Quality of Public Finance and Government Expenditure in the Czech Republic

Irena Szarowská
Silesian University in Opava
School of Business Administration in Karviná, Department of Finance and Accounting
Univerzitní nám. 1934/3
Karviná, 733 40
Czechia
e-mail: szarowska@opf.slu.cz

Abstract
The quality of public finance is one of the crucial economic matters as it comprises all important tasks and goals of public sector and public finance and its improvement should lead to supporting long-term economic growth and employment. Therefore, analysis of its conception as well as used channels and tools (structure of revenue system, size of the government, composition and efficiency of expenditure, level and sustainability of fiscal position, fiscal governance) is of critical importance for both the economic theory and economic policy. The main objective of this paper is to investigate how the key channels and tools used by the public finance affect economic growth. The empirical evidence is focused on interaction among the government expenditure in compliance with the COFOG international standard and economic growth in the Czech Republic in the period 1995 – 2013. Granger causality methodology and Johansen cointegration test are applied as basic methods of the research. The results differ substantially between the government expenditure functions and provided evidence shows that expenditure for Health CF07 can be used as the tool for improvement of public finance quality.

Keywords: public finance, fiscal policy, government expenditure, Granger causality, COFOG
JEL codes: E62, H50, H11

1. Introduction

Public finance or public sector economics combines a body of theory with a set of institution to describe, analyze, and interpret the working of government in a predominantly private economy (Ulbrich, 2011). The quality of public finance (QPF) is a multidimensional concept. It may be regarded as representing all the arrangements and operations regarding the financial politics that sustain the macroeconomic objectives, particularly the long-term economic growth. In contrast to past discussions on the short-term impact of fiscal policy on aggregate demand, QPF focuses on fiscal policy's role for raising the long-run growth potential. Improving the quality of public finance is a major challenge for governments and European policy makers as establishment of Working Group on Quality Public Finances (QPF) confirms. At the same time, the European Commission conducted its own analytical work in a number of QPF areas, in part to support the QPF Working Group. Both focused predominantly on the link between the composition of public expenditure and growth, the role of fiscal governance and expenditure efficiency. In the literature, one can also find a large set of theoretical and empirical analysis in all of the above and additional areas (e.g. taxation and growth). Unfortunatelly, the global downturn and financial crisis have moved the focus of governments on other issues and concentrated the effort especially on budget consolidation and the activity of QPF Working Group nearly disappeared (the last paper was published in 2009).

We agree with Conte et al. (2009) who state that the economic crisis has increased budgetary pressures and accentuated the tension between the need to sustain public spending aimed at raising the EU growth potential and the increased scarcity of public resources. Rising the efficiency and effectiveness of public spending in growth-enhancing areas such as education, R&D and innovation has become, therefore, even more important.

Previously published studies are weakly supported by the data particularly in emerging and post-transition economies. We would like to eliminate the literature gap in this field and analyze government expenditure in the Czech Republic. The aim of the paper is to provide direct empirical evidence on

relationship between Gross Domestic Product (GDP) and government expenditure (G) and estimate long-run relationship between these variables in the Czech Republic. First, we apply Granger causality methodology and then we follow Abbot and Jones (2011) and apply the Johansen cointegration test on annul data of GDP and government expenditure during the period 1995-2013. The paper is organized as follows. In the next section, we summarize basic theoretical background. In Section 3, we describe the dataset and empirical techniques used. In Section 4, we estimate short-run and long-run relationship between output and government expenditure. In Section 5, we conclude with a summary of key findings.

2. Theoretical Background and Literature Review

As written above, the quality of public finance (QPF) is a multidimensional concept. Responding to the importance of quality of public finance, the Working Group on Quality of Public Finances was formed in 2004, as a sub-committee to the Economic Policy Committee (EPC). Its objective is to analyse the links between public finances and long-term potential growth. The Working Group on QPF and Barrios and Schaechter (2008) identify next main channels throughout the economic growth might be stimulated and recommend focuses on:

- the efficiency, and efectiveness of public expenditures, by exploring the scope for further analyses of efficiency and effectiveness across Member States and the EU in different areas of public spending and participating in work streams in various international fora to improve the measurement of public sector output and efficiency/effectiveness,
- the structure and efficiency of public revenues, by regular economic analysis of revenue trends and reforms of tax systems, and
- fiscal governance frameworks, by regular reviews, strengthening the analysis and exchanging views on the institutional framework for improving the efficiency and effectiveness of public finances. This also includes evaluation systems and public spending reviews. The overal aim is to improve the understanding of the different approaches used to underpin public budgets.

