

Article

Modelling the Influences of Economic, Demographic, and Institutional Factors on Fiscal Pressure Using OLS, PCSE, and FD-GMM Approaches

Alina-Cristina Nuță * and Florian-Marcel Nuță 

Finance and Business Administration Department, Danubius University, Galați 800654, Romania;
floriann@univ-danubius.ro

* Correspondence: alinanuta@univ-danubius.ro

Received: 3 February 2020; Accepted: 21 February 2020; Published: 24 February 2020



Abstract: The purpose of our article is to assess the effect of diverse factors, such as economic, demographic, and institutional factors, on global and social fiscal pressure. The study is based on a panel analysis of 38 states during 2000–2017. We used ordinary least squares (OLS) as a base model for our estimations, and a linear regression with panel-corrected standard errors and a first difference generalized method of moments (GMM) with robust standard errors and orthogonal deviations. The results of our study indicate that the demographic and institutional factors involved in the analysis contribute to the identification of some variables that affect the global or social fiscal pressure.

Keywords: fiscal pressure; government budget; public expenditure; panel data

1. Introduction

It is well known that, on the one hand, every individual and every economic agent wants to better know the tax burden and to pay as little as possible from their income and wealth to the state in taxes and bills, and on the other hand, any government needs increasing public financial resources from one year to another to meet the goals and, at least sometimes, try to conceal the real tax burden through various non-transparent public financial techniques and decisions—in which context, we accept the fiscal illusion theory of Puviani from 1903 (according to which, the individual will perceive the tax burden as being lower than that effectively supported).

In our article, we will try to highlight and analyze the factors that determine the global and social fiscal pressure, considering a panel [1] of 38 countries for a period of time beginning with 2000 and ending with 2017.

Thus, we take into account a number of factors that can put pressure on the rate of taxation, either by taking into account only the economic factors (which are a category generally recognized by economists as having a major influence on the taxation rate), or a combination of economic with demographic factors, or economic, demographic, and institutional factors (analyzed in some studies and partly accepted by experts as influencing the fiscal pressure).

In the current literature, the broad consensus on the factors that influence and explain the level of fiscal pressure is generally directed at indicators that refer to the level of GDP per capita (used as a proxy for the level of development of a country), the commercial openness level of the economy, and the fiscal system. Tanzi also proposes the level of public debt as a factor that affects the level of fiscal pressure.

The results of our analysis confirm the previous studies to a large extent, with the novelty (compared to the previous studies) being related to the negative relation between the level of GDP per capita and the fiscal pressure. This can be explained from an economic perspective, especially due to

the fact that an increase of the taxpayers' income determines the decrease of the amounts paid as taxes, considering a constant tax rate.

Our contribution to the existing studies is reflected by the use in the analysis of various countries that will give our study heterogeneity, on the one hand, and, on the other hand, by the time period analyzed. Additionally, another novelty element is represented by the separate approach on global fiscal pressure and social fiscal pressure.

The conclusions of our analysis prove that the inclusion of demographic and institutional variables in established models demonstrates that fiscal pressure is explained not only by economic variables, but also by demographic and institutional elements. One of the main contributions of this study is stating and demonstrating that not only the economic factors are important in the occurrence of fiscal pressure. Social, demographic, and institutional factors can also influence the level of fiscal pressure, leading to changes in the behavior of tax payers, and thus determining possible adverse effects.

Our study is structured as follows: in the first section, we present the concept of fiscal pressure and detail the economic, demographic, and institutional variables that influence the fiscal pressure. Section 2 exposes the econometric methods on which the study is based. The following section presents the results of the models addressed to analyze the factors that determine the fiscal pressure in the 38 countries. The final section presents the findings of our study.

2. Literature Review on Fiscal Pressure Determinants

Fiscal pressure expresses the extent to which income is collected from individuals and companies through taxation. Fiscal pressure has great economic relevance [2] because it indicates the extent to which the nominal income of the population is adjusted through taxation and, at the same time, shows the extent to which the public budget generates revenue through tax instruments.

Fiscal pressure [3] is generally given by the tax rate, which is calculated as a ratio between the tax receipts (at central and local level) for a certain period, and the value of the gross domestic product realized in the same period by a national economy (Equation (1)).

$$FP = \sum \frac{T_j}{GDP} \times 100 \quad (1)$$

where: FP = global fiscal pressure; T_j = tax bracket; GDP = gross domestic product.

Social fiscal pressure refers to all social contribution paid at the national level:

$$FPS = \sum \frac{T_{sj}}{GDP} \times 100 \quad (2)$$

It is known that a policy based on high taxes limits the possibility of consumption and investment. This generates a set of negative effects on the supply and demand of economic goods produced by economic agents. Thus, it can simply be concluded that tax revenue does not arise only from the taxable amount and the tax rate, but is also influenced by behavioral factors. Thus, the fiscal revenue earned on the budget depends on the ratio between the propensity towards evasion and the fiscal civism [4].

The literature focused mainly on analyzing the impact of economic factors on fiscal pressure at the national level, but some analyses also took into account other factors that can affect fiscal pressure, including institutional factors, which may lead to changes in the level of taxation and, thus, modify the volume of financial resources that taxpayers have to renounce in favor of the state.

