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Rural Economies and ahe Pillar 2 Budget Debate: A Regional Perspective

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Anotace

Následně po legislativním návrhu nařízení k rozvoji venkova pro období 2014 – 2020 (COM(2011) 627/3) přišla Evropská komise také se svojí představou rozpočtu Pilíře 2. Snaha Komise dosáhnout spravedlivějšího rozdělení fondů Pilíře 2 povede zřejmě k redukci rozpočtu pro Českou republiku. Tento článek se zabývá dopady takového snížení rozpočtu na zemědělství a venkovský rozvoj. K tomu je použit regionální model obecné rovnováhy. Výsledky regionálního modelu jsou poté srovnány s výsledky národního modelu. Článek ukazuje, že důsledky snížení rozpočtu a přesunu z pilíře 1 do pilíře 2 SZP jsou středně závažné pro zemědělství, naproti tomu vliv na venkovskou a národní ekonomiku je zanedbatelný. Je také ukázáno, že výsledky obou modelů jsou konzistentní, avšak jsou zde i diference vyplývající jak z rozdílných ekonomických struktur na různých geografických úrovních, tak z rozdílných specifikací modelů.

Klíčová slova

Model obecné rovnováhy (CGE) model, regionální ekonomika, venkov, venkovská politika, zemědělská politika.

Abstract

Following the legislative proposal of the Rural Development Regulation for the period 2014 – 2020 (COM(2011) 627/3) the Commission also issued its notion about the budget allocation for Pillar 2. The Commission effort to achieve a more balanced distribution of Pillar 2 fund among member states will lead to a cut of the budget for the Czech Republic. This paper investigates the consequences of such cuts for agriculture and rural areas using a regional CGE model. The results of the regional model are than compared with the results of a national model. The paper shows that the consequences of the budget cut as well as the reallocation from Pillar 1 of the CAP are moderately serious for agriculture, whereas the rural and the national economy remain mostly unaffected. It is also shown that the results of the both applied models are consistent; nevertheless, they differ due to structural differences at various geographical levels as well as due to differences in model specifications.

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Key words

General equilibrium model, regional economy, rural area, rural policy, agricultural policy.

Introduction

Following the legislative proposal of the Rural Development Regulation (RDR) for the period 2014 – 2020 (COM(2011) 627/3) the Commission also issued its notion about the budget allocation for Pillar 2. Unlike to Pillar 1 of the CAP[1], the legislative proposal of the RDR includes only the total EU budget outlay without its further distribution

[1] Common Agricultural Policy

among Member States (MS). It might indicate that the Commission is keen on redistributing Pillar 2 allocations among MS. The ideas about the possible reallocation are given in the Fiche 14 of the MFF issued in November 2011.

The proposals on the MFF[2] 2014-2020 assume a „nominal freeze" of the CAP amounts (both pillars) at the 2013 level. For rural development, the 2013 amount corresponds to 14,817 million EUR. After some adjustments including the UK's voluntary modulation and the shift of the cotton restructuring program the final proposed amount for Pillar 2 is 14,455 million EUR per year. The MFF Fiche 14 with the reference to the impact study (SEC(2011) 1153) argues that there are obvious disparities in the current Pillar 2 allocations among member states. Both the impact study (SEC(2011) 1153) as well as the Fiche 14 of the MFF presents several alternatives of the budget allocations among Member States: for example *the integration scenario, the refocus scenario* or *a redistribution scheme* in the interval ±10% of the current level. The first two reallocation options correspond to shifts in priorities between the three objectives of the rural development policy (Table 1): the integration scenario emphasizes a stronger alignment with Europe 2020 priorities and targets, while the refocus scenario drives the rural development policy to concentrate entirely on environment and climate change issues. The redistributions of the financial envelopes are calculated o n the corresponding (proposed) indicators/criteria as presented in Table 1 (SEC(2011) 1153).

The budget allocation formula for the integration scenario is quite complex weighing the agricultural sector viability, environmental concerns and the importance of rural areas: *[1/3 [(½ UAA[3] + ½ Labour) x labour productivity inverse index] + 1/3 (1/3 NHA[4] area + 1/3 Natura 2000 + 1/6 Forest + 1/6 Permanent pasture) + 1/3 Rural population] x GDP inverse index*; for the refocus scenario the formula is significantly reduced to only environmental indicators: *(1/3 Area + 1/3 Natura 2000 + 1/6 Forest + 1/6 Permanent pasture) x GDP inverse index*; the ±10% redistribution scheme combines by 50% the total envelope on the basis of the current distribution key and by 50% the new distribution key of the integration scenario.

