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SUBSIDIES OF AGRICULTURAL PRODUCTION IN THE CZECH REPUBLIC AND THEIR ECONOMIC CONTEXT

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Abstract

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An important part of evaluating common economic politics of countries in the European Union (EU) is the observation of microeconomic consequences of governmental subsidies in agriculture. This article mentions some basic theoretical and practical connections regarding subsidies in agriculture and of agricultural products on the Czech market, and regarding consequences of implemented price intervention programs. If a subsidy is directed to large-scale producers as well as to geographically unfavourably situated small-scale producers, it can not only miss its own target, but even deepen the existing problem. It is now becoming apparent that prospering large companies have an overall bigger profit from each crown of the subsidized price than small farms, which were originally the reason to implement the subsidies. The size structure of agricultural companies in the Czech Republic has so far been relatively favourable with respect to subsidies. After 2013, a reform of the Common agricultural politics of EU is planned and the amounts of direct payments for agriculture from the EU budget will be newly set. However, the European Parliament supports a proposal of limiting subsidies according to size of farms. Along with that, there is a real threat of growing prices of agricultural products on the market. Results of statistical analyses of source materials have revealed the largest proportion of subsidies in the outputs of Czech agricultural companies in the last years as compared to our neighbours, and also in up to now balance of subsidy level and aid in terms of economic size of the companies. The European Parliament's support of limiting direct payments for agriculture from the EU budget based on size of companies is unfavourable for the Czech Republic and will impact the price level of agricultural products.

subsidy, price intervention, European Union, Agricultural Policy, European Size Unit, agricultural product, equilibrium, long-run costs, short-run costs

It is known from the Czech praxis that a very actual problem of economic policy is created by subsidies on prices of agricultural products. The proportion of subsidies in farmers' revenues reached 22% in 2009, one fourth of all sources during production comes from subvention. Subsidies have been increasing every year since 2004, which is expressed in growing yields per hectare. A price subsidy of agricultural product causes the price to be kept above its equilibrium level.

The hereinbefore conclusions will be used for analysis of the consequences of the governmental price interventions. It is known from firm theory that the goal of a firm in a long and short run is to achieve (if possible) maximum profit. To point out the consequences of the governmental price interventions, two agricultural firms at a perfect competition market are assumed.

Agricultural subsidies fall into two general categories: (1) support based on production levels or prices (sometimes including limits to production) and (2) direct income support (GOTTSCHALK *et al.*, 2007).

MATERIAL AND METHODS

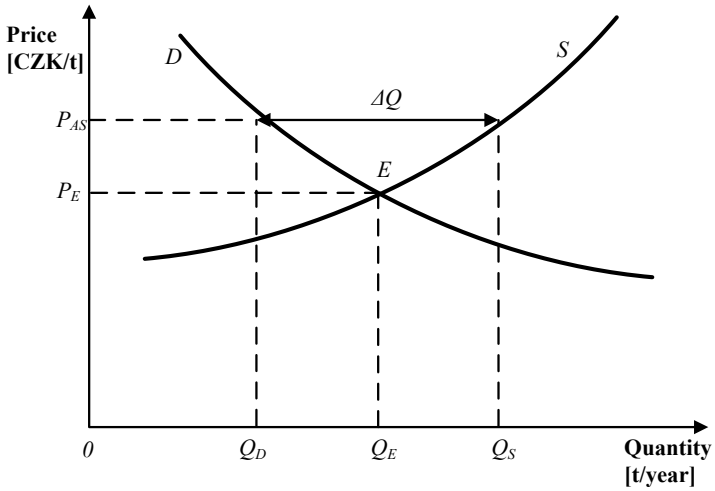
Proposal of the European Commission (EC) for the form of common agricultural policy of EU after 2013, introduced in the fall, promises more righteous conditions for the distribution of subsidies among farmers from new member countries. These farmers feel discriminated on a long-term basis when compared to their West European colleagues. Contrary to earlier views, the proposal does not include implementation of further transitional period that would prolong the time of different conditions for farmers from new and old member countries. The proposal among others opens up a way to supplement the basic rate of direct payments by subsidies from national budgets. Old member countries with richer economies could therefore put more money into agriculture than the new ones, which would further cause uneven positions of farmers in both member blocks.