2.1. Economic Factors

In our analysis, we took into account the influence of the following economic factors on the level of global fiscal pressure (tax revenue refers to compulsory transfers to the government for public purposes: International Monetary Fund, Government Finance Statistics Yearbook, and World Bank), and on social fiscal pressure (social contributions include social security contributions by employees,

employers, and self-employed individuals, and other contributions: International Monetary Fund, Government Finance Statistics Yearbook, and World Bank) that are: the level of GDP per capita, the level of public expenditures as a percentage of GDP [5], the public debt as a percentage of GDP, the economic growth rate [6], the level of public budget deficit, the level of agricultural production, the level of labor force involvement in agriculture, industry and services, the ability to attract foreign direct investment, the level of research development spending, and the level of unemployment.

In the previous studies, the most important economic factor with an impact on fiscal pressure was considered to be GDP per capita [7]. Furthermore, the level of FDI or public debt is the basis for analyzing the economic factors that influence the level of fiscal pressure in a particular country. Some studies [8–11] include the effect of lagged values of the tax revenue variable in the analysis [12].

2.2. Demographic Factors

In our study, we analyzed the impact that the dependency rate and life expectancy rate can have on the level of tax resources accumulated at the public budgets. We also included the level of the urban population in the analysis, which is a demographic factor with significant implications on the financial and fiscal flows between the state and the taxpayers.

Life expectancy at birth, total (years) indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. (United Nations Population Division, World Population Prospects: 2017 Revision).

Age dependency (old ratio) is the ratio of dependents (people older than 64) to the working-age population—those aged 15–64. The data are shown as the proportion of dependents per 100 working-age population (United Nations Population Division, World Population Prospects: 2017 Revision).

Urban population refers to people living in urban areas as defined by the national statistics offices. The data are collected and smoothed by the United Nations Population Division (United Nations Population Division, World Urbanization Prospects: 2014 Revision).

According to many studies, current and future changes regarding the level and structure of the population will have a direct impact on retirement, healthcare, education, and long-term care systems at country level. Structural demographic changes require discretionary adjustments of public budget indicators, and this leads to changes in the rate of taxation.

Conventional economic thinking has suggested that the aging of the population has been responsible for high increases in welfare spending due to the fact that aging tends to increase the share of beneficiaries of the two largest welfare programs—social security and health care [13]—which, again, leads to the influence of the demographic variables on the general and the social fiscal pressure.

The conclusions of the economic analysis highlight the fact that, with the increase in the number of the older and the modification of the dependency rates, there are implications regarding the long-term sustainability of the tax revenues.

Facing the prospect of the future rise in social spending and, thus, the fiscal pressure, several international organizations and authors [14] supported reform measures aimed at keeping social spending under control. However, economic measures are difficult to apply because they lead to high political or electoral costs [15]. On the other hand, while most theoretical and empirical analyses indicate a positive correlation between aging and social spending, Razin [16] presents an empirical analysis that leads to the opposite conclusion: the aging of the population is associated with reduced welfare expenditure.

In a model with the welfare state based on a social security system and a revenue redistribution program [17], the authors [13] conclude that the negative economic effect of aging on the welfare state's size increases with the fraction of welfare spending for pensions as a result of the decline in the cost-effectiveness of a PAYG (Pay-as-you-go) system under the aging pressure.

2.3. Institutional Factors

The link between the institutional variables and the tax rate is still poorly exploited in previous research [12,18]; there are approaches that note the importance of these factors for the quality of public finances in general and the tax system in particular, or approaches that conclude that there are no implications for the tax system. The interesting aspect appears when considering the institutional–political factors, taking into account the level of development of the respective countries. Thus, it has been found that in developing countries, where the rule of law is not yet well defined, public institutions operate discretionarily, not automatically, according to free market impulses, and the political factor can influence the lives of individuals more intensely and unpredictably, and, in most cases, with a negative impact on the social welfare of individuals, giving society as a whole an unstable decisional context, with too many elements of informational asymmetry. The Corruption Perception Index indicator used is prepared by Transparency International, which is frequently employed in prior works such as [19–21]. The Corruption Perception Index, published annually by Transparency International, ranks countries by their perceived levels of public sector corruption, as determined by expert assessments and opinion surveys. Scaled from 0 to 100, a higher value in the Corruption Perception Index indicates less corruption perceived in the country [19].

Political stability and the absence of violence/terrorism measures the perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. The estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution—i.e., ranging from approximately -2.5 to 2.5 . We used Worldwide Governance Indicators (WGI) for the data.

The rule of law captures the perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular, the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. The estimate gives the country's score on the aggregate indicator in units of a standard normal distribution—i.e., ranging from approximately -2.5 to 2.5 . We used Worldwide Governance Indicators (WGI) for the data.

3. Econometric Model

The table below (Table 1) describes the basic information of the economic, demographic, and institutional variables integrated into the econometric models, by which we analyze how global fiscal pressure and fiscal pressure for social purposes are influenced for the states under consideration. Thus, we present descriptive statistics (mean, standard deviation, minimum, and maximum, including the number of observations) for the variables included in the analysis.

