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Fiscal policy in former Yugoslavian countries (2001–2014): stylised facts and budget elasticities

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ABSTRACT

The aim of this paper is to analyse fiscal policy in former Yugoslavian countries over the period 2001–2014. The contribution of the paper is threefold; first, we build a homogeneous database to describe the evolution of the main fiscal aggregates in each country using an identical analytical structure. Second, we analyse the composition of national tax revenues to determine whether common patterns are still present, or if they have evolved in different ways over time. Third, we pool data to analyse and compute the elasticity of budget imbalance, taxes and expenditure to the output gap. Our results show that tax revenue composition is still similar and that the economic cycle is very relevant in explaining the dynamics of both deficit and expenditure over Gross Domestic Product, but not revenues.

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1. Introduction

Since the dissolution of Yugoslavia in the 1990s, its former republics (Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, Serbia and Slovenia) have taken different paths; however, one common denominator for all of them is the European path. On their way towards the European Union (E.U.), all countries have had to undergo a process of transition from a centrally planned, socialist economy towards a free market economy. This also includes guaranteeing fiscal stability by implementing new economic policies and institutional reforms.

The previous literature on fiscal issues in former Yugoslavian countries is mostly focused on single-country crises and other specific topics. By contrast, this paper adopts a cross-country perspective and deals with the main fiscal aggregates such as deficit, total expenditures and total revenues. Our main target is to partially fill this gap using cross-country data. Cross-country studies involve the possibility of comparing evolutions from a common starting point; secession is a type of natural experiment. Moreover, it increases the sample size for performing econometric analysis on

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basic fiscal aggregates, and this is relevant insofar as the time span of the series is limited at this point in time. In particular, we compile an integrated database¹ and then focus on two targets. First, we analyse the evolution of key fiscal aggregates with the aim of general macroeconomic stability and for the process of integration into the E.U. in particular, and evaluate the dynamics of tax revenue composition. Unfortunately, the lack of data on expenditure composition makes this kind of dual budget analysis impossible. Second, we pool data to compute the elasticity of deficit, taxes and expenditure to the estimated output gap. This aspect is relevant from a policy standpoint insofar as fiscal stability depends not only on structural deficit but also on the effect of the business cycle on both revenues and expenditures. A positive output gap involves additional tax collection and a reduction in some expenditure programmes (for instance, unemployment insurance, thanks to a cut in the unemployment rate). Combining both effects, a reduction in deficit is expected.

To accomplish our targets, this paper is organised as follows. In [Section 2](#), a survey of the available literature on fiscal issues in former Yugoslavian countries is provided. [Section 3](#) presents data and specifications, as well as a cluster analysis merging countries of interest with all E.U. countries. [Section 4](#) analyses the relationship between the economic cycle and fiscal variables, including deficit, expenditure and taxes. Finally, [Section 5](#) focuses on policy implications and extensions of this research.

2. Brief survey of literature

The literature on fiscal matters in former Yugoslavian countries is still underdeveloped, and the reason for this becomes clear when attention is paid to the use of cross-country data in analytical papers.

Concerning papers on the main dynamics of fiscal variables, most focus on the influence of the Great Recession. Mencinger and Aristovnik (2014) compare the cyclical behaviour of E.U. countries' fiscal policies between 2004 and 2012 with fiscal policy measures taken in Slovenia during the economic crisis. The adopted necessary consolidation measures implemented by Slovenia did not vary substantively from other E.U. countries. The policy debate on the size of fiscal multipliers was also present in former Yugoslavian countries. Grdović Gnip (2015) used a structural vector auto regression (S.V.A.R.) approach to conclude that output reacted negatively to a tax shock and positively to government spending shocks in Croatia from 1996 to 2011. The cumulative output multiplier following four quarters is 2.45 for government spending, similar to that found by Šimović and Deskar-Škrbić (2013). Jemec et al. (2013), using an S.V.A.R. approach for Slovenia from 1995 to 2010, made a similar discovery: one-time fiscal spending shocks tend to increase output (multiplier equals 1.6), while a tax shock decreases it (multiplier at 0.4); however, effects become irrelevant in the long run (more than three years). Koczan (2015) also analyses the period of the Great Recession and identifies the main problems in their public sectors: wages and pensions constitute a very rigid and large share of the overall spending. The latter combined with a decline in public revenues due to the crisis disturbed the budget balance, which consequently led to a build-up of public debt. Future challenges to be faced are structural changes and fiscal consolidations, particularly in the

area of reviewing current expenditures. However, the set of countries is slightly different insofar as it relies upon the concept of the 'Western Balkans'. This term is used to denominate Balkan countries that are not members of the E.U. With the former Yugoslavian countries in mind, this excludes Croatia and Slovenia, but includes Albania and Kosovo.²

When the focus is on the elasticity of budget balances expressed in relation to Gross Domestic Product (G.D.P.) to G.D.P. changes, there are virtually no papers on these issues in former Yugoslavian countries. However, Slovenia and Croatia are covered in some cases by papers on E.U. countries. The existing cross-country studies on budgetary elasticity in European countries are summarised in [Table 1](#). In particular, [Viren \(2014\)](#), who analysed the EU15 countries over the period 1970–2011, found that deficit elasticities with respect to output growth appear to be around 0.46. He sets up a specification that includes public deficit, revenues or expenditure on the left side of the equation and a lagged endogenous variable, real G.D.P. growth, general government debt and real interest rate on the right side. Using similar samples, [Staehr \(2008\)](#) with EU27 and [Fincke and Wolski \(2016\)](#) with 10 new E.U. member countries obtained similar elasticities of 0.496 and 0.337, respectively. Nevertheless, [Tujula and Wolswijk \(2007\)](#) and [Kabashi \(2014\)](#) obtained much lower coefficients for the same elasticity by using a similar methodology. Both specifications include the budget balance as the dependent variable with country-specific dummies. However, the former performs panel regressions, while the latter uses generalised method of moments (G.M.M.) estimates. [Vegh and Vuletin \(2015\)](#), on the other hand, only deal with the cyclicity of taxes; they divide their sample into developed and industrialised countries to obtain a tax index whose base is a weighted average of personal income tax, corporate income tax and value-added tax (V.A.T.). The estimates of the tax index (tax revenues) are performed using country fixed effects, with the regressor being the cyclical component of the real G.D.P.

A second set of papers aims at computing elasticities using a different methodology. Instead of relying upon econometrics, global elasticities are estimated as the aggregation of individual elasticities of both expenditure and revenue components. [Bouthevillain et al. \(2001\)](#) measure their sensitivity with respect to G.D.P. by using an elasticity formula, which reflects the response of the budget balance to changes in economic activity, to obtain an elasticity of 0.53. Similarly, in other papers that analyse the Organisation for Economic Co-operation and Development (O.E.C.D.) and EU28 countries, such as [Mourre, Astarita, and Princen \(2014\)](#) and [Girouard and André \(2005\)](#), the overall cyclical sensitivity of the budget is measured by the semi-elasticity of the budget balance (as a percentage of G.D.P.) with respect to the output gap. In these studies, the overall budget elasticity is computed using the individual cyclical elasticities of the four categories of taxes (corporate tax, personal tax, indirect tax and social security contributions) and the one expenditure item (current expenditure), weighted by their respective shares in G.D.P. In these cases, the influence of the output gap variable was between 0.4 and 0.5, calculated as an arithmetic average for the group of countries in the sample. Another paper with similar methodology is [Altar, Necula, and Bobeica \(2010\)](#), which deals with Romania and obtains a lower result of 0.290.

