test the cross-sectional dependence.

If results do not indicate a cross-sectional dependency between the countries, we choose to apply the granger cause analysis on the panels, in order to observe if the level of taxation in developing countries has different effects or a more powerful impact on economic growth and citizens' well-being. We expect stronger causal relationships within the panel of CEE countries, but it is important to also observe which type of taxes has more impact on citizens and economy.

4. Results and Discussions

4.1. Descriptive Statistics

Table 1 includes the descriptive statistics for all the variables included in this analysis: the tax revenues in GDP ratios, the GDP and GNI growth, and the HDI. On average, the level of tax revenues in GDP is below 34% in CEE Countries, while tax revenues in developed countries are 40% in GDP. In CEE countries the social security contributions and taxes on goods and services represent more than 12% of the GDP each, being followed by taxes on income, profits and capital gains, around 7.5% of the GDP, and taxes on property, which are less than 1% of GDP. The panel consisting of developed countries indicates differences in this hierarchy of different tax revenue categories: the highest are taxes on income, profits, and capital gains, with an average of 15% of GDP, followed by taxes on goods and services (11.8% in GDP) and social security contributions (10% in GDP); taxes on property are almost 2% in GDP.

The economic growth indicators highlight an increased level for CEE countries. The annual growth in GDP and GNI are 6.3% and 3.5%, compared to 4% and respectively 1.5%, in the case of developed countries. The standard deviation of the economic growth variables is very high for both databases, emphasizing that the values are spread out over a wide range. CEE countries have a much wider range in the case of GNI annual growth rate, indicating a higher variation relative to the mean.

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Variable	CEE Countries				Developed Countries			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
TotTax	33.622	3.426	27.4	41	40.031	5.210	29.7	49.6
TaxIPrCap	7.556	1.194	5.3	10.9	15.129	6.501	6.8	32.2
SSC	12.403	1.973	7.9	16.4	10.141	5.212	0.1	18
TaxProp	0.733	0.373	0.2	1.7	1.966	1.057	0.8	4.1
TaxGS	12.555	1.737	9.9	17.2	11.83	1.878	9.2	16.3
GDP	6.273	4.316	-13.087	16.668	3.981	3.571	-10.079	20.856
GNI	3.548	3.763	-12.406	12.380	1.511	2.177	-7.330	6.655
HDI	0.809	0.045	0.674	0.89	0.889	0.029	0.825	0.949

 Table 1. Descriptive statistics.

The average HDI for the developed countries is 0.89, while the CEE countries indicate an average index of 0.81, confirming that there is a higher standard of living in the European richest countries, and the population here has a longer and healthier life, with more years of schooling. Through the United Nations Development Program the summary measure of human development was computed for 188 worldwide countries. From the overall HDI database, the countries analyzed in this paper are ranked in the first quarter. Furthermore, the seven richest countries included in this analysis indicate some of the highest HDI values, being classified in the top 10%.

The evolution of the total tax revenues over the period analyzed is observed in Figure 1, as a comparison between the two panels. From all the countries included in the analysis, Sweden and Denmark present the highest tax revenues. Although before 2000, Sweden had the highest level of tax revenues in GDP (49%), it decreased to 43% by the end of the period analyzed, being overtaken by Denmark and France. The United Kingdom is, on the contrary, indicating the lowest level of tax revenues (up to 33% over the period analyzed). Between the CEE countries, Hungary has the highest tax revenues, followed by Slovenia (tax revenues above 37% in GDP), while Latvia has the lowest tax revenues (less than 30% of the GDP).



Figure 1. The evolution of tax revenues over the period 1995–2015. (**a**) panel of CEE countries; (**b**) panel of developed countries.

