DOI: 10.15290/ipf.2022.21

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Can Democracy Harm Public Finance? Some Evidences from Europe

Abstract: James Buchanan and Richard Wagner in their famous book "Democracy in Deficit" note that democracy has not enough fiscal discipline because the citizens' representatives are chosen in the election and they take the budgetary decisions seeking the re-election. Their theory of public choice may suggest the existence of a positive relationship between the democracy's quality and the public debt level reflecting the long-lasting consequences of the budgetary decisions of policy-makers. Thus, we formulate the following research question: Is democratic system harmful for public finance? To operationalize the democratic system, we use five democracy indices (i.e., electoral, liberal, participatory, deliberative, and egalitarian), and the public debt to operationalize the threat for public finance. Conclusions put in a new light the theory, as first the study confirmed that there are statistically significant relationships between democracy's quality and public debt and, however not in case of every democracy index and every European country.
Keywords: democracy, debt, Europe, fiscal discipline

Introduction

The contemporary democracies struggle with the excessive public deficits, that, if not recompensed by the surpluses in the following years, leads in consequence to the extensive public debt accumulation. James Buchanan and Richard Wagner have already described this phenomenon in their book with a perfectly ambiguous title Democracy in Deficit [Buchanan, Wagner 1997], as they note that democracy has not enough fiscal discipline because the citizens' representatives are chosen in the election and they take the budgetary decisions seeking the re-election. The fiscal illusion theory, developed in this way may thus suggest the existence of a positive relationship between the democracy's quality and the public debt level reflecting the long-lasting consequences of budgetary decisions of policy-makers.

Even if the scholars have explored the question of the influence of the democracy on the public debt, none of them analyzed five dimensions of democracy, i.e., electoral, liberal, participatory, deliberative, and egalitarian, especially in the European, comparative context.

The studies makes a scientific bridge between the public management, more precisely the public financial management as it concentrates on the ways of ensuring public finance sustainability going beyond traditional economic or legal analysis, and the public administration focusing on the consequences of functioning of the democratic systems.

Although the issues of public debt are on the borderline of economic and political sciences, the analysis presented in the article are crucial for the functioning of political system as it allows to determine the impact of the democratic system on public finances, as the stability and security of each country depends on the sustainability of the public finance.

The article comprises five sections. The first section provides a theoretical and empirical background for understanding the reasons of the public debt and strategies to public debt reduction. Second, we present the research design, i.e., the research hypothesis, the variables' operationalization, and data. Third, we present empirical results of the impact the democracy indices on the public debt. Fourth, we interpret and discuss the linear regression models. Our conclusion provides some general policy implications and set the direction of the further research.

Public Debt – Reasons of Public Debt and Strategies to Public Debt Reduction

In the literature among the most classic reasons of public debt scholars mention: the occurrence in subsequent periods of the budget deficit, which is covered by state borrowing; increase in public expenditures as a result of wars, natural disasters or major economic crises; implementation of state policy consisting in increasing public expenditures in order to stimulate prosperity; falling into the debt trap; achieving policy goals through increased redistribution of citizens' incomes without limiting other state spending [Daniłowska 2008]. Especially serious consequences results from the financial and economic crises, the last one started in 2007 in United States and progressively have spread all over the world. Financial crisis in an uncontrolled way result in declining revenues due to weaker economic conditions and higher expenditures associated with bailout costs [Furceri, Zdzienicka 2013]. Moreover, recent research show that also the corruption of public officials constitutes important source the excessive public expenditure and in consequence of the public debt [Liu, Mikesell 2014, pp. 346–59].

On the other hand, scholars try to find the reasons of public debt in the democratic system nature. The link between democracy and public debt has begun to be recognized in the seventeenth century [Macdonald 2003]. James Buchanan and Richard Wagner [1977] has also noted that democracies find it difficult to maintain financial discipline, even if technically the reduction of deficit and the public debt is not difficult. The lack of political will in this regard is linked to the essence of a democratic system. The policy-makers are chosen by citizens, so aspiring to take or maintain power they make expensive political promises and then they pass the laws allowing them to be re-elected, what often is harmful to the public debt level. Hannesson [2015] argues that democracy is better at distributing wealth widely than in generating it in the first place and he is wondering if it carries within itself the seeds of its own destruction. This is supported by the public choice theory, espoused by James Buchanan and Richard Wagner [1977]. According to this theory, called also the fiscal illusion theory, the politicians, as vote maximizers, tend to propose new government programs to attract new voters as much as possible, which makes public sector bigger. They are motivated to fool citizens so that they may attract individuals' votes without being blamed for the increase in government spending. By designing and manipulating the fiscal system, the politicians try to make the public underestimate the costs of public sector goods and services. The greater the extent of these illusion-inducing characteristics of a fiscal system, the greater the size of the government. In this sense, the fiscal illusion theory transmutes into the theory of democratic failure [Streeck, Wolfgang 2013]. The above is strictly related to the political business cycles theory that implies that governments, in order to be re-elected try harder to please voters immediately before election day [Breton 1974]. As Rögnvaldur Hannesson argues elites are voted into power, or kept in power, by a mostly uninformed electorate that votes for them in the expectation that they will govern well, which mostly means high and rising standards of living. When the elites fail to deliver, they are voted out. But raising taxes is not popular. The temptation to finance an expanding government sector by increasing debt is therefore strong [Hannesson 2015].