The European Commission proposed three options of politics regarding direct payments, market measures and development of rural areas. It assumes that the proposal will contribute to more rightful distribution of finances from the EU among farmers. Different rules for EU-15 countries (old EU members) and EU-12 (new EU members) exist in the current system, which cannot further continue after 2013.

The European Commission mentions three options to set direct payments for farmers (EUROPA, 2011):

1. introduce more rightful distribution of direct payments but do not change the current system,
2. introduce more rightful distribution of direct payments and change their setting. Payments would include basic rate for everyone or mandatory additional aid for specific ecological public estates. This option considers introducing new regime for small farms, introducing upper limit for basic rate (ceiling), but at the same time consider contribution of large farms to employment in rural areas,
3. gradually cancel direct payments in their current form and instead provide limited payments for environmental public estates and additional payments for natural restrictions.

The Czech Republic has objections to the European Commission's proposal because it would significantly affect domestic farmers. It concerns especially the idea of introducing ceilings for the basic rate of direct payment, which would reduce subsidies for large farms. In the Czech Republic, but also for example in Slovakia or in Eastern Germany, farms are on average much larger than in the old EU member countries. In addition, the proposal is from Czech point of view too general and not favourable for the Czech Republic because it dos not respect the historical development and current situation of the Czech agriculture.



Legend:

D – demand curve,

S – supply curve,

P_E – equlibrium price before subsidy,

P_{AS} – price after subsidy,

E – equlibrium point before subsidy, where having the price P_E is supplied and demanded Q_E,

ΔQ – supply surplus.

1: *Equilibrium on agricultural products market*

Results in the text can be demonstrated by analysis using costs curves of big and small firms. Competitiveness of the firm is closely connected to the accomplishment of equilibrium, thus maximizing profit under the condition of certain type of competition (SOUKUP, ŠRÉDL, 2011). Microeconomic knowledge about behaviour of average and marginal costs curves in short-run and long-run will be used. The presented model is naturally a simplified overview of reality. However, it sufficiently explains the base of the issue.

Fig. 1 shows the microeconomic consequences of the governmental decision to implement the price of subsidy of agricultural products. Under perfect competition market conditions the supply and demand equilibrium would be in point E, where the quantity of agricultural products QE is sold for the price PE. But the government accepts the decision to support the prices of agricultural products. With the subsidy, the price is set above the price level, which clears the market. What results is an overlapping supply, which the government has to buy back.

Fig. 1 also shows the price after subsidy in the amount of P_{AS}. It is obvious that the subsidized price is above the equilibrium price, whereby arises the dominance of the supply ΔQ units of agricultural product per year. To keep the price at the same level P_{AS}, the government has to buy back certain amount of agricultural production from recent year, signed as the quantity ΔQ units. If the government did not do so, the farmers would be forced to lower their prices, which would lead to a decline in their incomes.

Now let's recall the following connections of marginal and average costs curves, shown in Fig. 2.

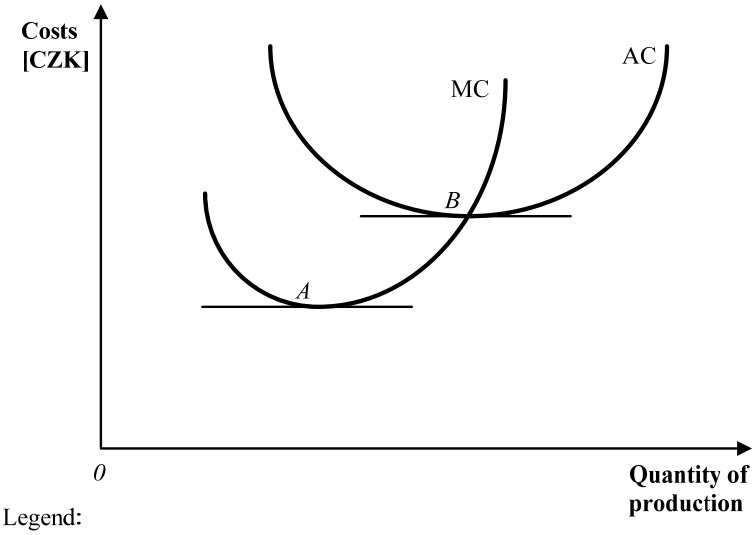
It is clear from Fig. 2 that the average costs in point B (showed as a tangent) are the same as the marginal costs in point B. In other words, the marginal costs curve always intersects the average costs curve in its minimum. Now the analysis of MC and AC functions in long-run will be used in an algebraic analysis.