We focused on the main ideas on the evolution of different tax revenues to GDP ratios, in the two sets of countries, without including graphs on every type of tax revenues. Taxes on income, profits and capital gains are highest in Denmark (approximately 30% of GDP), followed by Norway and Sweden (with 15% at the end of the period analyzed). Compared to the CEE countries, the richest European states do not have high fluctuations in the level of taxes from income, profits and capital gains over time. However, Poland and Estonia had the highest level of taxes on income, profits, and capital gains (11% in GDP in 1995) which decreased to 6.5% and 8%, respectively, in 2015.

In terms of social security contributions (SSC), developed countries did not register important fluctuations over the period analyzed. France has the highest SSC levels, between 16% and 18% of the GDP, followed by the Netherlands and Germany, with 14% in 2015. Tax revenues from social contributions change more over time in CEE countries: Slovenia and the Czech Republic have the highest levels (approximately 15% in GDP), while Latvia and Estonia indicate the lowest (8% and respectively 11% in GDP).

The highest levels of taxes on the property are registered by France and the United Kingdom, increasing over time from 3% up to 4% in GDP. Other developed countries have a level of 1–2% in GDP, as Germany presents the lowest taxes on the property. From CEE countries, Poland has the highest level (1.4%, with its peak in 2001 when it reached 1.7% in GDP), Hungary registers above 1% in GDP (with a significant increase over time), and Estonia has, on the other side, the lowest levels of taxes on property (0.2–0.3% in GDP since the crisis started).

The highest levels of taxes on goods and services are registered by Hungary and Denmark. If in the case of Denmark, since the crisis started, the level of indirect taxes decreased from 16.2% to 15% in GDP, Hungary indicated an opposite evolution, increasing from 14% to 17.2% in GDP, since 2006. Norway had the most dramatic decrease over the period analyzed, from 15.4% to 11.6% in GDP. For the CEE countries, fluctuations were more obvious than for the other set of countries, decreasing between 1995 to 2006, and increasing after the crisis. Slovakia and the Czech Republic have the lowest tax revenues from goods and services (approximately 11%).

The evolution of GDP and GNI over the decades analyzed are reflected in the following figures (Figures 2 and 3). Estonia and Latvia indicate the highest levels of GDP and GNI growth during the first decade analyzed, with an average increase of 10% and 7%, respectively. Although the richest European countries do not present such high GNI growth rates, France, Denmark and Germany have an annual average increase of 1.5–2%, while the rest of the developed countries indicated an average increase of 2.5%; Sweden had the biggest increase (3.4%).

From all the countries analyzed, the increase in Norway's GDP was the highest (in 2000 it reached 20% from 0 in 1998). This is the richest country with the most important fluctuations over the period analyzed, as it will also be described based on the other indicators. Over the crisis period, Estonia and Latvia faced the most dramatic decrease in GDP and GNI, while Sweden and Norway were two of the rich countries with the highest dropout in GNI (–7%) and GDP (–10%) in 2009. In 2008–2009 all the countries analyzed (except Poland) faced a decrease up to 13% in GDP or GNI. The growth indicators slowly recovered and registered increases from 1% to 5% in 2014 and 2015. For these final years, the CEE countries registered the highest GNI growth rates, while Sweden and Norway are the only richest countries that registered more than 3% increase in this rate.

For the human development index, the evolution is reflected in Figure 4. This measurement of life quality constantly increased over the period analyzed, but to a larger extent for the CEE countries. From these, Latvia, which had the lowest HDI value in 1995, managed to catch up with the other CEE countries, to 0.83. Slovenia and Estonia had the highest level of HDI over the period, increasing from 0.78 to 0.89. Related to the developed countries, the highest HDI was registered by Norway, increasing from 0.88 in 1995 to 0.95 in 2015. Besides, this is the country ranked on the first position in the HDI database realized by the United Nations Development Program. On the other side, from the richest countries considered, France has lower levels of HDI, up to 0.897 in 2015.



Figure 2. The evolution of Gross Domestic Product (GDP) over the period 1995–2015. (**a**) panel of CEE countries; (**b**) panel of developed countries.