3. Fiscal variables: data and preliminary analysis

Our sample covers the period 2001–2014, but the starting point is not the same in all cases due to the reasons explained below. Public deficit is defined as ‘net lending/borrowing’. This position of the budget balance is considered, according to the International Monetary Fund’s (I.M.F.) Government Finance Statistics Manual (G.F.S.M.) 2014,³ to be ‘the basic indicator of the fiscal balance, measured from ‘above-the-line’ as revenue minus expenditure’. For Bosnia and Herzegovina, Croatia and Slovenia, the fiscal data were obtained from the Government Finance Statistics (G.F.S.) data portal of the I.M.F. Owing to the unavailability of earlier data, the series for Bosnia and Herzegovina starts in 2005. In the case of Croatia, no data before 2002 was used because the reporting standard changed from the G.F.S. 1986 to the G.F.S. 2001 in mid-2004. Thereafter, the calculations were only performed retroactively for the previous three years. Time series data for Macedonia and Montenegro start at nearly the same time, 2005 and 2006, respectively. The data for Macedonia were available in the monthly Bulletin of the Ministry of Finance of the Republic of Macedonia.⁴ As for data regarding Montenegro, the time series begins in 2006, the same year Montenegro declared independence. The data were obtained courtesy of the Ministry of Finance of Montenegro.⁵ Lastly, the time series for Serbia was available in the monthly Bulletin Public Finances issued by the Ministry of Finance of Serbia.⁶ Owing to a lack of data for the autonomous province of Kosovo and Metohija, this region was not included in the coverage for the Republic of Serbia. Furthermore, after the declaration of independence in 2008, Kosovo appears in international databases as a separate country. However, as the time series data in the G.F.S. data portal of the I.M.F. begin in 2011, the authors decided to exclude Kosovo from the analysis.

While data sources are different for each country, homogeneity is guaranteed by the fact that in all cases it is based on the I.M.F.’s G.F.S.M. Data for Bosnia and Herzegovina, Croatia and Slovenia are presented according to the G.F.S.M. 2014, while Serbia, Macedonia and Montenegro use the G.F.S.M. 1986.⁷ As for the country level, in all cases it covered annual⁸ data on general government and all extra-budgetary funds.

The G.D.P. data source for calculating the output gap was the World Development Indicators from the World Bank. The unit of measurement for G.D.P. is constant 2011 international dollars converted using purchasing power parity rates. The output gap was computed using the Hodrick–Prescott (H.P.) filter (Hodrick & Prescott, 1997) over a sample from 1993 to 2015. The parameter λ was set at 4 according to the Ravn–Uhlig frequency rule (Ravn & Uhlig, 2002). The variable is defined as follows:

$$\text{output gap} = \left(\frac{\text{GDP series}}{\text{filtered GDP series}} - 1 \right) \cdot 100 \quad (1)$$

According to the formula, a positive output gap emerges when the actual output is greater than the potential output.⁹

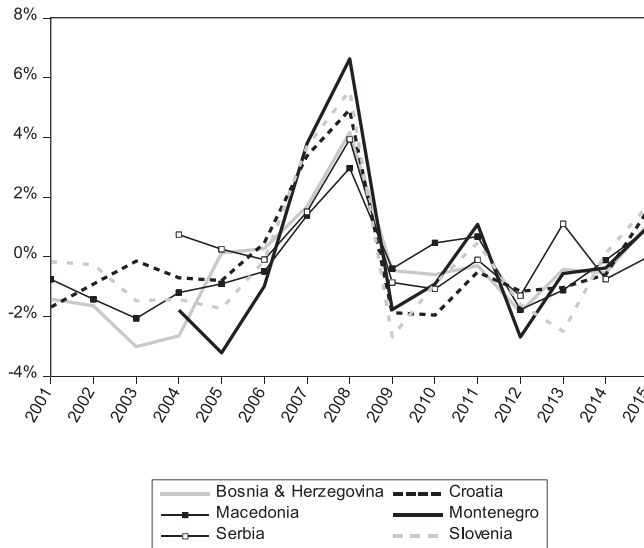


Figure 1. Output Gap (as % G.D.P.). Source: World Bank and authors' calculations.

The mid-2000s still saw rapid growth across the region largely driven by external borrowing for consumption and construction. Furthermore, this period matched the comfortable global environment at the time and increasing confidence in the convergence process of these countries with the E.U. (Roaf, Atoyan, Joshi, & Krogulski, 2014). Knowing this makes it easy to explain the peak in output gap that was reached for all six countries in 2008. Until the appearance of the economic crisis, a positive output gap was working well for all countries, with the actual output being above the potential output (Figure 1). During this period, the economies were working at more than full capacity ('overheating'). After the recession, however, the situation changed dramatically. The imbalances that the recession brought made the former Yugoslavian economies very vulnerable. A spillover effect reached these countries by 2009, when their budget deficits reached all-time lows in the first decade of the 21st century. The impact was manifested in the continuance of below-potential growth, high unemployment and fragile financial markets (Roaf et al., 2014). The linkages with international trade partners made the countries vulnerable which, combined with low levels of employment, high public debt and current account deficits, greatly impacted the countries.

A graph showing budget deficit data is presented in Figure 2. Former Yugoslavian countries managed to cope with the fiscal pressures after their secessions. It is clear that all countries have a joint downwards slope. The reasons for this can be found in the consequences of the world economic crisis from 2007/2008, which started in these countries with a delayed effect. In fact, even 2007 was a downturn point for every country except Croatia, whose deficit took a downwards turn in 2008. Nevertheless, all countries reached their low points between 2012 and 2014, with the sole exception of Bosnia and Herzegovina. A sharp decline in capital inflows led to economic recessions and modest recoveries thereafter. The former was caused by an overall decline in international trade and transactions. The economies were vulnerable externally and

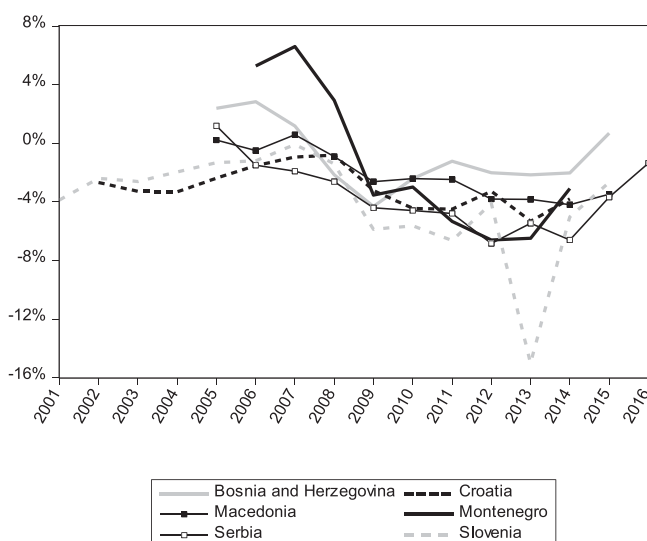


Figure 2. Budget balance (as % G.D.P.). Source: Countries' respective Ministries of Finance.

linked by trade to all major countries that were themselves experiencing problems as a result of the crisis. Another interesting feature of [Figure 2](#) is the case of Slovenia, whose budget deficit more than tripled in 2013, only to recover in the following two years. This is due to an emergency recapitalisation of the country's banks, performed by the government by pumping 3.6 billion euros into the banking sector in order to avert an international bailout.

