

The Public Sector's Structure of Production and Its Changes: the Czech Case

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Abstract

The public sector in its role as a producer has been expanding beyond the provision of public goods only. Currently, public producers are engaged in almost all activities as they are classified in the NACE classification. However, due to political or economic reasons, the structure of production has been changing over time. The aim of this paper is to investigate trends in the evolution of the public sector in the Czech Republic in individual areas. In addition, the paper examines the share of public units in the value added production of individual industries of the Czech economy. Moreover, the analysis reveals the current distribution of production between the public and the private sphere of the economy and its changes during last 15 years.

Keywords

Public sector, industries, structure of production

JEL code

H40, H54, L38

INTRODUCTION

Particularly since the Great depression in the 1920s, the states as central authorities have become growingly involved in an ever-broader spectrum of activities ranging from the fiscal and monetary management to water supply or provision of public transport services. However, not all of these activities are undertaken by the state itself. For this purpose, central or local authorities have set up a great deal of specialized institutions putting general public policies into practice. The formation of such establishments is usually done for the sake of addressing market deficits, promoting of economic performance or a reduction in mass employment (OECD, 2005). Thereafter, a production of these public producers embodies a deliberate social and economic policy of central or local government authorities, practically substituting a market solution by the political management.

Obviously, the same holds true for the Czech Republic or the former Czechoslovakia. After the Velvet revolution in 1989, the Czech economy went through the transformation process aiming to redirect the economy from the centrally-planned system to a more market oriented environment. This process made the politicians to consider carefully an optimal distribution of the production between the market and the public sphere. Practical embodiment involved privatisation of companies, transformation of public units into private market agents. Looking at this process from the longer-term perspective,

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the transition of public ownership into private hands took place especially in the 1990s. Since the 2000s, this trend is not unidirectional even if the influence of the privatisation projects launched already in the previous decade still persists.

Not exceptionally, some previously privatised companies were bought back afterwards due to a failure of management to operate successfully on the market. Consequently, an effort to transfer a provision of certain goods and services to the market might have been partially offset by buybacks or by setting up new institutions or by an expansion in activities of already existing public institution. Thus, the aim of this paper is to analyse these trends in the Czech Republic since 2001 and to scrutinize changes in the public sector's production structure. This reference year was chosen also due to the availability of fully consistent data in terms of sectoral classification.

1 BACKGROUND

Practically all the economies around the globe have been experiencing substantial changes in their institutional arrangements. Economic events or changes in the political sphere usually give rise to changes in the allocation of production between public and private sphere. The availability of reliable information on the size of both private and public sphere is of high importance as they operate in different sets of incentives (Buchanan, Wagner, 2000) so that the economic performance over the business cycle or wage policy (Quadrini, Trigari, 2007) can differ considerably as well as the public sector's responses to market forces, the decision-making in financial affairs (Rybacek, 2016) or its contribution to other economic variable as unemployment or inflation (Nussbaumer, 1977).

Ongoing institutional changes can be driven by a number of forces which can be grouped into political and economic reasons whereas the line between them is rather blurred in most cases. During the current economic crisis, European governments took over a number of institutions, mostly of the financial nature, to bail them out or some of them were nationalised irrespective of current general economic situation (e.g. private pension funds). This initiates changes in the range of public goods and service provided by the public sector.

In addition, changes in demographic structure may have a similar effect as they can make it necessary to open up new public schools for baby boomers or new healthcare providers in reaction to ageing population. The same holds true for the allocation issue as the regulators aim to find the most effective way of resources allocation as well as the most appropriate extent of competition. All these factors can result in intensive changes of the production structure.

When analysing public institutions, we are not, however, concerned only with public goods and services. As the theory of public goods holds, there are two key features of the public goods. Firstly, consumption of public goods does not reduce the amount for others (non-rivalry). Secondly, there is non-excludability from consumption implying the impracticable to collect payments for the use of public goods to finance their provision (Stiglitz, 1986). This is known as so-called "free rider problem." Public defence, street lights or police services can be put as examples of goods generally considered as public goods.