Two agricultural firms on a perfect competition market are assumed. We can assume two sorts of firms in praxes not two individual firms.

The first firm (small family firm) has a capital, which is expressed in Fig. 3 as a short-run average costs curve SAC_1 and short-run marginal costs curve SMC_1. The costs curves of an agricultural large-scale company represent the short-run average costs curve SAC_2 and the short-run marginal costs curve SMC_2. As a consequence of competition, the long-run equilibrium price gets closer to P_2, which corresponds to the minimum of the long-run average costs curve LAC. As is obvious from the graph, the agricultural large-scale company reaches normal profit with price P_2, but the small family firm has higher costs, therefore it runs a profit loss, which is expressed as a surface of the rectangular.

The pressure of the small-scale producers on the government to intervene in the agricultural product market leads to the fact that the government keeps prices high enough, so that the small agriculture oriented firms do not go bankrupt. This can lead to a fulfilment of certain social goals, but it can cause an efficiency loss, as shown in Fig. 4.

In Fig. 4 consequences of the government price interventions in favour of a certain agricultural product are shown. The political goal of the government is, in this case, (usually) to prevent the bankruptcies of small agricultural firms. For better understanding of the base of the problem we simplified our assumptions. The government guarantees the price of a certain agricultural product

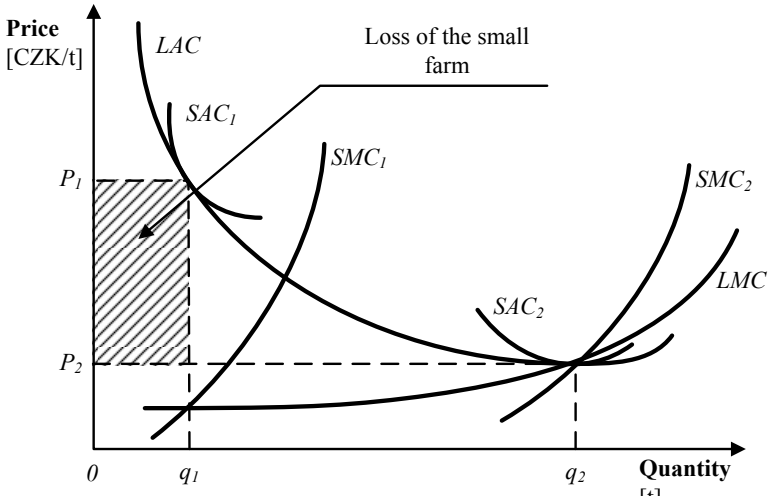


Legend:

A – minimal marginal costs,

B – minimal average costs.

2: *Short-run marginal costs (MC) and average costs (AC)*



Legend:

SAC_1 – short-run average cost curve of the small family farm,

SMC_1 – short-run marginal cost curve of the small family farm,

SAC_2 – short-run average cost of the large-scale agriculture company,

SMC_2 – short-run marginal cost of the large-scale agriculture company,

LAC – long-run average cost curve,

LMC – long-run marginal cost curve,

P_1 – the price for which the family farm realizes production,

P_2 – the long-run equlibrium price (price, for which the large-scale company realizes its production),

q_1 – quantity of production of family farms before government intervention,

q_2 – quantity of production of agriculture large-scale company before government intervention.

3: *Average and marginal costs*

and buys out any surplus which is not purchased by the private sector. The price without intervention is in our case P_2. After the governmental intervention the guaranteed price is P_2', which causes family farms production to reach q_1' and the large-scale producers increase it to q_2'. With this production, large-scale companies reach a profit expressed as a surface of the rectangular P_2DCP_2', while family farms run a loss showed by the surface of P_2'BAP_1.