This paper is focused on importance of government expenditure for economic growth, so effects of this channel is explained primarily. The size of governments tends to matter for economic growth, especially if large public sectors are combined with short-comings in other dimensions of QPF. It is clear that the size of the public sector reflects past and current political choices that go beyond the macroeconomic goal of sustained economic growth. In particular, income distribution and social cohesion considerations also play a role, and some countries have been quite successful in achieving both objectives simultaneously. However, on average, empirical studies find that when governments become too large they tend to hamper long-run growth as they often go hand in hand with higher tax burdens and inefficient public administrations. Thus, overall there is a need to consider many factors simultaneously, such as other policy objectives and the types, financing and efficiency of expenditures, in an assessment of the costs and benefits of large governments.

Sound and sustainable fiscal positions are preconditions for growth over the medium and long run. The EU's fiscal framework draws on this link which is also confirmed by empirical work. The estimates substantiate earlier findings of a negative relation between public debt and growth, but the issue of endogeneity of debt and deficits to growth conditions should not be overlooked. When looking in more detail at the channels through which fiscal policies influence economic growth by using a growth-accounting approach, the evidence tends to suggest that in countries with poor fiscal performance, private investment is less of a driver of growth. This indicates a possible crowding-out effect. European Commission (2015) points out that the role of fiscal policy in stabilizing the economy can only be effective if Member States are in a sound fiscal position, thus allowing automatic fiscal stabilizers to operate fully.

While both the size of the public sector and the debt/deficit can impair growth, an important conditioning factor is the composition and efficiency of public expenditure. Both theoretical and empirical research indicates that growth can be supported when public expenditure is oriented towards investment. This can be particularly relevant for investment in human capital (through education and health spending), technical progress (R&D spending) and

public infrastructure. However, evidence also suggests that the link between the amount of spending in these areas and economic growth is not automatic, but depends largely on the ability to achieve the envisaged outcomes (e.g. higher education attainment, more private investment in R&D) and overcoming existing market failures without creating new distortions. Thus, high efficiency and effectiveness of public spending are key to maximising the potential of government outlays and creating fiscal space for other demands (Hagen, 2011).

Moreover, the structure and efficiency of revenue systems can be a factor for long-run growth. Since the tax structure affects labour supply and demand, incentives for investment, risk taking and human capital formation, it can hamper growth potential by creating various distortions. In addition to lowering the overall tax burden, which would have to go hand in hand with expenditure reforms, adapting tax structures in a revenue-neutral manner is a further important policy option (details in Nerudova and David, 2008). Such efficiency-enhancing tax reforms should also make tax systems more transparent and link them better to benefit systems.

Good fiscal governance can facilitate structural reforms and is beneficial for all dimensions of public finances. Fiscal governance represents the institutional side of fiscal policy as it comprises the set of rules and procedures that determine how public budgets are prepared, executed and monitored. The importance of fiscal governance has been confirmed in empirical studies, including studies conducted by the European Commission, which have found that EU Member States with strong fiscal rules, medium-term budgetary frameworks and independent budgetary institutions, have exhibited stronger budgetary positions and have been more successful in fiscal consolidations.