[Figure 3](#) shows the dynamics of public expenditure across all six former Yugoslavian countries. The countries with the highest expenditure in terms of G.D.P. percentage are Serbia and Slovenia. On the other hand, Macedonia has the lowest. With the exception of Macedonia, which has also had a steady increase in expenditure, the countries can be described as having a tendency towards expenditure growth over time, especially after the crisis. Therefore, tight fiscal policies and austerity measures were recommended by both the E.U. and the I.M.F. These two institutions had the last word in terms of external funding and providing advice to Balkan countries. With this in mind, the conclusions made for the former Yugoslavian countries by these institutions were that there was a need to build up the flexibility of the economy and increase the capacity of the economy to grow. Practically speaking, this would imply a reduction in debt, the implementation of structural reforms that would attract investments to the trading sector and an increase in savings as a consequence of economic growth (Koczan, 2015).

Total revenue has also had similar dynamics for all six of our countries of interest ([Figure 4](#)). The early 2000s were a time of fiscal consolidation and restructuring. A V.A.T. was introduced and public revenues were stabilising after the war in the 1990s. However, steady development and slight growth were replaced by sharp declines in public revenues after the crisis. The turning point came in the years 2008 and 2009, when revenues in all countries started to plummet. Nevertheless, stabilisation occurred after 2011 when every country except Macedonia began experiencing growth. Throughout the entire period observed, the process of European integration

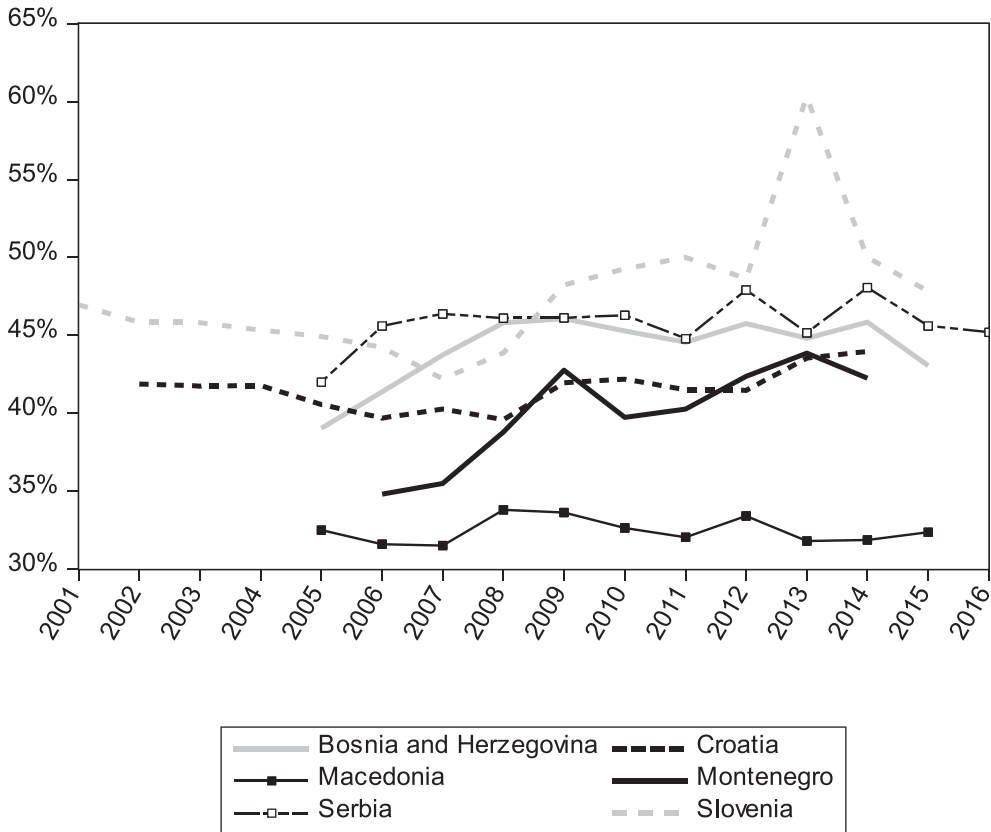


Figure 3. Expenditures (as % G.D.P.). Source: Countries' respective Ministries of Finance.

is apparent in the customs contributions, which seem to have decreased in all countries. The collapse in tax revenues, together with the difficulty in scaling back spending, resulted in a significant deterioration of fiscal positions and a build-up of debt (Koczan, 2015).

In order to analyse tax revenue composition and the evolution of tax revenues over time, we pool the countries of interest with a wide set of neighbouring countries. If the common patterns are strong enough, the existence of a cluster inside the pool should be detected. In particular, the analysis includes data of the tax categories in 34 countries: 26 of these are E.U. members (excluding Slovenia and Croatia), three are members of the European Free Trade Association (E.F.T.A.) and the remaining five are former Yugoslavian countries. The time span of the available data ranges from 2001 to 2014. One former Yugoslavian country had to be excluded from the analysis owing to lack of data for tax categories, namely Bosnia and Herzegovina. The variables used include total tax revenues and their seven tax categories expressed as a percentage of G.D.P.: personal income tax, corporate income tax, V.A.T., customs, excise, social contributions, and other taxes. This kind of classification was imposed by the availability of data for some countries. Later, the others were adapted so a homogeneous dataset could be constructed. The computations were made using the Stata 14 statistical package.

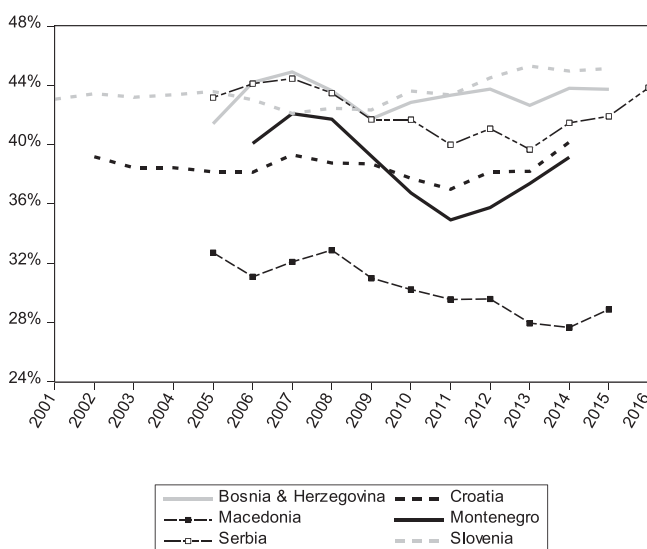


Figure 4. Total revenues (as % G.D.P.). Source: Countries' respective Ministries of Finance.