The expansion of the public administration led to the current situation where public producers are engaged also in the production of goods or services not having the features of public goods as education, healthcare or electricity supply. From economical point of view, some publicly provided goods and services are of non-rival nature but excludable at different costs. In some cases, the exclusion is technically feasible, but supposedly too costly when provided by market producers. This might be the case of public access to landscapes, etc. Costliness of the exclusion is discussed in a number of texts, e.g. Buchanan (1965) or Musgrave (1959).

The reason for the government intervening in the production of goods or services not having the feature of public goods is also the existence of external effects, i.e. positive or negative externalities. We can put as an example the case of education supposedly generating highly positive effects for the society

as a whole. Government thus aims to assure that every citizen consumes at least minimal amount of this service (Hyman, 2013).

One of the most difficult issues is the price strategy related to the provision of goods and service by the public sector. As Hyman (2013) points out, some of public goods have a nature of congestible goods meaning that if a number of users reach a certain level, then the benefits for other users will decrease. In other words, congestible public goods are non-rival only up to a certain point. Highways or healthcare facilities can serve as examples as they are not provided fully for free to avoid congestion.

From the national account's point of view, a chosen price strategy might influence sector classification of units (government or non-government sectors). What matters here is the extent to which payments made by direct users of public facilities cover the production costs (Rybacek, Vebrova, 2015). As a result, the national accounts methodology divides the public sector into two parts, government units and public corporations. As our aim is to cover the public sector in its entirety, the following analysis is based on data for all public institutions irrespective of their market or non-market behaviour. It also implies that we will examine the production of not only public goods and services, but also the public provision of goods and services which do not meet the generally accepted definition of public goods.

2 METHODOLOGY

The public sector in the ESA methodology consists of producers under control of government units. Government units are grouped into the sub-industries of general government producing goods and services on the non-market basis. However, a number of units were set up to act upon social and economic policy of government institutions whereas their activities are carried out on the market basis, i.e. output is provided at economically significant prices as defined in the methodology. Such units are classified outside general government industry. To show the public activities in their entirety, the analysis below deals with all publicly controlled units as well as general government industry itself.

This means that the public sector is defined as sum of general government industry (code S13), public non-financial institutions (S11001) and the central bank. All other public financial institutions are left out because the relevant data are not available at all or in sufficiently long time series. However, a distortion is pretty negligible as nearly all public financial institutions were reclassified in the general government industry.

When analysing the economic activity of industries or industries, a value-added is commonly used to represent the performance of groups of units (Spevacek, 2010). Technically, value added is the balancing item of the production account; in other words, the excess of resources over uses (par. 6.70 SNA). Economically, value added shows the value created in the production process with the contribution of labour and capital. Adding taxes and subsidies on production, we arrive at GDP. However, this is not the case at the levels of sector or industry. For that reason, the analysis below is done by use of value added.

At this stage, it is worth mentioning that value added of most of public producers is based on the cost-approach to valuation of output. As there is not market for a great deal of goods and services provided by public producers, their output is valued at alternative way, i.e. as a sum of costs. There are pros and cons of this approach. As a large part of public goods and services are not traded on the market, this approach enables to overcome the valuation problem arising from the absence of appropriate market prices. On the other hand, the valuation at costs does not reflect the real evaluation by final users and it prevents us from a reliable calculation of changes in productivity (Murray, 1992).

The manual SNA in the paragraph 6.98 specifies two reasons for the existence of non-market output. Firstly, there are technical obstacles to collect payments from all users so that a supposed market-failure occurs. In other words, transaction costs to charge users are of such an extent that the production must be organized collectively and financed out of compulsory payments in particular. Secondly, market solution in terms of prices and volumes of goods and services does meet, in some cases, the government criteria

of a fair distribution in the society. Then, market mechanism can be replaced by a redistribution system acting upon a deliberate social and economic policy of government. This might be the case not only of a redistribution of incomes, but also redistribution in kind, i.e. direct provision of goods and services at prices below a market level or purchases of goods from market producers in favour of final users.