There are different strategies to public debt reduction, having the budgetary and extra-budgetary character. Starting from the budgetary measures, on the one hand the financial austerity policy may turn out effective, even if in some situations reduction of public expenditure, especially of the investment ones may give the contractionary effect [International Monetary Fund 2012]. Next, the optimal taxation increases and the appropriate trade-off between minimization of the expected cost of debt servicing and minimization of budgetary risk seem to be effective [Missale 2002, pp. 235–265]. Moreover, ensuring balance over the cycle or eliminating foreign public debt are considered as effective strategies to public debt reduction [Makin, Pearce 2016, pp. 424–440]. To achieve the satisfactory results in the above fields different types of fiscal rules are introduced all over the world. Fiscal rules typically are defined as the numerical or procedural restrictions on the preparation, approval, and implementation of public budgets [Corbacho, Ter-Minssian 2013]. These rules cover summary fiscal indicators, such as the government budget deficit, borrowing, debt, or major components thereof – expressed as a numerical ceiling or target, in proportion to the gross domestic product, GDP or being procedural limitations [Kopits, Symansky 1998, Corbacho, Ter-Minassian 2013]. As it results from the research conducted by the International Monetary Fund, the majority of countries in the world has introduced some kind of fiscal rules [www.imf.org., access as of 10 September 2021], however only in some of them the fiscal rules are effective. The analysis shows that these formal constraints on fiscal policy, even at the constitutional level, do not prevent the excessive debt [Ayuso-i-Casals et al. 2009] or encourage politicians to go around these regulations [Hagen 1991].

On the other hand, the democracy itself may be seen as a solution to the excessive public debt accumulation. The relations between public debt and the level of democracy are widely analyzed in the literature, even if some of the results stay ambiguous [Feld, Kirchgässner, 2001, Holland 2016, Stallings, Kaufman 1988, Frieden 1985, Cheru 1989], in some articles being restricted to precious legal analysis but not supported by quantitative proofs [Schragger 2012], in other scholarships being limited to single-case analysis [Lindholm 1946, pp. 87–93]; [Chossudovsky, Ladouceur 1994]. Also, contributions based on the statistical methods give ambiguous results, thus still require more attention. For instance, Gary Anderson [1988] using a simple model supports the thesis that the external public debt levels will be higher in dictatorship. Next, Balkan and Greene [1990] denying the Anderson's contribution and using larger, but still limited, sample of countries and the statistical analysis found little empirical support for the thesis that democracy or autocracy influence foreign debt [Balkan, Greene 1990] On the other hand, Oatley [2010] provides the statistical evidences that the autocratic governments accumulated substantially larger foreign debt relative to their national income than democratic governments. Moreover, the studies have shown that the direct democracy (financial referendum) contributes to a reduction of public debt in Switzerland [Feld, Kirchgässner 2001, pp. 347–370]. It has also been proven that the financial referendum in Switzerland contributes to reduction of public debt by limiting by the citizens the growth of social spending, as citizens deciding on public money (in fact on taxes that they pay) are much more economical in that regard than the political elites [Kriesi, Trechsel 2008]. In contrast to these Swiss experiences, the evidences from German municipalities suggest that that direct democracy causes an expansion of local government expenditure [Asatryan 2016].

Research Design

The theoretical considerations presented above lead us to formulate the following research question: Is democratic system harmful for public finance? To formulate the hypothesis, we need to operationalize the democratic system and the threat for public finance.

Democracy is often identified with the representative (electoral) democracy that is a form of rule by professional politicians and government officials over the citizens, in which some of those rulers are periodically changed by the mechanism of election [Hirst 1988]. To prevent popular tyranny, the rule by the majority should be moderated and checked by special mechanisms and institutions of the liberal democracy [Nieuwenburg 2014, pp. 374–82]. However, dissatisfied with the limits of representative democracy, scholars have pursued democratizing reforms in a host of extra-electoral realms such as public budgeting, service provision, planning, and policy implementation [Fischer 2009]. These claims result in the participatory and deliberative forms of democracy. Moreover, as Carole Pateman, clarified in 2012 in American Political Science Association Presidential Address deliberative and participatory forums can deepen an already democratic process, but they are unlikely to democratize a broader polity defined by profound inequalities of power [Dahl, Soss 2014]. Thus, the egalitarian democracy should also be in mind.

These theoretical considerations are coherent with the V-Dem data[1], as they compose of 5 democracy indices. As it results from table 1, each democracy indices comprises apart the component resulting from its name (i.e., electoral, liberal, participatory, deliberative, and egalitarian) also the electoral democracy index. This is doubly important for our research, as first, none of political system should be considered as democratic if the electoral mechanisms were not implemented, second these democracy indices enable to analyze the relationships between the public debt and the democracy variables with emphasis placed on its various aspects.

In consequence as electoral citizens' rights are the core of the democracy and the theory of democratic failure directly refers to them to operationalize the democratic system, we use the electoral democracy as the basis democracy variable. Moreover, in order to not lose sight from the variety of democracy, our research uses 4 supplementary democracy variables, i.e., liberal, participatory, deliberative, and egalitarian democracy indices.

Next, to operationalize the threat for public finance, let's note that there are four basic parameters characterizing the state of public finances of each country, i.e., public revenue, public expenditure, public balance (surplus or deficit), and public debt. All these parameters can be expressed in the national currency of a given country,

1 In our analysis, we do not use The Economist Intelligence Unit (2016) data, as they cover smaller number of countries and years than V-Dem data.

or for comparative purposes, in relation to the GDP of a given country. All these parameters are interrelated, as the public balance is defined as the negative difference between the public revenue and the public expenditure in a given year, and the accumulation of public deficits of consecutive years leads to the public debt. The level of public revenue and expenditure, analyzed independently do not pose a threat to the public finance, but they indicate the quality of citizen's life of a given country. Only the negative difference between public revenue and public expenditure, recorded at the end of the budget year, results in public deficit, that may be harmful to public finance, but it is not always a case. The public deficit does not automatically threaten the safety and sustainability of public finances, because in the subsequent year(s) it may be compensated by the public surplus, provided that the government plans or/and actually it executes the surplus. Only deficits which have not been repaid regularly, accumulated over many years, result in the formation of the public debt that is one of the crucial determinants of the public finance sustainability, understood as the capacity to incur future financial burdens arising from the current debt [European Commission 2012]. Even if current generations of citizens (and voters) may be pleased by the public debt accumulation used to finance public services, the excessive indebtedness may be dangerous for future generations. In extreme cases the excessive level of public debt decides about the undisturbed existence of states. Significant public debt was one of the reasons for the bankruptcy of Argentina, the problems thereof are being compared with the current situation of Greece. Hence, to operationalize the threat for public finance, we have chosen the public debt variable.