Based on the available data, we use average values for the two seven-year periods of 2001–2007 and 2008–2014. The analysis uses the average linkage clustering method and Euclidean distance as the similarity or dissimilarity measures. We perform a cluster analysis for each period; the corresponding dendrograms are presented in [Figures 5](#) and [6](#). Since we use average linkage clustering and an average of all distances between points from different clusters, the Y axis provides a measure of such closeness of individual data points.

In both periods, countries can be organised into five main clusters: two of those clusters hold in both periods (Denmark and Sweden on the one hand; and the United Kingdom and Iceland on the other), and a third cluster is almost the same in both cases (Belgium, Austria, France, Italy, Finland and Norway). These clusters are all characterised by having high tax revenues. However, the third cluster, to which more countries belong, differs from the two smaller ones for one important reason: social contributions in this cluster are somewhat higher than the rest of the countries in the sample in both periods.¹⁰

The main feature of concern to us is that four out of the five former Yugoslavian republics belong to the same cluster in both periods. In the first period, they are joined by the Czech Republic, Greece, Portugal, Spain, Poland, Slovakia, the Netherlands, Hungary, Germany and Luxembourg. In the second period, the same cluster is subject to some changes, with Estonia joining it and Slovakia leaving it. Although they belong to a large cluster, the former Yugoslavian countries are closely positioned within the same cluster in both periods. Moreover, the data on tax revenue decomposition in [Appendix 1](#) shows that the values of tax variables for the three countries placed together in the sub-cluster in both periods all fall within a 2% range.

The only former Yugoslavian country that is located separately from the others is Macedonia, which is next to its geographical neighbours, Bulgaria and Romania. The reason for the difference in the position of Macedonia in the tree diagram is found in

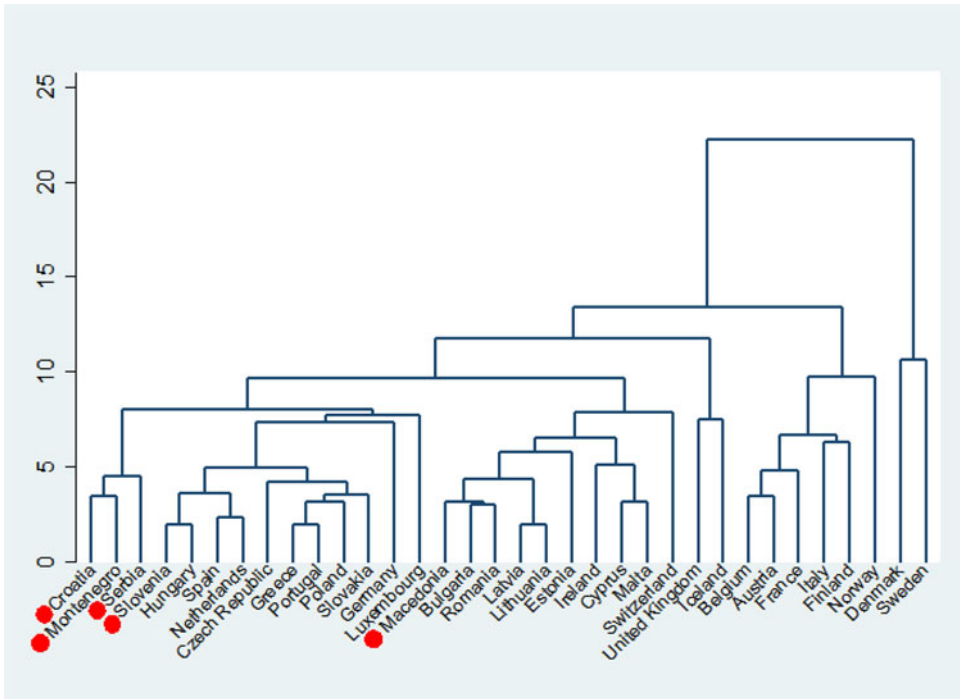


Figure 5. Dendrogram for tax revenue composition, Period 2001–2007. Source: Authors' calculations.

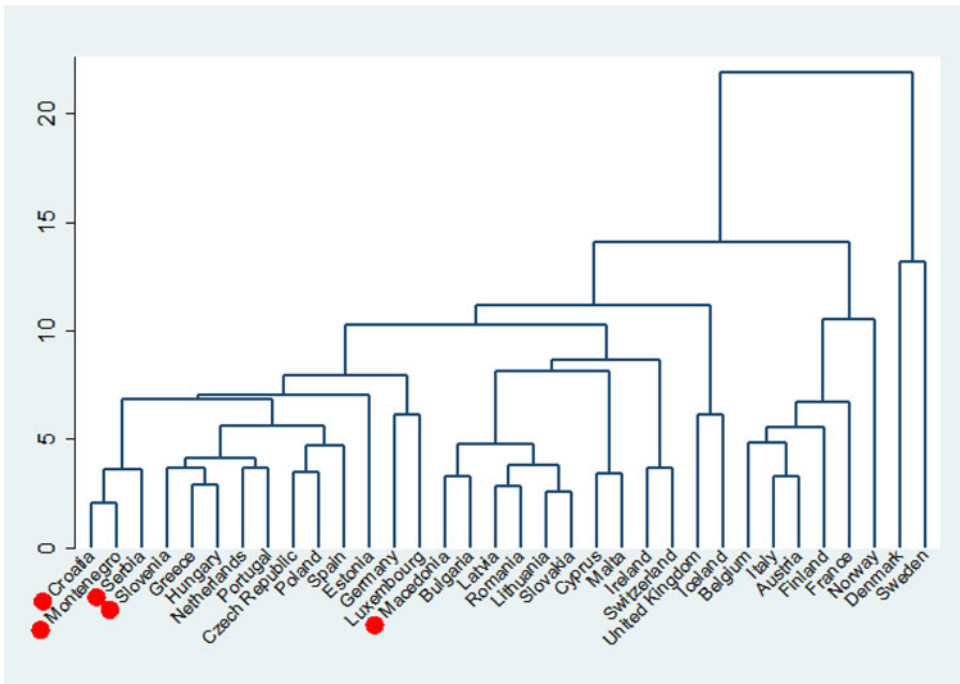


Figure 6. Dendrogram for tax revenue composition. Period 2008–2014. Source: Authors' calculations.

the two tax categories that have a joint weight of 70%: the V.A.T. and social contributions. On the one hand, V.A.T. constitutes a lower share of the tax revenues in Macedonia than in the other former Yugoslavian countries. On the other hand, when it comes to social contributions, Macedonia has the lowest percentage of G.D.P. of all the former Yugoslavian countries in both periods, with a difference of over 2% of the G.D.P.

