AGRICULTURAL DEVELOPMENT AND GOVERNMENT EXPENDITURES IN THE NEW EU COUNTRIES

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Abstract: The main ambition of this paper is to analyse agricultural developments in selected new EU member states with particular emphasis on government expenditures in agriculture. The main objective is to identify the relationship between government expenditures development on one side, and agrarian sector performance (the value of production) in selected member states on the other. The conclusions drawn from this analysis are that the agricultural sector has changed its structure and position within the national economy of selected new EU member states significantly in the 20 years since the early 1990s. Member states included in the analysis reduced both the size of their agricultural sector (number of people working in agriculture, total arable areas, number of animals, etc.), and the value of agricultural output. Despite the significant reduction of the agricultural output, member states became more efficient – and in particular their productivity per farmer increased significantly. Selected country's agricultural sector, its structure and production value development are closely related to government expenditures. Significant correlation is apparent between agricultural government expenditures and the change in the number of economically active persons in agriculture, development of agricultural production, agricultural area, agricultural GDP and agricultural capital stock. Regarding the elasticity of new EU member states' agricultural sector in relation to changes in government expenditures, significant elasticity is apparent in the case of the number of economically active persons in agriculture, agricultural production (especially livestock production), area of arable land, agricultural GDP and capital stock.

Introduction

The agrarian and food sectors are without any doubt the key sectors of any economy around the world (Svatoš, 2009). The agricultural sector and its performance are influenced in many countries by the attitude of individual governments to agriculture (Bartolini; Viaggi, 2013). For many countries, agriculture and its performance (the value of production) and size (the number of hectares and people working in agriculture, livestock population, share in GDP etc.) represent a strategic item of their policy-making activities (Matthews; Buchan; Miller et al., 2013). Agriculture is not only an important part of the economy, but it is also part of the strategic sector, as it satisfies one of the most important needs of the human population – food (Horská, 2011). There is no country which does not have to address the problems of food security, and where internal security policies do not also include food security (Bielik, 2010). It therefore follows that the agricultural sector represents a specific sector of the global economy, and its development is affected not only by economic power (supply and demand), but also by political power (liberalisation,

protectionism etc.) (Jeníček, 2009). The agricultural market, both from global and regional/individual countries point of view, is seriously affected by the policies implemented relating to the agricultural sector and market development (Svatoš, 2008). The result of political interventions to agriculture is that the agricultural market represents one of the least liberalised markets within the world market (Horská, Hambálková, 2008). One significant element within the global agricultural market is the European Union (Viaggi; Gomez y Paloma; Mishra, et al., 2013). The EU's Common Agricultural Policy, together with the Common Trade Policy, significantly influences not only the EU's internal agricultural market, but also global market development (De Castro; Adinolfi; Capitanio; et al., 2012). Every new member state of the EU is obliged to accept the Common Agricultural and Trade Policies – and both have a direct impact on the performance of each country's agricultural sector (Drabík, Bártová, 2008). These policies can be either positive or negative (Ramniceanu; Ackrill, 2007). Accession to the EU means significant changes in the economy of each individual member, including the agricultural sector (Lukas, Poschl et al., 2004).

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Government expenditure is a very important source of funding for agricultural sector development (Pokrivcak; Swinnen; de Gorter, 2003). In Europe, and especially in the European Union, government expenditures – and notably subsidies provided by the European Union's Common Agricultural Policy – are a very important source of income for individual farmers and agricultural companies. (Strelecek; Zdenek; Lososova, 2009; Basek; Kraus, 2011). It is a fact that without government support the majority of EU farmers would be operating at a loss (Bielik; Juricek; Kunova, 2007). When considering government expenditures in the agricultural sector it should be noted that currently they are split into two flows. The first flow is represented by purely agricultural expenditures. The second flow is represented by expenditures related to environmental protection (Sadowski; Czubak, 2013). The new EU member countries have recorded a significant growth of government expenditures related to agriculture and environment protection value during the last two decades. In the period 2001–2011 alone, the value of government agricultural expenditures increased from 4.7bn. USD/year to 9.5bn. USD/year (in constant 2005 USD prices), and the value of expenditures for environmental protection increased from ca 3.9bn. USD/year to 9.3bn. USD/year. This means that government expenditures related in some way to agricultural activities, more than doubled during the last ten years. This growth of public support strongly influences the economy, the structure, and the performance of each new EU member states' agricultural sector. Despite the fact that the share of government expenditures on agriculture and environment protection in relation to total government expenditures in individual countries is very low – about 4% of NMCs' total government expenditures value – government expenditures represents a very important part of each countries' agribusiness. Nowadays individual governments of NMCs spend about 20bn. USD for different kinds of expenditures related more or less to activities in the agricultural sector. This means that government expenditures (paid every year) play a very important role in the formation of the agricultural sector's final state budget in individual countries (Rickard; Sumner, 2011). When considering the mutual relationship between government expenditures and agricultural sector development, it is necessary to highlight the existence of many common trends among all NMCs, though there are also huge differences apparent among the individual countries in the area of their agricultural sectors' sensitivity and correlation in relation to changes in the value and structure of government expenditures. (Blazejczyk-Majka, Kala, Maciejewski, 2012; Bohackova, Hrabankova, 2011)

The main aim of this paper is to analyse agrarian sector development in individual new EU member countries with an emphasis on government expenditures (both agricultural and environmental expenditures) directed towards agriculture. The idea is to analyse the relationship between the agricultural sector and its performance (production value) on one side, and the level of government expenditures in agriculture on the other. Government expenditures in agriculture are a very important element influencing the position and performance (production value) of agriculture within the economy of individual coun-

tries. Government subsidies have a direct impact on crops and animal production value and structure development. Available public sources (government expenditures) also have a significant impact on the agricultural sector, its productivity and competitiveness. The conducted analysis provides a basic overview of the development of government expenditures value development on one side and agricultural sector and its performance on the other, in the period 2001 – 2011.

Materials and Methods

This paper analyses the value and structure development of government expenditures in agriculture in ten new EU member countries (NMCs), viz: Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. Cyprus and Malta are excluded from the analysis because there are not typical representatives of new EU countries and their agricultural sector is very specific. The main objective is to identify the relationship between government expenditures value development on one side, and the performance (gross agricultural production value; the gross value of production is analyzed in constant (2004–2006) USD prices) of the agrarian sector in each of these analysed countries on the other. The analysis provides a basic overview of individual countries' agricultural sector development (in relation to total agricultural production, crops and livestock production). The paper is especially focused on agricultural sector output, productivity (agricultural production value and GDP development per person economically active in agriculture), and size development (area of agricultural land development, number of people working in the agricultural sector etc.). It should be noted that the number of persons economically active in the agricultural sector is taken from the FAOSTAT database – this number covers not only farmers, but also other people somehow connected with agricultural sector development. Thus, the numbers are not necessarily in compliance with individual countries' national statistics. The FAOSTAT database was chosen because of the authors' intention to use data conducted according to the same methodology for the analysis

In the case of government expenditures, this paper analyses their total value development both in relation to agriculture and environment protection (in this case it is assumed that a part of the expenditures for environment purposes is also devoted to farmers, because their production activities are also closely related with environment protection activities (Baylis; Peplow; Rausser; et al., 2008).

A significant part of the paper is devoted to the correlation and elasticity analysis between government expenditures on one side and the number of economically active persons in agriculture, agricultural GDP, agricultural production, crops and livestock production, arable and agricultural land area, and the value of capital stock on the other. In this case correlations and elasticities are calculated from two different points of view. The first is represented by calculations conducted in relation to the total value of public expenditures going only to agriculture. The second point of view is by calculations conducted

in relation to public expenditures supporting not only agricultural activities, but also supporting environmental protection activities. The aim is to identify the level of dependency and sensitivity existing between public expenditures and the development of the agricultural sector structure and performance (gross agricultural production value).

