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**Size and quality of public sector and economic growth
- changes occurring in the former communist EU countries**

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Size and quality of public sector and economic growth - changes occurring in the former communist EU countries *

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Abstract

The impact of fiscal policy on economic growth is a complex and contradictory topic in finance debates. Government influences real economy through the impact of public revenues and expenditures on the quantity and quality of production factors, labor and capital. High taxation for supporting big public sector can impede growth. On the other hand, some of the public expenditures can stimulate growth. This opposite effects of the public sector's intervention through fiscal policy rise the debate about the performance of public sector in stimulating economic growth.

The size and the quality of public sector is a reflection of the past and current political decisions. Ex-communist countries face the challenge of reconstructing the public sector, in order to correspond to the requirements of the market economy, but also to ensure a stable macroeconomic and social environment.

The aim of this paper is to analyze the the differences between developed UE countries and former communist EU countries regarding the public sectors and economic growth.

Keywords: fiscal policy, size of public sector, quality of public sector, economic growth

JEL Code: E62, H11, O10

1. Introduction

The economic growth process and its determinant factors represent a topic of interest both for theoretical and empirical research. The interest is primarily justified by the observation of the increasing of living standards in time but also by the existence of major differences in living standards between countries.

The economic growth process can be assimilated to the improvement of the quality of life indicators through a more efficient use of economic resources. Commensuration of the economic growth is achieved through specific indicators related to gross domestic product (GDP), for example by increasing in GDP per capita or through the growth rate of real GDP.

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Factors that influence directly or indirectly the economic growth can be identified through the impact on the production function:

$$Y_t = F(A_t \cdot K_t, B_t \cdot L_t)$$

where

Y_t = output (production)

K_t = quantity of capital used in production process,

L_t = quantity of labour used in production process,

A_t = quality of capital (technical progress),

B_t = quality of labour (education, health, etc.).

Economic growth (output per capita – Y/L) is determined by stock of capital per capita – K/L and the quality of capital – A and labour – B :

$$y_t = f(A_t, B_t, k_t)$$

These determinant factors act through the effects they produce on the quantity and quality of factors of production:

➔ **factors of production – physical and human capital** - between economic development and production factors's quantity and quality there is a direct, intense and bidirectional relationship.

Both exogenous and endogenous growth theories support the importance of the production factors for stimulating economic growth. Physical capital is the key element in the theoretical and empirical foundation for the differences in living standards in time. Human capital is the key element in the theoretical and empirical foundation for the differences in living standards in space.

Turner, Tamura and Mulholland (2008) obtained results which showed that a large proportion of the average growth of GDP is generated by the average growth of labour and capital. Hall and Jones (1999) explain international differences between the level of per capita output through differences in physical and human capital accumulation and the productivity of these factors; the productivity of production factors is primarily determined by social infrastructure, defined by Hall and Jones as being a combination of government policies and institutions that form the economic environment in which individuals acquire knowledge and skills and in which companies accumulate factors of production and make the production process. Barro (1991) conducted empirical tests of the determinant factors of economic growth for a sample of 98 countries, the results of these tests supporting the positive effect of human capital and investment to GDP ratio.

➔ **capital market development** - Graff (1999) argues the possibility of four types of causal relationships between financial development and economic growth: (a) financial development, the result of development of financial institutions, and economic growth, the result of real factors, are not directly correlated, (b) economic growth, through the effects of change and development of financial institutions, has effects on the development of the financial sector, (c) financial development leads to economic growth, a phenomenon that is supported by the fact that financial development is a necessary condition for achieving economic growth, by the fact that financial development encourages economic growth, (d) financial development impedes economic growth due to potential adverse effects caused by financial crisis.

King and Levine (1993) show that the level of financial intermediation is a predictor of the economic growth rate. Carlin and Mayer (2003) argue that there is a strong correlation between the specific structure of the financial system and economic growth. In what concerns empirical tests, the results show a positive and intense relationship between financial market development and economic growth – for example, Garretsen, Lensink and Sterken (2004), Beck, Lundberg and Majnoni (2006), Bose (2005), Claessens, Klingebiel and Schmukler (2006)). Obreja Braşoveanu, Dragotă, Cataramă and Semenescu (2008) test for Romania the correlation between capital market development and economic growth. Empirical test results show, for Romania, the strong impact of economic growth on capital market development.

➔ ***institutional factors, government policies, macroeconomic and political stability, income distribution*** - the importance of institutional factors, government policies adopted, political and macroeconomic stability, income distribution in the economic growth process is given by the role of these factors on the real economy. The direct relationship between these factors and economic growth is given by the effect on private initiative to engage in productive activities, given by the safety and security of the investment and by the ownership right.

Helliwell (1992) identifies a positive influence on the economic growth over institutional factors and the degree of democracy, but a negative and insignificant influence in the opposite direction; at the same time, he analyzes the indirect effect of institutional factors and the extent of democracy degree on growth through the impact which these factors have on education and investments, which compensates the weak negative direct effect; Minier (1998) examines both direct and indirect effects of democracy on economic growth through effects of education and justice.

Agenor and Montiel (1999) examine the theoretical literature and support the importance of the fiscal adjustment process to achieve macroeconomic stability (see, also, Stoian 2010); on the other hand, the size and composition of the adjustment, influences the likelihood of success – for example, see Obreja Braşoveanu (2007); it has been shown that achieving fiscal adjustment by reducing public expenditure is more effective than the adjustment made by increasing taxation. Alesina and Perotti (1997) and McDermott and Wescott (1996) conclude that successful adjustments were made primarily by reducing public expenditures, while for the unsuccessful adjustments the adjustments were achieved largely by increasing taxes. Segura-Ubiergo, Simone and Gupta (2006) demonstrate a positive and statistically significant relationship between fiscal adjustment and economic growth for a panel of 26 transition countries for the period 1992-2001. Roubini and Sachs (1989) conclude that political fragmentation index is correlated with the size of the public deficit - coalition governments are more prone to fiscal indiscipline. Beldacci et al. (2004) argue that most governments encourage strong fiscal consolidation; Mulas-Granados (2005) tests the effects of fiscal adjustments on economic growth and income distribution. Adjustment achieved through lowering public spending is more efficient in stimulating economic growth than through the adjustment of public revenues, while the effects on income distribution are opposite.

These are the main channels throughout the economic growth might be stimulated. Those who act in the sens of generating economic growth are from private but also public sectors. The scope of this article is to analyze the impact of the public sector's size and quality on the economic growth process.

The paper is structured as follows: in section 2 there is a short literature review regarding the impact of the public sector, through expenditures, revenues and governance, on the economic growth; section 3 contains the empirical study – the correlation between public sector and economic growth, by regression, cluster and quantile analysis, and section 4 concludes.

