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Impact of the CAP´s Second Pillar Budget Reform on the Czech Economy

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Anotace

Tento příspěvek aplikuje model obecné rovnováhy pro analýzu tří scénářů možného vývoje rozpočtu SZP, které jsou realizovány v roce 2014 a kvantifikovány do roku 2020. Výsledky ukazují, že změny ve financování druhého pilíře SZP přinesou pouze marginální dopady na ekonomiku. Nicméně, přesun zdrojů mezi pilíři vyvolá výraznější pokles přidané hodnoty a zaměstnanosti v zemědělství než samotný pokles rozpočtu druhého pilíře. Na druhou stranu, realokace zdrojů mezi pilíři má pozitivní efekt na HDP, v důsledku stimulace ostatních odvětví ekonomiky.

Poznatky prezentované v této disertační práci jsou součástí řešení výzkumného záměru 6046070906 „Ekonomika zdrojů českého zemědělství a jejich efektivní využívání v rámci multifunkčních zemědělskopotravinářských systému“ a „ Výzkumného tematického úkolu ÚZEI, MZe-TÚ 4241/2011“.

Klíčová slova

Společná zemědělská politika, druhý pilíř SZP, rozpočet, investiční dotace, CGE model, simulace, zemědělství.

Abstract

In this paper, three scenarios concerning different budget options of the reformed CAP are analysed based on the general equilibrium approach. The simulations consider a policy shock in 2014 and assess its impact until 2020. The results suggest that the changes in financing the second pillar CAP will produce only marginal effects on the economy. However, the reallocation of funds from the first to the second pillar has considerably larger negative effects on gross value added and employment in agriculture than the case of the second pillar budget reduction. On the other hand, the reallocation of funds will produce small but positive effects on the remaining sectors of the economy and the GDP.

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Key words

Common Agricultural Policy, Second pillar, budget, investment subsidies, CGE model, simulation, agriculture.

Introduction

The Common Agricultural Policy (CAP) is one of the core policies which, since its establishment in the 1950s, has contributed significantly to the process of integration of the European Union. Since the reform carried out in the Agenda 2000, CAP has been implemented in two pillars, pursuing different policy goals. Whereas the first pillar of CAP concentrates on income support mostly via direct payments, the second pillar, with a gradually increasing yet considerably smaller share, aims at supporting the competitiveness of farmers and the socio-environmental functions of agriculture.

In connection with the approaching end of the current programming period, a debate on further reform of CAP has been opened and various legislative proposals have been produced that discuss the future shape of the Common Agricultural Policy. From the EU Budget Proposals (EC 2011a) it follows

that the Union's budget allocated to the CAP will likely stay constant in the nominal terms of the 2013 level. However, what remains unclear is the proportion of spending between both pillars on the national and regional level. The impact assessment study (EC, 2011b) highlights existing disparities in the allocation of national envelopes among member states and proposes several scenarios how to address them in the new CAP. The Multi-annual Financial Framework (EC, 2011c) sums up the suggestions of the impact study in three alternatives of the CAP budget reallocation to the second pillar. Based on the MFF, the second pillar budget for the Czech Republic will unlikely grow, in the most dramatic scenario it might decline up to 30%. This decline can be partially compensated by reallocating funds from the first to second pillar.

In view of these proposals, this paper aims at quantifying the impact of different scenarios of Pillar 2 budget allocation including the transfer from Pillar 1 on the Czech agriculture and the whole economy.

The above formulated general objective can be translated in three research questions to be answered by the model:

* What is the effect of the second CAP pillar reduction resulting in a decline of investment support, on the performance of the agricultural sector (output, income and employment)?
* What is the effect of the reallocation of CAP budget from the first to the second pillar on the performance of the agricultural sector (output, income and employment)?
* What are the effects of these alternative financing options on the performance of the national economy (GDP and macroeconomic balances)?

In order to capture the spill-over effects of the CAP budget scenarios on the non-agricultural/non-food economy, a general equilibrium approach is applied. Due to the specific CAP focus of the study, a detailed disaggregation of the agricultural sector was carried out.

The paper is structured as follows: in the next section we describe the applied CGE model, data and considered scenarios. The model results are presented in Section 3. Finally, a brief summary and discussion of the results are presented.

Material and Methods

1. Description of the Applied CGE model

The choice of the CGE approach is supported by various arguments. According to Piermartini (2006), general equilibrium models (CGE models) provide a consistent, rigorous and quantitative way of assessing economic policies and they serve as supporting tools in the decision making process. Robinson et al. (1999) further explain that multi-sector CGE models provide a versatile empirical simulation laboratory for analyzing quantitatively the effects of economic policies and external shocks on the domestic economy.