Table 1. Descriptive statistics (Source: elaborated by the authors).

Variable	Obs	Mean	Std. Dev.	Min	Max
Tax pressure	603	31.33356	9.744581	8.19	48.984
Social contributions	502	10.66982	3.480388	0.057	16.94
GDP per capita	684	2.432103	2.052765	0.0438865	11.92254
Public expenditure	632	38.52826	12.85301	9.45	65.0415
GDP growth	684	2.893295	3.664231	−14.81416	25.55727
General government deficit	640	−2.843804	3.425809	−32.02461	6.855226
Cereal yield	640	4721.49	1828.643	176.3	9842.2
Employment in agriculture	684	11.15239	12.64381	1.013	61.506
Employment in industry	684	26.39708	5.757992	10.983	40.527
Employment in services	684	62.45054	13.54208	22.462	87.591
Exports	681	49.85845	33.54235	9.037519	230.0164
FDI	679	8.736537	31.33873	−58.32288	451.7155
Age dependency old	684	22.80077	6.040465	7.227719	45.03247
Life expectancy at birth	646	76.92036	4.007119	62.582	83.98488
Urban population	684	68.7974	15.06061	27.667	97.934

Table 1. Cont.

Variable	Obs	Mean	Std. Dev.	Min	Max
Unemployment	684	9.908708	6.510474	1.8	37.25
Research expenditure	575	1.389647	0.9142429	0.01611	3.91087
New business density	381	5.311718	5.185477	0.0402942	39.27385
Corruption perception index	228	59.2807	17.06712	27	92
Economic freedom index	595	7.266641	0.5604442	5.36924	8.459856
Political Stability	574	0.4859206	0.7212771	−1.99828	1.760102
Rule of Law	574	0.8242408	0.84057	−1.271872	2.100273

First, we used ordinary least squares (OLS) as a base model for our estimations, using robust standard errors, which produced efficient and consistent parameter estimates [22]. The OLS consist of five pillars: linearity, erogeneity, homoskedasticity, non-autocorrelations, and no exact linear relationship among independent variables (no multicollinearity—completed after some adjustments that were supposed to eliminate some variables from our initial date base).

$$Y_{it} = \alpha + X_{it}\beta + v_i + \varepsilon_{it} \quad (3)$$

where $i = 1, \dots, n$ and, for each i , $t = 1, \dots, T$, of which T_i periods are actually observed.

Then, in order to test the robustness of our results, we provided a number of alternative specifications of the base OLS.

The second model used was a linear regression with panel-corrected standard errors in order to calculate panel-corrected standard error (PCSE) estimates for linear cross-sectional time series models, where the parameters were estimated by either OLS or Prais–Winsten regression, specifying that the disturbances are assumed to be panel-level heteroskedastic only, with no contemporary correlation across panels and a common first-order autocorrelation AR(1), and that the coefficient of the AR(1) process is common to all the panels.

$$Y_{it} = X_{it}\beta + \varepsilon_{it} \quad (4)$$

where $i = 1, \dots, m$ is the number of units (or panels); $t = 1, \dots, T_i$; T_i is the number of periods in panel i ; and ε_{it} is a disturbance that may be autocorrelated along t or contemporaneously correlated across i .

When autocorrelation with a common coefficient of correlation is specified (by using option correlation (AR1)), the common correlation coefficient is computed as:

$$\rho = \frac{\rho_1 + \rho_2 + \dots + \rho_m}{m} \quad (5)$$

where ρ_i is the estimated autocorrelation coefficient for panel i and m is the number of panels.

Thirdly, we used first difference generalized method of moments (GMM) with robust standard errors and orthogonal deviations. The linear dynamic panel-data models included p lags of the dependent variable as covariates and contained unobserved panel-level effects, fixed or random. By construction, the unobserved panel-level effects were correlated with the lagged dependent variables, making standard estimators inconsistent. Arellano et. al. [23] derived a consistent generalized method of moments (GMM) estimator for the parameters of this model. The model also reported the Hansen J statistic, which is the minimized value of the two-step GMM criterion function, and is robust.

A dynamic panel-data model has the form:

$$Y_{it} = \sum_{j=1}^p \alpha_j \gamma_i t - j + x_{it}\beta_1 + w_{it}\beta_2 + v_i + \varepsilon_{it} \quad (6)$$

where $i = 1, \dots, N$ $t = 1, \dots, T_i$; the α_j are p parameters to be estimated; x_{it} is a $1 \times k_1$ vector of strictly exogenous covariates; β_1 is a $k_1 \times 1$ vector of parameters to be estimated; w_{it} is a $1 \times k_2$ vector of predetermined and endogenous covariates; β_2 is a $k_2 \times 1$ vector of parameters to be estimated; v_i are

the panel-level effects (which may be correlated with the covariates); and ε_{it} are i.i.d. over the whole sample with variance σ_{ε}^2 . The v_i and ε_{it} are assumed to be independent for each i over all t .

We used some options [24] for this model, such as: robust, which specifies that the robust estimator of the covariance matrix of the parameter estimates be calculated; no constant, which suppresses the constant term in the levels equation; small, which requests t statistics instead of z statistics and an F test instead of a Wald chi-squared test of the overall model fit; no level, which specifies that level equation should be excluded from the estimation; and orthogonal, which requests that the forward orthogonal deviations transform instead of differencing.