2. Literature review

In order to determine the important channels through which public revenues and expenditures, may affect economic growth, we consider the production function.

The channels of influencing the economic growth consist of policies that (1) increase capital per labour – public sector might finance the public activities in a way that minimize the possible distortions over the demand or supply of capital and labour - (2) increase the productivity (quality) of capital – public sector might offer social and economic infrastructure that facilitate private sector's activity - and (3) increase the productivity (quality) of labour – public sector might invest in capital and labour only when it complete private sector's activities, situation that is necessary because of the externality or market imperfections.

In order to stimulate the economic growth through fiscal policy, the state has more instruments (for more details, Obreja Braşoveanu (2007)):

- (a) financing of direct investments, which the private sector would not provide in adequate quantities;
- (b) efficient supply of certain public services which are necessary to ensure the basic conditions for economic activity and long-term investments;
- (c) financing of public activities in such a way that minimizes the distortions generated in the economy (on the private sector's decisions to spend and invest).

Theoretical background offers arguments for both positive and negative relationship between public expenditures and economic growth. Arguments that sustain a **positive correlation** between public expenditures and economic growth are:

- (a) research and development in public sector

Research and developments in public sector may have positive effects through externalities on the private part of economy. Public spending create social infrastructure and other forms of public goods. Public research expenditures may also create technological innovations with broader applicability, enhancing economic growth.

In the less developing countries, public expenditures may help in creating a socioeconomic structure conducive to growth, expenditures for research and development provide technical skills, educational training and create an infrastructure necessary for economic development.

- (b) demand

The effect is positive through an expansion of aggregate demand (Keynesian effect), the increased demand leads to an increase of utilization the idle capital, higher employment and profits, therefore higher investment, all of which cause economic growth.

Public expenditure may be considered a tool of fiscal policy and can therefore be increased to stimulate demand or decreased to dampen demand. This impact depends on

the multiplier effect, assuming there is not a corresponding increase in taxation to finance the spending and the extent of crowding out caused by the spending.

(c) labour

Public spending may increase the skill set of the used labour force through training and education. It has a growth-stimulating effect if it moves the economy closer to full employment, creates human capital, promotes stability, and provides infrastructure.

It is often argued that expenditure for training in developing countries may contribute to improving the educational level of the labor force and may act as a stabilizing influence in the society.

(d) investment

Capital expenditure can have productive uses: private sector benefits from the transport networks that are originally constructed for public purposes. Investment in public sector generates positive externalities for the private sector, like public infrastructure development, technology spillovers and human capital formation.

Arguments that sustain a ***negative correlation*** between public expenditures and economic growth are:

(a) crowding out effect

Public spending can have an adverse effect on economic growth by crowding-out private investment - higher public spending generates a distortion in resource allocation and the diversion of resources from productive activities.

The extent and form of crowding out effects of an increase in public spending will depend on prior utilization and how the increase is financed.

(b) opportunity cost

Trying to explain the negative correlation between public expenditure and growth, economists focus on the opportunity cost of the different categories of expenditures, expenditures hinder economic development by reducing savings and misallocating resources away from more productive use in the public or private sector. In the same context, R&D in the public sector may divert R&D from the private sector where it may receive more practical application.

(c) increased taxation

The government budget constraint requires that an increase in public expenditure might be financed by increased taxes, increased borrowing. The way the increase of public expenditure is financed will have further effects, which feeds back on the economy.

Public expenditure if it is financed by nondistortionary revenues has a positive effect on economic growth; if it is financed by distortionary revenues, it might have a positive or negative effect on economic growth, depending on the level of the public expenditure.

(d) efficiency of resource allocation

Another channel by which public expenditures may affect the economic growth is through their direct impact on the efficiency of resource allocation. Public expenditure is not governed by market processes, so it tends to create distortions in relative prices. Policies implemented to support a public expenditure program might be detrimental to efficient resource allocation and economic growth.

(e) increase the political power of the public sector

In order to be reelected, political parties tend to make time-inconsistent fiscal policy and higher deficits and “bigger” public sector.

In the context of analysing the impact of public expenditures and revenues on economic growth, Barro, Sala-i-Martin (1995) proposed the distinction between:

→ distortionary – nondistortionary fiscal revenues, according to their effects over the decisions of the private agents (distortionary fiscal revenues contain personal income taxes, corporate income taxes, social security contributions, property taxes; nondistortionary fiscal revenues contain value added tax, excise duties). The correlation pattern between the real rate of growth of the GDP and these two categories of income reveals a link of positive causality between the economic growth and non-distortionary taxes and negative between the distortionary taxes. Public revenues have an impact on economic growth through its influence on the quantity of production factors (labour and capital) generated by the fiscal system - the public sector should finance its business in such a way as to minimize the distortions associated with the supply or demand for capital and labour. Theory and empirical evidence support the distortional character of some categories of taxes (income, capital and profit taxes) and undistortional character by those taxes and duties that do not generate changes in relative prices (value added tax, customs duties).

→ productive and unproductive public expenditures, according to their effects over the productivity of the private agents' actions (productive expenditures contain general public services, defence, public order, national security, education, health, housing, environment, transport and communication; unproductive expenditures contain social assistance, culture, religion, economic activities). The theory of economic growth suggests that changes from productive spending to the unproductive one hinder the economic growth. Public expenditures have an impact on economic growth through its influence on the average level of the quality of the labour and on the productivity of capital employed; the positive effects on economic growth are recorded only if the public sector activities are complementing, not competing, with the private sector activities. Theory and empirical evidence support the stimulation of economic growth through public spending for education, health, research and development, capital expenditures.

The effect on economic growth of budgetary revenues and expenditures might consider the connections between budgetary revenues, budgetary expenses and fiscal deficit: financing the productive spending by non-distortionary income might have a positive impact over the economic growth, while the financing distortionary taxes has ambiguous effects; the unproductive spending financed by distortionary taxes have unclear effects, while the financing by means of non-distortionary taxes implies no consequence.

The effects of fiscal policies on economic growth depend also on the quality of the public sector. Afonso, Ebert, Schuknecht, Thone (2005) consider that fiscal policy's quality and supporting-growth character are given by: providing an institutional environment that stimulates economic growth and sound public finances, limiting commitments to the essential role of providing public goods and services, setting growth promoting incentives for the private sector and using efficiently the public resources, financing public activities by an efficient and stable tax system, supporting macroeconomic stability through stable and sustainable fiscal policies.