We can find many studies, which highlight the fact that a concentration of the public expenses in areas that stimulate the economic growth and a more efficient use of the public resources are key methods for sustaining the economic growth. The government expenditure is also an important tool for national governments to mitigate the uneven economic development and economic shocks across individual countries. As Abbot and Jones (2011) write, government expenditure plays important role in a fiscal policy of each country as a possible automatic stabilizer. Serven (1998) points that procyclical fiscal policy is generally regarded as potentially damaging for welfare: it can raise macroeconomic volatility, depress investment in real and human capital, hamper growth, and harm the poor. If expansionary fiscal policies in "good times" are not fully offset in "bad times", they may also produce a large deficit bias and lead to debt unsustainability and eventual default. If a government respect a basic prescription that fiscal tools should function counter-cyclical, the optimal fiscal policy involves a decreasing of government spending in "good times" and increasing of government spending in "bad times." Contrary to the theory, many of empirical studies found evidence that government expenditure is procyclical. See Hercowitz and Strawczynski (2004), Rajkumar and Swaroop (2008), or Szarowská (2012, 2013) for more details. Talvi and Vegh (2005) show that fiscal procyclicality is evident in a much wider sample of countries. Abbott and Jones (2011) test differences in the cyclicality of government expenditure across functional categories. Their evidence from 20 OECD countries suggests that procyclicality is more likely in smaller functional budgets, but capital expenditure is more likely to be procyclical for the larger expenditure categories. Fiorito and Kollintzas (1994) document for G7 countries, the correlation between government consumption and output indeed appears to show no pattern and be clustered around zero. The differences in these results depend on the components of expenditure being measured. Government transfers and subsidies are found to have become substantially more countercyclical.

Afonso et al. (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.

Romero-Ávila and Strauch (2008) answer the question whether public finance reform can affect trend growth in the EU-15. Focusing on time series patterns, they investigate whether there have been persistent trends in economic growth and fiscal variables over the last 40 years. The estimate a distributed lag model, which indicates that government size measured either with total expenditure or

revenue shares, government consumption and direct taxation negatively affect growth rates of GDP per capita, while public investment has a positive impact.

Ferreiro et al. (2009) report that literature on fiscal policy is paying increasing attention to the impact of the composition of public expenditures on long-term economic growth. Public policy endogenous growth models recommend to change the composition of public expenditures to items considered as productive expenditures. Based on these models, European institutions are encouraging to increase the share of outlays, such as public investments, research and development, active labor market policies, and so on. Their paper analyzes whether a convergence to a new pattern of public finances with a higher share of productive expenditures is arising in the euro zone.

Coutinho et al. (2010) point out that discussions on fiscal policy were primarily centered on the functions of economic stabilization, income redistribution and resource allocation until the early 1990´s. Long-term growth was not usually viewed as an end itself, and fiscal policy was often not sufficiently tailored to the different circumstances and priorities of countries at different stages of development. Based on the conceptual framework for linking the quality of public finances and economic growth that has been developed by the European Commission and applied to the EU Member States, this study examines the conditions under which the budgetary policy, and more specifically expenditure, revenue and financing design would be supportive of growth in the Mediterranean EU countries. The main findings of the study can be summarized as follows. The way government expenditures are financed matters. Deficit and debt financing clearly undermines growth performance. The composition of expenditure does matter however the efficiency of the expenditure undertaken is even more important for growth. For countries with good governance indicators the positive impact of the productive expenditures on growth was enhanced. The analysis was applied to the efficiency of education and health expenditures with basically similar results.

Alesina (2010, 2013) presents the evidence on episodes of large stances in fiscal policy, in cases of both fiscal stimuli and fiscal adjustments in OECD countries from 1970 to 2007. He concludes that fiscal stimuli based on tax cuts are more likely to increase growth than those based on spending increases. As for fiscal adjustments, those based on spending cuts and no tax increases are more likely to reduce deficits and debt over GDP ratios than those based on tax increases. In addition, adjustments on the spending side rather than on the tax side are less likely to create recessions.

In line with Soroceanu and Lupaåcu (2011), to promote a growth and employment orientated and efficient allocation of resources, Member States should redirect the composition of public expenditure towards growth-enhancing categories in line with the Lisbon strategy, adapt tax structures to strengthen growth potential, ensure that mechanisms are in place to assess the relationship between public spending and the achievement of policy objectives, and ensure the overall coherence of reform packages.

Obreja-Brasoveanu (2011) notes that 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. She captures the size of the public sector through public expenditures, and the quality of it through governance indicators and the structure of public expenditures. Her 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.

Donath and Milos (2011) write that issue of public investments became a very challenging subject for public decision makers since it incorporates the question of state performance, the quality of public finance and their effects on growth. Their paper tries to reveal the effects of capital spending (functional classification of public expenses "COFOG") on economic growth in EU member states in the period 2000-2006. They state the fact that government expenditure proved different effects on economy and welfare by considering the member states of the European Union. They confirm influence especially focusing on educational and healthcare sectors. The influence of the public education expenses is strong especially in the Eastern Europe countries, namely Romania, Hungary, Slovakia, Lithuania, and Latvia.