4. Results

In order to investigate how economic (GDP per capita, public expenditure, GDP growth, general government deficit, cereal yield, employment in agriculture, employment in industry, employment in services, exports, FDI, unemployment, research expenditure, new business density), demographic (age dependency old, life expectancy at birth, urban population), and institutional (corruption perception index, economic freedom index, political stability, rule of law) factors influence the global fiscal pressure and social fiscal pressure, we used a panel data from 2000 to 2017 for 38 countries. Firstly, we used the ordinary least squares (Model 1) estimator to examine the impact of these three categories of factors. Subsequently, for testing the robustness of our results, we provide some alternative methods to the base model.

In Model 2, we present estimates with panel-corrected standard errors, using [19] and [25] methodology. In Model 3, we apply the different generalized method of moments (GMM) estimators. We conclude that the specification under Model 1 is robust to the variance considerations captured by the GMM approach. The results on the impact of economic, demographic, and institutional factors on fiscal pressure remain robust.

The empirical estimates of the regression specifications presented in the previous section can be seen in the tables above. Tables 2 and 3 report the empirical estimates of the regression using OLS. Table 4 presents the empirical estimates of the regression using PCSE, and Table 5 reports the empirical estimates of the regression using first difference GMM.

Table 2. Tax pressure—ordinary least squares (OLS) base model. (Source: elaborated by the authors).

Dependent: Tax Pressure	Tax OLS 1	Tax OLS 2	Tax OLS 3
GDP per capita	−0.0467 (0.1004)	−0.0710 (0.1577)	−0.1253 (0.1471)
Public expenditure	0.6028*** (0.0468)	0.6144*** (0.0575)	0.5919*** (0.0763)
GDP growth	0.0131 (0.0149)	−0.0081 (0.0108)	0.0449 (0.0450)
General government deficit	0.6725*** (0.0487)	0.6337*** (0.0544)	0.5808*** (0.0966)
Cereal yield	−0.0000 (0.0001)	−0.0000 (0.0001)	−0.0000 (0.0001)
Employment in agriculture	−0.0139 (0.0557)	0.0601 (0.0714)	0.0909 (0.1049)
Employment in industry	−0.0205 (0.0366)	0.0255 (0.0677)	−0.0888* (0.0508)
Exports	−0.0199 (0.0143)	−0.0016 (0.0085)	−0.0165 (0.0126)
FDI	0.0002 (0.0009)	0.0011 (0.0008)	0.0014 (0.0011)

Table 2. Cont.

Dependent: Tax Pressure	Tax OLS 1	Tax OLS 2	Tax OLS 3
Research expenditure	−0.1804 (0.3104)	−0.7066** (0.3474)	−1.1057*** (0.3848)
Age dependency old		0.1376** (0.0688)	−0.0258 (0.0782)
Life expectancy at birth		−0.1527 (0.1863)	0.0750 (0.1505)
Urban population		0.0920 (0.0763)	0.0579 (0.0584)
Unemployment		−0.0500 (0.0410)	−0.0326 (0.0604)
New business density		0.0209 (0.0249)	−0.0124 (0.0498)
Corruption perception index			0.0096 (0.0376)
Economic freedom index			−0.0136 (0.4318)
Political Stability			−0.1537 (0.3649)
Rule of Law			2.4252** (1.1176)
_cons	11.5105*** (2.7986)	11.7087 (17.4568)	2.8501 (12.6682)
R-squared for overall model	0.7796	0.6550	0.6114
Number of observations	513.0000	314.0000	124.0000
Number of groups	36.0000	34.0000	32.0000

Note: * Standard errors in parenthesis; ** Statistical significance: (* <0.1, ** <0.05, *** <0.01).

Table 3. Social fiscal pressure—OLS base model. (Source: elaborated by the authors).

Dependent: Social Contributions	Soc. OLS 4	Soc. OLS 5	Soc. OLS 6
GDP per capita	−0.0606 (0.0848)	0.1347 (0.1260)	0.0188 (0.1005)
Public expenditure	0.1569*** (0.0405)	0.1496*** (0.0329)	0.1323*** (0.0422)
GDP growth	−0.0329** (0.0131)	−0.0403*** (0.0121)	−0.0128 (0.0252)
General government deficit	0.1055*** (0.0340)	0.1057*** (0.0299)	0.1160** (0.0480)
Cereal yield	−0.0000 (0.0000)	0.0001 (0.0000)	0.0001 (0.0001)
Employment in agriculture	0.0567 (0.0582)	0.0412 (0.0585)	0.0534 (0.0742)
Employment in industry	0.0006 (0.0340)	0.0491 (0.0437)	−0.0025 (0.0583)
Exports	0.0024 (0.0080)	0.0151** (0.0074)	0.0022 (0.0077)
FDI	0.0007 (0.0008)	0.0018** (0.0008)	0.0013 (0.0009)
Research expenditure	0.3866 (0.2386)	0.3672 (0.2542)	0.0597 (0.2033)
Age dependency old		0.1168* (0.0708)	−0.0235 (0.0528)

Table 3. Cont.