For the public non-financial corporations classified outside the general government industry, the valuation of output follows the market approach, i.e. output valued at market prices. In these cases, the provision of output runs on the market bases as the methodology holds². Thus, the value added of the public sector covers both market and non-market producers. Value added by industries will be used to analyse the structure of production of public and general government units as well as the share of value added in total value-added in the domestic economy. Using time series from 2001, we are in a position to analyse changes in the production structure of public sector over last fifteen years. The aim is to identify public activities which have been expanding and those which have been shrinking in terms of value-added. The industrial structure follows the NACE classification by section as defined in the relevant manual (Eurostat, 2008).

3 THE PUBLIC SECTOR ANALYSIS

The public sector is widely analysed by the use of a great many of indicators, preferably by total expenditures and its share on GDP (Gemmell, 1993). However, we prefer to exploit the share of individual sector in the total value added production. The reason for doing so is that we focus on the production activity in the economy and the public sector's participation. Another reason is that using total expenditure or indicator of similar nature erroneously implies that these components are components of GDP (Blades, Pathirane, 1982). The analysis of value-added will reveal a part of the production covered by the public sector, i.e. which amount of goods and services expressed as value added is provided directly by the public producers.

3.1 The public sector's share in total value-added

Let's start by looking at the overall share of the public sector in the production of value added. This share is illustrated in the chart 1 showing an extent of the participation of the public sector in the production of goods and services in the society. From 2001 to 2014, the share of the public sector has declined by 0.4 percentage point. From the long-term perspective, the involvement of public units in productive activities was declining.

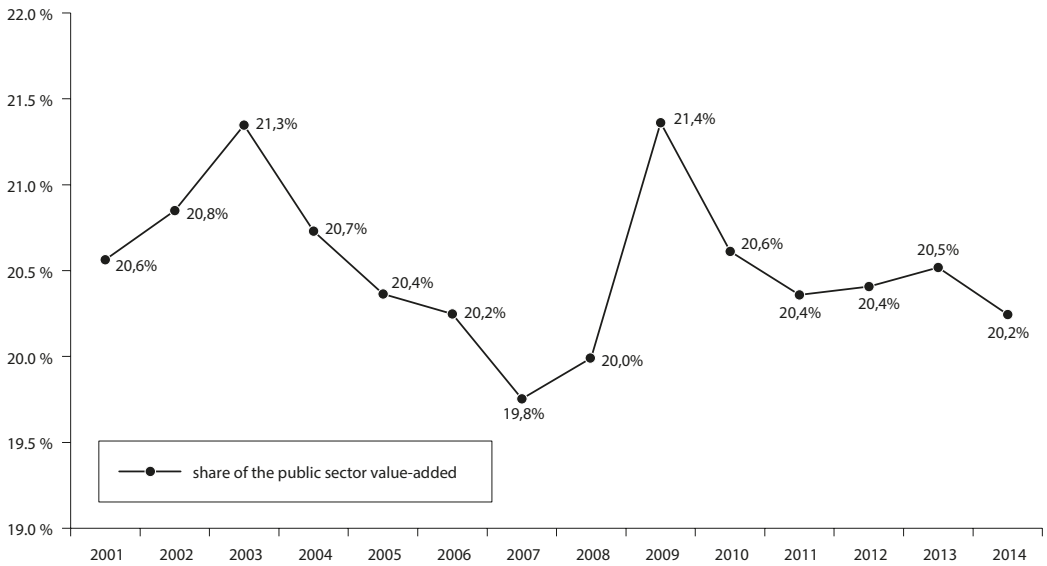
Before 2004, the share of public sector in value-added production had been steadily growing. During 2004, the Czech government approved a privatisation of the mining company OKD, a.s. This transaction led to decrease in the share of the public sector in the industry B "Mining and quarrying". The drop in the share of public sector was continuing till 2007; that can be explained by a declining share in the industries P (Education) and R (Arts, entertainment and recreation) accompanied by other significant changes in the structure as will be shown below.