The size of the public sector is a reflection of current and past political choices. Empirical studies support the idea that when public sector becomes “too big”, the economic growth is negatively affected, and there are also present higher tax burden and inefficiency of the public administration. On the other hand, there are empirical cases of big or small public sectors that achieve similar economic growth. In this context it is very important to consider the public governance – Kaufmann, Kraay, Mastruzzi (2004) construct indicators for six aspects of governance: voice and accountability (the extent to which a country’s citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and free media), political stability and absence of violence (perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including political violence and terrorism), government effectiveness (the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies), regulatory quality (the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development), rule of law (the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence), control of corruption (the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by elites and private interests).

In this context the direct effects of public revenue and expenditure on economic growth, but also taking into account the indirect effects through the impact on production factors, on the institutional factors, on government policies, macroeconomic and political stability, on income distribution, the governance factor becomes of a relevant importance. In the next section we test the correlation between the size and the quality of public sector on economic growth, using a panel data, consisting in EU countries but also separately in former communist EU countries.

3. Empirical study – testing the correlation between the size and the quality of public sector and economic growth

In this section I test the correlation between the size and the quality of public sector and economic growth in European Union context.

I use the real gross domestic product growth rate, gross domestic product growth per head of population and logarithm of the gross domestic product growth per head of population to comensurate economic growth process.

The variables that I use for the size of the public sector are total public expenditure and total current revenue on gross domestic product.

For the quality of the public sector I use specific categories of public expenditures on gross domestic product (education, health, housing and community amenities, public order and safety, recreation, culture and religion, social protection, general public services, environment protection, economic affairs, defence), productive and nonproductive expenditures (as suggested Barro), governance indicators (voice and

accountability, political stability, government effectiveness, regulatory quality, rule of law, control of corruption) and corruption perception index.

The notations are below:

Variables:

Economic growth variables:

growth = real GDP growth rate

gdppc = GDP per head of population

loggdppc = $\log(\text{gdppc})$

Budgetary variables:

exp = total expenditure – general government / GDP

rev = total current revenue – general government / GDP

edu = education public expenditures / GDP

health = health public expenditures / GDP

house = housing and community amenities / GDP

order = public order and safety / GDP

recreation = recreation, culture and religion / GDP

social = social protection / GDP

services = general public services / GDP

environment = environment protection / GDP

economic = economic affairs / GDP

defence = defence / GDP

expprod = productive expenditures / GDP

expnonprod = nonproductive expenditures / GDP

Governance indicators:

govva = governance indicators - Voice and Accountability

govps = governance indicators - Political Stability

govge = governance indicators - Government Effectiveness

govrq = governance indicators - Regulatory Quality

govrl = governance indicators - Rule of Law

govcc = governance indicators - Control of Corruption

gov = average of the governance indicators

cpi = corruption perception index

The countries that I use for panel data are

- UE27: AT, BE, BG, CY, CZ, DK, EE, FI, FR, DE, EL, HU, IE, IT, LV, LT, LU, MT, NL, PL, PT, RO, SK, SI, ES, SE, UK
- former communist UE countries: BG, CZ, EE, HU, LT, LV, PL, RO, SI, SK

I analyze the correlation between public sector and economic growth using both panels data, because I intend to identify the changes between capitalist economies and former communist countries. The descriptive statistics for the panels I used are in Appendix 1.

The level of development influence the effectiveness of fiscal policy in stimulating economic activity - fiscal policy is more difficult to implement in less developed countries because of the following characteristics:

- inefficient administration of tax and expenditure

- volatility of the tax base
- political instability
- the magnitude of fiscal adjustment needed to stabilize macroeconomic environment
- required changes in the composition of public expenditure
- required changes in the structure of public revenues
- weak institutional legacy of budget expenditure management system

In the next tables there are the results of the pool regression analysis with fixed effects, with each panel data.

Table 1: Results of pool regression – panel 1990-2012

Dependent variable	Independent variables	UE 27		10 former communist	
		coefficient	t-statistic	coefficient	t-statistic
loggdppc	exp	-0,005917	-3,0951	-0.009034	-2.127706
	rev	-2,057271	-6,6956	-4.871604	-8.531809

Data source: EUROSTAT

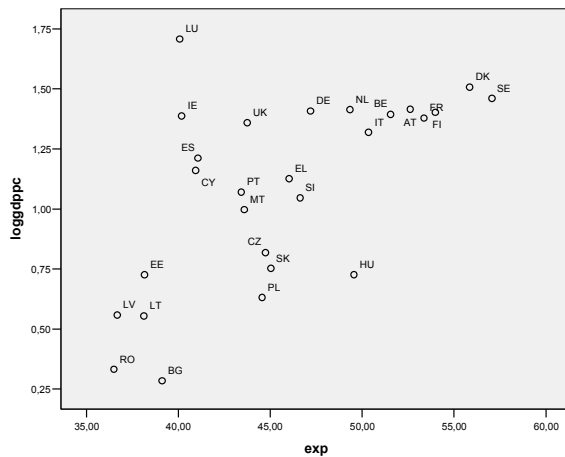


Table 2: Results of pool regressions – panel 1996-2009

dependent variable	independent variables	UE 27		10 former communist		
		coefficient	t-statistic	independent variables	coefficient	t-statistic
loggdppc	exp	-0.006883	-2.787695	exp	-0.014318	-2.790158
growth	exp	-0.554631	-9.085971	exp	-0.665268	-5.483342
loggdppc	exp	-0.004452	-1.913657	exp	-0.005047	-1.112871
	gov	0.072930	6.046563	gov	0.215482	4.978259
	cpi	0.062403	4.537838	cpi	0.128053	4.773283
growth	exp	-0.739823	-11.43590	exp	-1.077376	-8.252643
	gov	-0.771867	-2.301539	gov	0.171127	0.137352
	cpi	-0.535294	-1.399933	cpi	-1.874456	-2.427458
loggdppc	expprod	-0.007749	-1.279523	expprod	-0.009916	-0.756786
	expnonprod	-0.005042	-1.028291	expnonprod	-0.013379	-1.439321
growth	expprod	-0.050760	-0.348548	expprod	-0.270432	-0.924081
	expnonprod	-1.024580	-8.720984	expnonprod	-1.231245	-5.930784