Dependent: Social Contributions	Soc. OLS 4	Soc. OLS 5	Soc. OLS 6
Life expectancy birth		−0.2203 (0.1397)	0.0211 (0.1006)
Urban population		0.0043 (0.0615)	−0.0341 (0.0708)
Unemployment		0.0498 (0.0320)	0.0054 (0.0387)
New business density		0.0025 (0.0238)	−0.0300 (0.0241)
Corruption perception index			0.0089 (0.0170)
Economic freedom index			0.1259 (0.3462)
Political Stability			−0.4218* (0.2485)
Rule of Law			−0.3473 (0.4602)
_cons	3.4437 (2.3733)	14.5278 (9.4101)	5.4338 (8.0506)
R-squared for overall model	0.0361	0.0213	0.0345
Number of observations	459.0000	281.0000	109.0000
Number of groups	30.0000	29.0000	28.0000

Note: * Standard errors in parenthesis; ** Statistical significance: (* <0.1, ** <0.05, *** <0.01).

Table 4. Tax pressure and social fiscal pressure—panel-corrected standard error (PCSE) model. (Source: elaborated by the authors).

Dependent: Tax Pressure	Tax PCS 1	Tax PCS 2	Tax PCS 3	Soc PCS 4	Soc PCS 5	Soc PCS 6
Social Fiscal Pressure						
GDP per capita	0.0394 (0.1336)	0.0009 (0.1863)	−0.7401** (0.3600)	−0.2104** (0.0964)	−0.1539 (0.1553)	0.0270 (0.2690)
Public expenditure	0.7034*** (0.0317)	0.6834*** (0.0467)	0.6568*** (0.0788)	0.0891*** (0.0178)	0.0509** (0.0206)	0.0008 (0.0292)
GDP growth	−0.0109 (0.0200)	−0.0018 (0.0214)	−0.0511 (0.1854)	−0.0407*** (0.0095)	−0.0333** (0.0138)	−0.0126 (0.0919)
General government deficit	0.7453*** (0.0329)	0.7155*** (0.0469)	0.7977*** (0.1769)	0.0592*** (0.0220)	0.0526 (0.0322)	0.1592* (0.0845)
Cereal yield	0.0002* (0.0001)	0.0002* (0.0001)	0.0008*** (0.0003)	0.0001 (0.0000)	0.0001 (0.0001)	0.0000 (0.0002)
Employment in agriculture	0.0727*** (0.0188)	−0.0772 (0.1055)	0.5162* (0.3073)	62.1553 (47.7118)	−0.0958 (0.0622)	0.1743 (0.1284)
Employment in industry	0.0350 (0.0291)	−0.2404* (0.1364)	−0.1556 (0.2165)	62.2079 (47.7105)	0.0561 (0.0587)	0.4944*** (0.1505)
Employment in services	0.0409 (0.0255)	−0.2278 (0.1615)	0.0578 (0.2870)	62.0961 (47.7119)	−0.1312* (0.0690)	0.3052** (0.1391)
Exports	0.0076 (0.0053)	0.0106 (0.0080)	0.0083 (0.0147)	0.0039 (0.0044)	0.0129** (0.0063)	0.0149 (0.0116)
FDI	0.0008 (0.0008)	0.0008 (0.0010)	0.0032 (0.0042)	−0.0003 (0.0009)	0.0003 (0.0016)	0.0081 (0.0056)
Research expenditure	0.0123 (0.2398)	−0.1507 (0.3265)	0.4742 (1.2042)	0.5128*** (0.1703)	0.2512 (0.2401)	−0.4536 (0.7676)
Age dependency old		0.0296 (0.0669)	0.0398 (0.1108)		0.1096** (0.0470)	0.0494 (0.0738)
Life expectancy birth		0.3626** (0.1782)	0.4264* (0.2222)		0.1669* (0.0864)	0.1187 (0.1297)
Urban population		−0.0268 (0.0308)	0.0143 (0.0479)		−0.0091 (0.0224)	−0.0055 (0.0317)
Unemployment		−0.0238 (0.0638)	0.1600 (0.1219)		0.1109*** (0.0305)	−0.0708 (0.0733)
New business density		0.0203 (0.0329)	0.1383 (0.0958)		−0.1067*** (0.0292)	−0.3054*** (0.0774)

Table 4. Cont.

Dependent: Tax Pressure	Tax PCS 1	Tax PCS 2	Tax PCS 3	Soc PCS 4	Soc PCS 5	Soc PCS 6
Social Fiscal Pressure						
Corruption perception index			−0.0506 (0.0784)			−0.0296 (0.0470)
Economic freedom index			−5.2539*** (1.9107)			−3.9555*** (1.2457)
Political Stability			2.5254* (1.5184)			−1.7580* (1.0021)
Rule of Law			3.2121 (2.1725)			1.6132 (1.5175)
R-squared	0.9064	0.9092	0.8830	0.7165	0.7052	0.6470
Number of observations	513.0000	314.0000	124.0000	459.0000	281.0000	109.0000
Number of groups	36.0000	34.0000	32.0000	30.0000	29.0000	28.0000

Note: * Standard errors in parenthesis; ** Statistical significance: (* <0.1, ** <0.05, *** <0.01).