One of the earliest CGE applications in the geographical region of the Czech Republic can be found in the study on the impact of the EU accession on the agricultural markets (Tangermann and Banse, 2000); further contributions in this area were provided by Ratinger and Toušek (2004). Besides a regional CGE model applied for the scenarios concerning rural areas of the Czech Republic (Bednaříková and Doucha, 2009), there is very scarce evidence on the agriculture-oriented CGE applications with a specific focus on the economy of the Czech Republic. Most of the research on the impact of agrarian policy is performed by widely spread multi-country CGE models focused on agriculture, in which the Czech Republic is usually aggregated into a group of CEEC countries, or is not included at all. Furthermore, the nature of the multi-country models implies that the model closures are defined on a global scale, allowing for a macroeconomic disequilibrium on the individual country level[1].

The presented CGE model (CZNATEC) refers to small open economy and is structurally very similar to the IFPRI standard (Lofgren and Robinson, 2003). Due to this similarity we do not present the model in all details (the reader can find it in the cited Lofgren et al. or in Křístková, 2010b), instead we concentrate on the most distinguishing features of CZNATEC. The specific focus of the study on agriculture is reflected in the production and commodity structure of the model. The national economy is disaggregated into 13 production sectors; of which 8 represent individual agricultural sectors, and the other represent the sectors of industry (food processing, non-food industry) and services (research and development and other services).

[1] The presented CGE model is thus the only currently existing CGE model with agricultural policy extensions, built for the economy of the Czech Republic.

In the model, perfect competition and constant returns to scale are assumed at the production side. Total gross production of a sector is represented by a nested production function with a fixed-factor Leontief combination of intermediate consumption and value added

Two groups of production sectors are distinguished for the modelling of added value: sectors that use land as a production factor (secland) and sectors that use only labour and capital (secnland). In the first stage, value added is formed by the combination of labour (Li) and capital-land bundle (KDi) based on the CES I production function (Equation 1):

$$CES\ I:\ VA_i = aF_i \cdot \left(\chi F_i \cdot KD_i^{-\rho Fi} + (1-\chi F_i)\cdot L^{-\rho Fi}\right)^{-1/\rho Fi} \quad (1)$$

where aF_i is the efficiency coefficient and χF_i and $(1-\chi F_i)$ are the distribution parameters of the production function. Parameter ρF_i in the exponent is derived from the elasticity of substitution σF_i between the production factors KD_i and L_i.

In the second stage, the optimal combination of capital stock K_i and land D_i is modelled analogously with the use of the CES II production function (Equation 2):

$$CES\ II: KD_i = aG_i \cdot \left(\chi G_i \cdot K_i^{-\rho Gi} + (1-\chi G_i)\cdot D^{-\rho Gi}\right)^{-1/\rho Gi}. \quad (2)$$

The production structure further incorporates the depreciation of capital stock, which is modelled as a fixed proportion from the current level of capital stock.

The behaviour of households in the Czech economy is simulated by introducing two representative households – farmer households and other households, which optimise their utility subject to a budget constraint. Whereas microeconomic theory provides numerous suggestions, a standard choice in the field of CGE models is the Stone-Geary Linear Expenditure System (*LES*) which incorporates a subsistence level into the utility function (Equation 3).

$$U = \prod_j \left(C_j - \mu Hj\right)^{\alpha HLESj}, \qquad \sum_j \alpha HLES_j = 1 \quad (3)$$

where U is the consumer's utility, C_j is the amount of consumption of the j-th commodity, μH_j represents the subsistence level of consumption of each j-th commodity[2] and $\alpha HLES_j$ is a preferential parameter of the respective j-th commodity in the consumer basket.

The households' consumption budget is determined by the net value of its income after taxation and transfers, reduced by its savings.

In the CGE model, government is also introduced as an optimizing agent that maximizes utility subject to the disposable budget, derived from incomes received on the basis of tax collections. Contrary to households, it is not necessary to incorporate subsistence level in the government´s utility function, which enables to work with the simpler Cobb-Douglas type of utility function:

$$U = \prod_j CG_j^{\alpha CG_j}, \text{ where } \sum_j \alpha CG_j = 1 \quad (4)$$

where CG_j is governmental consumption of a commodity j and αCG_j represents a preferential parameter in the government´s consumption basket.

The closure of the governmental account is arranged by fixing a ratio of governmental consumption to GDP. Governmental savings are thus adjusted to the difference between governmental incomes and expenditures.