In case of education, the share of the public sector went down by 3 percentage point between 2003 and 2008. This can be accounted for by growing number of students in private universities which grew from 4% in 2003 in total undergraduates to nearly 10% at the end of 2008. Nevertheless, this trend reversed then in connection with the economic crisis and changes in the demographic situation or a gradual satisfaction of deferred demand of middle-aged students.

Next, there is a striking annual increase in the share in 2009. This sharp increase by 1.4 percentage point can be accounted for by the global economic crisis. In fact, this is one of signs of the beginning

² This approach is a subject of controversy and discussions. For discussion on the expansion of government, see i.e. DiLorenzo (1983), DiLorenzo (2007).

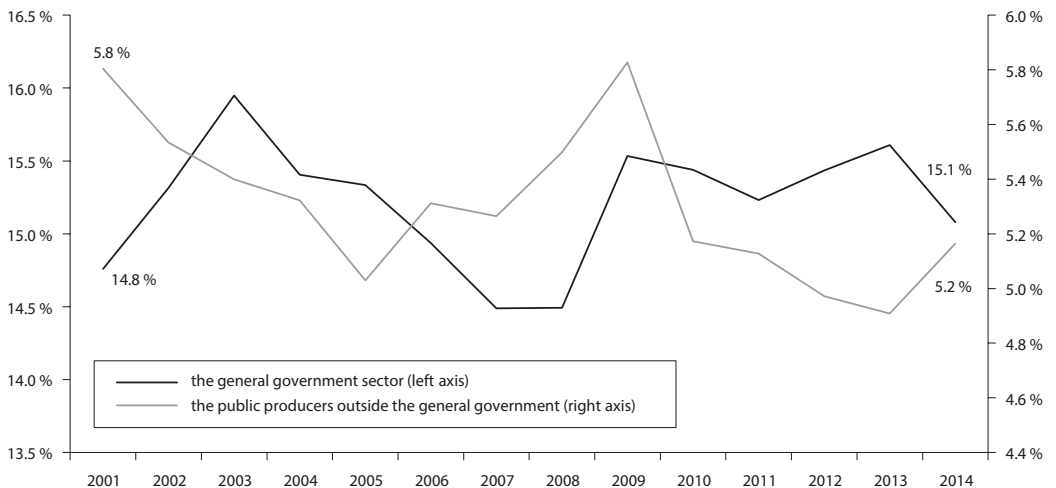
Figure 1 Share of the public industry in total value-added, the Czech Republic, 2001–2014



Source: Own calculation, <czso.cz>

of the crisis in the Czech Republic. While the nominal GDP fell by 4.3%, the value added of the public sector grew by 4 percent annually. It implies that the private industry responded more sensitively to the economic situation abroad but a reaction of the public sector was delayed by one year in reaction to the huge deficit of the state budget in 2009 (CZK 192 bill.).

Figure 2 Shares of the general government industry and other public units in value added, the Czech republic, 2001–2014



Source: Own calculation, <czso.cz>

The situation reversed in the year 2010, when the Czech economy recovered in terms of a nominal value-added growth in the private industry (1.7%), while the public sector experienced a fall by 2.7% annually. After 2010, the share of the public sector remained more or less stable slightly above 20% of total value-added, ending up at the level 20.2% at the end of 2014, i.e. by 0.4 percent point lower than the share in 2001.