4. Econometric analysis of the budget balance elasticity of deficits and their components

4.1 Econometric specifications and methodology

The first dependent variable is *deficit* and the regressors are *output gap* and the lagged endogenous *deficit*_{*t-1*} (Equation 2). As for the remaining elements in the equation, α_i stands for the country effects, λ_t for the period fixed effects, β for the coefficient of the independent variable, ρ for the coefficient of the lagged endogenous variable and ε_{it} for the error term. In order to break down the effect of *output gap* on both sides of the budget, in Equations (3) and (4) expenditure or revenues replace deficit. As in previous sections, variables are expressed as ratios over G.D.P.:¹¹

$$deficit_{it} = \alpha_i + \lambda_t + \beta \cdot output\ gap_{it} + \rho \cdot deficit_{it-1} + \varepsilon_{it} \quad (2)$$

$$expenditure_{it} = \alpha_i + \lambda_t + \beta \cdot output\ gap_{it} + \rho \cdot expenditure_{it-1} + \varepsilon_{it} \quad (3)$$

$$revenues_{it} = \alpha_i + \lambda_t + \beta \cdot output\ gap_{it} + \rho \cdot revenues_{it-1} + \varepsilon_{it} \quad (4)$$

The methodology used in the analysis is a simple and frequently used procedure for computing elasticities. More sophisticated equations, such as the ones used by Bouthevillain et al. (2001), Mourre et al. (2014) and Girouard and André (2005), were discarded due to the small sample size.¹² As stated above, in the related literature some studies used variables other than the output gap. For instance, Viren (2014) and Tujula and Wolswijk, (2007) use the growth rate of the G.D.P. However, the output gap is a better option insofar as it captures cyclical positions more effectively than simple annual growth rates.¹³ In addition, other control variables are used in the literature (Table 1). In preliminary estimates, we also include unemployment and inflation as right-hand variables, but neither was significant.

Empirical analysis was performed using the statistical software EViews 9.5. The basic statistics of the variables are reported in Table 2. A battery of specification tests on Equation (3) was performed. Concerning the redundancy of both individual and period fixed effects, the corresponding tests confirm their relevance. In contrast, a Wald test on cross-section slope homogeneity clearly supports the validity of the constrained equation assuming common slopes (p-value = 0.78), meaning that pooling data makes sense. The Breusch-Godfrey test on AR(1) autocorrelation shows that this is not an issue. Moreover, all variables are stationary according to the results of both augmented Dickey-Fuller (A.D.F.) and Levin, Lin, and Chu (L.L.C.) unit root tests. In contrast, the hypothesis of cross-sectional dependence cannot be rejected at the 5%

Table 1. Cross-country studies on budgetary elasticities.

Author	Period	Countries	Data source	Econometric specification			Coefficients on the elasticity to the economic cycle	
				Model specification	Methodology & research steps	Budget balance	Revenues	Expenditures
Viren (2014)	1970–2011	EU15	Ameco	deficit = $f(\text{G.D.P. growth, debt, real interest rate})$	O.L.S. with individual fixed effects, revenues or expenditures replace deficit in the specification	0.464	-0.09	-0.58
Boutheyvillain et al. (2001)	1999	EU15	European Commission		Change in the budget balance as a percentage of G.D.P. in response to a 1% change in G.D.P.	0.53		
Girouard and André (2005)	2003	26 O.E.C.D. countries	O.E.C.D.		Budgetary elasticity is computed using the cyclical elasticity of the four categories of taxes and the one expenditure item.	0.44		
Mourre et al.	2014	EU28	Ameco, O.E.C.D.		Budgetary elasticity is computed using the cyclical elasticity of the four categories of taxes and the one expenditure item.	0.50	0.00	-0.50
Altar et al. (2010)	Q1, 1998–Q4, 2008	Romania	European Commission		Budgetary elasticity is computed using the cyclical elasticity of the four categories of taxes and the one expenditure item.	0.285		
Tujula and Wolswijk (2007)	1970–2002	22 O.E.C.D. countries	O.E.C.D.	deficit = $f(\text{G.D.P. growth, negative output gap dummy, debt, real interest rate, stock price increase, house price increase dummy, election dummy, E.U. entry dummy})$	O.L.S. including individual fixed effects, year dummies and country-specific dummies	0.16		
Kabashi (2014)	1995–2011	EU15, C.E.S.E.E. countries	Ameco, National statistical offices, Central banks or Ministries of Finance	deficit = $f(\text{Output gap, debt, inflation rate})$	G.M.M.	-0.16		
	1960–2013		I.M.F.				-0.28	

(continued)

Table 1. Continued.

Author	Period	Countries	Data source	Econometric specification			Coefficients on the elasticity to the economic cycle		
				Model specification	Methodology & research steps	Budget balance	Revenues	Expenditures	
Vegh and Vuletin (2015)		42 developed countries		$tax_{it} = \beta_0 + \beta_1 \cdot real\ GDP_{it} + \varepsilon_{it}$	O.L.S., base of tax is a weighted average of Personal income tax, Corporate income tax and Value-added tax				
Staehr (2008)	1995–2005	EU27	Eurostat	$deficit = f(G.D.P., growth, debt, lagged\ deficit)$	G.M.M. with country- and time-specific dummies; all independent variables in two versions: new and old E.U. member countries	0.496			
Fincke and Wolski (2016)	Q1, 2000–Q4, 2011	10 new E.U. member countries	E.C.B. and I.M.F.	$deficit = f(output\ gap, lagged\ debt, lagged\ deficit)$	Panel regression with instrumental variables; all independent variables in two versions: before and after E.U. accession	0.337			
Our results	2001–2014	6 former Yugoslavian countries	National statistical offices, Central banks or Ministries of Finance	$deficit_{it} = \beta_0 + \beta_1 \cdot output\ gap_{it} + \beta_2 \cdot deficit_{it-1} + u_{it}$	O.L.S. including time and individual fixed effects; and G.M.M.	1.02–1.71	0	–1.27 to –1.20	

Source: Author's calculations.

Table 2. Main descriptive statistics.

Variable	Mean	Median	Maximum	Minimum	Observations
Deficit	-2.99	-3.17	6.60	-15.02	66
Expenditures	41.94	42.22	60.31	31.50	66
Total revenues	38.95	39.50	45.29	27.66	66
Personal income tax	3.82	3.19	5.77	2.03	56
Corporate income tax	1.63	1.57	3.18	0.59	56
Value-added tax	10.33	10.36	14.67	7.88	56
Excises	3.95	3.91	5.44	3.19	56
Customs	0.92	0.79	2.64	0.00	56
Other tax revenue	1.49	1.07	4.13	0.17	56
Social contributions	12.06	11.96	15.24	8.37	56
Output gap	0.06	-0.51	6.63	-2.69	78

All variables are expressed as a percentage of G.D.P. Fewer observations for tax category data is due to lack of data for Bosnia and Herzegovina. Source: Author's calculations.

level according to the results of the Pesaran C.D. test (Pesaran, 2004). For this reason, we report *t*-statistics computed on ordinary least square (O.L.S.) residuals and robust *t*-statistics computed using panel-corrected standard errors (P.C.S.E.) to comprehensively deal with both cross-sectional dependence and heteroscedasticity (Beck & Katz, 1995). All in all, the results provided by the two formulas are essentially the same.

However, Pooled O.L.S. is subject to two shortcomings. First, including both fixed effects and the lagged endogenous variable leads to the so-called Nickell bias (Nickell, 1981). Although this bias is of the order $1/T$, and T is not very small in our case, the potential bias is not negligible. Second, the potential endogeneity of the output gap is a result of the Keynesian effects of public deficit. In order to deal with both problems, we also compute a panel G.M.M. estimator. Taking into account the small N dimension of the panel, we choose the one-stage Arellano–Bond differenced estimator and discarded more sophisticated and informationally demanding estimators (two stages or system G.M.M.). A variable number of lagged values of the endogenous variable is used as the instrument, constrained by the sample size and the values of both the Hansen test and Arellano–Bond AR(2) autocorrelation test. In most cases, the main results hold using Pooled O.L.S. (P.O.L.S.) or G.M.M.