Total supply in the market is represented by a composite commodity consisting of the bundle of domestically produced goods supplied to domestic markets, and imports. The composite commodity is a result of two simultaneous forces in the model: first, the intention of the producer to find the most profitable combination of supply between foreign and domestic markets, modelled with a Constant Elasticity of Transformation (*CET*) function, and secondly the intension of the consumer to find an optimal combination of an imported and domestically produced commodity, modelled with a *CES Armington* function. An extension to the foreign market equations has been carried out in order to model trade and financial flows on a disaggregated level comprising the EU foreign sector and the Rest of the World (RoW).

Furthermore, the model is based on the following closure options and factor market assumptions: *(i)* supply of labour and land is fixed; the capital stock grows at the rate of net investments, *(ii)* capital is fully employed in all sectors, whereas land is employed only in sub-sectors of agriculture, *(iii)* certain amounts of labour are not employed,

[2] If μH = 0, the *LES* utility function is reduced to the Cobb-Douglas utility function.

modelled by a Phillips curve determining the level of unemployment, *(iv)* the model follows a standard macroeconomic balance of savings and investment, *(v)* based on the assumption of a small country, both world export and import prices are fixed, (vi) two foreign sector closures (for the EU and the RoW) consist of an endogenous exchange rate adjusting to the exogenously-set foreign savings.

The CGE model follows a recursive form of dynamization with a Tobin's Q investment function, which allocates investments to the sectors according to their ratio of profitability to user costs (for a detailed description, see Křístková, 2010 a). In the dynamic part, the expected growth rates of the exogenous variables were taken from the following official sources: the prediction of EU GDP is based on the Economic Forecasts of the European Commission (EC, 2010b), world prices and world GDP are taken from the IMF predictions (IMF, 2010), and the growth rates of the domestic exogenous variables, such as transfers and the GDP deflator, are taken from the Czech Ministry of Finance (MF, 2010). CZNATEC is calibrated on the economy of 2006 and provides simulations until 2020.

The instruments of the Common Agricultural Policy included in the CGE model concern direct payments (1st pillar) and investment subsidies (2nd pillar). Given the fact that in the Czech Republic the direct payment rate per hectare greatly exceeds the land's rent[3], modelling direct payments solely as land subsidies would cause computational problems, which is also alerted by other CGE modellers (see Gohin and Bureau, 2006). In order to eliminate this problem, part of the direct payment subsidy is allocated to land and the rest is modelled as a production subsidy. Furthermore, the sources of financing the direct payments are recorded in the balance of payment equation of the EU (for the *SAPS/SPS*[4] payments from the EU) and in the governmental expenditures equation (for the "*Top-Up*" payments). The investment subsidies in the 2nd pillar are incorporated into the investment allocation function for the recipient sectors.

2. Description of used data sources

The application of the CGE model requires data arranged in the form of a Social Accounting Matrix (SAM). The Social Accounting Matrix represents a consistent accountancy framework which is used in the set of simultaneous equations to quantify the intensity of shocks introduced in the system. The SAM contains information about the economy recorded in the System of National Accounts. Nowadays, after a pause in the field of economic modelling caused by a lack of relevant data, the Czech national accounts are fully compatible with the other countries of the European Union. The general form of the Social Accounting Matrix (SAM) is based on data provided by the Czech Statistical Office (CSO) in their published version of the SAM for the year 2006. Given that the purpose of the CGE model is to provide agriculturally oriented policy simulations, the general SAM does not provide sufficient details on the agricultural accounts. This refers to the proper disaggregation of the production accounts, representing key agricultural activities, the commodity accounts, representing flows of domestically produced, imported and exported key agricultural commodities, the production factors account with a specific treatment of land and the institutional account with independent farmer households' treatment.

In order to provide sufficient details with regards to the agricultural accounts, the SAM that was used in this CGE model was built on basis of data provided by the Institute of Agricultural Economics and Information (UZEI). Two major sources of information were used – the commodity balances and the cost surveys of agricultural enterprises. The disaggregation of household account into farmer and other households was carried out with the use of the Statistics of Household Accounts, where the groups of incomes and expenditures are recorded individually for each type of household[5].

A representation of all markets and institutions included in the CGE model and SAM is displayed in Table 1.

3. Definition of scenarios and main assumptions

In line with the different alternatives of the 2nd pillar financing, four scenarios are analyzed in the paper. It is important to note here, that out of the four axes of the CAP's second pillar, the CGE model only allows for the explicit modelling of subsidies in the first and the third axes due to their investment character. The second axis is mainly associated with the production of public goods in agriculture, such as landscape maintenance or

[3] For instance, in 2010, the direct payment rate (approx. 160 EUR/ha) was almost 3 times higher than the land's rent (approx. 50 EUR/ha).