The instruments used to achieve these objectives are: basic indices, chain indices, geomean calculation, elasticity calculation, and regression and correlation analysis (Hindls; Hronová; Seger; Fischer, 2007). To calculate elasticity it was necessary to conduct a set of regressions, providing basic information about the mutual relationships between individual variables (the exogenous variable is government expenditures value) and individual endogenous variables such as the number of economically active persons in agriculture, total agricultural production, crops and livestock production, agricultural area, arable area, agricultural GDP, and agricultural capital stock value.

Logarithmic regression was found to be the most suitable form of regression for the analysis. This type of regression provides information about elasticities directly (Individual regressions were also tested to obtain information about the significance of the relationships analysed. The significant relationships are presented in the individual tables which follow. The main sources of data are the databases of UN FAOSTAT and the World Bank. The analysed time period is from 2001 to 2011 (Data for the previous years are not currently available). All data used in individual analyses (both correlation analysis and elasticity analysis) is conducted on constant prices.

Analysis and discussion

Agricultural sector development in New Member Countries between 1993 and 2011

During the twenty years following the early 1990s, the agricultural sector changed its position in the national economy significantly for each of the New Member Countries (NMCs) (Pieniadz; Wandel; Glauben, et al., 2010). The share of agriculture in the GDP of the whole group of countries declined from more than 7% to about 4% (EUROSTAT, 2013). The most significant reduction of the agrarian sector's share in relation to GDP was recorded in the Czech Republic, Poland, Bulgaria, Slovenia and Romania (decline of share by 40-50%), though apart from Hungary, all the analysed countries recorded a significant drop of the share of the agricultural sector in their national economy. The actual value of the agricultural sector's performance in the analysed countries barely changed, but production output was reduced by about 10-20%. A significant decline of agricultural sector performance was especially noticeable in Bulgaria, Slovakia, the Czech Republic and Latvia. On the other hand, the only countries which were able to stabilise agricultural production value were Poland, Hungary, Romania and Slovenia (for details see Table 1).

When analysing individual countries' agrarian sector performance development, it must be emphasised that despite the decline of the agricultural sector's importance within the national economy of all analysed countries, its production value (together with its effectiveness and productivity) significantly increased, especially in relation to the number of economically active persons in the agrarian sector and agricultural GDP (for details see Table 2).

Gross agricultural production generated by all NMCs decreased from ca 52bn. USD to ca 49bn. USD (in constant 2004–2006 prices) within the analysed time period. Positive growth of agricultural production was recorded only in the cases of Romania and Slovenia. Considering the agricultural GDP development in individual NMCs, it should be emphasised that in all analysed countries, their inter-annual growth rate was lower in comparison with the inter-annual growth rate of each country's economy, which is why the importance of the agricultural sector in relation to the total economy declined significantly in each of the analysed countries. Another specific feature of individual country's agricultural sector development is the significant reduction in the number of economically active persons in agriculture. The reduction in the number of economically active persons in agriculture, together with a significant restructuring of individual countries' agricultural sector, led to a significant growth of individual NMCs' agricultural sector effectiveness.

All analysed countries recorded a significant growth of generated agricultural production value per person economically active in agriculture within the analysed time period. Considering the agricultural production per capita development – the most impressive growth was recorded in Slovenia, Bulgaria, Lithuania and Romania (for details see Table 2). Apart from the Slovak Republic, all the NMCs recorded the growth of GDP per capita of between 1.2%–10.0% per year during the analysed time period. The Slovak Republic recorded in this case GDP growth by about 0.07% (all data is provided in 2004–2006 USD constant prices). However, in general it should be emphasised that almost all analysed countries recorded a significant improvement to their agricultural sectors effectiveness. The most progressive growth of gross production per capita was recorded in the case of crops and especially cereals production. The growth of gross production value per capita in relation to livestock production was significantly lower (in the case of Slovakia the growth of livestock production was even negative). It should also be mentioned that the global economic crisis did not affect individual countries' agricultural sector performance so much. In general only the inter-annual growth rate reduced its value in the majority of analysed countries. If we compare individual country's agricultural sector performance in the period before the crisis (1993–2007) with the later period (2008–2011), we can see that the total agricultural sector performance was still positive. The whole analysed period 1993–2011 afterwards represents one of the most important periods in individual NMCs agricultural sector development – individual countries finished the transformation of their agrarian sector and their agriculture is now more efficient and competitive.

The explanation for the general positive per capita production value development trend is that while the analysed

Table 1. Gross agricultural production value structure in individual NMCs (in constant 2004–2006 million US$)

Gross Production Value (constant 2004–2006 million US$) (USD)		1993	1999	2004	2007	2009	2011	Basic 2007/ 1993	Basic 2011/ 1993	Chain 1993– 2007	Chain 1993– 2011
Bulgaria	Agriculture	3 230	3 270	2 827	1 964	2 526	2 644	0.6080	0.8186	0.9651	0.9889
Bulgaria	Crops	1 403	1 532	1 802	973	1 530	1 686	0.6935	1.2017	0.9742	1.0103
Bulgaria	Livestock	1 827	1 738	1 025	992	996	958	0.5430	0.5244	0.9573	0.9648
Czech Republic	Agriculture	5 746	4 957	4 907	4 364	4 358	4 335	0.7595	0.7544	0.9805	0.9845
Czech Republic	Crops	2 244	2 165	2 274	1 913	1 978	2 020	0.8525	0.9002	0.9887	0.9942
Czech Republic	Livestock	3 502	2 792	2 633	2 451	2 381	2 316	0.6999	0.6613	0.9748	0.9773
Estonia	Agriculture	734	513	528	610	621	637	0.8311	0.8678	0.9869	0.9922
Estonia	Crops	280	183	171	237	223	227	0.8464	0.8107	0.9882	0.9884
Estonia	Livestock	455	330	356	373	397	410	0.8198	0.9011	0.9859	0.9942
Hungary	Agriculture	5 507	5 943	6 566	5 053	5 551	5 281	0.9176	0.9590	0.9939	0.9977
Hungary	Crops	2 417	3 050	3 766	2 562	3 093	3 003	1.0600	1.2424	1.0042	1.0121
Hungary	Livestock	3 090	2 893	2 800	2 491	2 458	2 278	0.8061	0.7372	0.9847	0.9832
Latvia	Agriculture	1 049	602	673	780	786	767	0.7436	0.7312	0.9791	0.9828
Latvia	Crops	428	268	322	378	372	345	0.8832	0.8061	0.9912	0.9881
Latvia	Livestock	621	335	351	403	414	422	0.6490	0.6795	0.9696	0.9788
Lithuania	Agriculture	1 839	1 511	1 585	1 618	1 712	1 654	0.8798	0.8994	0.9909	0.9941
Lithuania	Crops	874	784	767	716	887	823	0.8192	0.9416	0.9859	0.9967
Lithuania	Livestock	965	727	819	902	825	831	0.9347	0.8611	0.9952	0.9917
Poland	Agriculture	17 356	16 319	16 711	16 974	17 094	16 652	0.9780	0.9594	0.9984	0.9977
Poland	Crops	8 779	7 553	7 954	7 370	7 848	7 126	0.8395	0.8117	0.9876	0.9885
Poland	Livestock	8 577	8 766	8 756	9 604	9 245	9 526	1.1197	1.1106	1.0081	1.0058
Romania	Agriculture	13 531	13 066	15 592	11 407	13 148	14 419	0.8430	1.0656	0.9879	1.0035
Romania	Crops	8033	8 029	10 437	5 936	7 961	9 530	0.7390	1.1864	0.9786	1.0095
Romania	Livestock	5 498	5 037	5 155	5 472	5 187	4 889	0.9953	0.8892	0.9997	0.9935
Slovakia	Agriculture	2 387	2 023	1 947	1 655	1 675	1 660	0.6933	0.6954	0.9742	0.9800
Slovakia	Crops	1 127	997	1 040	817	910	909	0.7249	0.8066	0.9773	0.9881
Slovakia	Livestock	1 260	1 026	907	838	765	751	0.6651	0.5960	0.9713	0.9717
Slovenia	Agriculture	782	848	919	811	783	790	1.0371	1.0102	1.0026	1.0006
Slovenia	Crops	267	297	347	294	281	299	1.1011	1.1199	1.0069	1.0063
Slovenia	Livestock	515	551	573	517	502	491	1.0039	0.9534	1.0003	0.9974
NMCs	Agriculture	52 161	49 052	52 255	45 236	48 254	48 839	0.8672	0.9363	0.9899	0.9964
NMCs	Crops	25 852	24 858	28 880	21 196	25 083	25 968	0.8199	1.0045	0.9859	1.0002
NMCs	Livestock	26 310	24 195	23 375	24 043	23 170	22 872	0.9138	0.8693	0.9936	0.9923