The mentioned three scenarios assume a cut of the budget for the Czech Republic between 10 and 30 percent. The cut of 30%, however, seems unlikely to happen since this scenario ("refocus") is too restrictive for rural development policy and only would introduce new inequalities. While the cut of Pillar 2 envelope can be expected, the legislative proposal on Pillar 1 (direct payments) allows for shifting some resources (directly 10%) from Pillar 1 envelope to the Pillar 2 budget (Article 14, COM(2011) 625/3). In addition, Pillar 2 budget can be strengthen by covering some of the payments for areas with natural constraints (NHA) in Pillar 1, i.e. up to 5% of the Pillar 1 envelope (Article 34, COM(2011) 625/3).

The objective of this paper is to show how various Pillar 2 budget options and so called flexibilities between pillars affect agriculture and rural economies. Since the rural economy is deeply integrated with the urban one, the additional objective of the paper is to assess spill-over effects i.e. how changes in the agricultural and rural policy can affect the urban economy and non-agricultural sectors.

[2] Multi-annual Financial Framework

[3] Utilised Agricultural Area

[4] Naturally Handicapped Areas

Objective 1 – competitiveness	UAA#, labour, inverse index of labour productivity (reflecting the extent of the farming sector and if it lags behind)
Objective 2 – sustainable management of natural resources and climate change activities	UAA, area of NATURA 2000, naturally handicapped areas, forest, permanent pasture areas (reflecting both environmental pressures and the potential to provide environmental public goods)
Objective 3 – balanced territorial development	Rural population (reflecting potential beneficiaries of support), with a GDP inverse index used across the board to reflect cohesion considerations

Utilised Agricultural Area
Source: Fiche 14 of the MFF 2014-2020

Table 1: Three main objectives of the rural development policy and the corresponding indicators.

To perform this analysis in a greater detail we have chosen a regional CGE model which distinguishes rural and urban economies. This approach and particularly the model are explained in the following section. In Section 3 we translate the above discussion on the Pillar 2 budget allocation in scenarios to be later assessed by the model. Then we present results in Section 4. In the final section we bring together results of this research with the results of the similar modelling exercise at the national level (Křístková, Ratinger, 2012).

Material and methods

Description of the applied methodological approach

1. Review of possible approaches

A range of economic models has been applied to assess agricultural and rural policy impacts. At least three methodological streams can be identified: i) programming models (sectoral or farm level, e.g. the supply module of CAPRI (Britz et al., 2008) or FSSIM (Louhichi et al., 2010)); ii) econometric market models (partial or general equilibrium, i.e. sectoral (Capri, Britz et al., 2008) or economy-wide (CZNATEC, Křístková, Ratinger, 2012); and iii) agent based models aimed at structural change, AgriPolis (Happeet Al., 2006) or social networks (Henning, Saggau, 2010).

Economic models for agriculture and rural development also differ in terms of agents involved (if sub-sectors or types of farms are considered, other sectors and stakeholders are included) and geographical level of analysis, which ranges from very local, regional to multinational applications (Harvey, 1990).

In more complex policy assessments, methodologies, levels of detail and geographical levels are combined usually by adopting a hierarchical structure of model approaches. Good examples of these efforts are the already mentioned CAPRI model, SEAMLESS-IF (Van Ittersum et al., 2010) or SIAT of the SENSOR project (Helming et al., 2008).

In our research on the ex-ante assessment of the proposals of the new Common Agricultural policy for the period 2014-2020, we have also adopted a multi-model approach combining farm level, regional and national models (Ratinger et al., 2011). However, for the particular analysis of the impacts of the Pillar2 budget allocation options on agriculture and rural areas we are excluding the farm level model as being too restrictive in its focus only on agriculture. Both the national and regional models are computational general equilibrium (CGE) models. In addition to CGE models' ability to capture policy-specific direct, indirect and induced effects, they can also account for possible displacement effects in factor and product markets. In recent years, the construction and use of CGE models to agricultural policy analysis has been widely applied to the investigation of trade policy issues (Tongeren et al., 2001). However, several CGE studies have also investigated the impacts of changes in farm support at the EU or national level (e.g. Keyzer et al., 2002; Gohin and Latruffe, 2006, Křístková 2011). Albeit, few studies have explored the general equilibrium effects of changes in agricultural support at regional level or sub-regional level.