Afonso and Jalles (2013) assess the fiscal composition-growth nexus, using a large country panel, accounting for the usually encountered econometric pitfalls. Their results show that revenues

have no significant impact on growth whereas expenditures have negative effects. Expenditure on education and health boosts growth; and there is weak evidence supporting causality running from expenditures and revenues to output.

Very important is report done by Deroose and Kastrop (2008) who drawn attention to the fact that analysis of the quality of public finance is incomplete without addressing the efficiency and effectiveness of public expenditure, i.e. the achievement of priorities at minimum costs. This allows for analyzing how specific inputs affect outputs and final outcomes (i.e. increasing sectoral and overall productivity). Available empirical evidence on specific spending categories (in particular, impact assessments in the case of innovation and human capital formation) shows that spending inefficiencies can be high, thus suggesting room for improvement in the use of scarce public resources. This kind of assessment requires suitable evaluation methods and tools to provide policy-makers with a better understanding of the impact of their policies.

3. Data and Methodology

The dataset consists of annual data on GDP and government expenditure in compliance with the COFOG international standard during the period 1995 – 2013. It is not possible to use higher frequently time series data as COFOG classification analyzes and reports only annual data. The data are all collected from the Economy and Finance database available on the Eurostat website. The series for GDP and total government expenditure and its subcomponents are converted into logs. First, we apply Granger causality methodology and then we follow Abbot and Jones (2011) and apply the Johansen cointegration test on annul data of GDP and government expenditure functions.

The Granger causality refers to a specific notion of causality in time-series analysis. A time series X is said to Granger-cause Y if it can be shown, usually through a series of t-tests and F-tests on lagged values of X (and with lagged values of Y also included), that those X values provide statistically significant information about future values of Y. Because the Granger causality may not show the full picture about the interactions between the variables we also apply the Johansen cointegration test for identifying the long-run relationship between output and government expenditure.

Many studies point out that using non-stationary macroeconomic variable in time series analysis causes superiority problems in regression. Thus, a unit root test should precede any empirical study employing such variables. We decided to make the decision on the existence of a unit root through Augmented Dickey–Fuller test (ADF test). The equation (1) is formulated for the stationary testing.

$$\Delta x_t = \delta_0 + \delta_1 t + \delta_2 x_{t-1} + \sum_{i=1}^{k} \alpha_i \Delta x_{t-i} + u_t \qquad (1)$$

ADF test is used to determine a unit root x_t at all variables in the time t. Variable Δx_{t-i} expresses the lagged first difference and u_t estimate autocorrelation error. Coefficients δ_0, δ_1, δ_2 and α_i are estimated. Zero and the alternative hypothesis for the existence of a unit root in the x_t variable are specified in (2).

$$H_0: \delta_2 = 0, \ H_\varepsilon: \delta_2 < 0 \qquad (2)$$

The result of ADF test, which confirms the stationary of all time series on the first difference, is available on request. Testing the stationary is the essential assumption for implementation of cointegration approach. It is necessary to confirm that time series are non-stationary at level data but stationary at first difference.

We suppose there is a steady-state relationship between government expenditure and output given by (3):

$$G = AY^\delta \qquad (3)$$

where G represents government expenditure, Y means output. Equation (3) can also be written in linear form:

$$logG = a + \delta logY, \ a = logA \qquad (4)$$

If the adjustment of government expenditure G to its steady-state $\bar{G}$ is gradual, then the level of government expenditure will respond to transitory changes in output, and G will move gradually toward its steady-state, or equilibrium level. To capture this gradual move, we specify a general autoregressive distributed lag specification for spending category i in period t:

$$logG_{it} = \mu + \alpha logG_{it-1} + \beta_0 logY_t + \beta_1 logY_{t-1} + \varepsilon_t, \; |\alpha| < 1 \tag{5}$$

We can solve for the static, steady-state equilibrium by assuming that output is at its steady-state level $\bar{Y}$ and ignoring the error term:

$$log\bar{G} = \frac{\mu}{1-\alpha} + \frac{\beta_0+\beta_1}{1-\alpha} log\bar{Y}, \; \delta = 1 - \alpha \tag{6}$$