Table 5. Tax pressure and social fiscal pressure—generalized method of moments (GMM) model.
(Source: elaborated by the authors).

Dependent: Tax Pressure	eff2a	eff2b	eff2c	eff3e	eff3f	eff3g
Social Fiscal Pressure						
Tax pressure (−1)//	0.7911* (0.4042)	0.2572 (0.3933)	0.0582 (0.2124)	0.6616** (0.2417)	0.6903** (0.3067)	2.0382 (3.3993)
Social yax pressure (−1)	0.1341 (0.1122)	−0.0264 (0.1814)	−0.0275 (0.1714)	0.0433 (0.0558)	0.1206* (0.0647)	−0.3988 (0.6845)
GDP per capita	0.2776 (0.1847)	0.5161*** (0.1456)	0.5915*** (0.0696)	0.0776* (0.0390)	0.0878** (0.0409)	0.1011 (0.0860)
Public expenditure	0.0014 (0.0210)	−0.0135 (0.0113)	0.0337 (0.0380)	−0.0433*** (0.0144)	−0.0531*** (0.0148)	0.0123 (0.0481)
GDP growth	0.3098 (0.1994)	0.5333*** (0.1490)	0.5888*** (0.0804)	0.0584** (0.0250)	0.0707** (0.0266)	0.1211* (0.0680)
General government deficit	0.0000 (0.0001)	−0.0000 (0.0001)	−0.0001 (0.0001)	0.0000 (0.0000)	0.0000 (0.0000)	−0.0001 (0.0002)
Cereal yield	53.6098 (85.9698)	100.9107 (72.6259)	40.5143 (87.5602)	63.8866 (45.0035)	83.9787 (68.0180)	149.6430 (229.8841)
Employment in agriculture	53.6030 (85.9705)	100.8528 (72.6454)	40.3133 (87.5451)	63.8978 (45.0168)	83.9927 (68.0227)	149.6279 (229.9875)
Employment in industry	53.6337 (85.9641)	100.8630 (72.6248)	40.3986 (87.5538)	63.8683 (45.0062)	83.9746 (68.0098)	149.5591 (229.8510)
Employment in services	−0.0100 (0.0079)	0.0048 (0.0106)	−0.0227 (0.0150)	0.0005 (0.0025)	0.0071 (0.0049)	−0.0184 (0.0392)
Exports	0.0008 (0.0006)	0.0017 (0.0011)	0.0018 (0.0012)	0.0001 (0.0005)	0.0005 (0.0008)	−0.0004 (0.0041)
FDI	−0.4617** (0.1938)	−0.6660** (0.3126)	−1.4414*** (0.4422)	0.0858 (0.1633)	−0.0555 (0.1993)	−1.5282 (2.4215)
Research expenditure		0.1342* (0.0771)	−0.1372 (0.1126)		0.0634* (0.0332)	−0.2446 (0.3138)
Age dependency old		−0.2015 (0.1630)	0.0055 (0.1830)		−0.1401 (0.0851)	0.1956 (0.3695)
Life expectancy at birth		0.0567 (0.1182)	0.5536* (0.2762)		−0.0019 (0.0334)	−0.0205 (0.4096)
Urban population		−0.0439 (0.0334)	−0.0399 (0.0582)		−0.0021 (0.0240)	−0.0086 (0.0756)
Unemployment		0.0181 (0.0286)	−0.0510 (0.0510)		−0.0097 (0.0140)	−0.0264 (0.0629)
New business density			0.0309 (0.0448)			0.0546 (0.0819)
Corruption perception index			0.1866 (0.4320)			0.4027 (0.9203)
Economic freedom index			−0.2997 (0.4274)			1.5050 (3.5306)
Political Stability						

Table 5. Cont.

Dependent: Tax Pressure	eff2a	eff2b	eff2c	eff3e	eff3f	eff3g
Social Fiscal Pressure						
Rule of Law			2.4100** (1.0918)			−0.2322 (0.6779)
Number of observations	449.0000	279.0000	92.0000	406.0000	252.0000	81.0000
Number of groups	36.0000	34.0000	32.0000	30.0000	29.0000	28.0000
Number of instruments	15.0000	20.0000	24.0000	15.0000	20.0000	24.0000
Hansen J statistic	0.7271	4.3871	3.4902	1.7884	1.5701	0.7697
p value of Hansen statistic	0.8668	0.2226	0.3220	0.6175	0.6662	0.8567
AR (2) test statistic	−0.7741	−0.6655	0.1845	0.7824	0.5943	−0.4249
p value of AR (2) statistic	0.4389	0.5057	0.8536	0.4340	0.5523	0.6709

Note: * Standard errors in parenthesis; ** Statistical significance: (* <0.1, ** <0.05, *** <0.01).

The empirical results from Tables 2 and 3 show the effects of the economic, demographic, and institutional variables on global fiscal pressure and on social fiscal pressure.