The model applied in this paper is rather embedded in the regional policy assessment tradition originating in Leontief's input-output analysis (Armstrong, Taylor, 2000). Regional Input-Output (e.g. Psaltopoulos and Thomson, 1993; Gilchrist and St. Louis, 1994) and SAM models (e.g. Roberts, 2000; 2003; 2005; Psaltopoulos et al., 2004; Psaltopoulos et al., 2006) have already become popular for analyzing rural development policies. CGE applications at the regional level might still be regarded as rather scarce, however, they are growing in importance. While Psaltopoulos et al (2011) only demonstrated the possible usefulness of the CGE approach at the regional level distinguishing rural and urban areas (sub-regions), the JRC/IPTS[5] project Rural-ECMOD (Psaltopoulos et al., 2012) already dealt with relevant options of the EU rural development policy (see also the already mentioned CAP 2020 impact study SEC(2011) 1153) in the EU wide context.

The regional CGE model of the Rural-ECMOD project which is adopted for the analysis in this paper is a dynamic – recursive CGE model, originating in the standard static CGE model developed by IFPRI, (Lofgren et al., 2002). The recursive dynamic part is taken from Thurlow (2008).

2. Main characteristics of the Rural-ECMOD model applied in this study

Production and consumption behaviour follows that of the IFPRI model; however, a number of modifications have been carried out in order to capture rural-urban linkages and the small regional

[5] Joint Research Centre of the European Commission, Institute for Prospective Technological Studies, Seville

nature of the study areas. Production activities are spatially disaggregated, i.e. they are explicitly based in either the rural or urban part of the region. While activities are spatially differentiated, commodities are not, so that the small scale of the regions under analysis is reflected. In particular, the market integration of the rural and urban areas in the study regions is very high so that assuming, a priori, the existence of separate rural and urban commodity markets in each study area suggests a more complete isolation of urban and rural space than is the case. Similar to production activities, households are disaggregated according to their rural/urban status. As rather typical, government represents the combined function of local and national government in each region. Finally, regarding the Rest of the World, this is assumed to capture both economic relationships with the rest of the national economy and third countries. By aggregating across the rest of the country and rest of the world, the models ignore certain trade relations and balances between the region and other parts of the country. To address this, a multi-regional model would be necessary, however this was beyond the resources of this effort.

As already noted, the update of the model parameters between periods draws on the extension of the static IFPRI model undertaken by Thurlow (2008). First, a number of exogenous dynamic adjustments can be imposed so that model produces a projected base path against which policy changes may be judged. The systematic exogenous adjustments in parameters such as total or factor-specific productivity or government spending growth (cuts) means the projected base path of the model should be able to produce "realistic" trends in key variables in the base path solution. Population and labour supply are exogenous between periods. The approach might be ignoring intra-regional migration and associated effects on the labour market, but, as with the treatment of the Rest of the World, a more comprehensive treatment was beyond our resources. In contrast to the other model parameters, capital adjustment for each sector between periods is typically endogenous, with investment in the solution of the model in period t-1 used to update capital stocks before the model solution in period t. The allocation of investments to sectors is translated into demand for producing investment goods. As in the Thurlow model, to map investment commodities in activities the simple assumption that the commodity composition of capital stock is identical across activities is employed. Effectively, the allocation of new capital across activities then uses a partial adjustment mechanism, with those activities where returns are higher than average obtaining a higher than average share of the available capital. This then determines, after accounting for (exogenous) depreciation, for the adjustment in capital stock in each activity. Alternatively, the growth rate of capital stock in a specific sector may be set exogenously. In this case, the amount of investment required for this sector is calculated and then the amount of investment available for endogenous allocation reduced accordingly.