More generally, we could allow output to grow at rate g. In this case, the only difference is that the constant term becomes $\frac{\mu+(\beta_0-\delta)g}{1-\alpha}$, which depends on g. To reflect the steady state, (5) can be rearranged as the error correction model (7).

$$logG_{it} = \mu + \beta_0 logY_t + \gamma(logG_{it-1} - \delta logY_{t-1}) + \varepsilon_t \tag{7}$$

In (7), we can interpret $\beta_0 \Delta logY_t$ as the short-term impact of output on government expenditure and β_0 as the short-run elasticity of government expenditure with respect to output. The error correction term $\gamma(logG_{it-1} - \delta logY_{t-1})$ captures deviations from the steady-state, or long-run equilibrium, where δ is the long-run elasticity of government expenditure with respect to output, and γ is the rate at which government expenditure adjusts to past disequilibrium. μ is constants of the model, ε_t means residual component of long-term relationship.

Moreover, (7) can be rewritten as (8) and then used to test if there is a long-run relationship between government expenditure and output. In particular, following Ericsson and McKinnon (2002), if γ is significantly different from zero in (8), then output and government expenditure are cointegrated.

$$logG_{it} = \mu + \beta_0 logY_t + \gamma logG_{it-1} - \varphi logY_{t-1} + \varepsilon_t \tag{8}$$

where $\varphi = \gamma\delta$. The above derivation makes clear the underlying assumption that there is an elasticity relationship between output and expenditure, while the transitory deviations are random.

3. Results and Discussion

In this section we report and discuss results of the Granger causality tests and Johansen cointegration test in order to examine the interaction between government expenditure and economic growth. The major concern in these analyses is to prove the causality from the government expenditure and its components to the economic performance and to determine a possibility of using government expenditure as a tool for long term economic growth.

The structure of government expenditure is very important for economic policy of each country as it can help in overcoming the inefficiencies of the market as well as in smoothing out cyclical fluctuations in the economy. We used government expenditure in compliance with the COFOG (Classification of the Functions of Government) international standard in our analysis. The COFOG is one of the four classifications of expenditure according to purpose (functional classifications) used in national accounts. COFOG classifies government expenditure into ten main categories / divisions:

- CF01: General public services
- CF02: Defense
- CF03: Public order and safety
- CF04: Economic affairs
- CF05: Environment protection
- CF06: Housing and community amenities
- CF07: Health

- CF08: Recreation; culture and religion
- CF09: Education
- CF10: Social protection

Figure 1 shows the share of government expenditure by functions on total government expenditure in the period 1995–2008 (the longest available time series).

Figure 1: Structure of Government Expenditure (COFOG Classification)
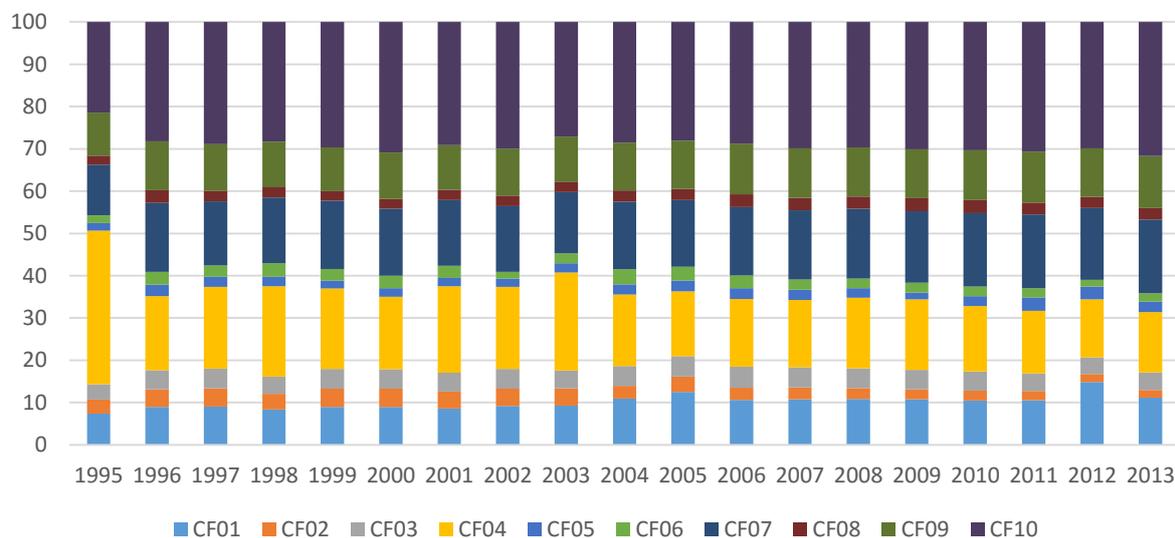
Source: author's calculations based on data from the Eurostat Economy and Finance database