Source: FAOSTAT, 2013

countries as a group of countries recorded a reduction of gross agricultural production value of about ca 7% in the analysed time period, the number of economically active persons in agriculture in these countries decreased from 9.4 million to less than 4.77 million (for details see Table 3). The reason for the agrarian sector productivity growth in relation to the number of economically active persons in agriculture is an increase of investments especially into machinery (in the period 1993–2011 alone, the value of investments into machinery and agricultural equipment in all NMCs increased by almost 20%, while the value of investments (Gross capital stock) into land development (14%), livestock (over 30%) and crops produc-

tion (over 12%) significantly declined). The number of items of agricultural machine equipment in all the analysed countries increased in the analysed time period from 2.5 million to more than 7 million.

On the basis of the following data it can be said that analysed countries in general recorded a reduction of agricultural sector performance – in this case the lowest level of production in comparison with 1993 was in 2007 (production declined by about 13%) – the current level of production is about 93 – 94% of production level performance of the year 1993. The reason for the NMCs' agricultural sector performance is the reduction of livestock production level and non-food

Table 2. Gross agricultural production value per person economically active in agriculture development in individual NMCs in the period 1993–2011

Gross Production Value (constant 2004–2006 US$) (USD)/capita		1993	1999	2004	2007	2009	2011	Basic 2007/ 1993	Basic 2011/ 1993	Chain 1993– 2011	Chain 1993– 2011
Bulgaria	Agriculture	7 425	13 028	15 281	13 007	19 136	22 991	1.7517	3.0964	1.0409	1.0648
Bulgaria	Crops	3 225	6 104	9 741	6 444	11 591	14 661	1.9979	4.5456	1.0507	1.0878
Bulgaria	Livestock	4 200	6 924	5 541	6 570	7 545	8 330	1.5642	1.9834	1.0325	1.0388
Czech Republic	Agriculture	10 924	11 089	12 913	12 328	12 970	13 632	1.1285	1.2479	1.0087	1.0124
Czech Republic	Crops	4 266	4 843	5 984	5 404	5 887	6 352	1.2667	1.4890	1.0170	1.0224
Czech Republic	Livestock	6 658	6 246	6 929	6 924	7 086	7 283	1.0399	1.0939	1.0028	1.0050
Estonia	Agriculture	7 340	6 494	7 765	9 385	10 016	10 617	1.2786	1.4464	1.0177	1.0207
Estonia	Crops	2 800	2 316	2 515	3 646	3 597	3 783	1.3022	1.3512	1.0190	1.0169
Estonia	Livestock	4 550	4 177	5 235	5 738	6 403	6 833	1.2612	1.5018	1.0167	1.0229
Hungary	Agriculture	9 178	12 781	16 665	14 036	16 620	17 035	1.5293	1.8561	1.0308	1.0350
Hungary	Crops	4 028	6 559	9 558	7 117	9 260	9 687	1.7667	2.4047	1.0415	1.0500
Hungary	Livestock	5 150	6 222	7 107	6 919	7 359	7 348	1.3436	1.4269	1.0213	1.0199
Latvia	Agriculture	5 492	4 300	5 384	6 555	6 835	6 910	1.1935	1.2581	1.0127	1.0128
Latvia	Crops	2 241	1 914	2 576	3 176	3 235	3 108	1.4175	1.3870	1.0252	1.0183
Latvia	Livestock	3 251	2 393	2 808	3 387	3 600	3 802	1.0416	1.1693	1.0029	1.0087
Lithuania	Agriculture	6 089	6 806	9 491	11 315	13 069	13 669	1.8581	2.2448	1.0452	1.0459
Lithuania	Crops	2 894	3 532	4 593	5 007	6 771	6 802	1.7301	2.3502	1.0399	1.0486
Lithuania	Livestock	3 195	3 275	4 904	6 308	6 298	6 868	1.9740	2.1493	1.0498	1.0434
Poland	Agriculture	3 818	4 290	4 893	5 329	5 630	5 774	1.3959	1.5123	1.0241	1.0232
Poland	Crops	1 931	1 986	2 329	2 314	2 585	2 471	1.1982	1.2795	1.0130	1.0138
Poland	Livestock	1 887	2 304	2 564	3 015	3 045	3 303	1.5982	1.7507	1.0341	1.0316
Romania	Agriculture	5 603	7 148	12 464	10 979	14 291	17 563	1.9595	3.1346	1.0492	1.0655
Romania	Crops	3 326	4 392	8 343	5 713	8 653	11 608	1.7176	3.4897	1.0394	1.0719
Romania	Livestock	2 277	2 755	4 121	5 267	5 638	5 955	2.3134	2.6157	1.0617	1.0549
Slovakia	Agriculture	8 495	8 291	8 731	7 881	8 292	8 601	0.9278	1.0125	0.9947	1.0007
Slovakia	Crops	4 011	4 086	4 664	3 890	4 505	4 710	0.9700	1.1743	0.9978	1.0090
Slovakia	Livestock	4 484	4 205	4 067	3 990	3 787	3 891	0.8899	0.8678	0.9917	0.9922
Slovenia	Agriculture	22 343	40 381	70 692	90 111	97 875	131 667	4.0331	5.8930	1.1047	1.1036
Slovenia	Crops	7 629	14 143	26 692	32 667	35 125	49 833	4.2821	6.5325	1.1095	1.1099
Slovenia	Livestock	14 714	26 238	4 4077	57 444	62 750	81 833	3.9040	5.5615	1.1022	1.1000
NMCs	Agriculture	5 531	6 539	8 400	8 028	9 146	9 888	1.4515	1.7879	1.0270	1.0328
NMCs	Crops	2 741	3 314	4 642	3 761	4 754	5 258	1.3722	1.9181	1.0229	1.0368
NMCs	Livestock	2 790	3 226	3 757	4 267	4 392	4 631	1.5294	1.6600	1.0308	1.0286

Source: FAOSTAT, 2013

production level. On the other hand NMCs recorded a slight growth of crops production and especially a very significant growth of cereals production value. The basic development trends are very similar for all the analysed countries – the exceptions are Hungary, Poland, Romania and Slovenia. While the other countries recorded a significant reduction of agricultural production sector performance – these countries were able to stabilise their agricultural sector, and some of them were able even to get regional comparative advantage. This can be seen in the case of Poland in particular, which is becoming the central European agricultural tiger.

From the above tables it is apparent that the number of economically active persons in the agricultural sector declined significantly in all the analysed countries – whilst the value of agricultural production reduced only slightly in comparison with the reduction of number of people active in agriculture – the result is the significant growth of per capita productivity.

Agricultural sector development in the analysed countries was significantly affected by the reduction of agricultural, and especially arable, land area. The most significant reduction of land area was particularly noticeable in Estonia, Bulgaria, Latvia, Poland, Slovakia and Slovenia. Considering the arable land area, the most significant reduction was recorded in the cases of Estonia, Latvia, Lithuania and Poland.