The SAM (Social Accounting Matrix) table for the study region (South Moravia) was constructed through a four-stage process. Stage 1 involved the regionalization of existing national Input-Output Tables for year 2005, through the use of location quotient and RAS procedures. This was followed by the rural-urban disaggregation of sectors and households, performed here through the utilization of secondary data (for example, employment data to split sectors, population data to split households). A key issue required at this point was the definition of rural and urban boundaries in the region. In the particular case of South Moravia it was rather straightforward: Brno and its surrounding were considered as the urban area while the rest of the NUTS3 region was taken as rural[6]. This possibility to define geographically compact rural and urban areas was one of the reasons why we had chosen the region of South Moravia as the case study.

Stage 2 mainly involved the disaggregation of agricultural activity and commodity entries (through the use of FADN[7] information on farm-types) and then, the conversion of the regional Input-Output Table into a SAM structure by filling in the inter-institutional transactions of the SAM table. The latter was carried out via the utilization of regional household income and expenditure data and information from key informants (regional agencies) and local government. In Stage 3, initial SAM entries were corrected by expert knowledge. Finally, Stage 4 involved the application of the cross entropy optimization procedure (Robinson et al., 2001) in order to balance SAM accounts.

SAM construction was followed by model calibration, which required the specification of elasticities, (exogenous) region-specific trends and closure rules. The choices of model elasticities (Table 2) resulted from literature review (e.g. from

[6] In this particular case "intermediate" districts are considered as rural

[7] Farm Accountancy Data Network

Production Block		Trade Block		Household Consumption	
Top Level	0.4 for all sectors	*Armington*	2.0 for all	*Frisch*	-1
Bottom Level	0.6 for all sectors	*CET*	1.6 for all	*Market*	0.33-1
Output aggregation	1.3				(transport 0.001)

Source: own specification

Table 2: Specification of elasticities for the Rural-ECMOD model of South Moravia.

		S0BSL (baseline)	S1P1inP2	S2P2-10	S3P2-20	S4P1inP2-20	S5AGRINV
Pillar 1							
Envelope	EUR millions	890.7	890.7	890.7	890.7	890.7	890.7
Transfer to Pillar 2			10%			10%	
Direct payment (SPS)	EUR/ha	253	228	253	253	228	253
Pillar 2							
Reduction of EAFRD bufget in respect to 2013				10%	20%	20%	
Modernisation of agricultural holdings		the share as in 2007-13					increase
AEM, NHA		the share as in 2007-13					a drop by 30%
Investment in the rural economy		the share as in 2007-13					a drop by 50%

Source: own proposal

Table 3: Scenarios.

Psaltopoulos et al., 2011, Lofgren et al., 2002), expert opinion and finally some experiments. Concerning the latter, several sets of elasticities were used and then assessed how well the model replicated the past (2006-2010). The model closure rules follow the notion that regions are small open economies: in the government account balance it is assumed that savings adjust endogenously and tax rates are fixed; in the external balance, real exchange rate are set as endogenous and the current account deficit as fixed; finally in the savings-investment balance, investment is taken as fixed and savings are assumed to adjust (i.e. investment driven economy). Regarding labour markets we assume an upward-sloping labour supply function for skilled workers (i.e. both labour and wages are flexible) while the unskilled labour market assumes neoclassical adjustment (total unskilled labour is fixed).

Description of the applied scenarios

To achieve the objectives of our research specified in Chapter 1 we defined a baseline and five alternative policy scenarios. In all scenarios Pillar 1 is introduced in the extent of the legislative proposal COM(2011) 625/3.

The baseline (S0BSL) assumes Pillar 2 in the extent and structure of the current programming period, more precisely on the basis of the regional use of the budget in the period 2007-2010. The national co-financing is made at 20%. The level of co-financing affects the amount of additional/ subtracted financial means for Pillar 2 – stating it at 20% expands the finances of Pillar 2 slightly (the minimum level is 15% for all Czech regions except Prague).

Various options of budget cuts and a budget transfer from Pillar 1 to Pillar 2 are presented the first four scenarios: S1P1inP2 represents only budget transfer from Pillar 1 (at its maximum level of 10%), S2P2-10 and S3P2-20 only the cut of the Pillar 2 budget by 10% and 20% respectively and S4P1inP2-20 is a combination of the first and third scenario. In addition, we defined a fifth scenario (S5AGRINV) which is financially identical with the baseline (S0BSL) but gives higher priority to agricultural competitiveness. Most of the Pillar 2 means go to the modernization of agricultural holdings. Scenarios are summarized in Table 3.