At the equilibrium, the price P_2 is very close to the price of large farms, small agricultural farms will be in accordance with the curve of the LMC offer in a long period quantity of q_1'. In this context, small agricultural farms realize a loss in amount of:

$$\pi' = (P_2 \times q_1') - LAC(q_1), \quad (1)$$

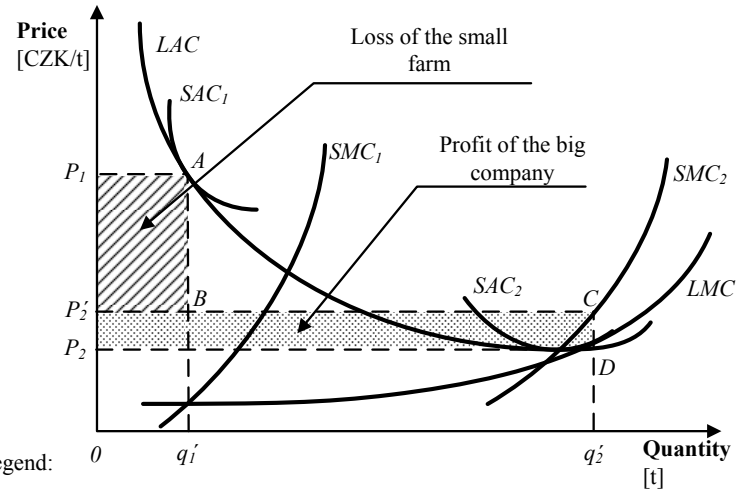
where π' represents the loss of the small farm, P_2 is the price without the government intervention, q_1' is the quantity of production of the small farm, LAC are the long-run average costs.

Large agricultural farms will achieve long-term breakeven at a price of P_2:

$$\pi = 0 \leftrightarrow P_2 \times q_2' = LAC(q_2'), \quad (2)$$

where π represents the profit, P_2 is the price of production unit of large farm, q_2' is the quantity of production of the large farm, LAC are the long-run average costs.

In the short-run, the range of the new loss suffered by family farms after the governmental intervention is smaller than the loss before the governmental intervention, but large-scale producers record higher profits. However, it is not possible to keep their positions for too long, because other entrepreneurs will be attracted (now running non-agricultural businesses) and willing to reach higher profits. This will lead to an increase in land



Legend:

P_2 – price without the government intervention,

P_2' – price after the government intervention,

q_1' – quantity of production of family farms after the government intervention,

q_2' – quantity of production of agriculture large-scale company after the government intervention,

SAC_1 – short-run average cost curve of the small family farm,

SMC_1 – short-run marginal cost curve of the small family farm,

SAC_2 – short-run average cost of the large-scale agriculture company,

SMC_2 - short-run marginal cost of the large-scale agriculture company,

LAC – long-run average cost curve,

LMC – long-run marginal cost curve.

4: *Impacts of subsidies on profit of the big company and the small farm*

prices and therefore to a shift out of the costs curves of all agricultural producers. A new intervention round will appear, let us say a vicious circle, in which the constantly increasing government price interventions will lead to a land price increase and to a shift of all costs curves (OCHRANA, 2001).

Based on our analysis, we assume that in the graph on the left side, returns to scale production in the long term would be growing (in the case of the LAC> LMC).

It is possible that, in contrast to our expectations, point of contact of short-and long-term average costs AC will lie farther to the right from a minimum of LAC. In this case, the economic profit of the company 2 in the long term does not converge to zero (case of monopoly).

RESULTS AND DISCUSSION

International comparison of the level of subsidies in agriculture

Dependence of Czech farmers on subsidies is constantly growing. In the entire EU-27, only Finnish farmers are more dependent on incomes from grant programs, as implied by an analysis of agriculture based on overall agricultural account, done by the Czech Statistical Office.

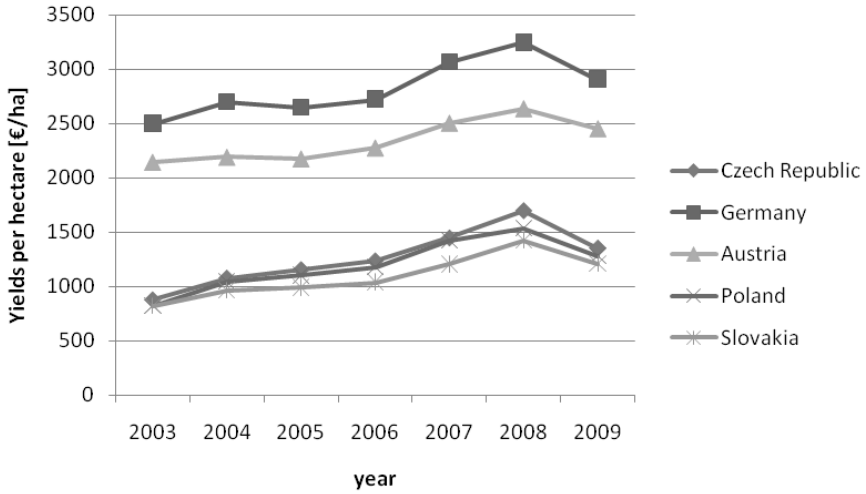
The proportion of subsides in farmers' revenues reached 22.56% in 2009, more than one fourth of all sources during production comes from subvention. Subsidies have been increasing every year since 2005, which is expressed in growing yields per hectare. At the same time, the value of Czech farmers' products is decreasing, which in turn increases the dependency on subsidies. Table I and Figures 5 and 6 show development of yields, subsidies and proportion of subsidies on yields in neighbouring countries in 2003–2009, as determined by a common methodology of overall agricultural account.