loggdppc	govps	-0.136147	-3.300746	govva	-0.363222	-2.655341
	govge	0.114582	3.297026	govge	0.344244	5.704875
	govrq	0.472138	11.45785	govrq	0.671106	7.814439
growth	govps	7.840068	6.032313	govps	10.26552	4.015420
	govrl	-11.90394	-5.531500	govrl	-21.23729	-5.388441
	govcc	3.628357	2.961931	govcc	7.222656	3.254293
loggdppc	health	0.051313	5.729457	health	0.073212	4.138073
	recreation	0.190267	5.990864	recreation	0.193948	2.829413
	social	-0.010465	-2.369282	social	-0.017509	-2.096683
	services	-0.043776	-8.398855	services	-0.061931	-5.853262
	environment	0.243170	7.749724	environment	0.363382	5.940449
	economic	-0.028835	-4.783360	economic	-0.035053	-3.070493
	defence	-0.043401	-2.775045			
growth	health	-1.608375	-5.984839	health	-1.343250	-2.552300
	house	1.752030	2.544099	recreation	-7.278187	-3.793088
	order	2.862238	4.306213	social	-1.907846	-7.994050
	recreation	-2.392691	-2.317408			
	social	-1.297110	-10.11357			
	environment	-3.203522	-3.127444			
	economic	-0.629669	-3.121894			
loggdppc	defence	1.444285	2.896534			
	health	0.049569	5.264182	govge	0.249059	4.110425
	recreation	0.132437	3.754048	govrq	0.451956	6.038363
	social	-0.009164	-2.018906	edu	-0.064609	-2.233217
	services	-0.031549	-4.866985	health	0.045489	2.721509
	environment	0.209177	6.278727	services	-0.033188	-2.985483
	economic	-0.014273	-2.179745	environment	0.262194	5.870036
	govge	0.066399	2.368871			
growth	govrq	0.234178	5.947087			
	govrl	-7.384757	-4.858364	govps	4.791767	2.163105
	health	-2.037132	-7.041215	govrl	-15.63160	-5.513523
	house	1.525952	2.148307	health	-1.692510	-3.201055
	order	2.210454	2.951149	social	-2.165902	-9.196355
	social	-1.603960	-11.86612			
	economic	-0.741845	-3.619018			
	defence	1.416271	2.752606			

Data sources: EUROSTAT, AMECO, WB, TI

The regressions' results sustain the following conclusions:

- ⇒ total expenditure – general government / GDP has a negative impact on economic growth, measured both in real GDP growth rate and log(GDP per head of population); considering the effects of the average of the governance indicators and corruption perception index doesn't change the negative effect of total expenditure – general government / GDP; also the productive and nonproductive expenditure / GDP have negative effects on economic growth. The coefficients demonstrate a stronger impact in the case of former communist countries.
- ⇒ regarding the effects of the governance indicators – the significant variables for the log(GDP per head of population) are political stability, with negative impact, government effectiveness, regulatory quality, both with positive impact, for UE27 panel data, and voice and accountability, with negative impact, government effectiveness and regulatory quality, both with positive effect, for 10 former communist countries. Regarding the effects of these governance indicators, the significant variables are for the real GDP growth rate are Political Stability, with

- positive impact, Rule of Law, with negative effect, and Control of Corruption, with positive impact, for UE27 panel data, and Political Stability, with positive impact, Rule of Law, with negative effect, and Control of Corruption, with positive impact, for 10 former communist countries.
- ⇒ regarding the composition of the public expenditure, there is evidence of the principle of productive and nonproductive expenditures – the significant variables for the log(GDP per head of population) are, with positive effects, health public expenditures / GDP, recreation, culture and religion / GDP, environment protection / GDP, and , with negative effects, social protection / GDP, general public services / GDP, economic affairs / GDP, for both panels.
 - ⇒ regarding the composition of the public expenditure, there is strange evidence of the principle of productive and nonproductive expenditures – the significant variables for the real GDP growth rate are, with positive effects, housing and community amenities / GDP, public order and safety / GDP, defence / GDP, and, with negative effect, health public expenditures / GDP, recreation, culture and religion / GDP, social protection / GDP, environment protection / GDP, economic affairs / GDP, for EU27, and with negative impact there are health public expenditures / GDP, recreation, culture and religion / GDP, social protection / GDP for the 10 former communist countries panel.

In the next tables there are the results of the cluster analysis.

Table 3: Cluster analysis – panel 1990-2012, UE 27

Case Number	country	Cluster	Distance
1	AT	1	,533
2	BE	1	,538
3	BG	2	2,643
4	CY	2	,780
5	CZ	2	3,063
6	DK	1	3,767
7	EE	2	3,526
8	FI	1	1,898
9	FR	1	1,278
10	DE	1	4,894
11	EL	2	4,350
12	HU	1	2,605
13	IE	2	1,574
14	IT	1	1,737
15	LV	2	5,020
16	LT	2	3,575
17	LU	2	1,785
18	MT	2	1,909
19	NL	1	2,745
20	PL	2	2,891
21	PT	2	1,747
22	RO	2	5,220
23	SK	2	3,363

Final Cluster Centers		
	Cluster	
	1	2
loggdppc	1,34	,93
exp	52,08	41,68
rev	,49	,38

24	SI	2	4,946
25	ES	2	,678
26	SE	1	4,977
27	UK	2	2,111

Using cluster analysis for UE27, 1990-2012, for variables log(GDP per head of population), total expenditure – general government / GDP, total current revenue – general government / GDP, I obtain the following cluster:

- ⇒ cluster 1, with greater value of economic growth, log(GDP per head of population), and greater size of the public sector, total expenditure – general government / GDP and total current revenue – general government / GDP, characterized by centre values 1,34 for loggdppc, 52 for expenditures, 49 for revenues: AT, BE, DK, FI, FR, DE, HU(the single former communist country), IT, NL, SE
- ⇒ cluster 2, with smaller value of economic growth, log(GDP per head of population), and a little size of the public sector, total expenditure – general government / GDP and total current revenue – general government / GDP, characterized by centre values 0,93 for loggdppc, 42 for expenditures, 38 for revenues: BG, CY, CZ, EE, EL, IE, LV, LT, LU, MT, PL, PT, RO, SK, SI, ES, UK

Table 4: Cluster analysis – panel 1996-2009, UE 27

Governance indicators:				Expenditures			
Case Number	country	Cluster	Distance	Case Number	country	Cluster	Distance
1	AT	1	,322	1	AT	1	2,659
2	BE	1	,577	2	BE	1	2,791
3	BG	2	1,392	3	BG	2	2,021
4	CY	2	1,030	4	CY	2	6,241
5	CZ	2	,343	5	CZ	2	3,549
6	DK	1	,760	6	DK	1	5,001
7	EE	2	,648	7	EE	2	3,335
8	FI	1	,840	8	FI	1	2,812
9	FR	1	,715	9	FR	1	3,247
10	DE	1	,115	10	DE	1	3,469
11	EL	2	,268	11	EL	1	4,984
12	HU	2	,469	12	HU	1	4,564
13	IE	1	,351	13	IE	2	2,851
14	IT	2	,125	14	IT	1	2,622
15	LV	2	,421	15	LV	2	2,093
16	LT	2	,304	16	LT	2	1,848
17	LU	1	,524	17	LU	1	4,712
18	MT	2	1,050	18	MT	2	2,781
19	NL	1	,456	19	NL	1	2,761
20	PL	2	,221	20	PL	1	3,298
21	PT	1	1,019	21	PT	2	2,727
22	RO	2	1,662	22	RO	2	2,743