In the beginning of the period, a high government expenditure was connected with privatization and transformation process (see CF04 in 1995). Five biggest expenditure functions, on average, account for 80% of the total expenditure: social protection, economic affairs, health, general public services and education. As Figure 1 shows, social protection (CF10) is the largest item of government expenditure from 1996, economics affairs (CF04) were on the second and health spending (CF07) on the third place till the year 2004. From 2005 the second and the third position has changed. The social protection expenditure CF10 is with the share about 30% the highest expenditure function and its share has continuously growing trend. It contains, for example, expenditure on sickness and disability, old age, survivors, family and children, unemployment, housing, social exclusion and R&D social protection.

We apply Pairwise Granger Causality Tests for examining relations between GDP and government expenditure functions in short-term, the results are given in Table 1.

It is important to mention that the statement for example "*GDP* Granger causes *CF01*" does not imply that *CF01* is the effect or the result of *GDP*. Granger causality measures precedence and information content but does not by itself indicate causality in the more common use of the term. The null hypothesis should be rejecting if probability is less than 0.05 (usual level of statistical significance). The example of null hypothesis is that *GDP* does not Granger-cause General public services *CF01* and that General public services *CF01* does not Granger-cause *GDP*. Table 1 summarizes results divided into pre-crisis and post-crisis period, lag is one year. Bold values indicate hypothesis which should be rejected.

One can find only two examples of the Granger causality from government expenditure function (General public services *CF01* and Education *CF09*) to *GDP* during the pre-crisis period. The causality from the *GDP* to the government expenditure function is revealed in four cases (*CF03, CF04, CF07* and *CF10*). The same number of evidence on Granger causality between the components of the government expenditure and *GDP* was discovered in the post-crisis period. There are two cases of causality in which the government expenditure functions Granger-cause the *GDP* (Economic affairs *CF04* and Health *CF07*). There are also two examples of the reverse causality, i.e. the GDP Granger-causes the government expenditure functions (Environment protection *CF05* and Social protection *CF10*). There is just one case of two-way causality, which was reported for *GDP* and Recreation; culture and religion

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CF08. One can conclude that the two examined periods yield completely different results as regards the strength and direction of the causality between the variables. However, no general conclusion can be drawn as the results differs across the government expenditure functions.

Table 1: Granger Causality Test

	1995 – 2013		Pre-crisis		Post-crisis	
	F statistics	Probability	F statistics	Probability	F statistics	Probability
CF01 -/- GDP	0.098	0.759	**5.139**	**0.049****	0.972	0.428
GDP -/- CF01	14.219	0.002*	1.628	0.234	1.208	0.386
CF02 -/- GDP	2.379	0.144	0.408	0.539	7.518	0.111
GDP -/-CF02	0.754	0.399	1.377	0.271	0.699	0.491
CF03 -/- GDP	7.159	0.017*	3.869	0.081	2.835	0.234
GDP -/- CF03	6.4E-05	0.994	**6.615**	**0.030****	0.583	0.525
CF04 -/- GDP	0.122	0.732	2.492	0.149	**26.886**	**0.035****
GDP -/- CF04	15.289	0.001	**12.739**	**0.006***	2.975	0.227
CF05 -/- GDP	0.214	0.651	2.127	0.179	8.940	0.096
GDP -/- CF05	2.927	0.108	0.636	0.446	**89.760**	**0.011****
CF06 -/- GDP	5.438	0.034**	1.5E-05	0.997	0.56608	0.53
GDP -/- CF06	0.692	0.419	3.001	0.117	0.839	0.456
CF07 -/- GDP	1.765	0.204	1.336	0.278	**45.101**	**0.022****
GDP -/- CF07	22.144	0.001*	**6.981**	**0.027****	0.110	0.772
CF08 -/- GDP	0.049	0.828	1.461	0.258	**99.822**	**0.009***
GDP -/- CF08	5.612	0.032**	1.184	0.305	**95.418**	**0.011****
CF09 -/- GDP	0.349	0.564	**7.539**	**0.023****	10.097	0.086
GDP -/- CF09	7.066	0.018**	3.028	0.116	0.179	0.713
CF10 -/- GDP	1.341	0.265	1.764	0.2169	16.326	0.056
GDP -/- CF10	19.580	0.001*	**7.924**	**0.020****	**12.255**	**0.073****