Table 3 – Share of economically active persons in agriculture in total economically active population in selected countries in the period 1993–2011

People working in agriculture in 1000s	1993	2007	2011
Bulgaria	5.09%	3.98%	2.45%
Czech Republic	5.10%	3.43%	2.92%
Estonia	6.68%	4.84%	4.33%
Hungary	5.80%	3.58%	3.01%
Latvia	7.43%	5.21%	4.83%
Lithuania	8.22%	4.23%	3.52%
Poland	11.86%	8.34%	7.33%
Romania	10.52%	4.80%	3.63%
Slovakia	5.27%	3.87%	3.43%
Slovenia	1.79%	0.45%	0.29%
NMCs	8.94%	5.51%	4.68%

Source: FAOSTAT, 2013

Government expenditures and agricultural production in new EU member countries in the period 2001–2011

Agricultural sector and production performance in individual EU member countries are heavily influenced by government activities (Olper, 1998; Grant, 2012). Government expenditures in individual NMCs significantly increased: in the period 2001 – 2011 their nominal value increased from 4.7bn. USD to ca 11.5bn. USD in the case of expenditures directly connected with agriculture, and from 3.5bn. USD to ca 11.4bn. USD in the case of expenditures connected with environmental protection activities (a part of those sources is also spent for agricultural activities – because of agricultural activities' significant impact on living environment (Westhoek; Overmars; van Zeijts, 2013)). In general, the total nominal value of government expenditures for agricultural and environmental purposes in all NMCs increased during the monitored time period from ca 8.3bn. USD to ca 23bn. USD. The inter-annual growth rate of NMCs' government expenditures into agriculture reached 9.3% in the monitored time period,

and in the case of expenditures for environmental protection the inter-annual growth rate reached 12.3% (for details about government expenditures value development see Tables 5 and 6).

When considering the real value development – the growth of government expenditures was not so high, but still impressive – see Tables 7 and 8 – data is processed in constant 2005 USD prices. According to this data in the period 2001 – 2011 the government expenditures for agriculture increased from 4.7bn. USD to 9.5bn. USD (the peak was more than 12bn. USD, in 2008) – the average inter-annual value growth rate reached 7.3%. Government expenditures for environmental protection increased from ca 3.9bn. USD to 9.3bn. USD – the average inter-annual value of growth rate reached 9.2%.

Tables 5 and 7 provide basic information about differences in government expenditures structure and value development in individual NMCs – both in current prices and in constant prices. When considering individual countries' government expenditures, huge differences exist among individual countries in the level of their agricultural sector subsidies. The most impressive growth of agricultural sector support was recorded in the cases of: Romania (5.8x), the Czech Republic (4.4x), Bulgaria (3.6x), Slovakia (3.1x) and Lithuania (2.8x). In general all NMCs approximately doubled the value of government expenditures related to agricultural sector or environment protection. The only exception among all the countries is Hungary. During the analysed time period, Hungary reduced the value of government expenditures by about 28% – the reason being the long term Hungarian economy and state budget crisis (Prochniak, 2011). Another very important finding related to individual NMCs' government expenditures related to agricultural activities is that they play only minor roles in individual countries total government expenditures. Comparing individual NMCs – it is possible to see that the value of expenditures related to agriculture represents ca 2.5 – 6.6% of total government expenditures value. It means that despite the value of government agricultural expenditures growing in individual countries, agriculture still plays only a minor role in individual countries' economy.

Table 4 – Area of agricultural and arable land development in NMCs in the period 1993–2011

Area (1000 Ha)	item	1993	1997	2001	2007	2011	Basic index
Bulgaria	Agricultural area	6 121	6 203	5 498	5 116	5 088	0.831237
Czech Republic	Agricultural area	4 282	4 280	4 278	4 249	4 229	0.987623
Estonia	Agricultural area	1 320	1 023	890	914	945	0.715909
Hungary	Agricultural area	6 130	6 195	5 865	5 807	5 337	0.870636
Latvia	Agricultural area	2 514	1 772	1 581	1 839	1 816	0.722355
Lithuania	Agricultural area	3333	3 417	2 896	26 95.9	2 805.9	0.841854
Poland	Agricultural area	18 715	18 457	17 788	16 177	14 779	0.789687
Romania	Agricultural area	14 793	14 798	14 798	13 630	13 982	0.945177
Slovakia	Agricultural area	2 446	2 445	2 255	1 930	1 929.7	0.788921
Slovenia	Agricultural area	560	495	510	498	458.5	0.81875
NMCs + (Total)	Agricultural area	60 214	59 085	56 359	528 55.9	51 370.1	0.853126

Source: FAOSTAT, 2013

Table 5 – Government expenditures value development in the period 2001 – 2011 in individual NMCs (in current USD prices value)

	Value US$ (USD million)	2001	2003	2005	2007	2009	2011	BASIC	CHAIN
Bulgaria	Agricultural expenditures	97	214	293	365	294	673	6.920	1.213
Bulgaria	Environmental expenditures	178	228	347	100	592	544	3.053	1.118
Czech Republic	Agricultural expenditures	591	956	1649	2351	2967	2671	4.522	1.163
Czech Republic	Environmental expenditures	578	1017	1563	1859	2582	3243	5.607	1.188
Estonia	Agricultural expenditures	60	85	80	177	256	177	2.961	1.115
Estonia	Environmental expenditures	46	72	128	188	206	224	4.905	1.172
Hungary	Agricultural expenditures	1574	1406	1416	1631	1046	726	0.461	0.925
Hungary	Environmental expenditures	401	568	669	983	828	1008	2.515	1.097
Latvia	Agricultural expenditures	129	191	518	595	595	566	4.388	1.159
Latvia	Environmental expenditures	104	133	202	277	327	185	1.785	1.060
Lithuania	Agricultural expenditures	151	303	287	523	501	383	2.534	1.097
Lithuania	Environmental expenditures	8	31	156	345	436	324	39.076	1.443
Poland	Agricultural expenditures	1366	1661	2824	3452	3523	3819	2.795	1.108
Poland	Environmental expenditures	1757	1368	1868	2449	3196	2884	1.641	1.051
Romania	Agricultural expenditures	78	242	603	935	783	652	8.350	1.236
Romania	Environmental expenditures	108	118	316	712	945	1712	15.782	1.318
Slovakia	Agricultural expenditures	493	493	845	949	1488	1318	2.672	1.103
Slovakia	Environmental expenditures	266	342	433	579	727	906	3.398	1.130
Slovenia	Agricultural expenditures	203	259	407	514	635	510	2.507	1.096
Slovenia	Environmental expenditures	124	221	235	298	410	348	2.809	1.109

Source: FAOSTAT, 2013

Another very important finding related to government expenditures is their importance for individual economically active persons in agriculture. Tables 9 and 10 provide information about the basic development trends in the case of expenditures value per person economically active in the agricultural sector. Comparing data in both these tables with data in Tables 7 and 8 we can see that inter-annual growth rate of expenditures value per capita was significantly higher in comparison with the total value growth rate. While the total value of agricultural and environmental government expenditures increased in NMCs by about 7.3%/year and 9.2%/year respectively expressed in per capita value, agricultural and environmental expenditures increased their values by 11.1%/year and 13.2%/year respectively. While in 2001 government expenditures per economically active person in agriculture in NMCs was about 1200 USD, in 2011 it was about 3800 USD (in constant 2005 USD prices). In this case it should be emphasised that environmental protection expenditures are growing faster than agricultural expenditures – both in per capita terms and in total value expression. It means that en-

vironmental protection activities are receiving a higher priority in comparison with agricultural production activities. This is fully in compliance with European Union policy – which is nowadays more focused on sustainable development and supporting the multifunctional role of agriculture (Lapka, Cudlinova, Rikoon, 2011).

When considering individual countries' government expenditures both for agricultural and environmental protection activities, individual countries are spending the following amounts of money: Poland (almost 5.7bn. USD), the Czech Republic (5.6bn. USD), Slovakia (2.1bn. USD), Hungary (1.4bn. USD), Bulgarian (850 mil. USD), Slovenia (750 mil. USD), Lithuania (536 mil. USD), Latvia (379 mil. USD) and Estonia (244 mil. USD). The highest level of inter-annual growth rate in the analysed time period was recorded in Romania, the Czech Republic, Bulgaria, Slovakia and Lithuania (all these countries recorded average inter-annual value growth rates higher than 10%).