23	SK	2	,271	23	SK	2	2,608
24	SI	2	,816	24	SI	1	3,300
25	ES	1	1,119	25	ES	2	1,448
26	SE	1	,562	26	SE	1	4,405
27	UK	1	,467	27	UK	2	4,344
Final Cluster Centers				Final Cluster Centers			
		1	2	edu	5,58	5,17	
govva	1,41	,92		health	6,07	5,09	
govps	1,01	,71		house	,85	1,12	
govge	1,73	,69		order	1,50	2,08	
govrq	1,48	,91		recreation	1,19	1,10	
govrl	1,60	,69		social	19,17	12,35	
govcc	1,79	,49		services	7,87	5,45	
				environment	,66	,73	
				economic	4,47	5,05	
				defence	1,45	1,57	

Table 4 continued: Cluster analysis – panel 1996-2009, UE 27

<i>govcc, pci</i>				<i>Growth, loggdppc, exp, govva, govps, govge, govrq, govrl, govcc, pci</i>			
Case Number	country	Cluster	Distance	Case Number	country	Cluster	Distance
1	AT	1	,171	1	AT	1	1,179
2	BE	1	1,381	2	BE	1	1,103
3	BG	2	1,202	3	BG	2	3,329
4	CY	2	1,271	4	CY	2	,960
5	CZ	2	,194	5	CZ	2	3,346
6	DK	1	1,642	6	DK	1	4,359
7	EE	2	1,262	7	EE	2	4,282
8	FI	1	1,598	8	FI	1	2,360
9	FR	1	1,195	9	FR	1	2,399
10	DE	1	,152	10	DE	1	4,052
11	EL	2	,233	11	EL	2	5,106
12	HU	2	,317	12	HU	1	3,391
13	IE	1	,427	13	IE	2	5,781
14	IT	2	,019	14	IT	1	4,143
15	LV	2	,888	15	LV	2	4,095
16	LT	2	,323	16	LT	2	3,828
17	LU	1	,565	17	LU	2	3,858
18	MT	2	1,355	18	MT	2	3,452
19	NL	1	,893	19	NL	1	4,579
20	PL	2	,533	20	PL	2	3,636
21	PT	1	1,685	21	PT	2	3,015
22	RO	2	1,767	22	RO	2	5,815
23	SK	2	,590	23	SK	2	2,670
24	SI	2	1,415	24	SI	2	4,784

25	ES	1	1,616	25	ES	2	1,624
26	SE	1	1,301	26	SE	1	5,132
27	UK	1	,419	27	UK	2	3,966
Final Cluster Centers				Final Cluster Centers			
		1	2			1	2
govcc		1,79	,49	growth		1,90	3,55
PCI		8,03	4,79	loggdpcc		1,38	,99
				exp		50,89	40,96
				govva		1,38	1,03
				govps		1,02	,76
				govge		1,64	,93
				govrq		1,39	1,06
				govrl		1,50	,91
				govcc		1,66	,79
				PCI		7,66	5,58

Using cluster analysis for UE27, 1996-2009, for governance indicators, voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, control of corruption, I obtain the following cluster:

- ⇒ cluster 1, with greater value of governance indicators, characterized by centre values 1,41 for govva, 1,01 for govps, 1,73 for govge, 1,48 for govrq, 1,6 for govrl, 1,79 for govcc: AT, BE, DK, FI, FR, DE, IE, LU, NL, PT, ES, SE, UK, only non-former communist countries
- ⇒ cluster 2, with smaller value of governance indicators, characterized by centre values 0,92 for govva, 0,71 for govps, 0,69 for govge, 0,91 for govrq, 0,69 for govrl, 0,49 for govcc: BG, CY, CZ, EE, EL, HU, IT, LV, LT, MT, PL, RO, SK, SI

Using cluster analysis for UE27, 1996-2009, for the structure of public expenditures, education public expenditures / GDP, health public expenditures / GDP, housing and community amenities / GDP, public order and safety / GDP, recreation, culture and religion / GDP, social protection / GDP, general public services / GDP, environment protection / GDP, economic affairs / GDP, defence / GDP, I obtain the following cluster:

- ⇒ cluster 1, with greater value of edu, health, recreation, social, services, and smaller values for house, order, environment, economic, defence: AT, BE, DK, FI, FR, DE, EL, HU, IT, LU, NL, PL, SI, SE, so Hungary and Slovenia have the same characteristics as the developed countries
- ⇒ cluster 2, with smaller value of edu, health, recreation, social, services, and greater values for house, order, environment, economic, defence: BG, CY, CZ, EE, IE, LV, LT, MT, PT, RO, SK, ES, UK

Using cluster analysis for UE27, 1996-2009, for governance indicator-control of corruption and corruption perception index, I obtain the following cluster:

- ⇒ cluster 1, with greater value of governance indicator of control of corruption and also great values of corruption perception index, characterized by centre values

- 1,79 for govcc and 8,03 for CPI: AT, BE, DK, FI, FR, DE, IE, LU, NL, PT, ES, SE, UK
 ⇒ cluster 2, with smaller value of governance indicator of control of corruption and also smaller values of corruption perception index, characterized by centre values 0,49, for govcc and 4,79 for CPI: BG, CY, CZ, EE, EL, IE, LV, LT, LU, MT, PL, PT, RO, SK, SI, ES, UK

In the next tables there are the results of the quantile analysis.