4.2 Results

Results are reported in Table 3. The main result is that the deficit is statistically and significantly influenced by the output gap. The coefficients on this variable in the first two columns are between 1.02 and 1.70, with *t*-statistics between 3.43 and 3.15, respectively. Equations (3) and (4) split the deficit into their two direct components, expenditure and revenues. All comments and choices on specification Equation (2) discussed above are imposed in both cases. While the ratio of total revenues to G.D.P. is not influenced by the cycle, that of expenditures to G.D.P. is, with average elasticities around -1.25 .¹⁴ Hence, deficit elasticity to the output gap is fully explained by expenditures. The positive value of the output gap coefficient in Equation (2), as well as a negative value of the same coefficient in Equation (3), indicates countercyclical fiscal policy in the considered period.

In order to check the robustness of results concerning the reported inelasticity of the ratio of revenues to G.D.P. with regard to changes in the output gap, Equation

Table 3. Pooled O.L.S. and G.M.M. estimates of specifications [3], [4] and [5].

	<i>Deficit</i>	<i>Deficit</i>	<i>Expenditure</i>	<i>Expenditure</i>	<i>Total Revenues</i>	<i>Total Revenues</i>
Output Gap	1.02 (3.43)*** [2.89]***	1.71 (3.15)***	-1.27 (-3.88)*** [-3.01]***	-1.20 (-3.11)***	-0.23 (-1.36) [-1.17]	0.05 (0.17)
Deficit (-1)	0.27 (2.12)** [1.61]	0.16 (0.85)				
Expenditure (-1)			0.26 (6.06)** [1.33]	-0.23 (-1.46)		
Total Revenues (-1)					0.70 (2.60)** [4.53]***	0.39 (1.93)**
Number of observations	61	56	61	56	61	56
R ²	0.77		0.92		0.97	
Individual fixed effects	0.1213					
Period fixed effects	0.0051					
Wald test	0.7803					
B-G test	0.4175		0.1320		0.2741	
Pesaran CD	0.0446					
Hansen test		0.132782		0.092566		0.285777
A-B AR(2)		0.8176		0.3873		0.5907
Method	P.O.L.S.	G.M.M.	P.O.L.S.	G.M.M.	P.O.L.S.	G.M.M.

All estimates include both fixed individual and period effects. *P*-values are reported in the case of specification tests. Individual fixed effects and period fixed effects is the *F*-test on the respective redundancy tests. The Wald test is Chi-square statistic value on the null hypothesis of cross-country homogeneity in slopes. B-G is the Breusch-Godfrey test of AR(1) autocorrelation. Pesaran CD is the Pesaran CD test on the null hypothesis of no contemporaneous correlation. ***, **, and * indicate statistical significance at 1%, 5% and 10%, respectively. *t*-statistics computed using O.L.S. residuals in parenthesis, robust *t*-statistics computed using panel-corrected standard errors P.C.S.E. in brackets (Beck & Katz, 1995). Instruments in G.M.M. include second and third lagged values for *Deficit* and *Revenues* and third and fourth lagged values for *Expenditures*. Estimates are performed using EViews 9.5. Source: Author's calculations.

(4) is adapted to perform individual analysis of the main tax categories (Table 4). In most columns, the output gap is not significant; the two exceptions are the G.M.M. estimate for V.A.T. and the P.O.L.S. estimate for social contributions. However, in both cases the parameter is not significant at 5% or less and findings are not robust for the estimation method, as they are in the case of deficit and expenditure.

Returning to the results summarised in Table 1, budgetary elasticity in the former Yugoslavian countries seems to be higher than in any other European country. Our estimates (1.02–1.71) are much higher than the ones in the analyses by Mourre et al. (2014), at 0.50, and by Bouthevillain et al. (2001), at 0.49–0.53. Similar results are found by Viren (2014), who used the same methodology we did (O.L.S. and G.M.M.) to obtain the elasticity of 0.46 for the EU15 countries. However, his measure for the economic cycle was the real G.D.P. growth instead of the output gap. Nevertheless, the results demonstrated how the public finances of former Yugoslavian countries are highly influenced by the economic cycle. Double elasticity of public finances in transition countries rather than European ones is not a rare finding. This idea is also backed up by the recent developments in literature; although not explicitly focusing on the former Yugoslavian countries, Staehr (2008) found that in the Eurozone, the effect of the economic cycle on the budget balance is twice as strong as in new E.U. member states. He also concluded that revenues were acyclical in new E.U. member states. Moreover, the results of Kabashi (2014) show a stronger effect in Western Balkan countries than in new E.U. member states. Koczan (2016) suggests that the

Table 4. Pooled O.L.S. and G.M.M. estimates of specification [5].

	Personal income tax	Corporate income tax	Corporate income tax	Value-added tax	Value-added tax	Excises	Excises	Customs	Customs	Other tax revenue	Other tax revenue	Social contributions	Social contributions
Output Gap	0.05 (1.22) [1.25]	0.09 (1.36) [-0.23]	-0.02 (-0.26) [-0.23]	0.08 (0.84) [0.73]	0.32 (2.18)** [0.36]	0.01 (0.35) [0.36]	-0.01 (-0.17)	-0.02 (-0.94) [-0.83]	-0.05 (-1.28)	-0.04 (-0.98) [-0.94]	0.02 (0.33)	-0.15 (-1.76)* [-1.44]	-0.12 (-1.14)
Personal income tax (-1)	0.71 (4.59)*** [3.41]***	0.59 (2.74)***											
Corporate income tax (-1)		0.60 (4.38)*** [3.23]***	0.47 (2.79)***										
Value-added tax (-1)				0.40 (2.51)** [1.61]	0.18 (0.93)								
Excises (-1)						0.80 (10.34)*** [7.81]***	0.64 (4.46)***						
Customs (-1)								0.87 (11.31)*** [7.14]***	0.89 (11.38)***				
Other tax revenue (-1)										0.77 (7.78)*** [6.10]***	0.61 (6.30)***		
Social contributions (-1)												0.46 (2.75)*** [2.10]**	-0.20 (-0.74)
Number of observations	51	46	46	51	46	51	46	51	46	51	46	51	46
R2	0.98	-	0.81	0.95	-	0.93	-	0.97	-	0.97	-	0.96	-
B-G test	0.71	-	0.86	0.71	-	0.99	-	0.65	-	0.04	-	0.89	-
Hansen test	-	0.11	-	0.08	-	-	0.41	-	0.10	-	0.08	-	0.81
A-B AR(2)	-	0.18	-	0.07	-	-	0.15	-	0.11	-	0.11	-	0.28
Method	P.O.L.S.	G.M.M.	P.O.L.S.	G.M.M.	G.M.M.	P.O.L.S.	G.M.M.	P.O.L.S.	G.M.M.	P.O.L.S.	G.M.M.	P.O.L.S.	G.M.M.

See Table 3. The list of G.M.M. instrument only includes the third and fourth lags of the corresponding endogenous variable in the cases of the Personal income tax and Other tax revenues and second and third lags in the cases of Corporate income tax, Value-added tax, Excises, Customs and Social Contributions. Source: Author's calculations.

political cycle might be linked to a larger discretionary component of fiscal policy (in this case concerning expenditures) in the Western Balkans.