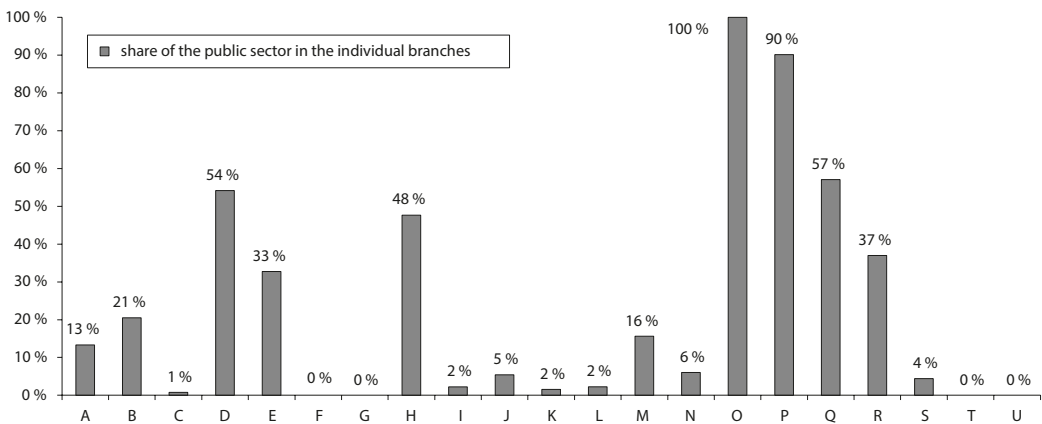
Now, we will take a look at the general government industry and the public producers outside the general government separately. As indicated in the following chart, changes in the shares of both groups were quite opposite compared with the long term perspective. However, the situation reversed in the 2014.

Both time series shows very similar cyclical trends except last years. For example in 2014, the share of the government industry fell 0.5 percentage point, due to the drop in value added produce in industries P (Education), Q (Healthcare) and R (Arts, entertainment and recreation), contrary to the other public producers whose share grew by 0.25 percentage point especially due to a sharp increase in the electric power generation, transmission and distribution (division 351 of NACE). The nominal value added in the division 351 (section D) went up by 21% annually. Resulting from these changes in last year, the shares of both groups returned to the level as at the end of 2011.

3.2 Industrial structure of the public sector

Let's proceed to the industrial structure of the public sector in terms of the shares of individual industries on the industries' value added in the economy. Logically, the public sector fully covers the provision of goods and services under the industry O (Public administration and defence; compulsory social securities). Other industries with the highest shares represent mainly the production of goods and services for households' individual consumption. This is first of all the cases of educational service; the public sector covers about 90% of total value-added generated by the industry P. Only 10% goes for the private producers in case of the educational service.

Figure 3 The public sector by industries, the share on total industry's value added, the Czech Republic, 2014



Source: Own calculation, <czso.cz>

In case of the NACE Q (Human health and social work activities), the share of the public producers reached 57%. This is mainly due to the fact that financing of healthcare provision is made to a crucial degree through public finance and the terms of financing are similar for both public and private producers. This implies that the provision of the healthcare service is much more attractive for private

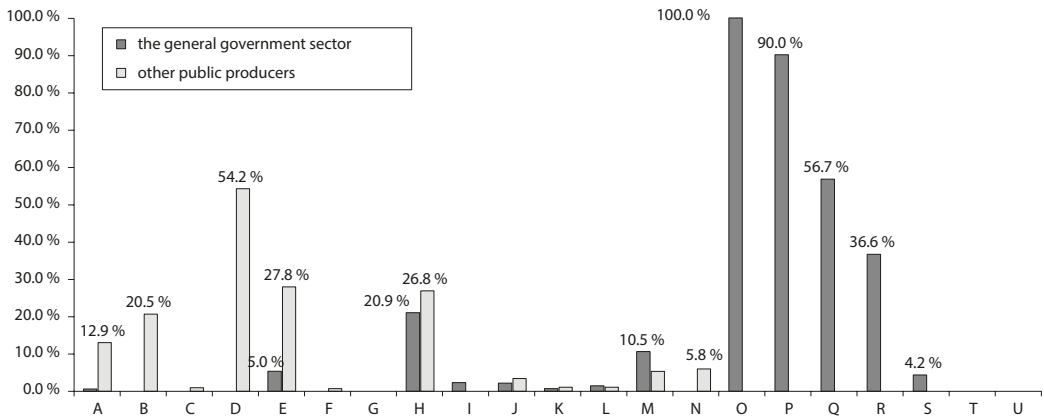
producers so that the competition occurs in particular in the profitable areas like dental care, gynaecology, plastic surgery, etc.