The theory of public choice, transmutes to the theory of democratic failure, suggests that the politicians in democratic systems are not interested in cutting public expenditure, and in consequence to limit the level of public debt, as they strive to convince the voters (the citizens) using public funds to re-elect them. That leads us to treat the particular types of democracy as the independent variables, whereas the level of public debt as dependent variable.

Taking into consideration that the theory of democratic failure seems to suggest that the increase of democracy's quality lead to the increase of public debt level, we hypothesize as follows:

- H1: In EU and EFTA countries, the public debt level is positively related to the electoral democracy' quality;
- H2: In EU and EFTA countries, the public debt level is positively related to the liberal democracy' quality;
- H3: In EU and EFTA countries, the public debt level is positively related to the participatory democracy' quality;
- H4: In EU and EFTA countries, the public debt level is positively related to the deliberative democracy' quality;

– H5: In EU and EFTA countries, the public debt level is positively related to the egalitarian democracy' quality.

For the democracy's variables, we use V-Dem indexes, version 7.1, being the result of the international research project Variety of Democracy, collected by more than 2800 experts from all over the world [Coppedge et al. 2017], available at www.v-dem.net. The V-Dem conceptual scheme recognizes several levels of aggregation: democracy indices (electoral, liberal, participatory, deliberative, and egalitarian; two, democracy components (5), subcomponents, and related concepts (46) and indicators (ca. 350). The complementary variables of democracy (i.e., liberal, participatory, deliberative, and egalitarian democracy) include in its construction the electoral component of democracy [Coppedge et al. 2017] because a state without the electoral citizens' right would not be considered as a democratic one. The level of particular types of democracy was established on the basis of values of particular indices and indicators (cf. table 1).

Table 1. Variables of Democracies as Used in V-Dem, v. 7.1

Democracy's Index	**The Main Indices and the Indices' Indicators**
Electoral democracy index	1. Additive electoral index; 2. Multiplicative electoral index: a) Expanded freedom of expression index (government censorship effort – media, harassment of journalists, media self-censorship, media bias, print/broadcast media critical, print/broadcast media perspectives, freedom of discussion for men, freedom of discussion for women, freedom of academic and cultural expression); b) Freedom of association index (party ban, barriers to parties, opposition parties autonomy, elections multiparty, civil society organizations (CSO) entry and exit, CSO repression); c) Share of population with suffrage (percent of population with suffrage); d) clean elections index (election management body (EMB) autonomy, EMB capacity, election voter registry, election vote buying, election other voting irregularities, election government intimidation, election other electoral violence, election free and fair); e) Elected officials index (legislature bicameral, lower chamber elected, upper chamber elected, legislature dominant chamber, head of state (HOS) selection by legislature in practice, HOS appointment in practice, head of government (HOG) selection by legislature in practice, HOG appointment in practice, HOS appoints cabinet in practice, HOG appoints cabinet in practice, HOS dismisses ministers in practice, HOG dismisses ministers in practice, HOS = HOG?, Chief executive appointment by upper chamber, chief executive appointment by upper chamber explicit approval).
Liberal democracy index	1. Electoral democracy index; 2. Liberal component index: a) Equality before the law and individual liberty index (rigorous and impartial public administration, transparent laws with predictable enforcement, access to justice for men, access to justice for women, property rights for men, property rights for women, freedom from torture, freedom from political killings, freedom from forced labor for men, freedom from forced labor for women, freedom of religion, freedom of foreign movement, freedom of domestic movement for men, freedom of domestic movement for women); b) Judicial constraints on the executive index (executive respects constitution, compliance with judiciary, compliance with high court, high court independence, lower court independence); c) Legislative constraints on the executive index (legislature questions officials in practice, executive oversight, legislature investigates in practice, legislature opposition parties).

Participatory democracy index	1. Electoral democracy index; 2. Participatory component index: a) Civil society participation index (candidate selection national/local, CSO consultation, CSO participatory environment, CSO women's participation); b) Direct popular vote index (Initiatives permitted, Initiatives signatures %, initiatives signature-gathering time limit, initiatives signature-gathering period, initiatives level, initiatives participation threshold, initiatives approval threshold, initiatives administrative threshold, initiatives supermajority, occurrence of citizen-initiative this year, referendums permitted, referendums signatures, referendums signature-gathering period, referendums participation threshold, referendums approval threshold, referendums supermajority, referendums administrative threshold, occurrence of referendum this year, plebiscite permitted, plebiscite participation threshold, plebiscite approval threshold, plebiscite supermajority, plebiscite administrative threshold, occurrence of plebiscite this year, constitutional changes popular vote, obligatory referendum participation threshold, obligatory referendum approval threshold, obligatory referendum supermajority, obligatory referendum administrative threshold, occurrence of obligatory referendum this year, obligatory referendum credible threat, popular referendum credible threat, plebiscite credible threat); c) Local government index (local government elected, local offices relative power, local government exists); d) Regional government index (regional government elected, regional offices relative power, regional government exists).
Deliberative democracy index	1. Electoral democracy index; 2. Deliberative component index (reasoned justification, common good, respect counterarguments, range of consultation, engaged society).
Egalitarian democracy index	1. Electoral democracy index; 2. Egalitarian component index: a) Equal protection index (social class equality in respect for civil liberties, social group equality in respect for civil liberties, weaker civil liberties population); b) Equal access index (power distributed by gender, power distributed by socioeconomic position, power distributed by the social group); c) Equal distribution of resources (means-tested vs. universalistic, encompassingness, educational equality, health equality).