[4] Single Area Payment Scheme (SAPS) is the current regime of the direct payments distribution in the Czech Republic, which will be replaced by the Single Payment Scheme (SPS) from 2014 on.

[5] The final SAM, representing a matrix of 43x43 size, is available upon request.

Sets	Elements of sets	Sets	Elements of sets
Production sectors / Commodity markets	Cereals	Production factors	Labour
	Fruits and vegetables		Land
	Sugar beet		Capital
	Oilseeds	Institutions	Firms
	Cattle		Farmer households
	Pigs and poultry		Other households
	Milk		Government
	Food processing	Foreign sector	EU
	Industry		
	Research and development		Rest of the World
	Services		

Source: Authors´calculation

Table 1: Representation of agents and markets in the CGE model.

Scenario	Modeling 1st pillar CAP	Modeling 2nd pillar CAP
Scenario 1	SPS = 252 EUR/ha from 2014	2nd pillar budget declines by 10%
Scenario 2	SPS = 252 EUR/ha from 2014	2nd pillar budget declines by 20%
Scenario 3	SPS = 227 EUR/ha from 2014	10 % of 1st pillar reallocated to 2nd pillar (+25% national cofinancing)
Baseline	SPS = 252 EUR/ha from 2014	2nd pillar budget remains on the level of 2013

Source: Authors´elaboration

Table 2: Overview of the Scenarios applied in the CGE model.

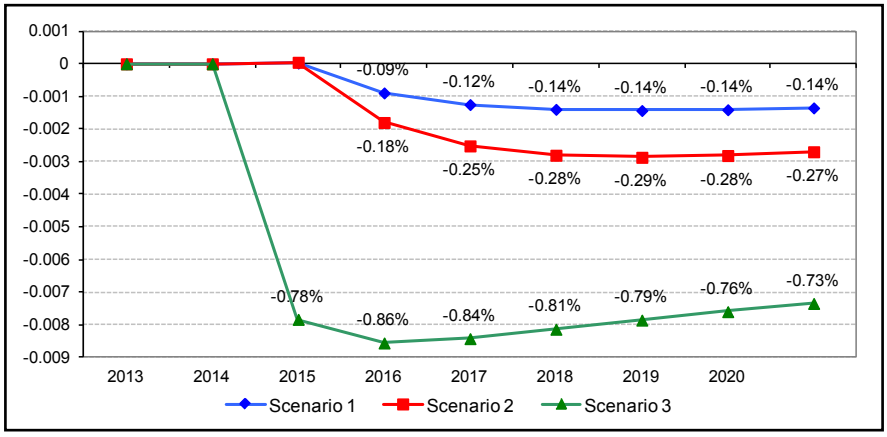
biodiversity. Despite the attempts to introduce the agro-environmental payments into the CGE model (e.g. in works of Rødseth, 2008 or Parra-Lopez et al., 2009), due to its complexity, the presented analysis only concentrates on the investment subsidies and therefore, all alternatives concerning different budget allocations to the second pillar are analyzed as if they were investment subsidies.

An overview of the applied scenarios is presented in Table 2. Scenario 1 considers a modest decline of the funds allocated to the second pillar of the CAP (10% decline from 2014), followed by Scenario 2 with a 20% decline in budget. Scenario 3 analyses the situation of a 10% budget reallocation from the first to the second pillar of the CAP, accompanied by a proportional increase of national co-financing. Finally, the baseline scenario represents a status-quo situation, in which the direct payment rate per hectare reaches 252 EUR from 2014 on (based on EC 2011c) and the budget allocations in the second pillar remain at the level of 2013 without change.

Given the investment nature of the subsidies included in the 2nd pillar, it is expected that their reduction would have stronger repercussions in the longer term, due to the adverse effect on the capital formation in agriculture. On the other hand, the reallocation of subsidies from the first to the second pillar could negatively influence the competitiveness of the agricultural sector in the very short run as the first pillar subsidies usually act as production subsidies covering producer costs.

Results

The results obtained from the CGE model simulations should always be interpreted relative to the baseline scenario in order to obtain an insight into the impact of the policy instruments on the variables of interest. General equilibrium models provide a comprehensive overview about the economy taking into account the complexity of linkages among various markets and sectors. In line with the research questions stated in the introduction chapter, the results of the simulations are interpreted in the following order: at first, the effects on the agricultural sector are analyzed in larger detail and consequently the implications on other industries and national economy are discussed.



Source: Authors´ calculation

Figure 1: Evolution of Gross Agricultural Production in c.p. 2006 (deviation against baseline).