The coefficient presented in Table 2 shows that one unit increase in public expenditure is associated with 0.6028*** units increase in fiscal pressure (Column 2). In addition, the results show a positive relationship between government deficit and fiscal pressure. When demographic indicators are included in the model (Column 3), that one unit increase in age dependency is associated with 0.1376** units increase in fiscal pressure, and this result is compatible with other studies [13]. From Column 4, we find that there is a positive and significant coefficient of 2.4252**.

The coefficients (Table 3) presented in Column 2 show that one unit increase in public expenditure is associated with 0.1569*** units increase in social fiscal pressure. In addition, government deficit, exports, and FDI are totally positive and significant in our econometric analysis on social fiscal pressure. The age dependency independent indicator is still positively and statistically significantly associated with the social fiscal pressure (knowing that an increase in the number of the old age individuals requires more public resources for financing all the age-related programs).

In addition, we found that the estimates of the economic, demographic, and institutional factors using the panel-corrected standard errors and the difference generalized method of moments estimators are statistically significant and produce consistent results with the regressions (as shown in Tables 4 and 5).

5. Conclusions

In our study, we examine the relationship between the economic, demographic, and institutional variables and global fiscal pressure/social fiscal pressure, using the dataset of 38 countries from 2000 to 2017, and testing these inputs through three models.

The results allow us to conclude that there is a positive and significant relationship between some economic (public spending, public deficit, cereal yield), demographic (age dependency), and institutional (rule of law) factors and fiscal pressure, confirming the results generated by previous studies [7,18], which demonstrates the validity of our analysis. The relationship between public spending and fiscal pressure is positive because a decision to increase the level of public spending to encourage demand (public or private) can be based either on a tax increase, with direct effect on short-term fiscal pressure, or through the increased public debt, with a long-term impact on fiscal pressure. Furthermore, studying the implications that age dependency has on fiscal pressure reveals the positive relationship between them because a larger number of older people involve a greater need of public financial resources. These additional resources are meant to cover the needs of long-term care or the provision of pensions, so that the decision-makers are required to increase the level of taxation for taxpayers.

One of the elements that is different from the results of previous studies is the sign and value of the estimated parameters for describing the impact of the level of GDP per capita on the fiscal pressure.

Thus, although in some previous analyses [7,18] there is a positive relationship between the level of GDP per capita and the level of fiscal pressure, in our study, the negative result can be explained by the fact that, as the level of income per capita increases, a constant tax rate can lead to a relaxation of fiscal pressure.

Furthermore, another conclusion of our analysis is that as we include in the three OLS base models the demographic variables and the institutional variables, the level of R² (Table 2) decreased from 0.78 (in case of estimating the effects of economic factors on fiscal pressure) to 0.66 (in case of estimating the effects of economic and demographic factors on fiscal pressure), respectively, to 0.61 (in case of estimating the effects of economic, demographic, and institutional factors on fiscal pressure), due to the unavailability of data on demographic and institutional indicators over an extended period. Thus, the inclusion of these additional factors meant that the temporal horizon of the analysis was diminished. However, the resulting estimators did not differ much, so the chosen models did not suffer from robustness.

We also found that the introduction in the analysis of the demographic variables increased the R-squared from 90.64 percent to 90.92 percent, so we can say that the models account for more than 88 percent of the total variance in the global fiscal pressure and more than 70 percent of the total variance in the social fiscal pressure (see Tables 4 and 5).

The results of our investigation reveal the importance of the investigation of all the aspects that determine the fiscal pressure, including in terms of political stability and the rule of law as key elements of the socio-economic organizational structure of the market economy. The relevance of our study consists in stating that the policy makers should take into account the economic, social, demographic, and institutional context for establishing the fiscal policies, so that they do not inhibit the private initiative. Moreover, political stability and the rule of law are important elements of the decision-making process, both from the perspective of public policy and from the perspective of taxpayers.

Although the study provides a broad picture of the analyzed phenomenon, we had some limitations, such as those related to the availability of data (especially those on demographic and institutional indicators) regarding certain countries, which determined the decrease in the period covered by our study. Also, the analysis of the impact of demographic factors on fiscal pressure may have certain limitations, due to the small number of studies that address this issue. Thus, this aspect will have to be addressed in the future in order to outline a relevant image regarding the implications of the specific demographic variables on the level of tax revenues. Future research will have to focus on this factor, introducing in the analysis indicators that include representative elements of the field that will give more relevance to the analysis. In addition, in the current context, we consider that the institutional factors can have important consequences in the fiscal pressure perception by the taxpayers. It also can lead to indirect effects in the market generated by changes in the agents' behavior that distort the public policy expected effects. Further analysis from this perspective will lead to a better understanding of the impact of the considered factors in the public financial policies deployment.

Author Contributions: Conceptualization, A.-C.N.; methodology, A.-C.N. and F.-M.N.; software, A.-C.N. and F.-M.N.; formal analysis, A.-C.N. and F.-M.N.; writing—original draft preparation, A.-C.N. and F.-M.N.; writing—review and editing, A.-C.N. and F.-M.N.; All authors have read and agreed to the published version of the manuscript.

Funding: This work was financed by Danubius University from Galati.