The Pillar 2 budget is distributed in three priority areas/support targets: i) modernization of agricultural holdings, ii) support to agriculture

in NHA, organic farming and environmental conservation (agri-environmental measures, AEM), and iii) support to rural areas. The latter priority area is further sub-divided the support to diversification, undertaking in rural areas and rural infrastructure. In Table 4, there is demonstrated the structure of CAP expenditure (the left part of the table) as well as the deviations from the baseline structure in the individual scenarios (the right part of the table). The actual expenditures for the South Moravian region are presented in Appendix. This region is specific by relatively low expenditure to environmental conservation and NHA payments comparing to the country average. This is mainly due to smaller extent of landscape protected areas and the share of grasslands. The expenditure to modernization accounts about a half of the Pillar 2 budget.

Results

As it has been mentioned above, the analysis presented in this paper is narrowed to effects of increasing or decreasing investment supports and in their consequence investment activities in general. In this exercise, the investment support is targeted to agriculture, energy (biogas stations, other renewable energies), rural tourism and rural services (including infrastructure). It means that the budgets of "axes"[8] and measures are further translated into actual target sectors: agriculture, rural energy, rural hotels and restaurants and rural services. The distribution of supports to these target sectors is based on the expenditure structures in the period 2005-2010.

Table 5 displays the effects of different pillar 2 measures on GDP as an average deviation from baseline. It can be noted that the effects on total regional GDP are relatively negligible as they range between 0.11% to -0.08% against the baseline. A more detailed inspection of the GDP growth rates in the sectoral disaggregation shows that, in general, the scenarios that reduce support to agriculture (S1 – S4) have moderately positive effects on the non-agricultural sectors and negative effects on agriculture. The reallocation of funds from direct payments to investment subsidies results in negative

[8] In terms of the current Rural Development Regulation (EC 1695/2005) and thus in terms of Table 3.

	S0BSL - the share		S1P1inP2	S2P2-10	S3P2-20	S4P1inP2-20	S5AGRINV
	on CAP	on Pillar 2	Budget changes in respect to baseline (S0BSL)				
Pillar 1 (DP)	**64%**		**-10%**			**-10%**	
Pillar 2	**36%**	**100%**	**21%**	**-10%**	**-20%**	**0.1%**	
Modernisation of agricultural holdings	19%	53%	21%	-10%	-20%	0.1%	62%
AEM, NHA payments	7%	20%	21%	-10%	-20%	0.1%	-30%
Support to rural areas	10%	27%	21%	-10%	-20%	0.1%	-50%
Diversification	4%	11%	21%	-10%	-20%	0.1%	-50%
Undertaking in rural areas	3%	8%	21%	-10%	-20%	0.1%	-50%
Rural infrastructure	3%	8%	21%	-10%	-20%	0.1%	-50%
Total CAP	**100%**		**1%**	**-4%**	**-7%**	**-6%**	**0%**

Source: own calculations

Table 4: Budget changes in the scenarios.

	S1P1inP2	S2P2-10	S3P2-20	S4P1inP2-20	S5AGRINV
TOTAL - regional	0.08%	0.04%	0.06%	0.11%	-0.08%
Rural	0.08%	0.00%	0.00%	0.06%	-0.05%
Urban	0.09%	0.08%	0.13%	0.15%	-0.12%
Agriculture and forestry	-0.71%	-1.28%	-2.11%	-1.87%	2.91%
Rural Secondary	0.17%	0.11%	0.16%	0.23%	-0.30%
Rural Tertiary	0.09%	0.05%	0.08%	0.12%	-0.16%
Urban Secondary	0.14%	0.14%	0.23%	0.26%	-0.23%
UrbanTertiary	0.08%	0.07%	0.12%	0.14%	-0.12%

Source: own calculations

Table 5: Average GDP deviations from baseline (S0BSL) over 2014-2020.

effects on GDP in agriculture, which suggests that the reallocation favours mainly non-agricultural sectors (more than a quarter of investment subsidies is allocated to non-agricultural rural activities)[9].

Concerning the fifth scenario (S5AGRINV), in which the funds are concentrated on agricultural modernization under a baseline budget, the GDP growth in agriculture is noticeably higher (almost 3% compared to baseline), whereas the non-agricultural sectors and urban areas are worse-off.