1. Impact of Pillar 2 budget alternatives on the agricultural sector

In this section, the impacts of the 2nd pillar budget alternatives on the sector of agriculture are analyzed. It should be noted that until 2014, the scenarios converge as there is no change in the agricultural policy. After 2014, different evolutions across the scenarios can be observed. In line with the assumptions, the reduction of funds to second pillar in Scenario 1 and 2 would have a negative effect on the gross agricultural production (GAP). However, these effects are rather marginal as they maximally produce only a 0.3% decline of GAP against the baseline (Figure 1). Also in line with the assumptions, the effects become more pronounced over time, with negligible impacts in the short run. The most significant repercussions could be expected under Scenario 3 in which the gross agricultural production would decline by 0.8% compared to the baseline. Moreover, it is observed that the effects are immediate as the production declines sharply from the beginning of the simulation. This finding is explained by the fact that in Scenario 3, financial means are reallocated from the first to the second pillar of the CAP, which is translated into a lower direct payment rate per hectare and an immediate decline of farmers' competitiveness due to rising producer costs.

Figure 1 offers yet another interesting observation – although the level of magnitude of the quantified effects on the GAP is rather insignificant, the reallocation of funds from the first to the second pillar in Scenario 3 causes a much stronger contraction of agricultural production, than a simple decline of the second pillar budget in Scenarios 1 and 2. Taking into account that the funds allocated to the second pillar in Scenario 3 are even higher than funds allocated in Scenario 1 and 2 (the reallocated budget is topped-up by the national government due to the rule of 25% co-financing in Scenario 3, see Table 3), it is clear that the agricultural sector is much more sensitive to reductions in the 1st pillar subsidies compared to the second pillar subsidies.

The CGE model also enables to analyze the impact of the budget alternatives on the individual agricultural commodity markets. Figure 2 displays an average percentage deviation of the domestic production of agricultural commodities against the baseline. Concerning Scenario 1 and 2 in which the budget allocated to the second pillar declines by 10% and 20% respectively, the negative effects are distributed symmetrically across all commodities. However, in Scenario 3, the effects vary per each commodity and the strongest decline is observed in case of cereals, sugar beet, cattle and milk, whilst the commodity group of fruits and vegetables even slightly benefits from the new budget situation. This is closely related to the distribution of the direct payments in form of the SPS in which the production of commodities such as cereals is subsidized considerably more than poultry or vegetables (because of Direct Payments bound to land). Thus, when the funds are reallocated to the second pillar, previously highly subsidized land intensive commodities suffer more than low-subsidized commodities.

The analysis of the commodity structure reveals that the contraction of the agricultural sector in Scenario 3 is mainly driven by the decline of the commodities sensitive to direct payments contributions.

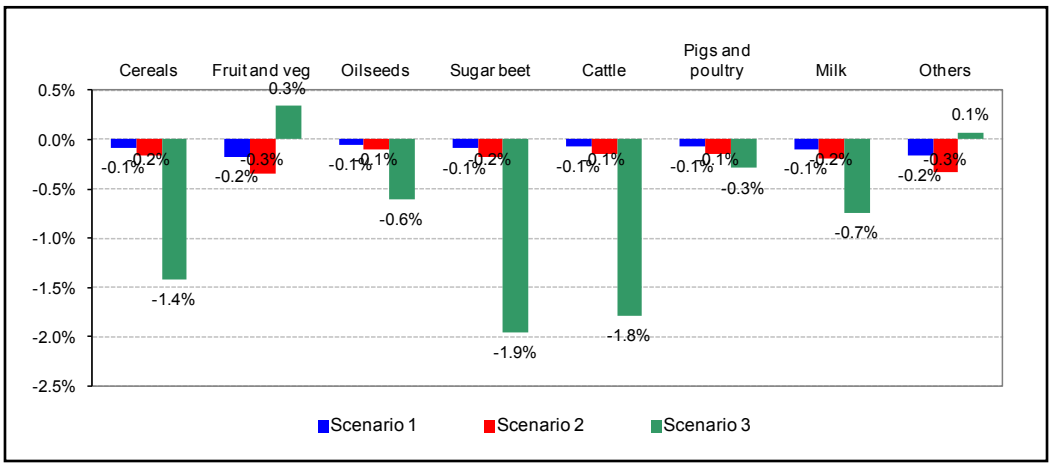
The overall effect of the analyzed budget alternatives on employment in agriculture is displayed in Table 4. It is visible that the decline in

million CZK	1st Pillar CAP budget (annualy) including Chapter 68		2nd Pillar CAP budget (annualy)		Total CAP Budget		% Change
	Before Reform (2013)	After Reform (2014-2020)	Before Reform (2013)	After Reform (2014-2020)	Before Reform (2013)	After Reform (2014-2020)	
Baseline	23,456	25,162	8,414	8,414	31,870	33,576	5.4%
Scenario 1	23,456	25,162	8,414	7,572	31,870	32,734	2.7%
Scenario 2	23,456	25,162	8,414	6,731	31,870	31,893	0.1%
Scenario 3	23,456	22,993	8,414	11,306	31,870	34,299	7.6%

Note: The decline of the 1st pillar by 10% does not include Chapter 68, therefore the effective change is less than 10%

Source: Authors´ calculation

Table 3: Comparison of the budget allocations before and after the CAP reform.