Acknowledgments: We wish to thank the reviewers for their valuable comments and suggestions that helped us to improve our paper.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Baltagi, B. *Econometric Analysis of Panel Data*; John Wiley & Sons: Hoboken, NJ, USA, 2001.

2. Moldovan, N.C.; Hatmanu, M.; Lobont, O.R. Reflections on the Romanian fiscal policy-driven election manipulation phenomenon. *Econ. Comput. Econ. Cybern. Stud. Res.* **2014**, *48*, 1–22.
3. Bistriceanu Gheorghe, D. *Lexicon de Finanțe, Bănci, Asigurări*; Editura Economică: București, Romania, 2001; Volume III, p. 89.
4. Hardwick, P.; Langmead, J.; Khan, B. *Introducere în Economia Politică Modernă*; Editura Polirom: Iași, Romania, 2002; p. 314.
5. Lupu, D.; Petrisor, M.B.; Bercu, A.; Tofan, M. The Impact of Public Expenditures on Economic Growth: A Case Study of Central and Eastern European Countries. *Emerg. Mark. Financ. Trade* **2018**, *54*, 552–570. [[CrossRef](#)]
6. Cigu, E.; Agheorghiesei, D.T.; Toader, E. Transport Infrastructure Development, Public Performance and Long-Run Economic Growth: A Case Study for the Eu-28 Countries. *Sustainability* **2019**, *11*, 67. [[CrossRef](#)]
7. Gupta, A.S. Determinants of Tax Revenue Efforts in Developing Countries; Working Paper 07/184; International Monetary Fund: 2007. Available online: <https://www.imf.org/external/pubs/ft/wp/2007/wp07184.pdf> (accessed on 23 February 2020).
8. Cassou, S.P. The link between tax rates and foreign direct investment. *Appl. Econ.* **1997**, *29*, 1295–1301. [[CrossRef](#)]
9. Bird, R.M.; Martínez-Vázquez, R.; Torgler, B. Tax effort in developing countries and high income countries: The impact of corruption voice and accountability. *Econ. Anal. Policy* **2008**, *38*, 55–71. [[CrossRef](#)]
10. Tanzi, V. *Structural Factors and Tax Revenue in Developing Countries: A Decade of Evidence*; Cambridge University Press: Cambridge, UK, 1992.
11. Lobont, O.R.; Nicolescu, A.C.; Moldovan, N.C.; Kuloğlu, A. The effect of socioeconomic factors on crime rates in Romania: A macro-level analysis. *Econ. Res.-Ekon. Istraživanja* **2017**, *30*, 91–111.
12. Castro, G.A.; Ramírez Camarillo, D.B. Determinants of tax revenue in OECD countries over the period 2001. *Contaduría Y Adm.* **2014**, *59*, 35–59. [[CrossRef](#)]
13. Galasso, V.; Profeta, P. How does ageing affect the welfare state? *Eur. J. Political Econ.* **2007**, *23*, 554–563. [[CrossRef](#)]
14. Lindbeck, A.; Persson, M. The Gains from Pension Reform. *J. Econ. Lit.* **2003**, *41*, 74–112. [[CrossRef](#)]
15. Pierson, P. The New Politics of the Welfare State. *World Politics* **1996**, *48*, 143–179. [[CrossRef](#)]
16. Razin, A.; Sadka, E. Aging population: The complex effect of fiscal leakages on the politico-economic equilibrium. *Eur. J. Political Econ.* **2007**, *23*, 564–575. [[CrossRef](#)]
17. Meltzer, A.H.; Richard, S.F. A Rational Theory of the Size of Government. *J. Political Econ.* **1981**, *89*, 914–927. [[CrossRef](#)]
18. Molina-Morales, A.; Amate-Fortes, I.; Guarnido-Rueda, A. Economic and Institutional Determinants in Fiscal Pressure: An Application to the European Case. *J. Econ. Issues* **2011**, *45*, 573–592. [[CrossRef](#)]
19. Toader, T.; Onofrei, M.; Popescu, A.; Andrieș, A.M. Corruption and Banking Stability: Evidence from Emerging Economies. *Emerg. Mark. Financ. Trade* **2018**, *54*, 591–617. [[CrossRef](#)]
20. Weill, L. How corruption affects bank lending in Russia. *Econ. Syst.* **2011**, *35*, 230–243. [[CrossRef](#)]
21. Chen, M.; Jeon, B.N.; Wang, R.; Wu, J. Corruption and bank risk-taking. Evidence from Emerging Economies. *Emerg. Mark. Rev.* **2015**, *24*, 122–148. [[CrossRef](#)]
22. Greene, W.H. *Econometric Analysis*, 6th ed.; Prentice Hall: Upper Saddle River, NJ, USA, 2008.
23. Arellano, M.; Bond, S. Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Rev. Econ. Stud.* **1991**, *58*, 277–297. [[CrossRef](#)]
24. Roodman, D. How to do xtabond2: An introduction to difference and system GMM in Stata. *Stata J.* **2009**, *9*, 86–136. [[CrossRef](#)]
25. Beck, N.; Katz, J.N. What to do (and what not to do) with time-series cross-section data. *Am. Political Sci. Rev.* **1995**, *89*, 634–647. [[CrossRef](#)]