Figure 3. The evolution of Gross National Income (GNI) over the period 1995–2015. (**a**) panel of CEE countries; (**b**) panel of developed countries.



Figure 4. The evolution of HDI over the period 1995–2015. (**a**) panel of CEE countries; (**b**) panel of developed countries.

4.2. Granger Causality Statistics

The results for the Im Pesaran and Shin test for panel unit root indicate that some of the variables reflecting the level of taxes in GDP, for developed countries, contain unit roots. In order to ensure data consistency and to maintain a unitary level, the first difference of the tax variables was computed for both panels. After applying the Im Pesaran and Shin test again, results proved us that all variables are stationary, satisfying the first condition necessary before testing for non-causality.

As outlined in the data and methodology section, testing for cross-sectional dependency in both panels is very important in order to ensure the appropriate estimators. The results are presented in Table 2, and were computed based on the group estimator developed by Pesaran, because this test is applicable to a wide range of panel data, including homogeneous or heterogeneous ones, regardless of the sample size (in this case we have a small N—seven countries for every panel, and larger T—20 years).

Results from the cross-sectional dependence tests demonstrate, with very few exceptions, that there is no cross-sectional dependence in the two panels. This means that the Granger causality analysis may be realized on the overall panel, not on individual cross-sections (countries).

The Granger non-causality tests indicate different causes for growth and development in CEE countries and in the richest states in Europe. We will first refer to the results obtained with a default lag of one, included in Table 3. Over the short term, the level of taxes in GDP is not necessarily the most important cause of growth or human development. For the CEE countries included in this study, tax on income, profits and capital gains, as well as tax on properties (with a *p*-value below the statistical significance, at 88% level) granger cause the level of annual GDP growth. Moreover, this growth indicator granger causes an increase in the level of tax on income, profits and capital gains, and tax on properties, as the bidirectional causal relationship is also direct. Fewer results were statistically significant in the richest countries case. For this panel, only the GDP granger causes taxes on property or taxes on goods and services, and it also seems to be statistically significant in terms of granger causing taxes on property.

Variables _ Considered	CEE Countries			Deve	Developed Countries		
	GDP	GNI	HDI	GDP	GNI	HDI	
TotTax	3.21	2.19	0.35	5.58 **	1.36	0.16	
	(0.0731)	(0.1385)	(0.5517)	(0.0181)	(0.2444)	(0.6883)	
TaxIPrCap	0.27	1.18	0.09	3.10	0.11	0.48	
	(0.6049)	(0.2766)	(0.7682)	(0.0781)	(0.7423)	(0.4901)	
SSC	7.87 ***	0.06	2.65	3.13	2.82	0.01	
	(0.005)	(0.8044)	(0.1036)	(0.0767)	(0.0933)	(0.9043)	
TaxProp	2.26	0.70	0.44	1.61	0.91	1.19	
	(0.1326)	(0.4031)	(0.5062)	(0.2049)	(0.3396)	(0.2759)	
TaxGS	0.06	0.23	5.89 ***	6.67 ***	0.05	0.06	
	(0.8104)	(0.6326)	(0.0152)	(0.0098)	(0.8219)	(0.8008)	

Table 2. Results of cross-sectional dependence tests.

***, ** indicate statistically significant at the 0.01, and 0.05 level respectively.

 Table 3.
 Granger causality between tax revenues and GDP, GNI, and HDI. (in CEE and developed countries).