Source: Authors´ calculation

Figure 2: Impact of the scenarios on production of agricultural commodities (average percentage deviation against baseline).

	2014	2015	2016	2017	2018	2019	2020	Průměr
Scenario 1	0.00%	-0.05%	-0.07%	-0.08%	-0.09%	-0.09%	-0.09%	-0.06%
Scenario 2	0.01%	-0.09%	-0.14%	-0.16%	-0.18%	-0.18%	-0.18%	-0.12%
Scenario 3	-1.25%	-1.28%	-1.27%	-1.24%	-1.22%	-1.19%	-1.17%	-1.08%

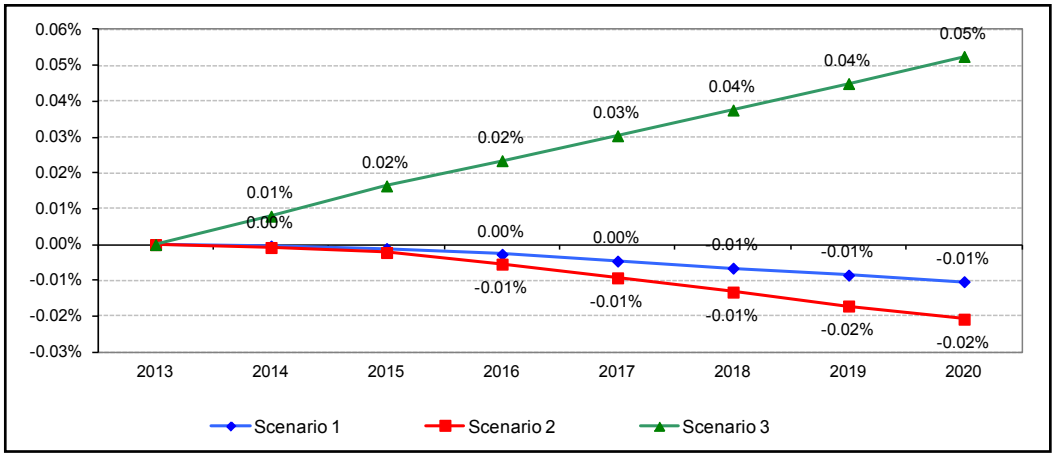
Source: Authors´ calculation

Table 4: The impacts of the scenarios on the employment in agriculture (% deviation against baseline).

the gross agricultural production is transmitted to a lower demand for labour leading to a decrease in employment in agriculture. However, it is notable that the reduction in the second pillar budget produces milder shocks to labour market than the reallocation of funds from the first to the second pillar. This is closely related to the role of the second pillar subsidies in the economy. As these subsidies are linked to investments, their reduction would slow down investment activity in agriculture and the formation of physical capital. Therefore, the decline of the agricultural production in Scenarios 1 and 2 is mainly caused by decelerating capital formation in agriculture. On the other hand, the reallocation of funds from the first to the second pillar would produce much stronger effects on the labour market because of limited substitution of labour by capital as the capital is fixed in the short-term.

2. Impact of Pillar 2 budget alternatives on other sectors of the economy

The general equilibrium approach applied in this paper also enables to assess the effects of the different budget alternatives on the other sectors of the national economy, which are interlinked with agriculture through their intermediate consumption and the markets of production factors. Figure 3 plots the evolution of the gross value added in industry and services (calculated as a percentage



Source: Authors´ calculation

Figure 3: Impact on Gross value added of industry and services (% deviation against baseline).

deviation against the baseline). Although the reported changes are relatively small, they still provide an interesting insight into the impact of the CAP funds in the economy. It can be observed that whereas the reduction of the second pillar budget would negatively influence the remaining sectors of the economy, the reallocation of subsidies from the first to the second pillar would in fact boost them. This finding is related to the nature of the second pillar support; due to the fact that investment subsidies in the second pillar are also distributed to rural development projects in industry and services, their reduction has much broader effect across all industries (although these are small in terms of the magnitudes). Under Scenario 3, in which funds are reallocated to the second pillar, value added in industry and services goes up via two channels – directly as there are more rural development projects financed outside agriculture and indirectly as the farmers lose competitiveness and resources from agriculture are reallocated to industry and services. Furthermore it is observed, that these effects become more pronounced over time as the reported values do not converge back to the baseline. This shows that a policy shock that happens in 2014 has ongoing repercussions beyond 2020.