Note: symbols *, ** denote significance on 1%, 5% level, respectively
Source: author's calculations

We also analyzed the long-term relationship between GDP and government expenditure functions. The Johansen cointegration test, which is also used in this paper, is nowadays frequently used for testing cointegration.

Table 2 Long-run Relationship between GDP and Government Expenditure Function

Variables	Cointegration at the 0.05 level	Number of cointegration equitions	Eigenvalue	Critical Value	Trace Statistic	Prob.
GDP & G01	no	0				
GDP & G02	yes	1	0.5471	16.6015	15.4947	0.0339
GDP & G03	no	0				
GDP & G04	no	0				
GDP & G05	no	0				
GDP & G06	yes	2	0.4937	16.0282	15.4947	0.0415
			0.2307	4.4581	3.8415	0.0347
GDP & G07	yes	2	0.6925	24.6075	15.4947	0.0016
			0.2353	4.5617	3.8415	0.0327
GDP & G08	yes	1	0.5754	17.9194	15.4947	0.0211
GDP & G09	no	0				
GDP & G10	no	0				

Source: author's calculations

Assumption for implementation of cointegration is done by the fact that time series are stationary at first difference. Individual series are non-stationary, but their common cointegration movement in a long time lead (for example as a result of various market forces) to some equilibrium, though it is possible that in the case of short time periods there is a misalignment of such a long balance. The aim of cointegration test is to determine the number of cointegration relations r in the VAR models. It is also necessary to identify an optimal time lag. The optimal time lag is one periods (year) and it was found with using Akaike information criterion, Schwarz information criterion and Hannan-Quinn information criterion applied to estimation of the non-differenced VAR model. The results of Johansen cointegration test proved the existence of the long-run positive relationship between *GDP* and Defence *CF02*, Housing and community amenities *CF06*, Health *CF07* and Recreation; culture and religion *CF08* (look at Table 2).

In case of Defence *CF02* and Recreation; culture and religion *CF08*, government expenditure functions follow *GDP*. Cointegration equation for Housing and community amenities *CF06* are not statistically significant at standard levels. So from our point of view, when we estimate possible impact of government expenditure functions on *GDP* and quality of public finance, we can conclude that only expenditure for Health *CF07* can be used as a tool for improvement of public finance quality. Our results are in line with conclusion of Obreja-Brasoveanu (2011) or Donath and Milos (2011) who state the fact that government expenditure proved different effects on economy and welfare by considering the government expenditure functions and identify also significant positive effects of health public expenditures, as well as Afonso and Jalles (2013).

5. Conclusion

The main aim of this paper was to investigate how the key channels and tools used by the public finance affect economic growth and quality of public finance. Following empirical evidence was focused on interaction among the government expenditure in compliance with the COFOG international standard and economic growth in the Czech Republic in the period 1995 – 2013. Granger causality methodology and Johansen cointegration test were applied as basic methods of the research. Although many studies suggest that government expenditure and its components significantly affect economic growth and quality of public finance, our research does not prove that conclusively.

First, we investigated relationship between government expenditure functions and economic growth using Granger causality methodology in pre-crisis and post-crisis periods. Findings suggest that the two examined periods yield completely different results as regards the strength and direction of the causality between the variables in short-term. That is why, no general conclusion can be drawn as the results differs across the government expenditure functions.

Next, we also analyzed the long-term relationship between government expenditure functions and GDP. The results of Johansen cointegration test proved the existence of long-run positive relationship only between defense, housing, health and education expenditure on economic development, but not all results are statistically significant at the standard level. When we focus on possible impact of government expenditure functions on quality of public finance, we can conclude that just expenditure for Health *CF07* can be used as the tool for affecting the economic growth and improvement of public finance quality.

Acknowledgement

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