Lag 1		TotTax→GDP	TaxIPrCap-	→GDFSSC→GDP	TaxProp→GDP	TaxGS→GDP
CEE	Wald stat.	0.991	5.134	1.294	2.178	1.095
	Z-bar	-0.213	5.954 ***	0.239	1.554	-0.058
Dev	Wald stat.	1.055	0.968	0.888	1.278	1.414
	Z-bar	-0.117	-0.246	-0.365	0.216	0.418
	Lag 1	GDP→TotTax	GDP→TaxIPrCapGDP→SSC		GDP→TaxProp GDP→TaxGS	
CEE	Wald stat.	0.596	2.545	1.158	3.048	0.912
CLL	Z-bar	-0.7998	2.101 **	0.037	2.849 ***	-0.329
Dev	Wald stat.	1.841	0.885	0.49	2.167	47.338
200	Z-bar	1.054	-0.369	-0.957	1.538	11.093 ***
	Lag 1	TotTax→GNI	TaxIPrCap-	→GNISSC→GNI	TaxProp→GNI	TaxGS→GNI
CEE	Wald stat.	0.719	2.393	2.264	1.624	0.582
022	Z-bar	-0.617	1.874 *	1.683 *	0.73	-0.819
Dev	Wald stat.	1.371	1.166	0.416	2.788	1.349
	Z-bar	0.353	0.048	-1.067	2.463 ***	0.321
	Lag 1	GNI→TotTax	GNI→TaxII	PrCapGNI→SSC	GNI→TaxProp	GNI→TaxGS
CEE	Wald stat.	0.904	3.592	0.912	3.888	1.735
	Z-bar	-0.342	3.658 ***	-0.329	4.099 ***	0.896
Dev	Wald stat.	1.281	0.675	0.659	1.415	2.168
200	Z-bar	0.22	-0.683	-0.706	0.419	1.539
Lag 1		TotTax→HDI	TaxIPrCap-	→HDISSC→HDI	TaxProp→HDI	TaxGS→HDI
CEE	Wald stat.	2.116	1.263	3.241	1.547	0.889
	Z-bar	1.463	0.192	3.136 ***	0.615	-0.363
Dev	Wald stat.	1.438	2.089	1.303	0.479	1.872
Dev	Z-bar	0.453	1.422	0.253	-0.973	1.099

	Lag 1	HDI→TotTax	HDI→TaxIPr	CapHDI→SSC	HDI→TaxProp	HDI→TaxGS
CFF	Wald stat.	2.326	1.542	1.709	0.809	1.347
CLL	Z-bar	1.775 *	0.609	0.856	-0.418	0.318
Dav	Wald stat.	3.652	1.439	1.643	2.158	1.321
Dev	Z-bar	3.747 ***	0.456	0.758	1.524	0.279
	Lag 1	TotTax→GDP	TaxIPrCap→GDI S SC→GDP		TaxProp→GDP TaxGS→GDP	
CFF	Wald stat.	0.991	5.134	1.294	2.178	1.095
CEE	Z-bar	-0.213	5.954 ***	0.239	1.554	-0.058
Dev	Wald stat.	1.055	0.968	0.888	1.278	1.414
Dev	Z-bar	-0.117	-0.246	-0.365	0.216	0.418
	Lag 1	GDP→TotTax	GDP→TaxIP	rCapGDP→SSC	GDP→TaxProp	GDP→TaxGS
CFF	Wald stat.	0.596	2.545	1.158	3.048	0.912
CLL	Z-bar	-0.7998	2.101 **	0.037	2.849 ***	-0.329
Dev	Wald stat.	1.841	0.885	0.49	2.167	47.338
Dev	Z-bar	1.054	-0.369	-0.957	1.538	11.093 ***
	Lag 1	TotTax→GNI	TaxIPrCap→	GNISSC→GNI	TaxProp→GNI	TaxGS→GNI
CEE	Wald stat.	0.719	2.393	2.264	1.624	0.582
CLL	Z-bar	-0.617	1.874 *	1.683 *	0.73	-0.819
Dev	Wald stat.	1.371	1.166	0.416	2.788	1.349
Der	Z-bar	0.353	0.048	-1.067	2.463 ***	0.321
Lag 1		GNI→TotTax	GNI→TaxIPr	CapGNI→SSC	GNI→TaxProp	GNI→TaxGS
CEE	Wald stat.	0.904	3.592	0.912	3.888	1.735
022	Z-bar	-0.342	3.658 ***	-0.329	4.099 ***	0.896
Dev	Wald stat.	1.281	0.675	0.659	1.415	2.168
200	Z-bar	0.22	-0.683	-0.706	0.419	1.539
	Lag 1	TotTax→HDI	TaxIPrCap→	HDISSC→HDI	TaxProp→HDI	TaxGS→HDI
CEE	Wald stat.	2.116	1.263	3.241	1.547	0.889
CEE	Z-bar	1.463	0.192	3.136 ***	0.615	-0.363
Dev	Wald stat.	1.438	2.089	1.303	0.479	1.872
	Z-bar	0.453	1.422	0.253	-0.973	1.099
	Lag 1	HDI→TotTax	Гах HDI→TaxIPrCapHDI→SSC		HDI→TaxProp	HDI→TaxGS
CEE	Wald stat.	2.326	1.542	1.709	0.809	1.347
	Z-bar	1.775 *	0.609	0.856	-0.418	0.318
Dev	Wald stat.	3.652	1.439	1.643	2.158	1.321
Dev	Z–bar	3.747 ***	0.456	0.758	1.524	0.279