3. Impact of the 2nd pillar budget alternatives on macroeconomic situation

Finally, the effects of the CAP budget reform on the macroeconomic stability can be assessed. Table 5 contains an overview of the impacts of the selected macroeconomic variables. For most of the variables, the effects are negligible. This is understandable as the agricultural sector participates only by a small share in the total GDP of the country and therefore policy simulations directed to agriculture will have limited impact on the whole economy.

In spite of these small effects, it is still possible to interpret the obtained macroeconomic effects as they can indicate the direction in which the scenarios affect the economy. Concerning the wage rate, with a 10% reduction of the second pillar funding, there is no impact. A small negative effect can be registered in case of Scenario 3, which is in line with the decline in agricultural employment discussed in chapter 3.1. The reaction of the land market is much stronger than of the labour market. Unlike labour, which can freely move from agriculture to other industries, the use of land is restricted to agriculture and in addition, its supply is limited. Therefore, a minor change in demand for land causes a major reaction in the rental prices of land. This is well illustrated in case of Scenario 3, in which the reallocation of funds in the first pillar to the second pillar produces a decrease in the demand for land, which results in a considerable decline of the land rental prices.

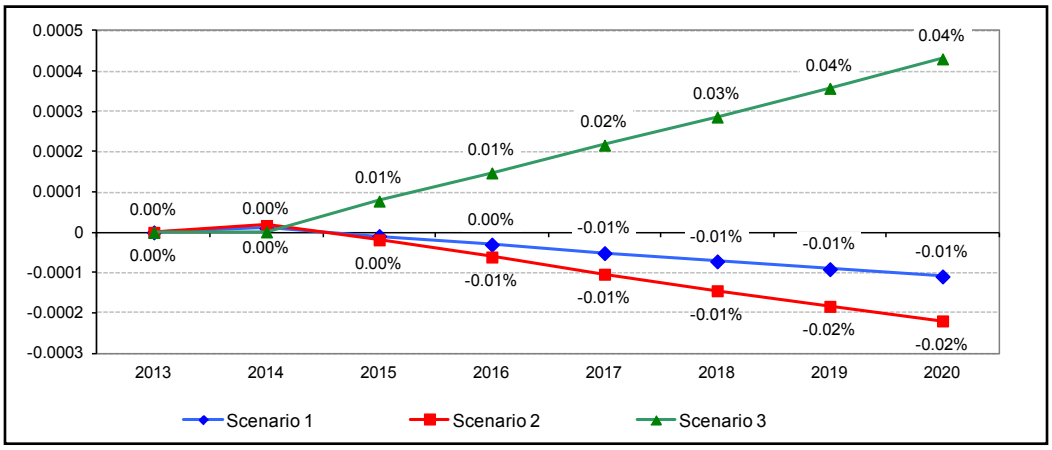
As a consequence of the decline in agricultural employment, the unemployment index goes slightly up in Scenario 3. The effect of the total domestic savings is positive in case of Scenarios 1 and 2 because the reduction of the second pillar subsidies from the EU also reduces the burden of national co-financing and thus has a positive effect on the governmental budget. When funds are reallocated from the first to the second pillar, the requirements for co-financing increase and the effect on national savings is negative, as shown in Scenario 3.

The evolution of the Gross Domestic Product in

	Scenar 1	Scenar 2	Scenar 3
Wage index	0.00%	-0.01%	-0.02%
Index of land rent	-0.06%	-0.12%	-19.73%
Unemployment	0.03%	0.07%	0.13%
Total Savings	0.03%	0.06%	-0.13%

Source: Authors´ calculation

Table 5: Impact on the macroeconomic indicators (average % deviation against baseline).



Source: Authors´ calculation

Figure 4: The impact on the Gross Domestic Product (% deviation against baseline).