Source: For the public debt variable, the article uses the data of the International Monetary Fund [www.imf.org., access as of 10 September 2021] available at www.imf.org. The public debt level is presented in the relation to gross domestic product (GDP) of each country.

As, in the literature, as far as we know, there is no comparative research concerning Europe in the selected research area and the research problem refers to the democratic countries, whereas some European countries are not democratic, our research covers only European Union (EU) and European Free Trade Association (EFTA) countries. All of them adhere to relatively coherent, even if not uniform, system of democratic and economic values, as the economic cooperation has been at the core of both international organizations. Some of the countries currently belonging to the EU previously were members of EFTA but with time they have withdrawn from EFTA, selecting membership in a competitive organization aiming at far greater economic integration, i.e., European Economic Community (ECC) that with time evolved into the EU. Our analysis covers 29 countries, as 3 smallest members of these organizations were excluded from the analysis because of non-availability of the public data (cf. table 2).

Table 2. EU and EFTA Countries analyzed in the Article

International Organization		Member States
European Union (EU)	EU Members of Eurozone (€)	Austria (AT), Belgium (BE), Cyprus (CY), Estonia (EE), Finland (FI), France (FR), Germany (DE), Greece (EL), Ireland ((IE), Italy (IT), Latvia (LV), Lithuania (LT), Netherlands (NL), Portugal (PT), Slovakia (SK), Slovenia (SI), Spain (ES). The last Eurozone country, i.e., Malta (MA) were excluded from the analysis.
	EU Members outside of Eurozone	Bulgaria (BG), Czech Republic (CZ), Denmark (DK), Croatia (HR), Hungary (HU), Poland (PL), Romania (RO), Sweden (SE), and United Kingdom (UK). The last country of EU, i.e., Luxemburg (LU) was excluded from the analysis.*
European Free Trade Association countries (EFTA)		Switzerland (CH), IS (Island), and NO (Norway). the last EFTA country, i.e., Lichtenstein (LI) was excluded from the analysis.

** DE and UK, when adhered to EU have negotiated the opt-out clause that enables them not to enter to Eurozone; UK as a result of referendum from 2016 is currently in the process of leaving EU (Brexit). The remaining countries, when signing their adhesion treaties have taken responsibility to meet the Maastricht (convergence) criteria required to adopt common currency (Euro) even if in Czech Republic, Hungary, and Poland, are 3 out of 10 countries that adhered to EU in 2004 and still the national governments have not taken sufficient actions to realize the commitment.*

The analysis generally covers the period 1990–2015 with the exception of single missing data (tables 3–5 indicates the information on number of observations N). Even if some of the EU and EFTA countries are classified not as full democracies but as "flawed democracies" [Economist Intelligence Unit 2016], the data on the quality of particular types of democracy (i.e., electoral, liberal, participatory, deliberative, egalitarian) are not differentiated significantly, although some outliers exist (cf. figures 1 to 5).