The public sector takes also a large part of output in the industries H (Transportation and storage) and R (Arts, entertainment and recreation) covering 37%. In case of the industry H, the share of 54% reflects the deliberate economic policy of government institutions in the field of the passenger transportation. This service is predominantly provided by public units under the control of government institutions receiving subsidies to fill the gap between the market prices and the prices charged by these institutions. This is especially the case of the rail transportation and the public city transport companies.

One third of the value-added is generated by the public sector in case of the water supply, sewage and waste management (the industry E). This implies that a private provision of this service predominates in water management. In other cases, the provision of goods and services is mostly or almost exclusively ensured by units whose behaviour is driven by market forces. To draw the line between public and private, we found out that about 20% of goods and services are delivered by the public sector, particularly in the industries O, P, Q, D, whereas the public sector takes as well a significant part of the production in the industries H, R, E.

Now, let's separate government sector from other public producers operating on the market basis. The following chart shows the structure of both groups in terms of NACE classification.

Figure 4 Share in total value-added of industries, the Czech Republic, 2014



Source: Own calculation, <czso.cz>

We can easily draw the number of observations. Production recorded in the industries O (Public services, etc.), P (Education), Q (Human health and social activities), R (Arts, entertainment and recreation) and S (Other service activities) go almost totally for the general government sector. It implies that virtually all public healthcare producers are treated as non-market producers providing their services at lower prices that would have prevailed on the market, had all these services been produced by market units.

On the contrary, other public producers (market oriented) represent all the contribution of the public sector to total value-added in cases of B (Mining and quarrying) and D (Electricity, gas, steam and air conditioning supply). The other public producers also dominate in the industries A (Agriculture, forestry and fishing) and E (Water supply, sewerage, etc.). In case of NACE H (Transportation and storage), the total contributions of both groups is shared with higher input from other public producers (26.8%) while the general government sector contributes with 20.9%. On the part of other public producers,

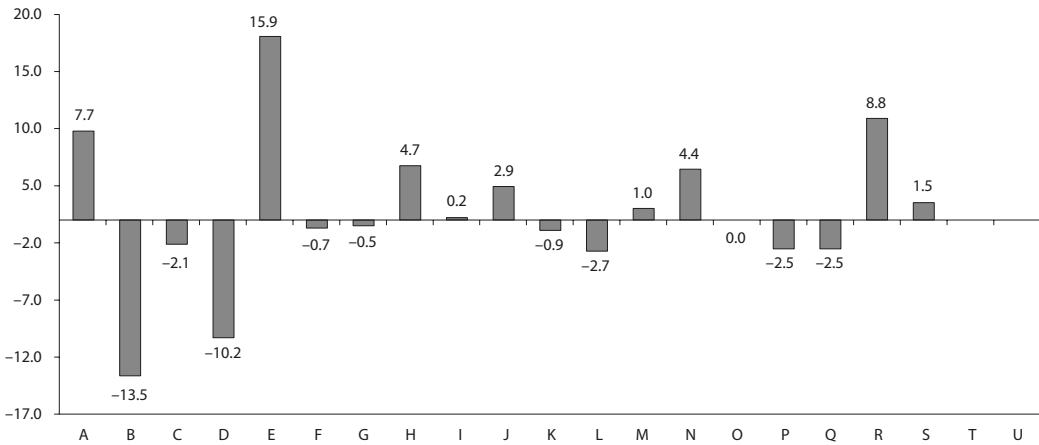
it is mainly about direct provision of transport services while the government institutions mainly deal with other activities like maintenance of roads, repairs, etc.