Similar conclusions as for the GDP can be derived for the gross production per sector (Table 6). It can be observed that the production of rural sectors of energy, tourism and services slightly declines as a consequence of subsidies reduction. On the other hand, the production in these sectors is positively stimulated by the reallocation of funds from the first to the second pillar, if the original distribution of funds between rural development and modernization is maintained. When more funds are allocated to modernization, the development of agricultural sector is favoured at the expense of the non-agricultural sectors.

Discusion and conclusion

This part concentrates on compiling the results of the two exercises: the first using the regional CGE model (Rural ECMOD) presented in this paper and the other using a national CGE model (CZNATEC) conducted at the national level and presented in Křístková, Ratinger (2012). To simplify the comparison and the synthesis we concentrated only on scenarios S1P1inP2 and S3P2-20[10] and on a few indicators: namely the sectoral GDP, employment and land rent. It is clear that one has to be careful when comparing the results of the two different models. In this respect it is important that these models come from the same family of the CGE models, use similar functional forms and their static and dynamic structures are designed on the same principles. We have also run the identical scenarios. In spite of the great level of consistency there are also certain modelling differences concerning investment allocation methods, labour supply functions, base years (2005 for Rural-ECMOD and 2006 for CZNATEC), differences in function parameters resulting from calibrations and the different aggregation levels of activities and commodities.

The both models indicate that the transfer of financial resources from Pillar 1 to Pillar 2 of the CAP (S1P1inP2) will have a positive response in the economy (national, regional, rural and urban) in terms of GDP (Table 7). However, these effects are negligibly small. This is without doubts due to a tiny share of agriculture in the national and regional levels. Although South Moravia has a good soil and a suitable climate and its agricultural production belongs to the most important in the country, it is also an industrial and services region - thus the share of agriculture in the regional and even the rural economy is comparably small to the national level. Cutting the Pillar 2 budget by 20% (S3P2-20) will also produce negligible total effects (perhaps with the exception on the South Moravian urban economy). The opposite signs between the national

[9] It should be noted that biogas stations and other bio-energy activities are included in energy sector.

[10] Scenario 3 and Scenario 2, respectively in Křístková, Ratinger, 2012.

Domestic Production	S1P1inP2	S2P2-10	S3P2-20	S4P1inP2-20	S5AGRINV
Agricultural and forestry prod.	-0.68%	-1.26%	-2.09%	-1.84%	2.91%
Manufacturing products	0.15%	0.13%	0.21%	0.26%	-0.27%
Services	0.09%	0.07%	0.11%	0.14%	-0.15%
Total	0.10%	0.07%	0.11%	0.15%	-0.14%
Grapes , Fruits & Veg.	-0.63%	-1.48%	-2.50%	-2.11%	3.58%
Other Agricultural Products	-0.86%	-1.52%	-2.49%	-2.23%	3.43%
Wine, Procesed Fruits&Veg.	-0.08%	-0.16%	-0.27%	-0.23%	0.35%
Other Food	-0.09%	-0.17%	-0.27%	-0.24%	0.36%
Rural Energy	0.42%	-0.19%	-0.38%	0.03%	-0.97%
Rural Tourist Serv.	0.63%	-0.26%	-0.53%	0.08%	-1.40%
Rural Civil Serv.	0.02%	-0.02%	-0.02%	0.01%	-0.03%

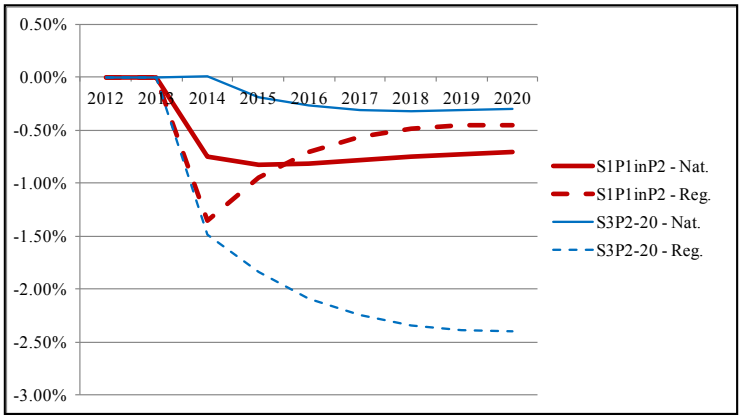
Source: own calculations

Table 6: Average production deviations from baseline (S0BSL) over 2014 - 2020.