A completely different order of countries can be seen if we compare individual countries according to government

Table 6 – Government expenditures value development in the period 2001 – 2011 in all NMCs (in current USD prices value)

ALL NMCs	2001	2003	2005	2007	2008	2009	2010	2011	Basic	Chain
Total Outlays	194 035	251 037	341 866	475 059	588 004	521 672	535 473	571 633	2.946	1.114
Agricultural expenditures	4 743	5 809	8 923	11 492	13 629	1 2087	10 692	11 494	2.423	1.093
Environmental expenditures	3 571	4 099	5 918	7 790	10 465	10 250	10 298	11 377	3.186	1.123

Source: FAOSTAT, 2013

Table 7 – Government expenditures development in the period 2001 – 2011 in individual NMCs

(USD million)	(in constant 2005 USD prices value)	2001	2003	2005	2007	2009	2011	BASIC	CHAIN
Bulgaria	Agricultural expenditures	116	239	293	312	222	472	4.056	1.150
Bulgaria	Environmental expenditures	118	243	298	86	449	382	3.229	1.124
Czech Republic	Agricultural expenditures	634	991	1649	2264	2740	2520	3.974	1.148
Czech Republic	Environmental expenditures	621	1054	1563	1789	2385	3061	4.928	1.173
Estonia	Agricultural expenditures	54	94	80	145	203	135	2.494	1.096
Estonia	Environmental expenditures	55	80	128	155	163	109	1.975	1.070
Hungary	Agricultural expenditures	1409	1516	1416	1495	879	572	0.406	0.914
Hungary	Environmental expenditures	494	613	669	900	696	794	1.607	1.049
Latvia	Agricultural expenditures	124	225	518	450	472	259	2.090	1.076
Latvia	Environmental expenditures	58	105	241	209	220	121	2.090	1.076
Lithuania	Agricultural expenditures	164	331	287	452	410	290	1.768	1.059
Lithuania	Environmental expenditures	27	34	156	299	357	246	9.274	1.249
Poland	Agricultural expenditures	1499	1774	2824	3272	3123	3236	2.159	1.080
Poland	Environmental expenditures	1927	1462	1868	2322	2833	2444	1.268	1.024
Romania	Agricultural expenditures	98	312	603	747	519	377	3.833	1.144
Romania	Environmental expenditures	137	152	316	569	627	991	7.220	1.219
Slovakia	Agricultural expenditures	391	535	845	912	1406	1220	3.118	1.120
Slovakia	Environmental expenditures	271	370	433	556	688	838	3.092	1.120
Slovenia	Agricultural expenditures	243	272	407	483	557	448	1.849	1.063
Slovenia	Environmental expenditures	148	232	235	280	360	306	2.072	1.076

Source: FAOSTAT, 2013

Table 8 – Government expenditures value development in the period 2001 – 2011 in all NMCs (in constant 2005 USD prices value)

ALL NMCs (constant 2005) mil. USD	2001	2003	2005	2007	2009	2010	2011	Basic	Chain
Total Outlays	213 646	272 966	341 866	434 270	442 754	449 605	466 259	2.182	1.081
Agricultural expenditures	4 733	6 290	8 923	10 533	10 532	9 215	9 531	2.014	1.073
Environmental expenditures	3 856	4 345	5 909	7 166	8 775	8 616	9 290	2.409	1.092

Source: FAOSTAT, 2013

expenditures for agricultural and environmental activities per person economically active in agriculture: the Czech Republic (17.55 ths./cap), Slovakia (10.66 ths./cap), Bulgaria (7.42 ths./cap), Lithuania (4.43 ths./cap), Hungary (4.41 ths./cap), Estonia (4.07 ths./cap), Latvia (3.42 ths./cap), Poland (1.97 ths./cap) and Romania (1.67 ths./cap). The most progressive inter-annual growth rate in the analysed time period was recorded in Romania, Bulgaria, the Czech Republic, Slovenia, Lithuania and Slovakia (all these countries recorded average inter-annual value growth rates higher than 10%).

On the basis of the above, it can be said that apart from Hungary, all countries recorded significant growth of government expenditures related to agriculture and those expenditures significantly changed structure and performance of agricultural sector in individual countries. The process of restructuring the agricultural sector in individual countries led to a significant growth of per capita (per person economically active in the agricultural sector) government expenditures. The growth of per capita expenditures was much higher in comparison with the growth of total government expenditures for agricultural and environmental activities. The positive feature of this development trend is that agricultural subsidies are becoming

more concentrated in relation to individual economically active persons in agriculture, therefore the effectiveness of government support devoted to agriculture is becoming higher; the following analysis proves the existence of the high level of correlation and elasticity between individual countries agricultural sector performance and government expenditures.

The analysis of correlation and elasticity/sensitivity of individual NMCs' agricultural sector on changes in government expenditures related to agricultural and environmental activities

Correlation analysis

Significant correlation exists between agricultural government expenditures and selected features of agricultural sector development in individual NMCs. The analysis of correlation proved (Table 11) a significant relationship between expenditures and the number of economically active persons in agriculture development, agricultural area development, agricultural GDP development, and agricultural capital stock development. Positive correlation is in relation to agricultural GDP and capital stock. Negative correlation exists in relation

Table 9 – Government expenditures value/person economically active in agriculture development in the period 2001 – 2011 in individual NMCs (in constant 2005 USD prices value)

Value in constant 2005 US$ prices/cap		2001	2004	2007	2009	2011	BASIC	CHAIN	
Bulgaria	Agricultural expenditures	510	1 408	2 067	1 685	4 105	8.042	1.232	
Bulgaria	Environmental expenditures	518	1 430	568	3 398	3 318	6.402	1.204	
Czech Republic	Agricultural expenditures	1 521	3 020	6 394	8 156	7 926	5.212	1.179	
Czech Republic	Environmental expenditures	1 489	3 445	5 054	7 097	9 625	6.462	1.205	
Estonia	Agricultural expenditures	733	1 420	2 237	3 269	2 255	3.076	1.119	
Estonia	Environmental expenditures	744	1 317	2 386	2 628	1 813	2.436	1.093	
Hungary	Agricultural expenditures	3 246	3 984	4 153	2 633	1 844	0.568	0.945	
Hungary	Environmental expenditures	1 138	1 728	2 501	2 083	2 561	2.250	1.084	
Latvia	Agricultural expenditures	953	2 632	3 781	4 108	2 333	2.448	1.094	
Latvia	Environmental expenditures	444	1 225	1 760	1 912	1 086	2.448	1.094	
Lithuania	Agricultural expenditures	851	1 983	3 163	3 131	2 400	2.819	1.109	
Lithuania	Environmental expenditures	137	633	2 088	2 723	2 032	14.792	1.309	
Poland	Agricultural expenditures	406	529	1 027	1 029	1 122	2.763	1.107	
Poland	Environmental expenditures	522	496	729	933	847	1.622	1.050	
Romania	Agricultural expenditures	60	462	719	564	460	7.614	1.225	
Romania	Environmental expenditures	84	84	548	681	1 207	14.344	1.305	
Slovakia	Agricultural expenditures	1 644	2 877	4 343	6 962	6 321	3.844	1.144	
Slovakia	Environmental expenditures	1 139	1 803	2 648	3 404	4 342	3.813	1.143	
Slovenia	Agricultural expenditures	14 267	30 438	53 707	69 566	74 748	5.239	1.180	
Slovenia	Environmental expenditures	8 687	19 610	31 134	44 958	50 998	5.871	1.194	

Source: FAOSTAT, 2013

Table 10 – Government expenditures value/person economically active in agriculture development in the period 2001 – 2011 in NMCs (in constant 2005 USD prices value)

ALL NMCs (constant 2005) – Subsidy/cap	2001	2004	2007	2009	2011	BASIC	CHAIN
Agricultural expenditures	671	1150	1869	1996	1930	2.875	1.111
Environmental expenditures	547	813	1272	1663	1881	3.440	1.132
Total agricultural and environment expenditures	1218	1964	3141	3659	3811	3.129	1.121

Source: FAOSTAT, 2013

to the number of economically active persons in agriculture, agricultural and arable area, and also in relation to agricultural production – both crops production and livestock production. These results are also confirmed by Table 12, which provides the results of correlation analysis between government expenditures including agricultural and environmental expenditures on one side and selected agricultural sector's characteristics on the other. The results of the correlation analysis confirmed the existence of strong relationships between government expenditures and number of economically active persons in the agricultural sector. Government expenditures, together with the previously-mentioned investments, lead to a reduction in the number of economically active persons in agriculture and an increase in the effectiveness of individual countries agriculture. Government expenditures are also very important factors influencing production in individual countries, though not in NMCs as a group of countries.