3.3 Changes in the production structure of the public sector

After the analysis of industrial structure of production in the public sector, we can now proceed to the analysis of changes in the structure over time. In other words, how the structure of production has evolved over last fifteen years. This can reveal changes in the delimitation between private and public sphere of the economy in individual industries. We can also identify in which activities the public institutions have become more expanded or, on the other hand, which activities were left to the market forces.

Let's start with a graphical overview of changes in individual industries of the public sector between 2014 and 2001 as shown in Figure 5.

Figure 5 Changes in industries of the public sector between 2014 and 2001, the Czech Republic, in percentage points (p.p.)



Source: Own calculation, <czso.cz>

The public sector have experienced considerable changes especially in the industry B (Mining and quarrying), in which case the share dropped due to privatisation mentioned above (OKD, a.s.). The same trend appears in the industry D (Electricity, gas, steam, etc.) with a decrease by 10.2 p.p. However, if we compare the year 2001 to 2015, then we arrive at the decline by 24 p.p. A growing share of the public sector in this industry over last four year was made by a fall in the total value-added while the public sector experienced a growth amounting to 20% annually. As no privatisation operation took place in these years, the sharp changes can be hardly explained in different way than by economic factors affecting results of individual companies, i.e. extraordinary revenues or expenditures, an effectiveness of hedging against price changes, etc.

In case of educational service (NACE P), the share of the public sector dropped by 2.5 p.p. As the share of the public sector represents 90% of total value-added of this industry, we investigated this development in a greater detail. However, relevant information from the yearbooks of the Ministry of Education, Youth and Sports is not available before 2005 so we can compare the values at the end of 2014 to corresponding indicators in 2005. During this period, the number of public schools declined by 2% and the number of students by 3%. This trend is very striking in cases of elementary school and high schools. Contrary to public elementary schools, the number of private elementary schools went

up by 55 % along with the growing number of students (89.5%). However, private high schools followed the general trend with a declining number of schools by 6.1%.

The private sector clearly outperformed the public sphere in cases of kindergartens and colleges. The number of private nursery schools grew by 416.7% concurrently with the growing number of students (308.9%). Growth in the public sector experienced much lower dynamics (1.5% in the number of schools and 30 % in the number of students). Similar holds true for private colleges where the number of student sharply increased by 42.6% contrary to 10.3% growth in the public ones. These changes can account for the general decline in the share of the public sector in the educational service provision.

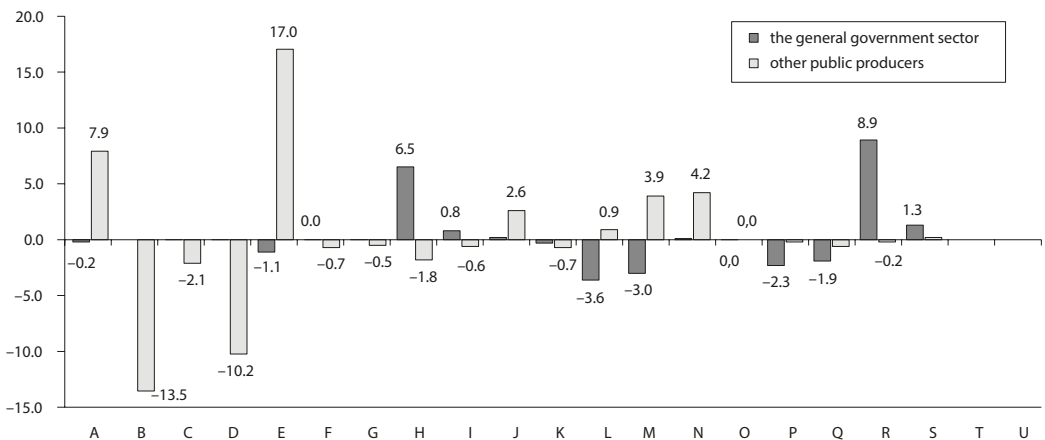
Let’s move on to the healthcare services (NACE Q). Similarly to the educational services, the share of the public sector decreased by 2.5 p.p. At this stage, we can recall that the public sector covered 57% of the healthcare services provision as shown in the Figure 3. The following information was obtained from the statistical yearbooks of the Institute of Health Information and Statistics of the Czech Republic. In 2014, there were 30 914 health establishments in the Czech Republic, with 57.6% of physicians and 42.3% of paramedical workers in the private sphere. A comparison to the 2001 reveals that the share of the private sphere went up in both indicators. In 2001, 55.2% of physicians and 36.4% of paramedical workers were in the private sector. The private sector thus slowly grew in terms of workforce over the investigated period and consequently in the production of value-added.