While our results can also be influenced by the fact that the analysed period includes the so-called 'Great Recession', they suggest the strong role of spending policies in former Yugoslavian countries as a countercyclical tool; this is in line with results by Fincke and Wolski (2016) for new E.U. member states. However, further research on this topic is required in order to determine which mechanisms explain the countercyclical nature of public expenditure in former Yugoslavian countries.¹⁵ In particular, we should determine the role played by three complementary mechanisms: (1) automatic stabilisers (as unemployment benefits), (2) discretionary expenditure programmes implemented for compensating the effects of crisis and (3) the rigidity of expenditures: in general, it is an easier task for policymakers to increase expenditures during boom times than it is to reduce them in troubled times.

As for the inelasticity of revenues, this proved to be the case for both European and former Yugoslavian countries. Mourre et al. (2014) obtained an elasticity of 0.00 for an EU28 sample, which they justify by noting a marked cyclical pattern between tax revenues and G.D.P., whose fluctuations offset each other in their ratio. On the other hand, Viren (2014) obtained an elasticity of -0.09 for an EU15 sample.

5. Concluding remarks

The contribution of this paper to the literature on fiscal issues in former Yugoslavian countries is threefold. First, we describe the comparative evolution of the main fiscal aggregates of all six former republics using a new panel dataset. Second, after comparing the composition of their national tax revenues in a European context over time, we have seen in the cluster analysis how there are common patterns in four of the five analysed countries. Third, we have shown that the output gap is highly significant in explaining the evolution of both deficit and expenditures over G.D.P. in all countries, but not to account for the evolution of revenues over G.D.P. In fact, the elasticity of expenditures is well above average for E.U. countries, but the elasticity of revenues is below average. Public deficit and expenditures are both countercyclical, while tax revenues over G.D.P. remain acyclical.

Further research is required to disentangle this result; in particular, to shed additional light on the relevance of automatic stabilisers, discretionary expenditure measures and the rigidity of expenditure programmes. Understanding countercyclical behaviour will help to define sound fiscal consolidation strategies, which is particularly relevant when meeting E.U. fiscal requirements. Concerning tax inelasticity, we should explore the extent and impact of the shadow economy and fiscal evasion in the region, and whether they are correlated with the economic cycle.

Bearing in mind the difficulties in gathering data from heterogeneous sources, the improvement of databases for these countries presents itself as a relevant objective. A convergence in statistics for all of them would be possible by making efforts to participate in international statistical coverage by, for example, Eurostat and the I.M.F. Although there is some presence in these institutions, not all former Yugoslavian countries are participating fully. Having homogeneous data sources would enable the

development of viable, more sophisticated econometric studies that could help with policy and institutional design.

Notes

1. Collecting homogeneous data for the former Yugoslavian republics was a cumbersome task. This likely explains why cross-country studies have been so scarce until now. Since there was no uniform source for all countries, the data had to be collected individually for each country. Bearing in mind the different governing structures, various institutions such as State Statistical Offices, Central Banks and Ministries of Finance had to be contacted. Furthermore, in order to confirm their lack of data, research on the availability of data within European institutions was also necessary. Based on availability, in five countries, the respective Ministries of Finance were taken as a relevant source for all fiscal variables present in the database. The exception was Bosnia and Herzegovina, where the Central Bank has the task of collecting and presenting consolidated data for the whole country. Although in some countries the data is usually publicly available on their websites, others kept them for their own internal use. This meant establishing a necessary contact and seeking data through formal channels. After compiling all the necessary information, the raw data had to be recalculated to a joint unit of measurement, which in our case was G.D.P. percentage. We would like to take this opportunity to thank all of those who helped and participated in the extensive and time-consuming data-collection process.
2. Beyond the central focus of our paper, fiscal decentralisation in Western Balkan countries is analysed by Mazllami and Osmani (2014). They reveal a significant number of problems in local public finances and suggest the creation of legal mechanisms for the allocation of grants, as well as the introduction of improvements in the administrative and managerial capacities of the municipalities. In the same vein, Diamond and Last, (2003) confirm a lack of strategic planning for budget system reforms in all former Yugoslavian countries.
3. Government Finance Statistics Manual 2014. Washington, DC: International Monetary Fund, 2014.
4. <http://www.finance.gov.mk>
5. <http://www.mf.gov.me>
6. <http://www.mfin.gov.rs>
7. Nevertheless, the compatibility of all three data sources in this sense is not questionable due to the following explanation from the I.M.F.'s G.F.S.M. 2014 (Appendix 1. Changes from the G.F.S.M. 2001 and G.F.S.M. 1986): 'Another balancing item in the GFS framework is the overall balance, defined as net lending/net borrowing adjusted through the rearrangement of transactions in assets and liabilities that are deemed to be for public policy purposes. ... It is the equivalent of the overall deficit/surplus in the GFSM 1986, but determined using the accrual basis of recording.'
8. Ideally, a fiscal dataset that could enable a more sophisticated analysis would count on quarterly data, such as Profeta and Scrabosetti (2017).
9. The advantages of using the output gap instead of the observed G.D.P. growth rates are discussed in more detail in section 4.
10. Full data are reported in Appendix 1.
11. Moreover, Equation (4) is also adapted to analyse the behaviour of the main tax categories.
12. Bouthevillain et al., (2001) also introduce other variables that take into account discretionary fiscal policy measures, in addition to a number of other possible idiosyncratic features of the economy. For the European Commission, Mourre et al., (2014) obtain the value of the budgetary semi-elasticity as a difference of the corresponding values of revenues and expenditures. Furthermore, they calculate this

using data for five different tax categories for the former and unemployment-related expenditures for the latter. Both of these kinds of data were unavailable to us for all countries. Girouard and André, (2005) first applied this approach to the O.E.C.D.; they used four different tax categories for the revenue side and current expenditures (to reflect unemployment-related spending) for the expenditure side.

13. For instance, if G.D.P. growth rate is 3% in year t , but was -3% over the last three years, it is clear that fiscal variables in year t will reflect a negative effect of the business cycle. While using the observed growth rate in year t would not capture the cyclical position of the economy (information on previous years is not taken into account), the output gap would. The same approach is followed in Simon, Sacchi, and Lago-Peñas, (2017).
14. In order to check the robustness of results for expenditure and deficit, we used a bias-corrected least squares dummy variable (L.S.D.V.) estimator, originally proposed by Kiviet (1995) and extended by Bruno (2003) to unbalanced panels. Whilst short-run effects (β) were lower, the coefficient on the lagged endogenous variable was higher and so in the long-run multipliers were more similar.
15. de Castro Fernández, Basterrechea, Montesinos, García, and Fuentes, (2018) prove that social transfers, particularly unemployment-related expenditures, reflect counter-cyclical behaviour.

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Appendix 1

Table A1. Data on the decomposition of tax revenues in European and Former Yugoslavian countries used in the cluster analysis (as % G.D.P.).