Table 3. Cont.

***, **, and * indicate statistically significant at the 0.01, 0.05, and 0.1 level respectively.

At first glance, results prove that tax systems produce different effects on economic and social development in CEE and richest countries. The most obvious results prove that, in CEE countries, higher levels of taxes on income, profits and capital gains immediately cause an increase in economic growth. Negative coefficients would indicate that total tax revenues should be reduced in order to

register higher GDP or GNI values. However, this assumption was not proven as coefficients are not statistically significant.

The level of income, profit, and capital gains taxes are a granger cause for GNI as well as the annual growth in GNI represents a granger cause for these types of taxes. These effects happen over a very short time. The social security contributions proved to be a granger cause for GNI as well. For developed countries, the only category of taxes to granger cause GNI was tax on property. Considering the opposite causal relationship, this growth indicator was revealed as a granger cause for tax on property for CEE countries, but it was not statistically significant as an influential factor on taxes from the richest European countries.

The fiscal revenues that granger cause human development index are the social security contributions, in the case of CEE countries, while in developed ones it seems that tax on income, profit and capital gains are a cause. In addition, regardless of the panel analyzed, the human development index is a granger cause of the level of total tax revenues, proving that the happier and healthier citizens are, the higher their tax payments will be.

The causality models applied to panel data indicate whether or not the results request different lag orders in order to minimize the Akaike, Bayesian, or Hannan-Quinn information criteria. Therefore, we extend the model by applying a set of regressions containing lag orders above 1. Moreover, Stata offers options which rely on a series of estimations for the maximal number of observations available and re-runs with the optimal number of lags. A new set of results is presented in Table 4, being selected in an optimal way. With few exceptions, where results are the same as the previous ones (where optimal lag was considered to be 1), the rest of the models are optimal for lag 6. Considering that more results were statistically significant with the use of lag 6, it demonstrates that in terms of taxation, economic growth and human development, causality is produced over the long-term, and not immediately.

Coefficients obtained through all models are positive, indicating that there is a direct influence between the three categories of variables (taxes, economic growth, HDI). Except for the granger cause between taxes and HDI, all the other coefficients are statistically significant at 1% level.

A growth in tax revenues granger causes an increase in GDP growth. For the developed countries the impact of total taxes seems to be higher, according to the Z-bar value. From all the taxes, tax on income, profits and capital has the most impact on GDP growth in CEE countries. For the richest countries in Europe, results indicate that social contributions have the strongest impact on growth. The inverse relationships are also confirmed between GDP and tax categories. The highest coefficient values highlight the fact that GDP variations in CEE countries have the most influence on taxes on property and on taxes on income, profit, and capital. In developed countries, a growth in GDP would cause the highest increase in taxes on property, social security contributions, and taxes levied for income, profit, and capital.