Czech farmers are not able to generate profit from their own sources on a long-term basis. They had to expend 934 EUR in costs per 1 000 EUR of yields. Without subsidies our agriculture would not be able to compete, especially with countries of former EU-15. Overall production of the Czech agricultural sector increased in 5 years since 2003

I: *Yields and subsidies per hectare of cultivated land (in EUR per hectare) in selected countries in 2003–2009*

	2003	2004	2005	2006	2007	2008	2009
Czech Republic	878.2	1078.2	1156.1	1237.0	1448.3	1699.0	1355.0
Subsidy*	62.9	62.4	179.6	210.7	211.4	345.6	305.7
Proportion (%)**	7.16	5.79	15.53	17.03	14.60	20.34	22.56
Germany	2496.0	2698.5	2646.5	2723.8	3066.1	3247.2	2906.5
Subsidy*	92.5	90.5	357.1	376.1	380.1	383.1	384.4
Proportion (%)**	3.71	3.35	13.49	13.81	12.40	11.80	13.23
Austria	2145.4	2192.1	2176.6	2277.1	2504.0	2637.2	2453.9
Subsidy*	350.3	353.6	477.2	487.6	479.4	486.2	488.6
Proportion (%)**	16.33	16.13	21.92	21.41	19.15	18.44	19.91
Poland	822.0	1045.5	1102.8	1176.9	1425.1	1536.7	1283.5
Subsidy*	4.9	65.1	80.0	107.0	134.3	126.0	163.7
Proportion (%)**	0.60	6.23	7.25	9.09	9.42	8.20	12.75
Slovakia	822.6	961.9	991.0	1039.3	1207.7	1424.7	1210.3
Subsidy*	62.9	32.1	89.4	110.4	165.5	173.8	246.2
Proportion (%)**	7.65	3.34	9.02	10.62	13.71	12.20	20.34

*subsidy = from that other subsidies for production per 1 ha in EUR
**portion of amount of subsidy and yield per hectare of cultivated land in %
Source: Czech Statistical Office



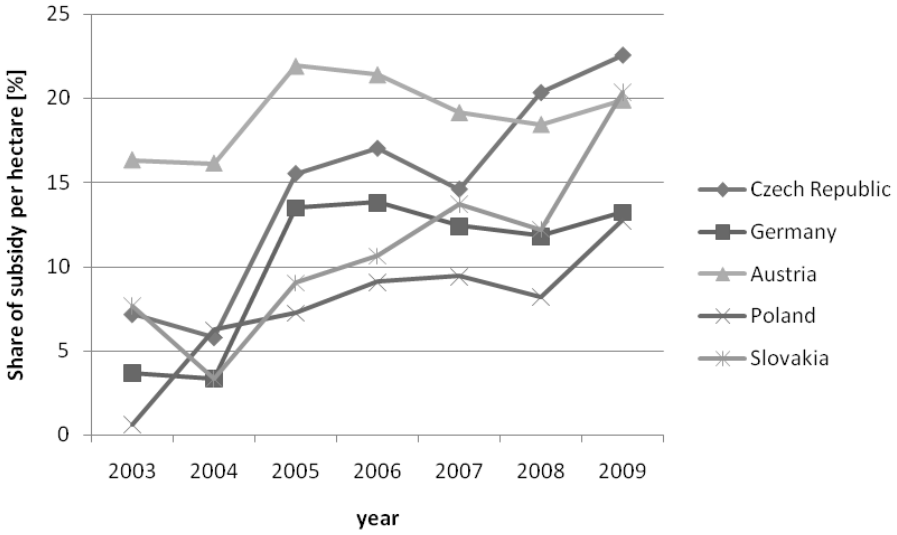
5: *Yields per hectare of cultivated land (in EUR per hectare) in neighbouring countries in 2003–2009*
Source: Czech Statistical Office