Figure 1. Electoral Democracy in EU and EFTA Countries

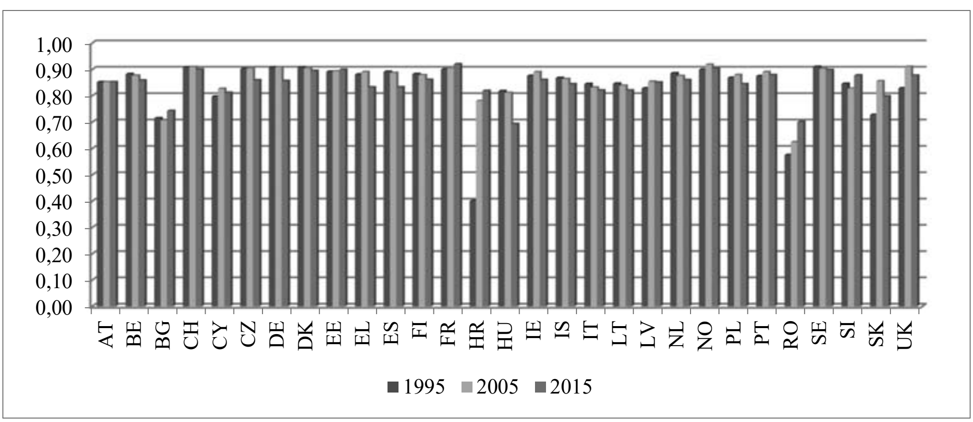


Figure 2. Liberal Democracy in EU and EFTA Countries

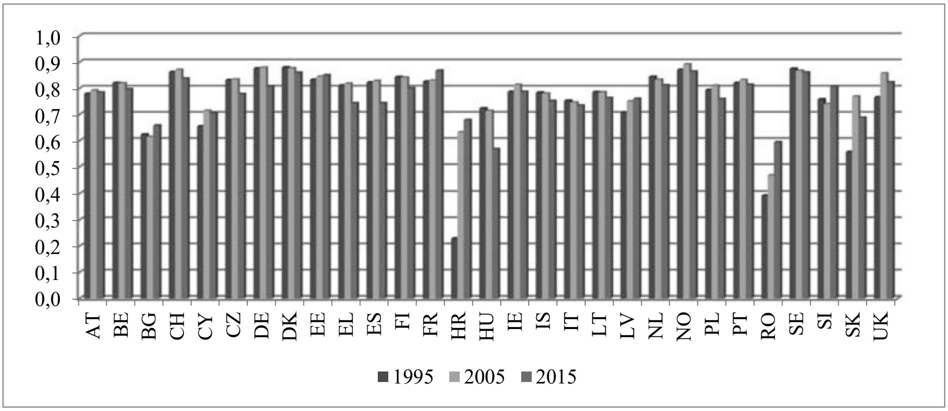


Figure 3. Participatory Democracy in EU and EFTA Countries

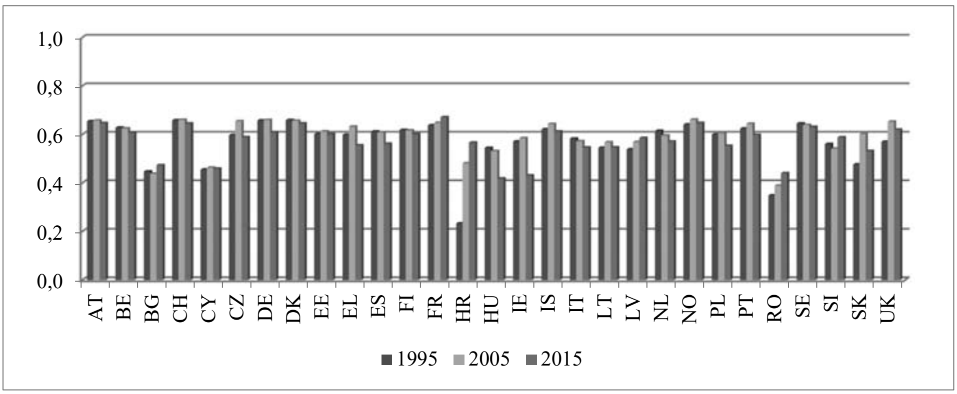


Figure 4. Deliberative Democracy in EU and EFTA Countries

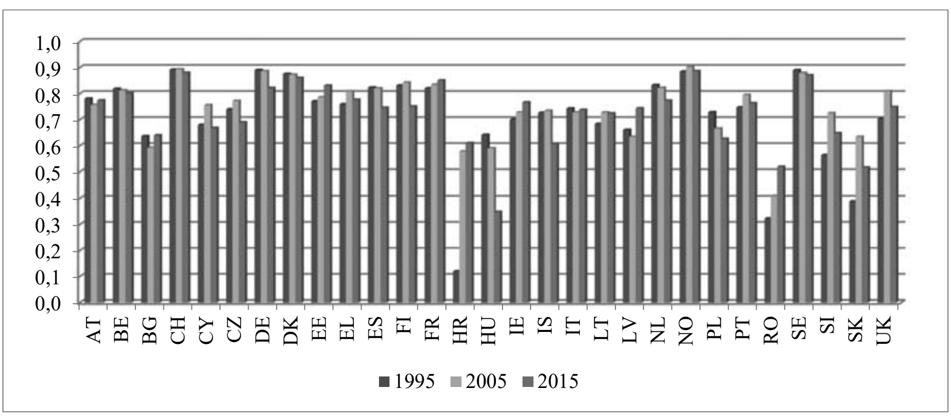
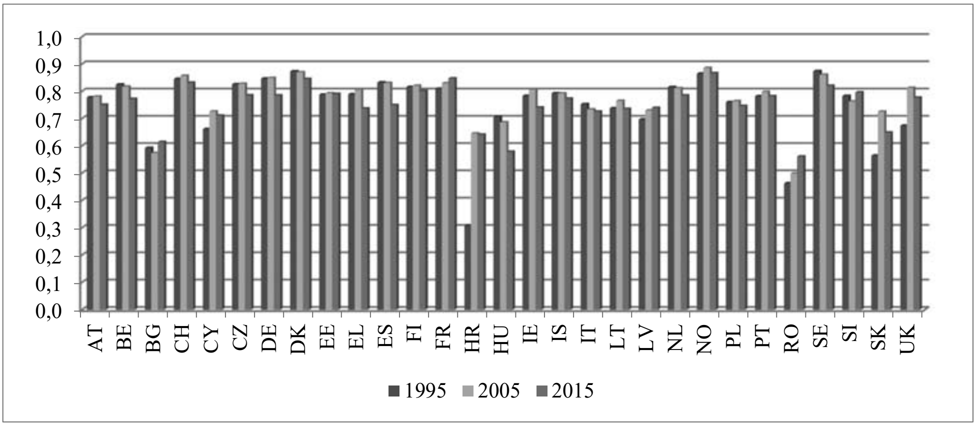
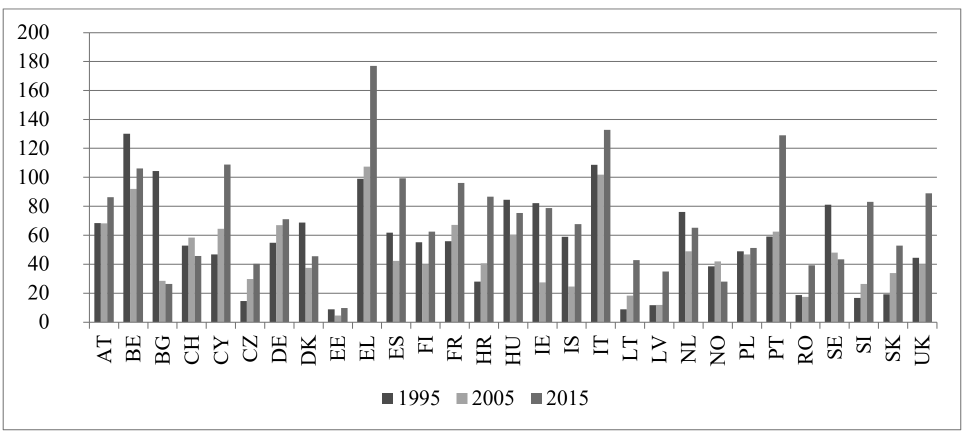