An increase in tax revenues would also granger causes a rise in GNI, the impact being higher in CEE countries. Granger coefficients are lower than in the relationships between taxes and GDP, but, in CEE countries, we observe once again that the highest impact comes from taxes on income, profit, and capital gain. Even a higher impact is observed for the opposite granger cause: results indicate that, from all the taxes, those on income, profit, and capital gain represent the strongest granger cause on GNI.

In terms of the human development index, the only taxes with statistically significant influence on HDI are social security contributions. However, in the opposite direction, results indicate that HDI is a granger cause for taxes in all countries. More specifically, in CEE countries, whenever HDI value increases we can expect an increase in future tax revenues; most influence is on consumption taxes and social contributions. Trends are different in the richest European countries, where HDI seems to have the highest impact on social contributions and taxes on income, profit, and capital.

	Lag 6	TotTax→GDP	TaxIPrCap→C	GDISSC→GDP	TaxProp→GDP	TaxGS→GDP
CEE	Wald stat.	1220.34	23200	377.04	418.406	732.26
CLL	Z-bar	345.28 ***	6595.45 ***	105.03 ***	116.81 ***	206.23 ***
Dov	Wald stat.	43400	20.939	7731.77	80.899	47.338
Dev	Z-bar	12,400 ***	3.572 ***	2200.40 ***	20.65 ***	11.093 ***
	Lag 6	GDP→TotTax	GDP→TaxIPr	CapGDP→SSC	GDP→TaxProp	GDP→TaxGS
CEE	Wald stat.	77.37	2376.11	48.71	4318.09	252.66
CLL	Z-bar	19.65 ***	674.56 ***	11.485 ***	1227.84 ***	69.58 ***
Dev	Wald stat.	90.958	916.22	3633.32	4094.31	204.696
Dev	Z-bar	23.52 ***	258.64 ***	1032.75 ***	1164.08 ***	55.93 ***
	Lag 6	TotTax→GNI	TaxIPrCap→C	SNISSC→GNI	TaxProp→GNI	TaxGS→GNI
CFF	Wald stat.	2176.87	2636.83	91.289	118.204	198.91
CLL	Z-bar	617.8 ***	748.84 ***	23.62 ***	31.28 ***	54.277 ***
Dev	Wald stat.	142.21	244.705	221.21	127.41	42.203
Dev	Z-bar	38.13 ***	67.324 ***	60.63 ***	33.906 ***	9.63 ***
	Lag 6	GNI→TotTax	GNI→TaxIPrO	CapGNI→SSC	GNI→TaxProp	GNI→TaxGS
CFF	Wald stat.	18100	1420000	222.95	743.82	2202.82
CLL	Z–bar	5155.99 ***	406,000 ***	61.13 ***	209.52 ***	625.19 ***
Dev	Wald stat.	284.25	154000	147.97	113.35	122.16
Dev	Z-bar	78.59 ***	43,700 ***	39.76 ***	29.902 ***	32.41 ***
	Lag 6	TotTax→HDI	TaxIPrCap→H	IDISSC→HDI	TaxProp→HDI	TaxGS→HDI
CFF	Wald stat.	2.116	1.265	575.59	1.547	0.889
	Z-bar	1.463	0.192	161.59 ***	0.615	-0.363
Dev	Wald stat.	1.438	2.089	1.303	0.479	1.872
	Z-bar	0.453	1.422	0.253	-0.973	1.099
	Lag 6	HDI→TotTax	HDI→TaxIPrO	CapHDI→SSC	HDI→TaxProp	HDI→TaxGS
CFF	Wald stat.	1390.83	658.95	1559.92	165.86	2505.12
CLL	Z-bar	393.86 ***	185.34 ***	442.03 ***	44.86 ***	711.32 ***
Πριγ	Wald stat.	1116.07	2655.98	30400	540.07	1008.57
Dev	Z-bar	315.57 ***	754.3 ***	8644.57 ***	151.47 ***	284.95 ***

Table 4. Granger causality between tax revenues and GDP, GNI, and HDI with multiple lags (in CEE and developed countries).