On the other hand, the public sector considerably expanded in some of the other industries. The involvement of public institutions has increased by 15.9 percentage points in the industry E (Water supply, etc.). The second highest growth was recognized in the industry R (Arts, entertainment and recreation) and NACE A (Agriculture, forestry and fishing). An expansion of the public sector is also remarkable in cases of transportation services (NACE H), administrative and support service activities (NACE N) and information and communication (NACE J).

The following chart is decomposing the changes in the public sector value-added into the contributions of the general government sector and of other public producers.

The industries, where the contribution to total value added is shared by both groups forming the public sector, are in most cases contradictory. This is the case of NACE M (Professional, scientific and technical activities) related to the expansion of value added predominantly caused by newly established research institutions. This can be seen as a gradual shift of research activities from the government

Figure 6 Changes in the shares between 2014 and 2001, the Czech Republic, percentage points



Source: Own calculation, <czso.cz>

institutions toward the public market producers. Besides that, the position of the government institutions in the NACE L weakened (by -3.0 p.p.) while other public producers take a larger share than at the end of 2001 (by 0.9 p.p.).

Interesting is the case of transportation and storage (NACE H) in which the share of the government sector grew by 6.5 p.p. while the share of other public producers dropped by 1.8 p.p. This can be accounted for by the development in the NACE 522 (support activities for transportation) in the general government sector which contains units dealing with the road maintenance, etc.

CONCLUSION

There are many observations which can be drawn from the analysis above. Overall size of the public sector in the Czech Republic, in terms of the share on total value added, has declined by 0.4 over last 15 years. Among the individual consumer goods, public producers take a predominant part in the provision of educational services, healthcare or in supplying electricity or gas. Looking at the changes over the period in question, the public sector's share dropped in the mining and quarrying and electricity, gas, steam and air conditioning supply. On the contrary, the public sector has expanded in water and waste management, agriculture or arts, entertainment and recreation.

The decline in the public sector size might lead to several interpretations and macroeconomic implications. It should be stressed that this decline does not imply a decreasing quantity of goods and services supplied by the public sector. Declining share determined by our analysis is only in relative terms. This development thus signifies that a higher share in production is left to the private producers, so it is subjected to the influence of market forces. This trend has a potential to promote growth in output or productivity as the increasing share of the market production implies more intensive competitive pressures and market incentives.

Further, shrinking public sector tends to be less demanding on the State budget or the budgets of local government institutions owning or otherwise controlling public producers. However, the relation between the size of the public sector and its financial effect on the budget would require more detailed investigation as it also depends on whether public producers are entitled to raise additional funds on the capital market or if they are financially dependent notably on the government institutions.

As was also demonstrated in the text, the public sector and its size can influence the business cycle development and its analysis. In reaction to the economic crisis, there was a significant drop in the nominal value added produced by the private sphere of the Czech economy. A contraction in value-added of the public sector experienced a contraction one year later when nominal value added of the public sector fell by 2.7% annually. This supports the view of the studies concluding a different behaviour of the public sector over the business cycle.

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