Figure 5. Egalitarian Democracy in EU and EFTA Countries



In contrast to the democracy quality, the public debt level varies importantly in particular countries and years. For illustration we present (cf. figure 6) the public debt levels in 1995, i.e., in normal economic times, in 2005, i.e., just before the last financial crisis, and in 2015, when, although the crisis has ended, its influence on public finance is perceptible, especially in countries that were not able to introduce the effective fiscal rules to make reduce the public debt level.

Figure 6. Public Debt in EU and EFTA Countries



Results

As it results from the Table 2, presenting the descriptive statistics of the independent and dependent variables, among the particular types of democracy, the electoral democracy has the highest mean, whereas the participatory democracy has the lowest one, that suggests that the EU and EFTA countries have better achievements in the representative (indirect) democracy than in the participatory (direct) one.

Table 3. Descriptive Statistics: Democracy' Indices and Public Debt, 1990–2015

Variable	Mean	SD	Min.	Max.
Independent Variables				
Electoral	.854	.076	.393	.947
Liberal	.780	.106	.219	.916
Participatory	.586	.078	.207	.814
Deliberative	.748	.132	.118	.913
Egalitarian	.767	.096	.306	.890
Dependent Variable				
Public Debt	56.406	32.583	1.027	289.554

Concerning the minimal and maximal values, among the analyzed countries, on the one hand, the lowest level of the electoral democracy and of the liberal democracy was in HR (1994), the highest one in UK (2012), regarding the participatory democracy the lowest one was in RO (1990), the highest one was in PT (2009), regarding the deliberative democracy the lowest was in HR (1994), the highest one was in CH (2011), regarding the egalitarian democracy the lowest one was in Romania (1990), the highest one was in DE (2012). On the other hand, the public debt was the lowest in RO (1990) and the highest one in BG (1993).

To test the hypothesis on the impact of the democracy's indices on the public debt we have constructed the linear regression models. In the table 4, presenting the results, the statistically significant results are bold. The analysis of the significance of the structural parameters of the models was aimed at determining which variables significantly differ from zero, and thus significantly affect the dependent variable. Next, four null hypothesis were tested to check the assumptions of the classical ordinary least squares theory (OLS).

Table 4. Impact of Democracy's Indices on the Public Debt in EU and EFTA Countries, 1990–2015

	AT (€)	BE (€)	BG	CH	CY (€)	CZ	DE (€)	DK	EE (€)	EL (€)
Electoral Democracy	**-1141.48 * (-2.053)**	**4172.02 ** (2.224)**	**-5430.14 ** (-2.353)**	**2308.70 *** (4.271)**	-707.18 (-.913)	533.63 (.654)	-711.74 (-.404)	-3798.56 (-.994)	**613.48 *** (3.528)**	103.99 (.065)
Liberal Democracy	**683.23 *** (3.846)**	**-5085.69 *** (5.360)**	-720.95 (-.378)	**743.59 ** (2.442)**	574.40 (1.269)	-436.3 (-.853)	**-2531.41 *** (-2.937)**	2451.67 (.687)	-200.02 (-1.134)	491.05 (.456)
Participatory Democracy	**192.96 ** (2.169)**	1479.60 (1.086)	-574.43 (-.315)	-194.96 (-1.060)	-364.20 (-1.065)	**363.22 *** (7.199)**	3570.01 (1.469)	2193.61 (.573)	**-61.18* (-1.766)**	165.17 (.838)
Deliberative Democracy	**178.62 *** (3.203)**	-356.94 (-.239)	**2511.69 *** (3.122)**	**-3177.40 *** (-5.991)**	**-591.26 *** (-3.984)**	-100.48 (-1.649)	**-1539.01 *** (-5.667)**	-108.08 (-.144)	15.49 (.475)	**887.20 *** (3.914)**
Egalitarian Democracy	-181.51 (-.713)	210.75 (.693)	3214.49 (1.075)	283.49 (1.097)	821.91 (1.656)	-509.50 (-.985)	**2148.80 *** (4.666)**	-1012.17 (-.435)	-182.35 (-1.663)	**-2094.65 * (-1,997)**
R^2	.8242	.7720	.6890	.9117	.8289	.8357	.8371	.1352	.6753	.8788
H0: heteroscedasticity does not occur	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected
H0: linearity of the model	Not-rejected	Not-rejected	Not-rejected	Rejected	Not-rejected	Rejected	Rejected	Not-rejected	Not-rejected	Rejected
H0: normal distribution	Not-rejected	Not-rejected	Rejected	Not-rejected	Not-rejected	Rejected	Not-rejected	Not-rejected	Not-rejected	Rejected
H0: autocorrelation of the first order does not occur	Rejected	Not-rejected	Not-rejected	Rejected	Rejected	Not-rejected	Not-rejected	Rejected	Not-rejected	Not-rejected
H0: arch effect does not occur	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Rejected	Not-rejected	Rejected	Not-rejected	Not-rejected
N	26	26	23	22	26	23	26	25	21	26