Table 5: Quantile analysis – panel 1990-2012, UE 27

	percentile	q1	q2	q3	q4
Loggdppc	0,726717 1,160588 1,40273	BG; RO; LT; LV; PL; EE	HU; SK; CZ; MT; SI; PT; EL; CY	ES; IT; UK; FR; IE; BE; FI	DE; NL; AT; SE; DK; LU
Exp	40,17561 44,74137 50,34657	RO; LV; LT; EE; BG; LU; IE	CY; ES; PT; MT; UK; PL; CZ	SK; EL; SI; DE; NL; HU; IT	BE; AT; FR; FI; DK; SE
rev	37,22748 39,36806 46,63752	RO; LT; LV; IE; MT; EL	PT; ES; CY; BG; SK; EE; PL	UK; CZ; LU; HU; SI; DE; IT; NL	BE; FR; AT; FI; DK; SE

	exp	q1	q2	q3	q4
Loggdppc		<40,17561	>40,17561 <44,74137	>44,74137 <50,34657	>50,34657
q1	<0,726717	BG, RO, LT, LV, EE	PL		
q2	>0,726717 <1,160588		CZ, MT, PT, CY	HU, SK, SI, EL,	
q3	>1,160588 <1,40273	IE	ES, UK,	IT	FR, BE, FI
q4	>1,40273	LU		DE, NL,	AT, SE, DK,

Table 6: Quantile analysis – panel 1996-2009, UE 27

Variable	percentile	q1	q2	q3	q4
Growth	1,9 - 2,82 - 4,14	IT, DE, DK, MT, FR, BE	PT, AT, UK, NL, SE, HU, CZ	FI, BG, RO, ES, EL, CY, SI	LU, SK, PL, LT, LV, EE, IE
Gdppc	6,754 - 16,303 - 27,585	BG, RO, LV, LT, PL, SK	EE, HU, CZ, MT, SI, PT, EL	CY, ES, IT, FR, DE, BE, UK, FI	AT, NL, SE, IE, DK, LU
gdppchange	3,67 - 5,04 - 8,85	DE, AT, SE, FR, BE, DK, FI	NL, IT, UK, PT, MT, CY	ES, LU, SI, EL, IE, HU, PL	CZ, BG, SK, RO, EE, LV, LT
Exp	39,92 - 44,01 - 49,52	IE, RO, EE, LV, LT, BG	LU, ES, CY, UK, SK, PT, MT	CZ, PL, SI, EL, NL, DE, IT	HU, BE, FI, AT, FR, DK, SE
Rev	37,22 - 39,55 - 45,2	RO, LT, IE, LV, MT, EE, SK	CY, ES, EL, PT, BG, PL, CZ	UK, LU, SI, HU, DE, IT, NL	BE, FR, AT, FI, DK, SE
Govva	0,98 - 1,19 - 1,39	RO, BG, LV, SK, LT, CZ, EL, PL	IT, EE, CY, SI, HU	ES, FR, MT, PT, UK, AT, IE, BE	DE, LU, SE, NL, FI, DK
Govps	0,64 - 0,9 - 1,15	ES, RO, BG, CY, EL, UK, PL	LV, FR, IT, EE, LT, SK, HU	CZ, BE, DE, PT, SI, NL	AT, DK, IE, SE, MT, FI, LU
Govge	0,72 - 1,11 - 1,76	RO, BG, LV, PL, LT, IT	SK, EL, CZ, HU, MT, EE, SI	PT, CY, ES, FR, IE, DE, BE	UK, AT, LU, NL, SE, FI, DK

Govrq	0,91 - 1,13 - 1,51	RO, BG, PL, SI, EL, SK	IT, LV, LT, CZ , MT, HU , FR, PT	ES, BE, CY, EE , DE, SE	AT, IE, FI, LU, UK, DK, NL
Govrl	0,63 - 1,16 - 1,65	BG, RO, SK, LV, LT, PL	IT, EL, CZ, EE, HU , CY, SI , PT	ES, BE, MT, FR, IE, DE, UK	NL, LU, SE, AT, DK, FI
Govcc	0,46 - 1,16 - 1,9	RO, BG, LV, LT, SK, PL	CZ , IT, EL, HU, EE , MT, SI	CY, PT, ES, BE, FR, IE, DE, LU, UK	AT, NL, SE, DK, FI
Edu	4,59 - 5,64 - 6,19	EL, RO, SK, BG , DE, ES, CZ	LU, IT, IE, NL, HU , UK, MT	AT, LT, LV , BE, PL , CY	FI, FR, SI , PT, EE , SE, DK
Health	4,5 - 5,7 - 6,58	CY, RO, LV, BG , NL, EE	PL, LT , EL, LU, HU , MT, ES	SK , UK, IT, SI , PT, FI, IE, DE, CZ	SE, BE, DK, FR, AT
house	0,66 - 0,94 - 1,2	BE, LT , EL, FI, EE , DK	SI, BG , IT, LU, AT, PT, DE	SK , UK, ES, HU , NL, SE	CZ , MT, LV, PL , RO , IE, FR, CY
order	1,53 - 1,76 - 2,04	LU, DK, EL, FR, SE, FI, AT	NL, MT, BE, DE, IE, PL	SI, RO , PT, ES, LT , IT, HU	CY, CZ , UK, BG, LV, EE, SK
recreation	0,88 - 1,13 - 1,35	EL, MT, IE, DE, BG , IT, RO	LT , UK, AT, SK, PL , BE, CY	PT, FI, CZ , FR, SE, NL	LV, SI , ES, HU , DK, LU, EE
social	12,38 - 15,9 - 18,1	CY, EE , IE, RO, LT, LV, BG	CZ , ES, SK , PT, MT, UK	HU , EL, LU, SI, PL , NL, BE	IT, AT, FR, DE, FI, SE, DK
services	4,55 - 6,25 - 8,35	EE , IE, LV, LT , LU, CZ , UK	RO , ES, SI, BG , DE, PL	SK , MT, PT, FI, AT, FR, DK	NL, SE, CY, IT, BE, HU , EL
environment	0,52 - 0,68 - 0,85	RO , CY, SE, FI, LV , AT	LT , EL, DK, PL , PT, DE, BE	HU , UK, FR, EE , SI , NL	SK , IT, ES, IE, BG, CZ , LU, MT
economic	4,2 - 4,45 - 5,16	UK, FR, DK, DE, IT, PL	EE , SE, PT, CY, LU, LT, BG	IE, SI , ES, NL, BE, FI	AT, LV , EL, RO, HU, SK , MT, CZ
defence	1,14 - 1,45 - 1,97	LU, IE, MT, AT, DE, ES, LV	BE, HU, PL , IT, SI , PT	EE, LT, CZ , FI, NL, DK, CY	SK , SE, RO , FR, UK, BG , EL
PCI	4,6 - 6,1 - 7,96	RO, BG, LV, SK, PL , EL, CZ	LT , IT, HU , CY, EE, SI	MT, PT, ES, BE, FR, IE, DE, AT	UK, LU, NL, SE, FI, DK

Using quantile analysis for UE27, 1990-2012, log(gdppc) and exp, the correlation between economic growth and the size of public sector is positive – most of the former communist countries are characterized by “small” public sectors and less developed economies. The majority of the developed countries have “big” public sectors.