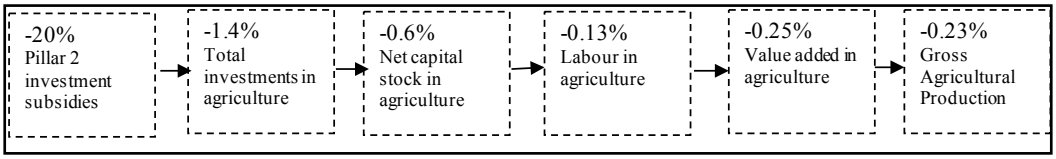
all scenarios is displayed in Figure 4. This figure clearly shows that, whereas the reduction of the second pillar budget in Scenarios 1 and 2 has a negative effect on the overall GDP, the reallocation of funds from the first to the second pillar has a positive effect on GDP. This result is in line with the evolution of value added in industry and services.

Discussion

The results of this analysis must be interpreted in the context of the applied modelling approach. The CGE approach is characteristic by its reliability on a range of assumptions, such as optimization behaviour of all agents or flexibility of prices to achieve equilibrium on all markets. Furthermore, due to a shortage of reliable econometric estimates, most of the elasticity parameters in the CGE models are taken over from existing literature. Furthermore, the use of the CGE models requires a very detailed representation of the economy, which is often not readily available, especially when analysing the effects of specific sector policies. Despite these shortcomings, the CGE models are one of the few methodological instruments that enable to assess various policy simulations in a very comprehensive way.

In this study, the applied CGE model CZNATEC was used to assess the impact of the alternative financing options of the second CAP pillar on the agricultural sector and the total economy. It was found out that the effects have long-term implications on the economy and therefore, the dynamic modelling approach applied in this study is appropriate. Also, the directions of changes caused by the considered policy simulations are logical and they show that the agricultural sector is more sensitive to changes in the first pillar subsidies, due to a significant role of direct payments in the competitiveness of the agricultural sector. Direct payments also strongly influence prices on land market due to the capitalization of direct payments in land rents which is also observed in case of the Czech Republic[6]. The simulated reduction in direct payments rate thus creates strong pressures in land market and leads to an extreme decline of land rents as shown in Scenario 3. However it should be noted that in the reality, land prices would not decline so dramatically because of existing transaction costs that cause high rigidity of land market, as discussed in Ciaian and Swinnen (2006).

[6] Land prices in the Czech Republic have increased by 50% between 2003 – 2009, partially as a result of direct payments allocations (evidence from MA, 2009 and 2010).



Source: Authors´elaboration

Scheme 1: Chain reactions caused by the Pillar 2 budget reduction by 20%.

Probably the most disputable finding of the study is the negligible effect of the concerned scenarios on the agricultural sector. As the results show, even under a 20% reduction of the second pillar budget, the gross agricultural production declines by less than a percent. This is explained by the fact that in the baseline scenario public investments financed from the CAP budget represent only about 17% of total investments in the sector. Private investments are thus major drivers of capital formation in agriculture. Therefore, a reduction in investment subsidies by 20% causes only a one percentage decline in total investments, resulting in less than a percentage decrease in net capital formation and less than a quarter percent fall of value added in agriculture (the graphical representation of these causal relations is displayed in Scheme 1).

The results of this research can be only partially compared with other papers, since the multi-country CGE models, such as the GTAP, have a different model structure. As opposed to the micro-level, where the effects on particular agricultural commodity markets are more comparable, macro-level comparisons can be misleading due to different macro closures in each model.

Conclusion

In this paper, three scenarios concerning different budget options of the reformed CAP were analysed. In order to quantify both the direct effects on the agricultural sector, but also the indirect effects on the Czech economy, a general equilibrium approach was applied. The simulations considered a policy shock in 2014 and assessed its impact until 2020.

From the results reported in the previous section, it can be concluded that changes in financing the second pillar of the CAP that are realistic to expect (i.e. up to a 20% reduction of the budget, or a 10% reallocation between pillars) will produce marginal effects on the economy. However, when comparing these effects across the scenarios, the reallocation of funds from the first to the second pillar has considerably larger negative effects on gross value added and employment in agriculture than the case of the second pillar budget reduction. On the other hand, the reallocation of funds would produce small but positive effects on the remaining sectors of the economy and the GDP.

These results suggest that alternatives for the financing of the second pillar highly depend on the aim that the policy makers pursue. If sustaining employment in agriculture is the main goal, then any reductions in direct payments, despite being compensated by larger investment subsidies, might cause an outflow of labour from agriculture. However, allocating more funds to investment subsidies in the second pillar seems to be a better choice if the aim is to stimulate all sectors of the economy. Moreover, the benefits or investment subsidies are more pronounced in the longer run.

An interesting extension of this research would include a prolongation of the prognostic horizon beyond 2020 to trace the effects of the investment subsidies in agriculture in the longer run. Furthermore, the incorporation of the agri-environmental payments to the CGE model would enable a more complex assessment of the second CAP pillar budget effects in the economy.

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