Country	Averages for period	Personal Corporate		Value-added taxes	Excises	Customs	Other taxes	Social contributions	Total tax revenues
		Income Tax	Income Tax						
Croatia	2001–2007	3.1	2.1	12.0	4.2	0.7	0.9	11.7	34.7
Macedonia	2001–2007	2.5	1.3	8.6	3.7	1.7	0.5	9.1	27.4
Montenegro	2001–2007	3.3	1.0	13.7	3.4	2.6	0.8	11.7	36.5
Serbia	2001–2007	5.4	0.9	11.5	4.2	2.3	1.4	12.8	38.5
Slovenia	2001–2007	5.6	2.2	8.3	3.3	0.3	3.8	14.1	37.6
Belgium	2001–2007	12.4	3.1	6.8	2	0.3	4.9	15.6	45.1
Bulgaria	2001–2007	3	2.8	9.1	3.8	1.3	1.1	9.1	30.2
Czech Republic	2001–2007	4.2	4.2	6.1	2.4	1.1	1	14.8	33.8
Denmark	2001–2007	24.5	3.1	9.5	3.8	0	5	1.7	47.6
Germany	2001–2007	8.3	2.1	6.3	2.2	0.6	1.9	17.4	38.8
Estonia	2001–2007	6.1	1.4	8.4	0	3.4	1	10.5	30.8
Ireland	2001–2007	8.9	3.5	7	1.1	1.5	3.6	5.1	30.7
Greece	2001–2007	4.2	2.9	6.8	2.6	0	4.4	12.2	33.1
Spain	2001–2007	6.8	3.6	6	2.3	0	3.6	12.7	35
France	2001–2007	7.8	2.6	7	2.2	0	7	17.5	44.1
Italy	2001–2007	10.4	2.6	5.8	2.3	0	6.8	12.1	40
Cyprus	2001–2007	3.7	4.9	7.5	2.7	1.4	3.6	6.8	30.6
Latvia	2001–2007	5.6	1.9	7.1	3.1	0.2	1.7	8.6	28.2
Lithuania	2001–2007	6.8	1.7	7.2	2.9	0.3	1.1	9.4	29.4
Luxembourg	2001–2007	6.9	6.3	5.9	0.2	4.1	3.6	11.3	38.3
Hungary	2001–2007	6.9	2.3	8	3.2	0.5	4	12.7	37.6
Malta	2001–2007	6.1	4	6.8	2.8	0.5	4.2	7.4	31.8
Netherlands	2001–2007	6.2	3.3	6.9	1.2	1.2	3.8	13.5	36.1
Austria	2001–2007	10.1	2.4	7.7	2.6	0	5	15.1	42.9
Poland	2001–2007	4.4	2.1	7.5	3.7	0.6	2.2	13.5	34
Portugal	2001–2007	5.1	3	7.8	2.7	0.3	3.8	11.3	34
Romania	2001–2007	2.8	2.8	7.3	3	0.7	1.5	10.4	28.5
Slovakia	2001–2007	3.1	2.7	7.2	2.6	0.7	2.1	13	31.4
Finland	2001–2007	13	3.6	8.1	3.7	0	2.4	11.6	42.4
Sweden	2001–2007	16.7	2.8	8.4	2.9	0	11.6	4.1	46.5
United Kingdom	2001–2007	10.1	3.1	6.3	3.4	0	5.1	7.6	35.6
Iceland	2001–2007	13.9	1.5	10	2.3	0.3	6.2	3	37.2
Norway	2001–2007	9.8	9.8	8	2.4	0.1	3.1	9.1	42.3
Switzerland	2001–2007	8.6	2.5	3.5	0.4	1.3	3.9	6.6	26.8
Croatia	2008–2014	3.0	2.3	11.8	3.5	0.4	1.2	11.8	34
Macedonia	2008–2014	2.1	1.1	8.5	3.4	1.0	0.7	8.8	25.6
Montenegro	2008–2014	3.0	1.5	12.7	4.5	1.3	0.3	11.5	34.8
Serbia	2008–2014	4.4	1.4	10.3	4.9	1.3	1.3	12.6	36.2
Slovenia	2008–2014	5.5	1.7	8.2	4.1	0.0	2.7	14.8	37
Belgium	2008–2014	12.3	2.9	6.9	1.8	0.3	5.3	16.4	45.9
Bulgaria	2008–2014	2.9	2.1	9	5	0	1.1	7.2	27.3
Czech Republic	2008–2014	3.6	3.4	7	2.6	1.3	0.8	14.7	33.4
Denmark	2008–2014	25.8	2.4	9.6	3.3	0	4.8	1.3	47.2
Germany	2008–2014	8.6	2.3	7	1.8	0.6	2.1	16.5	38.9

(continued)

Table A1. Continued.

Country	Averages for period	Personal Income Tax	Corporate Income Tax	Value-added taxes	Excises	Customs	Other taxes	Social contributions	Total tax revenues
Estonia	2008–2014	5.5	1.5	8.3	0	4.2	1	11.9	32.4
Ireland	2008–2014	9.2	2.4	6.1	0.6	1.8	3.3	5.8	29.2
Greece	2008–2014	5.2	1.9	7	3.3	0.1	5.3	13.2	36
Spain	2008–2014	7.4	2.1	5.3	2.1	0	2.9	12.7	32.5
France	2008–2014	8.2	2.6	6.8	2.2	0	7.3	18.4	45.5
Italy	2008–2014	11.5	2.4	5.9	2.5	0	6.8	13.3	42.4
Cyprus	2008–2014	3.4	6.1	8.4	3	0.3	3.4	7.9	32.5
Latvia	2008–2014	5.8	1.7	6.8	3.3	0	1.8	8.9	28.3
Lithuania	2008–2014	4.1	1.5	7.6	2.9	0.1	0.7	11.5	28.4
Luxembourg	2008–2014	8.4	5.2	6.9	0.2	3.3	3.1	12.2	39.3
Hungary	2008–2014	5.9	1.6	8.7	3.3	0	5.7	13	38.2
Malta	2008–2014	6.4	5.9	7.5	2.9	0	3.7	7	33.4
Netherlands	2008–2014	7.2	2.4	6.6	1.1	1.1	3.6	14.5	36.5
Austria	2008–2014	10	2.1	7.7	2.3	0	5.3	15	42.4
Poland	2008–2014	4.6	2.1	7.4	3.7	0.3	2.2	12.5	32.8
Portugal	2008–2014	6.2	3	7.9	2.1	0.5	3.6	11.8	35.1
Romania	2008–2014	3.4	2.2	7.8	3	0.3	1.6	9.2	27.5
Slovakia	2008–2014	2.9	2.7	6.5	2.7	0	1.7	12.6	29.1
Finland	2008–2014	12.6	2.4	8.7	3.5	0	2.6	12.4	42.2
Sweden	2008–2014	14.9	2.9	9	2.5	0	10.9	3.7	43.9
United Kingdom	2008–2014	9.7	2.8	6.4	3.2	0	5.3	7.9	35.3
Iceland	2008–2014	13.3	2	8	1.9	0.4	6	3.5	35.1
Norway	2008–2014	9.7	9.6	7.6	2	0.1	2.6	9.4	41
Switzerland	2008–2014	8.6	2.8	3.5	0.4	1.1	4	6.6	27

Source: I.M.F., Ministry of Finance of the Republic of Macedonia, Ministry of Finance of Montenegro and Ministry of Finance of Serbia.