		National	South Moravia		
			Regional	Rural	Urban
S1P1inP2	Secondary	0.04%	0.16%	0.17%	0.14%
	Tertiary	0.02%	0.08%	0.09%	0.08%
	Total	0.03%	0.08%	0.08%	0.09%
S3P2-20	Secondary	0.00%	0.19%	0.16%	0.23%
	Tertiary	-0.01%	0.10%	0.08%	0.12%
	Total	-0.01%	0.06%	0.00%	0.13%

Source: own calculations

Table 7: A comparison of the national and regional results: GDP deviations from S0BSL over 2014-2020.



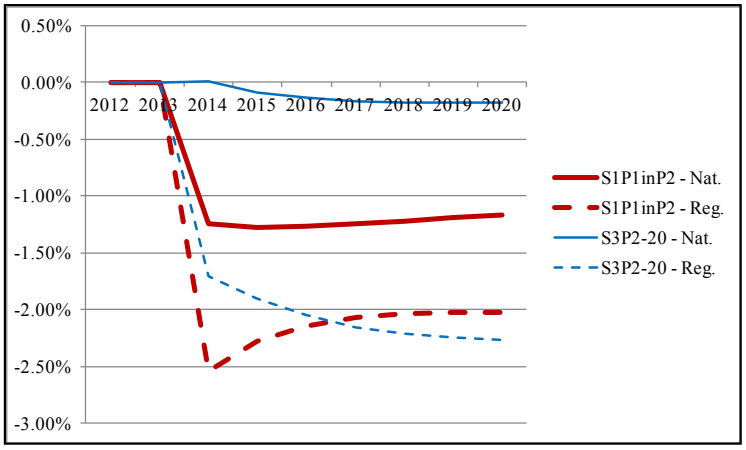
Source: own calculations

Figure 1: A comparison of the national and regional results: Agricultural GDP deviations from S0BSL over 2014-2020.

model (negative GDP effects) and the regional model (positive GDP effects) are remarkable concerning both total economy and the tertiary sector. The explanation is not straightforward: it seems that while the regional economy benefits from releasing any resources from agriculture in the Rural-ECMOD model, the same does not hold for CZNATEC, and the similar tiny reduction of support to the services is not offset by the release of resources from agriculture there. Another interesting observation relates to the different responses on the sectoral level. It is apparent that the Rural-ECMOD generates slightly more pronounced effects than CZNATEC for the both scenarios.

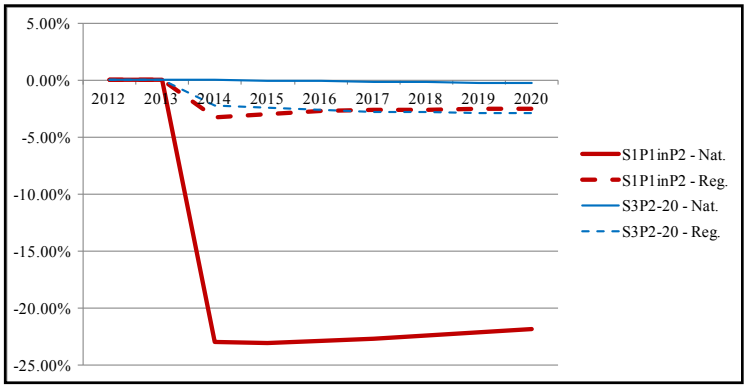
The effects on the agricultural GDP are more significant. Looking at Figure 1 we can see well similarities and differences in results of both models. Cutting direct payments is a shock for agricultural production which is not compensated by an increase in Pillar 2 budget (bold red lines). However, farmers gradually adjust to the loss of the direct payments and both models converge to the same long run effects in terms of the relative deviations from the baseline (S0BSL). Thus we can say that in the Rural-ECMOD model, investment activity compensates losses of direct supports rapidly, while in the CZNATEC, the process of adjustment is much slower. In contrast, in the budget cut scenario the results depart significantly in terms of the magnitude of the impact, while the curves exhibit very similar shapes. We can also see that CZNATEC reaction to the policy shock is delayed in the S3P2-20 scenario.