In this case it should be mentioned that in some countries government expenditures stimulate the growth of production values, whilst in other countries they are not. Reduction of production usually means that part of production is transformed into bio-production. In other areas, usually Less Favoured Areas (LFAs), production is subdued, meaning that a higher correlation of public expenditures exists in relation to livestock production in comparison with crops production. Those NMCs where noticeable stimulation occurs are Estonia, Latvia, Lithuania, Poland and Romania, with the specific case of Hungary, where government support in general is stimulating the level of production – though it is the only one where the level of support was significantly reduced and therefore a strong impact on level of production value is visible. The NMCs where little or no stimulation is apparent are the Czech Republic, Slovakia, Bulgarian and Slovenia.

If we analyse individual countries differences in relation to correlation between government expenditures and agricultural sector characteristics, we can see that in the case of the number of economically active persons in agriculture development, a strong correlation exists in the case of all analysed

Table 11 – Correlation between government agricultural expenditures value development and selected variables representing agricultural sector development in individual analysed countries (NMCs) in the period 2001–2011

Correlation agricultural subsidy	Economically active persons in agriculture	Agricultural production	Crops production	Livestock production	Agricultural area	Arable area	Agricultural GDP	Capital stock
Bulgaria	−0.528	−0.380	−0.094	−0.516	−0.450	−0.474	−0.302	−0.890
Czech Republic	−0.952	−0.504	−0.088	−0.895	−0.949	−0.941	0.077	−0.974
Estonia	−0.721	0.713	0.566	0.697	0.500	−0.095	−0.079	−0.598
Hungary	0.873	0.468	0.060	0.805	0.857	0.837	−0.337	0.354
Latvia	−0.479	0.737	0.846	0.508	0.761	0.748	0.440	0.827
Lithuania	−0.630	0.579	0.098	0.834	−0.654	0.291	0.389	0.758
Poland	−0.813	0.439	−0.158	0.703	−0.586	−0.520	0.593	0.894
Romania	−0.535	0.070	−0.090	0.655	−0.823	−0.898	0.771	−0.322
Slovakia	−0.953	−0.654	−0.243	−0.877	−0.775	−0.700	−0.248	−0.870
Slovenia	−0.820	−0.638	−0.058	−0.742	−0.603	0.562	0.774	−0.978
MNCs	−0.844	−0.099	−0.087	−0.012	−0.776	−0.670	0.833	0.631

Source: own calculations, 2013

countries except for Latvia (the correlation value is usually negative, meaning that the growth of support is connected with a reduction in the number of economically active persons in agriculture in analysed countries), in the case of agricultural production the correlation higher than 0.5 appeared in Bulgaria, the Czech Republic, Estonia, Latvia, Lithuania, Poland, Slovakia and Slovenia (In this case much higher correlations exists in relation to livestock production – correlation higher than 0.5 appeared in the case of all countries except for Romania). Crops production is much more independent in relation to government expenditures – the higher value of correlation appeared only in Estonia and Latvia – however the correlation analysis proved the high level of correlation between government expenditures and crops production in the case of NMCs as a group of countries (In relation to crops and livestock production – it should be mentioned that correlation value is usually positive, meaning that current government expenditures are encouraging agricultural production value growth in individual countries.). The area of agricultural and arable land is also influenced by government expenditures – the high value of correlation did not only appear in Estonia, Lithuania and Slovenia (correlation value is usually negative – ie: the growth of subsidies does not encourage farmers to increase the area of agricultural land). Nowadays the area of agricultural land and especially arable land is declining, but government policy is not the only factor responsible for this development, though a significant portion of government expenditures is appropriated for programmes reducing agricultural production and changing the status of agricultural land, and programmes preventing the sub-division of the land are especially supported (Renwick, Jansson, Verburg et al., 2013) Agricultural sector GDP development is also correlated with government expenditures development in some countries – especially in Poland, Romania and Slovenia. The high level of government expenditures correlation was discovered in relation to capital stock value development in individual analysed countries apart from Hungary and Romania – however the value of correlation is negative.

Elasticity analysis

The above correlation analyses are followed by elasticity analyses. The individual elasticity values are calculated on the basis of logarithmic regression analysis. Again we can see a significant relationship existing between NMCs' government expenditures and especially the number of economically active persons in agriculture, agricultural production (especially livestock production), area of arable land, agricultural GDP and capital stock. However relationships are positive in many cases, usually the value of elasticity is very low, implying that a change of government expenditures value by one percent causes the change of any selected variable by less than one percent. In relation to individual variables it can be said that for the number of economically active persons in agriculture, elasticity is very low in all analysed countries except for Slovenia and Bulgaria (The explanation for this is that all countries had already significantly reduced the number of economically active persons in agriculture during the period 1990–2000, during their economies restructuring process.). Agricultural production's (both crops and livestock production) elasticity calculated in relation to government expenditures is also very low in all analysed countries (This can be explained as, currently individual expenditures programmes, which are the result of EU policies, are not encouraging the growth of production, and are more focused on restructuring the agricultural production and agricultural activities (Viaggi, Gomez y Paloma, Mishra, et al., 2013). They are more focused to support the multifunctional role of agriculture policy than to support the production growth. Also, the current government expenditures in individual EU countries are applied in relation to the EU's WTO obligations (Swinbank, 1999), meaning that subsidies should not primarily stimulate production.). The area of agricultural and arable land also embodies low elasticity – explained by the effort of the EU to protect agricultural land – despite activities trying to keep land in piece or to keep land out of the production process. It is quite interesting to

Table 12 – Correlation between government agricultural and environmental expenditures value development and selected variables representing agricultural sector development in individual analysed countries (NMCs) in the period 2001–2011

Correlation agricultural and environmental subsidies	Economically active persons in agriculture	Agricultural production	Crops production	Livestock production	Agricultural area	Arable area	Agricultural GDP	Capital stock
Bulgaria	−0.7931	−0.0866	0.3515	−0.6296	−0.7371	−0.6172	−0.6015	−0.7844
Czech Republic	−0.9878	−0.5175	−0.0818	−0.9313	−0.9865	−0.9832	0.1088	−0.9928
Estonia	−0.6829	0.6504	0.5641	0.5947	0.5201	−0.1521	−0.2727	−0.7919
Hungary	0.6738	0.4592	0.1621	0.6215	0.8407	0.8431	−0.3060	−0.2996
Latvia	−0.4790	0.7370	0.8459	0.5084	0.7611	0.7484	0.4398	0.8266
Lithuania	−0.8673	0.5062	0.0208	0.8216	−0.3764	0.6515	0.6591	0.8700
Poland	−0.8409	0.5323	−0.0356	0.6639	−0.5661	−0.5135	0.5139	0.8961
Romania	−0.9114	−0.0387	−0.0941	0.2385	−0.9189	−0.8468	0.6941	−0.2757
Slovakia	−0.9715	−0.6722	−0.2536	−0.8970	−0.7668	−0.6888	−0.2798	−0.8793
Slovenia	−0.8694	−0.6743	−0.0859	−0.7653	−0.6727	0.4659	0.8525	−0.9486
MNCs	−0.928	−0.080	−0.031	−0.194	−0.846	−0.727	0.788	0.648