*t-statistics in parentheses *p < .05; **p < .01; ***p < .001.*

Table 4. Impact of Democracy Indices on the Public Debt in EU and EFTA Countries, 1990–2015 (Continuation)

	ES (€)	FI (€)	FR (€)	HR	HU	IE (€)	IS	IT (€)	LT (€)	LV (€)
Electoral Democracy	**2864.31 *** (3.041)**	-230.82 (-..121)	**-1909.37 ** (-2.417)**	-216.27 (-1.024)	**-2264.91 * (-1.866)**	**5980.11 *** (3.043)**	3697.47 (.783)	-2916.86 (-1.442)	-1479.44 (-1.222)	**-355.92 ** (-2.331)**
Liberal Democracy	-443.49 (-1.207)	-232.60 (-.243)	**1212.53 *** (3.206)**	244.03 (.902)	-653.93 (-.865)	**-2657.02 ** (-2.329)**	-5196.32 (-1.303)	1302.24 (1.536)	868.85 (.725)	99.48 (.630)
Participatory Democracy	-1386.95 (-.925)	963.93 (.535)	-13.71 (-.041)	**432.71 ** (2.517)**	**1394.05 * (1.896)**	398.88 (1.166)	-190.59 (-.653)	-723.70 (-1.420)	754.01 (1.468)	**547.44 * (1.932)**

Deliberative Democracy	-234.24 (-1.005)	-285.51 (-1.428)	-101.63 (-0.424)	86.37 (1.290)	185.31 (1.125)	**538.83** * **(1.813)**	-117.49 (-.355)	1.77 (.007)	-171.55 (-1.038)	**112.07** ** **(2.730)**
Egalitarian Democracy	**-870.27** * **(-1.757)**	85.99 (.228)	**597.61** *** **(3.545)**	**-457.38** *** **(-3.363)**	1215.42 (1.707)	**-3081.35** *** **(-3.516)**	**3042.49** *** **(3.053)**	**2205.14** ** **(2.410)**	-296.91 (-.836)	-158.24 (-.473)
R^2	.7034	.4517	.8578	.9117	.5134	.7307	.6494	.2949	.3808	.8838
H0: heteroscedasticity does not occur	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected
H0: linearity of the model	Rejected	Rejected	Rejected	Rejected	Not-rejected	Rejected	Rejected	Rejected	Rejected	Rejected
H0: normal distribution	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected
H0: autocorrelation of the first order does not occur	Rejected	Rejected	Rejected	Not-rejected	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected
H0: arch effect does not occur	Rejected	Rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected
N	26	26	26	22	24	26	26	26	22	22

*t-statistics in parentheses *p < .05; **p < .01; ***p < .001.*

Table 4. Impact of Democracy Indices on the Public Debt in EU and EFTA Countries, 1990–2015 (Continuation)

	NL (€)	NO	PL	PT (€)	RO	SE	SI (€)	SK (€)	UK
Electoral Democracy	**3836.83** *** **(4.191)**	-4836.74 (-.606)	1007.80 (.734)	**8679.59** ** **(2.604)**	**-708.15** ** **(-2.594)**	2689.42 (.891)	**1774.59** * **(1.769)**	-341.78 (-.483)	-342.75 (-.2746)
Liberal Democracy	-878.00 (-1.217)	-90.86 (-.030)	**-713.51** * **(-1.749)**	-2363.07 (-1.443)	-37.24 (-.384)	-3056.45 (-1.501)	21.13 (.043)	244.60 (.765)	**1926.86** ** **(2.176)**
Participatory Democracy	-289.59 (-1.455)	-597.98 (-.308)	-63.68 (-.131)	-5.71 (-.050)	182.84 (1.556)	**-1731.38** * **(-1.980)**	-17.52 (-.031)	**-546.81** ** **(-2.136)**	-797.42 (-1.598)
Deliberative Democracy	357.03 (1.213)	7532.24 (1.183)	173.42 (1.642)	**899.81** *** **(3.710)**	32.24 (.354)	-1093.86 (-1.700)	**175.27** * **(1.833)**	8.92 (.080)	**-541.49** *** **(-3.804)**

Egalitarian Democracy	**-2253.53 *** (-4.266)**	-1402.12 (-.126)	-432.62 (-.436)	**-6352.14 *** (-3.497)**	**985.53 ** (2.393)**	**1687.22 *** (4.417)**	**-1825.61 *** (-3.651)**	**453.97 ** (2.215)**	-148.58 (-.576)
R^2	.7928	.1663	.3667	.6895	.7341	.6723	.7614	.5559	.6727
H0: heteroscedasticity does not occur	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected
H0: linearity of the model	Not-rejected	Not-rejected	Rejected	Rejected	Not-rejected	Rejected	Not-rejected	Rejected	Rejected
H0: normal distribution	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Not-rejected	Rejected	Not-rejected	Not-rejected
H0: autocorrelation of the first order does not occur	Not-rejected	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	Not-rejected	Rejected
H0: arch effect does not occur	Not-rejected	Rejected	Rejected	Rejected	Not-rejected	Rejected	Not-rejected	Not-rejected	Not-rejected
N	26	26	26	26	26	25	23	22	26

*t-statistics in parentheses *p < .05; **p < .01; ***p < .001.*

Discussion of the results

Discussing the analysis of the linear regression models, first, let's note the average value of the coefficient of determination (R^2) that assesses the degree of explanation of the variance of the model's explanatory variable (the public debt variable) in 29 countries is 0.6552. It means that 65.52% of the total variance of the debt variable in the 29 examined countries was explained by the democracy variables. However, there are some countries (AT, CH, CY, CZ, DE, EL, FR, HR, LV) where the results are even more satisfying, as R^2 is above 0.8.