An interesting question is how do factor markets such as labour and land perform in the two models. Due to the flexible labour mobility among sectors, employment effects are of a higher importance than wages (their variations are absolutely negligible in both scenarios). The responses to the policy shocks are showed in the chart in Figure 3. The shapes of the response curves are similar to those in Figure 2, only magnitudes are different: for S1P1inP2 the deviations from baseline (S0BSL) are twice bigger in absolute terms for agricultural labour than for agricultural GDP; in contrast in S3P2-20, the deviations contract at the national level, while they stay almost constant at the regional level if we move from agricultural GDP to employment. This cannot



Source: own calculations

Figure 2: A comparison of the national and regional results: Agricultural employment deviations from S0BSL over 2014-2020.



Source: own calculations

Figure 3: A comparison of the national and regional results: Land rent deviations from S0BSL over 2014-2020.

be explained simply by the differences between the national and South Moravian economy, it rather indicates that shocks are treated differently in each of the applied models.

Since land is fixed in agriculture, only land rents respond to the farming sector performance. If direct payments are reduced by 10%, land rents drop – in the CZNATEC calculations really dramatically (Figure 4): almost nine times more than in Rural-ECMOD; again in terms of deviations from the baseline. In respect to Pillar 2 reductions, the land rent fall is very moderate in CZNATEC.

In the above comparison we could see some differences in the results of the models and the geographical levels of analyses. Some of these differences can be attributed to structural differences between the national and regional economies some of them are due to the model specifications. However, it does not seem that the results are inconsistent. In contrary, we can assert that applying these two models we can better mark the range of possible impacts of the planned policy.

The analysis also indicated that it is important to take into account regional differences when designing agricultural and rural development policies. From this point of view it will be very useful to carry out at least one additional regional model of the region which differs more substantially from the national average (e.g. Vysocina region).

Another challenge for the future will be to bring closer both models in respect to the response to investment shocks. Also, the over-sensitivity of CZNATEC in the land rent should be dealt with.

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Appendix

	S0BSL	S1P1inP2	S2P2-10	S3P2-20	S4P1inP2-20	S5AGRINV
Pillar 1 (DP)	106047	95442	106047	106047	95442	106047
Transfer to Pillar 2		10605			10605	
Pillar 2	60606	73493	54545	48485	60680	60606
Pillar 2 reduction			*10%*	*20%*	*20%*	
Modernisation of agricultural holdings	32094	38919	28885	25675	32133	52048
AEM, NHA payments	12225	14825	11002	9780	12240	8557
Support to rural areas	16287	19750	14658	13029	16307	8143
Diversification	6446	7817	5802	5157	6454	3223
Undertaking in rural areas	5116	6204	4604	4093	5122	2558
Rural infrastructure	4725	5729	4252	3780	4730	2362
Total CAP	166652	168935	160592	154531	156122	166652

Source: own calculations

Table 8: Policy expenditure in ,000 EUR - the region of South Moravia.

Name	NACE		Rural/Urban
Agriculture	1	A	U
Permanent crops, vegetable - family farms	1.2, 1.1.3	A	R
Permanent crops, vegetable - large farms	1.2, 1.1.3	A	R
Other agriculture, family farms	1 (the rest)	A	R
Other agriculture, large farms	1 (the rest)	A	R
Forestry	2	A	R/U
Processing and preserving of fruit and vegetables, wine production	10.3, 11.0.2	D	R/U
Other food processing and beverages	10, 11 (the rest)	D	R/U
Machinery, metal prod., electric.	24-31	D	R/U
Other manufacturing	13-23, 32, 33	D	R/U
Energy	35, 36	E	R/U
Construction	41-43	E	R/U
Trade (whole- and retailsale)	45, 46, 47	G	R/U
Hotels, restaurants	55-56	I	R/U
Transport and communications	49-53, 58-63	H	R/U
Financial, real estate and renting services,	64-82	K, L, M, N	R/U
Public administration, education, health and social security	84-87	O	R/U
Other services	90-96	R,S	R/U

Source: own calculations

Table 8: Policy expenditure in ,000 EUR - the region of South Moravia.