The conclusions of the quantile analysis for UE27, 1996-2009 are:

- ⇒ the former communist countries are in the upper quartile of the real GDP growth rate, which supports the convergence principle
- ⇒ the former communist countries are in the bottom quartile of the GDP per head of population
- ⇒ most of the former communist countries are in the bottom quartile of the public expenditure – exceptions are CZ, PL, SI, HU
- ⇒ most of the former communist countries are in the bottom quartile of the governance indicators – exceptions are CZ, SI in the case of govps, EE in the case of govqr
- ⇒ regarding the structure of the public expenditures, there are a lot of differences between the former communist countries – the productive expenditures are high in the case of LT, LV, PL, SI, EE for edu, SK, SI, CZ for health, SK, HU, CZ, LV, PL, RO for house, SI, RO, LT, HU, CZ, BG, LV, EE, SK for order, SK, HU

- for services, HU, EE, SI, SK, BG, CZ for environment, EE, LT, CZ, SK, RO, BG for defence
- ⇒ regarding corruption perception index, all the former communist countries are in the bottom quartiles

4. Conclusions

The size of the public sector is a reflection of current and past political choices. There are empirical evidences that support the idea that when public sector becomes “too big”, the economic growth is negatively affected, and there are also present higher tax burden and inefficiency of the public administration.

The particularities of the former communist countries consist in inefficient administration of tax and expenditure, volatility of the tax base, the magnitude of fiscal adjustment needed to stabilize macroeconomic environment, required changes in the composition of public expenditure and revenues, weak institutional legacy of budget expenditure management system

The effects of public sector’s size on the economic growth is dependent of the quality of the public sector. In this article I capture the size of the public sector through public expenditures, and the quality of it through governance indicators and the structure of public expenditures.

The empirical results sustain the following conclusions: public expenditure has a negative impact on economic growth; a part of the governance indicators are relevant for economic development; the significant variables for the economic development that have positive effects are health public expenditures, recreation, culture and religion, environment protection.

A further reaserch have to be done in order to estimate the changes in public sector’s size and quality for ex-communist countries that are also EU members and to evaluate the impact of these changes on economic growth.

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Appendix 1
Descriptive statistics

1.1. loggdppc, exp, rev, 1990-2012

data source: EUROSTAT

a) 27 UE countries, 1990-2012

	loggdppc?	exp?	rev?
Mean	1.167007	45.89374	0.421259
Sum	630.1837	24782.62	227.4797
Median	1.245083	45.28042	0.407901
Maximum	1.936804	71.72042	0.603937
Minimum	0.073729	31.26731	0.298365
Sum Sq. Dev.	805.1210	1162583.	98.42484
Std. Dev.	0.359582	6.839843	0.069413
Skewness	-0.802078	0.324863	0.493648
Kurtosis	3.270648	3.004875	2.423993
Jarque-Bera	59.54776	9.498800	29.39712
Probability	0.000000	0.008657	0.000000
Observations	540	540	540
Cross sections	27	27	27

b) 10 former communist countries, 1990-2012

	loggdppc?	exp?	rev?
Mean	0.728962	42.03299	0.378748
Sum	134.8579	7776.104	70.06837
Median	0.744291	41.74587	0.381009
Maximum	1.275849	78.09006	0.496351
Minimum	-0.029031	32.88934	0.307300
Sum Sq. Dev.	115.5884	333572.8	26.87196
Std. Dev.	0.306471	6.043275	0.042587
Skewness	-0.436197	1.307687	0.190595
Kurtosis	2.461272	8.455917	2.044852
Jarque-Bera	8.103765	282.1806	8.152444
Probability	0.017390	0.000000	0.016971
Observations	185	185	185
Cross sections	10	10	10

1.2. All variables 1996-2009

data sources: EUROSTAT, AMECO, WB, Transparency

a) 27 UE countries, 1996-2009

b) 10 former communist countries, 1996-2009

a) 27 UE countries, 1996-2009

Common sample

	growth?	loggdppc?	exp?	rev?	expprod?	expnonprod?	gov?	cpi?
Mean	3.059394	1.179907	44.91540	42.36426	22.79303	22.08273	0.917722	6.486818
Sum	1009.600	389.3695	14822.08	13980.21	7521.700	7287.300	302.8483	2140.650
Median	3.400000	1.300405	44.92477	41.04386	22.80000	22.30000	0.947500	6.600000
Maximum	12.20000	1.909620	62.91680	59.47925	30.80000	33.90000	1.900000	10.00000
Minimum	-18.00000	0.137151	31.26731	30.72999	15.00000	13.10000	-0.076667	2.600000
Sum Sq. Dev.	7465.880	502.3540	679491.5	607756.4	174736.6	166605.6	403.1278	15176.87
Std. Dev.	3.647506	0.361246	6.465146	6.862813	3.164312	4.155829	0.616878	1.980803
Skewness	-1.464745	-0.727684	0.038612	0.510824	-0.038640	0.044599	-0.212764	0.011686
Kurtosis	9.207044	2.835020	2.356014	2.418437	2.320360	2.340535	1.798453	1.812389

Jarque-Bera	647.7531	29.49803	5.784371	19.00220	6.433383	6.089189	22.34087	19.40080
Probability	0.000000	0.000000	0.055455	0.000075	0.040087	0.047616	0.000014	0.000061
Observations	330	330	330	330	330	330	330	330
Cross sections	27	27	27	27	27	27	27	27

b) 10 former communist countries, 1996-2009

	growth?	loggdppe?	exp?	rev?	expprod?	expnonprod?	gov?	cpi?
Mean	3.974336	0.766353	41.08606	37.59369	21.12389	19.88673	0.575531	4.580973
Sum	449.1000	86.59790	4642.725	4248.087	2387.000	2247.200	65.03500	517.6500
Median	4.800000	0.762769	41.03318	38.04415	21.20000	19.70000	0.701667	4.600000
Maximum	12.20000	1.265345	52.13891	45.78087	27.90000	26.60000	1.093333	6.700000
Minimum	-18.00000	0.137151	33.16940	30.72999	16.60000	14.70000	-0.076667	2.600000
Sum Sq. Dev.	4518.910	73.61462	193917.7	161484.0	51164.68	45827.18	53.42728	2487.863
Std. Dev.	4.940752	0.254426	5.317077	3.989654	2.573813	3.187209	0.377936	1.019986
Skewness	-1.957156	-0.316430	0.201589	0.050246	0.476719	0.050510	-0.453396	0.224572
Kurtosis	8.243001	2.586581	1.911187	1.733278	2.697936	1.650212	1.692498	2.338071
Jarque-Bera	201.5680	2.690473	6.347146	7.602468	4.709687	8.626292	11.92071	3.012770
Probability	0.000000	0.260478	0.041854	0.022343	0.094908	0.013391	0.002579	0.221710
Observations	113	113	113	113	113	113	113	113
Cross sections	10	10	10	10	10	10	10	10