Source: own calculations, 2013

Table 13 – The elasticity of selected variables representing agricultural sector in individual analysed countries (NMCs) in relation to one percent change of government agricultural expenditures value development in the analysed time period

Elasticity in relation to Agricultural subsidies	Economically active persons in agriculture	Agricultural production	Crops production	Livestock production	Agricultural area	Arable area	Agricultural GDP	Capital stock
Bulgaria	−0.2781	−0.1386	−0.0709	−0.2220	−0.0349	−0.0567	−0.0831	−0.3308
Czech Republic	−0.1584	−0.0575	−0.0175	−0.0877	−0.0068	−0.0132	0.0285	−0.0574
Estonia	−0.1438	0.1353	0.1573	0.1247	0.1236	−0.0337	−0.0049	−0.2572
Hungary	0.2259	0.1134	0.0407	0.1899	0.0774	0.0387	−0.1467	0.1196
Latvia	−0.0602	0.1356	0.1627	0.1112	0.1061	0.1483	0.1046	0.0670
Lithuania	−0.3200	0.1551	0.0352	0.2628	−0.0903	0.1339	0.1175	0.2050
Poland	−0.1564	0.0294	−0.0273	0.0759	−0.0821	−0.0851	0.0854	0.0699
Romania	−0.1857	0.0206	−0.0005	0.0482	−0.0380	−0.0351	0.2079	−0.0021
Slovakia	−0.1489	−0.1044	−0.0576	−0.1551	−0.1328	−0.0247	−0.0355	−0.0937
Slovenia	−0.8193	−0.1127	0.0064	−0.1704	−0.0663	0.0364	0.5557	−0.0692
MNCs	−0.31439	−0.01038	−0.02017	−0.00079	−0.07317	−0.04977	0.255588	0.018501

Source: own calculations, 2013

note the low elasticity of agricultural GDP and capital stock value in relation to government expenditures in all analysed countries. This means that government expenditures are not stimulating farmers to increase their investments, and that the majority of incomes from public sources are transformed into the usual cash-flow – these sources are used to cover production costs and probably they are also transformed into farmers' final profit. This is very interesting especially because of the value of government expenditures in individual NMCs related to agricultural sector activities according to the FAO represents almost 40% of the final agricultural production value.

The following Tables 15 and 16 summarise the impact of government expenditures on selected agricultural sector's characteristics in the analysed group of countries. From the results it is evident that a high correlation exists between public support and agriculture in relation to the number of economically active persons in agriculture, agricultural and arable area, and agricultural sector GDP, and gross capital stock in agriculture. Total agricultural production at the general level is not really influenced by government support. The higher level of elasticity existing between the provided public sources and the agricultural sector is apparent in relation to the number of economically active persons in agriculture and agricultural GDP. The conducted functions reached the high determination index values especially in relation to the number of economically active persons in agriculture development, agricultural area development, and agricultural GDP development.

Very interesting results are provided by the following Tables 17 and 18. Both tables provide information about mutual correlation and elasticity existing between agricultural (Table

Table 14 – The elasticity of selected variables representing agricultural sector in individual analysed countries (NMCs) in relation to one percent change of government agricultural and environmental expenditures value development in the analysed time period

Elasticity in relation to Agri+Envi subsidies	Economically active persons in agriculture	Agricultural production	Crops production	Livestock production	Agricultural area	Arable area	Agricultural GDP	Capital stock
Bulgaria	−0.4581	−0.0407	0.141159	−0.27261	−0.0577	−0.0693	−0.18401	−0.31485
Czech Republic	−0.1682	−0.0600	−0.01704	−0.09283	−0.0072	−0.01403	0.032336	−0.06167
Estonia	−0.1356	0.1267	0.161633	0.109473	0.1334	−0.04411	−0.03452	−0.3095
Hungary	0.3163	0.1913	0.112057	0.268219	0.1272	0.064736	−0.24603	−0.10529
Latvia	−0.0602	0.1356	0.162745	0.111193	0.1061	0.148306	0.104648	0.066956
Lithuania	−0.2757	0.0864	−0.00353	0.168853	−0.0359	0.164056	0.11221	0.166176
Poland	−0.1998	0.0437	−0.00976	0.087852	−0.0959	−0.10178	0.091483	0.098158
Romania	−0.3091	0.0076	−0.00835	0.027158	−0.0464	−0.038	0.219782	−0.00248
Slovakia	−0.1646	−0.1175	−0.06676	−0.17278	−0.1424	−0.02646	−0.04108	−0.10617
Slovenia	−0.9592	−0.1289	−0.00407	−0.19	−0.0793	0.034212	0.668259	−0.07782
MNCs	−0.3303	−0.00853	−0.00767	−0.00947	−0.07515	−0.05065	0.23542	0.02102

Source: own calculations, 2013

Table 15 – The selected results analysing logarithmical regression between agricultural government expenditures and selected variables in the period 2001 – 2011 (in constant USD prices) in NMCs (as a group of countries)

Agriculture government expenditures	Elasticity/b	Abs unit	R2	Correlation	Significance
Economically active persons in agriculture	−0.314392	11.50695	0.71575	−0.84413	Yes
Agricultural production	−0.010381	10.87075	0.007307	−0.09909	No
Crops production	−0.020167	10.287	0.005936	−0.08736	No
Livestock production	−0.000789	10.06757	0.000177	−0.01166	No
Agricultural area	−0.073168	11.54292	0.674622	−0.77623	Yes
Arable land	−0.049774	10.97967	0.535312	−0.66998	Yes
Agriculture, GDP	0.2555876	7.790406	0.758611	0.833399	Yes
Gross Capital Stock	0.0185006	11.88366	0.303383	0.631466	No

Source: own calculations, 2013

Table 16 – The selected results analysing logarithmical regression between agricultural and environment protection government expenditures and selected variables in the period 2001 – 2011 (in constant USD prices) in NMCs (as a group of countries)

Total agricultural and environment protection government expenditures	Elasticity/b	Abs unit	R2	Correlation	Significance
Economically active persons in agriculture	−0.330303	11.83825	0.85027	−0.92771	Yes
Agricultural production	−0.008531	10.85894	0.005311	−0.07968	No
Crops production	−0.007675	10.1788	0.000925	−0.03071	No
Livestock production	−0.009473	10.1512	0.027485	−0.19434	No
Agricultural area	−0.075148	11.60351	0.765889	−0.8457	Yes
Arable land	−0.050654	11.01642	0.596675	−0.72739	Yes
Agriculture, GDP	0.2354203	7.838181	0.692692	0.787853	Yes
Gross Capital Stock	0.02102	11.85003	0.331281	0.648239	No

Source: own calculations, 2013

17) and environmental (Table 18) government expenditures per capita (person economically active in agriculture) on one side and agricultural production per capita (person economically active in agriculture) – both in relation to crops production and livestock production on the other. On the basis of this data we can see that while at the general level the relationship between government expenditures and agricultural production was not proved, at the level of individual economically active persons in agriculture the relationship exists. Also it is possible to see that government expenditures are probably very important stimuli influencing individual farmer's decisions related to the value of agricultural production – especially in relation to livestock production. Again it was confirmed that agricultural expenditures together with environment expendi-

Table 17 – The selected results analysing relationship between agricultural government expenditures and agricultural production in the period 2001 – 2011 (in constant USD prices) in individual NMCs