Second, analyzing the significance of the individual democracy's parameters explaining the variance of public debt level, we observe that the parameters have the positive or the negative sign. The positive sign suggests that with the increase of the democracy quality the public debt increases and with the decrease of the democracy quality the public debt decreases, that is coherent with the democratic failure theory. In turn, the negative sign means that with the increase of the democracy quality the public debt decreases and with the decrease of the democracy quality the public debt increases. As it results from table 5, the study revealed twice more positively statistically significant relationships than the negative ones.

Table 5. The EU and EFTA Countries with Statistically Significant Positive and Negative Relationship between Public Debt and Democracy's Indices

Democracy Indices	Positive relationship	Negative relationship
Electoral	7 countries: BE, CH, EE, ES, IE, SI, NL	6 countries: AT, BG, FR, HU, LV, RO.
Liberal	4 countries: AT, CH, FR, UK	4 countries: BE, DE, IE, PL
Participatory	5 countries: AT, CZ, HR, HU, LV	3 countries: EE, SE, SK
Deliberative	9 countries: AT, BG, EL, IE, LV, SI, PT, UK	3 countries: CH, CY, DE
Egalitarian	7 countries: DE, FR, IS, IT, RO, SE, SK	7 countries : EL, ES, HR, IE, NL, PT, SI
Total	**39**	**20**

Discussing the results of testing the null hypothesis, first let's note that in any country in the analyzed time frame there was no ground to reject the hypothesis about the non-existence of heteroscedasticity of models, what means that the variance of the random component is homogenous (there are no outliers), the random component is homoscedastic and meets the assumptions of the classical ordinary least squares theory (OLS).

Second, in the analyzed period, the null hypothesis concerning linearity of the model based on squares of explanatory variables was rejected at the significance level of 5% (0.05) in favor of non-linearity in 18 out of 29 countries (in 62.1% of cases) what can be argued by the high dynamics of phenomena in particular countries (changes in the public deficit, type of economy, fiscal and monetary policies, etc.). On the other hand, the use of the linear analytical form of the model, which is proposed by OLS, may be a cause of its weakness for use on real data.

Third, in the case of testing the normal distribution, only in 4 countries (in 2 countries from the Eurozone and 2 from outside the zone), the null hypothesis of the normality of the random component was rejected, what is consistent with the assumptions of the OLS.

Fourth, when studying the occurrence of the autocorrelation of the random component of the first order, the relationship between long-term observations (in our study for one year) was checked. In the case of 19 countries (i.e., in 65.5% of countries, of which 11 from the Eurozone), the hypothesis of the lack of autocorrelation was rejected, which means that in these states there is a connection between observations about one year away. This result is logically consistent as the political and financial situation in a particular time is not shaped each year anew but partially results from the previous year.

Fifth, the heterogeneity of the residual variance can result from many reasons. One of them is the emergence of a sub-period in the examined period with a clearly increased variability of the process, so the causes appearing in the model may not accurately describe this variability. Such a variation of the residual process can be described by an additional equation called the model or the effect of autoregressive conditional heteroscedasticity (ARCH). The obtained results indicate that in 8 countries (including 3 from the Eurozone), the hypothesis that the ARCH effect was rejected. This means that there is the autoregressive variability of conditional variance and there is a need to estimate parameters of the model using a method other than classic OLS (e.g., weighted ordinary least squares). The future research may also be extended to the study of the autocorrelation of higher order and the study of the parameter stability and the order of model integration.

Conclusion

The study confirmed that there is a relation between the democracy quality and the public debt and, however not always, not in case of every democracy indices, and not in every EU and EFTA state. These results lead to the following final observations related to the public choice theory, where it transmutes into the democratic failure theory.

First, there are countries where the change of the democracy quality is related to the change of the public debt level but also there are countries where these relationships do not appear that may suggest that in these cases the theory of democratic failure may not apply. The other explanation may be that the nature itself and the existence of the democratic system influences on the public debt accumulation, however, the increase or the decrease of democracy level not necessarily must be statistically significant related to the change of public debt level.

Second, if our research seems to confirm the democratic failure theory in cases of countries where, in the regression model at least 1 out of 5 democracy indices has statistically significant results with the positive sign, it is not the cases of has statistically significant results with the negative sign. As in the second case, the research provide evidences that the democratic systems are not doomed to be harmful to public finance, as the fiscal illusion theory may suggest, as in particular situations the public debt may decrease with the increase of democracy.

In consequence, the democratic system is capable to ensure the stability and sustainability of public finance, as the public debt level depends not only from the democratic institutions and mechanism but also on the responsible attitude of the political decision-makers (government and parliament) for the public finance, and the mechanisms of horizontal, vertical, and societal accountability, that in the context of the public debt takes form of the financial accountability.

The scholarship, contrary to the existing literature, indicates the concrete European countries, where the financial accountability effectively is shaped by the characteristics of the democratic system, indicating the components thereof that have the special role in that. The adopted research design can be applied to the other continents, also taking into consideration the non-democratic countries.

Furthermore, the determination of the concrete factors shaping the financial accountability requires the particular countries' context analysis. However, as the achieved results refer to the particular period of time, and not only the current countries' situation, thus the profound explanation of the achieved results require the further econometric and even machine learning methods. For this deeper analysis of the democracy variables, the V-Dem data of the lower level of aggregation (ca. 350 variables) can be used. That constitutes the most interesting limitation of the study being simultaneously the most challenging task for the future research of our study, as it should enable to indicate the ways of using the democratic institutions and mechanism to shape the financial accountability of the political decision-makers towards citizens (voters) for sound public financial management that should be based on the democratic values.

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