*** indicates statistically significant at the 0.01 level.

The main results observed with the granger cause analysis with lag 1 prove that the statistical significance of the relationships between taxes, economic growth, and human development is reduced over the short term. According to the statistics analyzed, higher tax revenues are collected in developed countries, with highest shares from taxes on income, profit and capital (15% of GDP compared to 7.5% of GDP in CEE countries). CEE countries tend to depend on taxes on good and services and on social contributions. Regardless of these important tax differences between countries, our results indicate that taxes on income, profit and capital have more impact on immediately increasing the economic growth of CEE countries. The opposite causal relationship evidenced that developing countries with higher GDP and GNI would collect a larger share of their national output in taxes on income, profit, and capital and in taxes on property. This proves that by relying more on direct taxation, economic

growth and development is ensured. For CEE countries results also indicated that a larger share of social security contributions would positively influence the GNI and HDI, inducing an increase in both measures over the short term. Modern countries should develop social security systems with a major role in the welfare state. Our results prove that, especially in developing countries, higher social security contributions are associated with happier and wealthier people. This means that in CEE countries the national social security systems tend to focus more on ensuring the social protection for their citizens over the short-term, providing the financial assistance for contingencies such as retirement, childbirth, unemployment or disabilities.

For the granger cause analysis with lag 6 almost all results prove statistically significant causal relationships in all the countries analyzed. First of all, results indicated that over the long term, higher taxes (regardless of their category) induce an increase in economic growth. More specifically, for developed countries, the most influence on GDP comes from total tax revenues and social security contributions, while GNI would be mostly increased based on higher taxes on income profits and capital and social security contributions. In CEE countries, the most influential for GDP and GNI growth would be taxes on income, profits, and capital and total tax revenues. Once again, results prove that economic development is sustained over the long term by an increase in tax revenues. Although in developed countries the total taxes and the taxes on income, profit and capital levied have a higher share in GDP, their role in country development is as important in developing countries such as the CEE countries overviewed in this study. The citizens wealth in developed countries is strongly impacted by social contributions, but the effect is over the long term (opposite to the short term relevant in CEE countries). Evidencing a cycle, the results proved for both country samples that an increase in GDP and GNI per capita would also induce an increase in the level of taxes collected. All these confirm that direct taxation is the most relevant type of tax in sustainable economic growth, as long as the tax competition does not interfere [16]. This competition is specific to taxes on income, profit and capital, and refers for example to a decrease in profit tax which should not generate inequitable effects on employees, by increasing taxes on income or capital. This way, the tax system would provide equity for businesses and citizens.

Over the short term, happier citizens are associated only with higher levels of tax revenues collected (HDI granger causes total tax revenues). But over the long term, our study evidenced that, regardless of the country analyzed, happier citizens would pay higher taxes of any kind, with most impact on social contributions and consumption taxes. As happiness may be related to internal feelings of empathy and various states of satisfaction, citizens are willing to pay more taxes and ensure the income redistribution across the society. Moreover, in rich countries the social security systems are viewed as a productive component in economic development, as social contributions were the taxes with highest impact on GDP and GNI growth. This way, a larger human development index could reflect a society with a more effective social security system, providing benefits from social insurance and other government assistance programs, and continuing the cycle by increasing economic growth.

5. Conclusions

Empirical studies, including this one, prove that taxation has significant influences on economies and citizens well-being. Although an immediate effect of tax revenues fluctuation is rather limited, over medium to long-term effects on GDP growth are obvious. Referring to the impact of taxes on human development, only social security contributions seem to have an immediate effect on HDI in CEE countries, but, regardless of the country analyzed, healthier, educated citizens with a decent standard of living will pay more taxes in the future. The novelty of this study is that it applies the mixed concept of quantitative and qualitative growth and development (through economic growth and HDI, respectively), emphasizing the impact taxes have beyond the economy, on the citizens, reflecting the welfare state.