Agricultural government expenditures/cap	Agricultural production/person economically active in agriculture active in agriculture		Crops production/person economically active in agriculture active in agriculture		Livestock production/person economically active in agriculture active in agriculture	
	Correlation	Elasticity	Correlation	Elasticity	Correlation	Elasticity
Bulgaria	0.59608	0.22978	0.57662	0.30096	0.54793	0.13707
Czech Republic	0.75660	0.08845	0.65159	0.12337	0.90652	0.06201
Estonia	0.79792	0.25944	0.75537	0.27544	0.76636	0.25182
Hungary	−0.49905	−0.12656	−0.44774	−0.20603	−0.36182	−0.04380
Latvia	0.69190	0.19842	0.81651	0.21893	0.54360	0.17991
Lithuania	0.81474	0.42008	0.62838	0.33311	0.87412	0.49972
Poland	0.82358	0.16986	0.61763	0.12026	0.84630	0.21063
Romania	0.53180	0.20699	0.39370	0.19308	0.73485	0.22445
Slovakia	0.26654	0.03782	0.35060	0.07772	−0.21694	−0.00553
Slovenia	0.93039	0.44129	0.90306	0.50567	0.93515	0.40956
MNCs	0.84637	0.24787	0.69897	0.24472	0.92924	0.25089

Source: own calculations, 2013

Table 18 – The selected results analysing relationship between agricultural and environment protection government expenditures and agricultural production in the period 2001 – 2011 (in constant USD prices) in individual NMCs

Agricultural and environment protection expenditures/cap	Agricultural production/person economically active in agriculture active in agriculture		Crops production/person economically active in agriculture active in agriculture		Livestock production/person economically active in agriculture active in agriculture	
	Correlation	Elasticity	Correlation	Elasticity	Correlation	Elasticity
Bulgaria	0.88360	0.32508	0.88216	0.43708	0.73973	0.17905
Czech Republic	0.78298	0.09317	0.67847	0.13010	0.92921	0.06501
Estonia	0.74357	0.25012	0.73284	0.27617	0.69784	0.23731
Hungary	−0.07369	−0.03835	−0.04111	−0.05325	−0.17615	−0.03716
Latvia	0.69190	0.19842	0.81651	0.21893	0.54360	0.17991
Lithuania	0.87049	0.29624	0.67455	0.23102	0.93073	0.35651
Poland	0.87360	0.21378	0.71038	0.16609	0.86079	0.25324
Romania	0.86305	0.25167	0.75079	0.24299	0.96162	0.26155
Slovakia	0.26926	0.03951	0.35639	0.08216	−0.22451	−0.00696
Slovenia	0.95183	0.46524	0.92358	0.52940	0.95690	0.43345
MNCs	0.90733	0.24944	0.77324	0.25211	0.96297	0.24670

Source: own calculations, 2013

tures are correlated with agricultural production more than it is only in the case of pure agricultural government expenditures. In general, total NMCs' agricultural production is not directly driven by public money, but individual farmers' production is driven by public money support, though because the number of economically active persons in agriculture is constantly decreasing, the total growth of production is not fully compensated for by the growth of individual farmer's production. If we take into consideration the reduction of the number of economically active persons in agriculture during the last two decades – we can see that NMCs' agricultural production performance recorded a much lower level of reduction. Especially after the EU accession, individual NMCs were able to stabilise their agricultural sector and its production performance, and some of them even strengthened their

position not only within the European Union market, but also within the global market. In general, a high level of correlation between production/cap and government expenditures/cap was recorded in Bulgaria, the Czech Republic, Estonia, Latvia, Lithuania, Poland, Romania and Slovenia. The only exceptions in this case are Hungary and Slovakia. Similar results also appeared in relation to elasticity analysis.

The results of the elasticity analysis conducted both for agricultural government expenditures and agricultural and environmental government expenditures (Tables 13, 14, 15 and 16) provide similar results. From the Tables 14 and 16 it is even visible that agricultural sectors and their characteristics in individual analysed countries are more sensitive in relation to agricultural and environmental expenditures calculated together. However in this case it should be emphasised that

agricultural production – both crops production and livestock production – is much more sensitive in relation to government expenditures, if the correlation and elasticity analyses are conducted at the per capita level. This means that government expenditures are not so important for the agricultural production at the level of whole agricultural system, but they are very important for individual farmers making their business in agriculture. Finally it is possible to say that because of the growth of individual farmer's performance, stimulated by government expenditures, we can record stabilisation of agricultural production in the analysed regions, and in some countries (e.g. Poland) we can even see significant growth of production value performance.

Conclusion

The agricultural sector has significantly changed its structure and position within the national economy of individual new EU member states during the last two decades. During the analysed time period, individual selected countries have reduced their agricultural sector, and also reduced the value of agricultural sector performance. Despite a significant reduction of the agricultural sector in many analysed countries, it can be said that each country became more efficient in relation to the agricultural sector performance. Individual countries' agricultural sector size (area of agricultural land, number of economically active people, and the share in national GDP etc.) and performance (output) development are closely related to government expenditures going to agriculture.

Both the agricultural sector structure and also the agricultural sector production performance are closely related to available government subsidies devoted to both agricultural and environmental programs. Government subsidies are more related to the development of agricultural sector's size (the number of people working in agriculture, agricultural area, the number of animals etc.) and structure (plant vs. animal production). If we take into consideration the main objective of this paper (being to identify the relationship between government expenditures for agricultural purposes on one side and agrarian sector's development and performance in individual analysed countries on the other), we can say the following:

With respect to government expenditures, the total nominal value of expenditures for agricultural and environmental purposes in all NMCs increased during the monitored time period from ca 8.3bn. USD to ca 23bn. USD. In the same period, inter-annual growth rate of NMCs' government expenditures into agriculture reached 9.3%, and in the case of expenditures for environmental protection the inter-annual growth rate reached 12.3%. Government expenditures are a very important part of agricultural sector development. The most impressive growth of agricultural sector support was recorded in the case of: Romania, the Czech Republic, Bulgaria, Slovakia and Lithuania. In general, the value of government expenditures related to the agricultural sector or environment protection in all NMCs, virtually doubled, the only exception being Hungary. The highest level of correlation between government ex-

penditures and selected agricultural sector's characteristics in NMCs can be seen in the case of the number of economically active persons in agriculture development, agricultural area development and agricultural GDP and capital stock value development. The agricultural sector in individual NMCs is sensitive to changes in government expenditures especially in relation to the number of economically active persons in agriculture, and agricultural GDP development.

A very interesting part of the paper is devoted to correlation and elasticity analyses conducted at the per capita level. This analysis is especially focused on the sensitivity of agricultural production – both crops and livestock production – on changes in total value of government expenditures. The results of these analyses proved the existence of a significant relationship between individual countries' production performance value and government expenditures value development. It was proved that, while at a general level there is no significant relationship between production on one side and government expenditures, at the individual farmers' level a significant relationship exists. It was also proved in general that much higher correlations and also elasticities exist between government expenditures development on one side and livestock production on the other, than in relation to crops production. Crops production in this case is more independent. A much higher level of independency in this case is given by the fact that crops production is not as money-demanding as in the case of livestock production. Also, currently in crops production, a much higher level of profitability exists in comparison with livestock production.

At the end we can say in general that government expenditures value connected with agricultural sector development in individual analysed countries is constantly increasing. In the period 2001–2011 all analysed countries except for Hungary increased government expenditures value both in relation to the total value development and also in relation to the per capita (the number of economically active persons in agriculture) expression. It is, however, necessary to highlight that the main aim of public or government expenditures in the European Union (including all analysed countries) is not to stimulate the effectiveness of the agricultural sector, but to support and develop the multifunctional role of the agricultural sector – the main aim of provided public support is the maximisation of public utility.

At the end of this paper it can be said that government expenditures are a crucial part of individual countries' agricultural sector development. However, government agricultural expenditure is currently a very hot topic; its character and value are discussed not only within the European Union, but also at the global level (e.g. WTO etc.). The European Union – including its NMCs – will have to make a crucial decision about the form, structure and value development of government agricultural expenditures. It is necessary to make a decision whether public sources will be concentrated more on the support of the multifunctional role of agriculture within the European Union, or whether the available sources will be concentrated on improvements to the European agricultural sector and its products' competitiveness in relation to the world market.

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