a) 27 UE countries, 1996-2009

	govva?	govps?	govge?	govrq?	govrl?	govcc?	gov?
Mean	1.159529	0.856195	1.190438	1.183569	1.129192	1.114781	1.105617
Sum	344.3800	254.2900	353.5600	351.5200	335.3700	331.0900	328.3683
Median	1.160000	0.880000	1.160000	1.190000	1.130000	1.050000	1.068333
Maximum	1.830000	1.580000	2.240000	2.010000	1.960000	2.470000	1.900000
Minimum	0.110000	-0.220000	-0.960000	-0.230000	-0.190000	-1.020000	-0.323333
Sum Sq. Dev.	429.9382	257.7643	544.7106	466.5122	475.3071	549.6111	430.8401
Std. Dev.	0.321629	0.367802	0.646768	0.412900	0.571301	0.780935	0.478562
Skewness	-0.598971	-0.282527	-0.472428	-0.464038	-0.432786	-0.068374	-0.335292
Kurtosis	3.273823	2.595598	2.787952	3.307781	2.304327	2.051514	2.496077
Jarque-Bera	18.68677	5.974990	11.60427	11.83117	15.26056	11.36429	8.707306
Probability	0.000088	0.050414	0.003021	0.002697	0.000486	0.003406	0.012860
Observations	297	297	297	297	297	297	297
Cross sections	27	27	27	27	27	27	27

b) 10 former communist countries, 1996-2009

	govva?	govps?	govge?	govrq?	govrl?	govcc?	gov?
Mean	0.862182	0.705000	0.597455	0.860182	0.585636	0.381455	0.665318
Sum	94.84000	77.55000	65.72000	94.62000	64.42000	41.96000	73.18500
Median	0.930000	0.750000	0.700000	0.905000	0.650000	0.395000	0.758333
Maximum	1.220000	1.160000	1.250000	1.490000	1.260000	1.360000	1.125000
Minimum	0.110000	-0.220000	-0.960000	-0.230000	-0.190000	-1.020000	-0.323333
Sum Sq. Dev.	88.65740	63.58670	61.33860	94.75300	54.10540	36.26920	60.07342
Std. Dev.	0.251383	0.285971	0.450014	0.350132	0.387638	0.431164	0.323145
Skewness	-1.021465	-0.605510	-1.141552	-0.887343	-0.586414	-0.430861	-0.877908
Kurtosis	3.198862	2.879065	3.974529	3.706431	2.237767	3.677555	2.949673
Jarque-Bera	19.31009	6.788810	28.24372	16.72254	8.967407	5.507543	14.14153
Probability	0.000064	0.033561	0.000001	0.000234	0.011292	0.063687	0.000850
Observations	110	110	110	110	110	110	110
Cross sections	10	10	10	10	10	10	10

a) 27 UE countries, 1996-2009

	edu?	health?	house?	order?	recreation?	social?	services?	environment?	economic?	defence?
Mean	5.384703	5.635411	0.986686	1.773654	1.152125	15.92550	6.757790	0.693201	4.783853	1.496601
Sum	1900.800	1989.300	348.3000	626.1000	406.7000	5621.700	2385.500	244.7000	1688.700	528.3000
Median	5.500000	5.700000	0.900000	1.800000	1.100000	15.70000	6.600000	0.700000	4.600000	1.400000
Maximum	8.000000	8.900000	3.200000	3.200000	2.300000	25.70000	14.20000	1.800000	11.30000	4.700000
Minimum	2.500000	2.000000	0.000000	0.500000	0.200000	7.200000	2.700000	0.000000	1.700000	0.200000
Sum Sq. Dev.	10673.80	11881.77	449.6100	1198.210	527.9700	96026.51	18108.89	202.1700	8776.810	947.5700
Std. Dev.	1.116200	1.380925	0.548623	0.499218	0.410795	4.296586	2.376603	0.304062	1.408495	0.667670
Skewness	-0.153606	-	1.207243	0.122816	0.439826	0.201640	0.514236	0.394473	1.338836	1.134723
		0.260875								
Kurtosis	2.329118	2.409684	4.660995	2.933740	3.189996	2.185462	2.702388	3.443363	6.102781	5.837265
Jarque-Bera	8.008135	9.129396	126.3246	0.952001	11.91210	12.15065	16.86056	12.04621	247.0585	194.1567
Probability	0.018241	0.010413	0.000000	0.621263	0.002590	0.002299	0.000218	0.002422	0.000000	0.000000
Observations	353	353	353	353	353	353	353	353	353	353
Cross sections	27	27	27	27	27	27	27	27	27	27

b) 10 former communist countries, 1996-2009

	edu?	health?	house?	order?	recreation?	social?	services?	environment?	economic?	defence?
Mean	5.169167	4.943333	0.959167	2.154167	1.263333	13.18167	5.585833	0.693333	5.473333	1.578333
Sum	620.3000	593.2000	115.1000	258.5000	151.6000	1581.800	670.3000	83.20000	656.8000	189.4000
Median	5.350000	4.850000	1.000000	2.200000	1.200000	12.90000	4.750000	0.700000	4.900000	1.400000
Maximum	7.500000	8.000000	2.100000	3.200000	2.300000	18.80000	13.10000	1.400000	11.30000	4.700000
Minimum	3.100000	2.000000	0.000000	0.500000	0.600000	8.400000	2.700000	0.000000	3.400000	0.800000
Sum Sq. Dev.	3362.490	3105.780	133.3500	582.9300	213.7400	21635.02	4322.710	69.22000	3917.320	341.2400
Std. Dev.	1.145161	1.207103	0.439154	0.468126	0.432101	2.567181	2.204895	0.311336	1.646067	0.596232
Skewness	-0.074736	0.181129	0.153494	-	0.788857	0.280476	1.324805	-0.204485	1.276895	2.509444
				0.627611						
Kurtosis	1.797844	2.727536	2.394992	4.485518	2.937573	1.958803	4.242737	2.649881	4.406805	12.33116
Jarque-Bera	7.337602	1.027337	2.301380	18.91174	12.46540	6.993797	42.82415	1.449199	42.50474	561.2988
Probability	0.025507	0.598297	0.316418	0.000078	0.001964	0.030291	0.000000	0.484519	0.000000	0.000000
Observations	120	120	120	120	120	120	120	120	120	120
Cross sections	10	10	10	10	10	10	10	10	10	10

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