This study proves that there are differences between the countries analyzed, especially over the short-term. From all tax revenues, those from income, profit and capital influence the most the GDP

and GNI in CEE countries. In the same countries, an increase in economic growth would also induce a rise in the level of taxes levied from income, profit, capital, and property. The immediate granger cause of direct taxes on economic growth is neglectable in developed countries, except for taxes on property, which seem to have a direct influence on GNI. For the opposite direction of the granger cause analyzed, an increase in GDP in the richest countries will bring an increase in revenues from consumption taxes.

These results point out that economic growth may be based on tax policies. However, policymakers should consider that increasing taxes has an effect over long-term, and must be sustained by citizens well-being. Taxpayers who are healthier, more educated and have an average or above average standard of living are willing to pay more taxes. This proves that sustainable growth and development are, as predicted, based on taxation, and that welfare states do practice a more sustainable tax policy by levying higher taxes but also registering larger values of economic growth and human development. These results are similar to those which found that higher values of economic growth and development may be realized by promoting higher tax rates and even higher tax progresivity [6–9]. Moreover, in CEE countries, social contributions paid seem to boost HDI values because social security and economic stability are essential factors for the quality of life. This comes in contrast with other studies on developing countries suggesting that a good tax system is one that does not involve employers in labor taxes [11].

From all types of taxes, the least distortive ones, regardless of the countries studied, are taxes related to wealth, especially those on immovable property. Besides, results indicate that economic growth has an immediate and direct effect on revenues from the tax on property in CEE countries. This demonstrates that in times of economic growth, citizens are willing to invest their money. Nowadays, there seems to be a gap in wealth taxation, which could be reduced by increasing property tax rates and raising substantial revenues to public budgets. Generally, taxes on returns on housing are smaller compared to taxes on returns on other assets, which may be appealing to citizens with savings.

Some conclusions based on the literature review and the different results obtained for developed versus emerging countries, will refer to changes in taxation, which should always be realized in complementary manners. For example, developed countries could shift from direct taxation towards consumption taxation. First of all, indirect taxes are less progressive than personal income taxes. Moreover, by transferring the tax burden from corporations to consumers (based on consumption taxation), an increase in share prices would be induced, as the net profits and firm after-tax values would grow, but there would also be an increase in wealth inequality generated by lower capital income taxation. In terms of direct taxation, relying more on personal income tax than on corporate income tax could be efficient in terms of economic growth, with results obtained over a shorter period of time. However, when tax systems regulate a lower corporate tax rate than personal income tax rate, individuals may be tempted to invest their savings in corporations in order to avoid taxes. Flattening personal income taxes may be one measure against a potential decrease in GDP per capita, reflecting in both, economic growth and citizens well-being.

Other matters that may be considered in terms of the positive relationship between human development and taxes are associated to longer life expectancy and more years of education (reflected by countries with high levels of HDI), which are both related to higher government spendings, better welfare systems and therefore increased levels of taxation. However, citizens are willing to pay higher taxes for a better quality of life. The main conclusion of this study is that as long as tax policies implementing high tax rates are practiced by Governments that invest more in education and health systems, better services will be provided to citizens, ensuring the welfare of the society and sustainable growth over the long term.

One study limitation refers to the period analyzed, which includes the financial crisis. Over the second decade, the growth variables (GDP and GNI) registered a sudden drop in 2009, then recovered in 2010 and 2011, then steady decreased over the rest of the period. These shocks in data could influence the results and therefore future research could consider Granger causality in the presence of structural breaks. For this panel data the period analyzed could be divided but the sub-samples

obtained would only consider a decade, allowing Granger causality analysis with few lags due to the limited time. Therefore, an extended period would be more appropriate for considering the structural break during the financial crisis, in order to reveal a reliable causal relationship over the long-term, which was evidenced over this 21-year analysis.

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