by more than 60%, as opposed to less than 8% in EU-15. Plant production is growing with only small fluctuations, animal production is – on the other hand – decreasing, especially due to lowering numbers of pigs and cattle. Farmers are producing 60% more feeding crops and 1.5 multiple of technical crops by volume, which is related to the support of biofuels. This currently gives farmers more interesting sales for their commodities than food-processing or feeding purposes. The economic aspect of agricultural companies is unambiguously winning. According to statistics, Czech agriculture also has the highest costs of employees in EU. As opposed to for example Austria, where family farms prevail, most workers in the Czech Republic have salaried employment status and companies pay their deductions as well as their wages.

In the USA "farmers who rent the land and cultivate capture 75 percent of the subsidy, leaving just 25 percent for landowners. This finding contradicts the prediction from neoclassical models" (KIRWAN, 2009).

Agricultural subsidies under conditions of the Czech economy

Detailed company data on the level of subsidies as related to the size of companies are given in materials from agricultural accounting network FADN CZ. Aggregated data on the amount of overall subsidies and aid for Czech agricultural companies in the period 2004–2009 are listed in Table II.



6: *Proportion of subsidies on yields (in %) in neighbouring countries in 2003–2009*
Source: Czech Statistical Office

Agricultural companies divided into four groups according to their economic size expressed in ESU units do not show big differences in the amount of subsidies and aid in CZK per hectare (Tab. II). Average level for the period 2004–2009 and also the growth rate of subsidies are relatively balanced, while the lowest level of noted characteristics is registered in the group of very large companies, the highest growth rate of subsidies on the other hand by small companies. If a comparison of microeconomic theoretical conclusions with practical results is done, a justified concern of farmers about restricting subsidies based on farm sizes after 2013 exists, as well as a risk of growing prices of subsidized agricultural products from small farms. Risk can be viewed as a difference between the real future states and the expected future state. This difference arose due to the change of the risk factors, which translated the utility of subjects (ŠRÉDL, 2010).

CONCLUSION

Several practical conclusions arise from the presented facts. Government price interventions can fulfil political goals in the short-run, but from the economic point of view is their effectiveness problematic. More suitable tools can be for example the use of some tax instruments (lowering the income tax) or, in an extreme case, directly addressed support. Using subsidies can ensure that prices of agricultural products are at such a level that farmers have appropriate incomes. However, an efficiency loss can occur because of the subsidy, as the surplus, which is purchased by the government, actually stays unused. For example, in the consequence of price support, all households happen to have increased food budgets. Also, small-scale producers are disadvantaged compared to big agricultural companies. The firms cannot affect the total market supply in any way because of its heterogeneity and the size of the firms. (SOUKUP, ŠRÉDL, 2011) From every single crown of the supported price, the prosperous large-scale companies experience larger total utility compared to the small-scale ones, on whom the subsidy is usually focused. Defenders of the price subsidies of agricultural goods argument with possible social consequences, that is by wider understanding of all contexts. In such a case, different tools for this analysis should be used (e.g. the social costs and benefits analysis).

II: *Operational subsidies and aid overall in a set of agricultural companies FADN CZ in 2004–2009 (in CZK/ha)*

Economic size of companies	2004	2005	2006	2007	2008	2009	Average level (CZK/ha)	Average coefficient of growth
Companies overall	4 784	5 721	7 328	7 573	8 287	8 437	7 021.7	1.120
Small farms (0–16 ESU*)	4 290	5 546	7 752	7 954	9 529	8 826	7 316.2	1.155
Medium farms (16–100 ESU*)	4 789	6 011	7 866	7 539	9 011	9 327	7 423.8	1.143
Large farms (100–250 ESU*)	4 669	5 724	7 797	7 445	8 833	8 928	7 232.7	1.138
Very large farms (above 250 ESU*)	4 856	5 664	7 048	7 564	7 820	8 032	6 830.7	1.106

*ESU (European Size Unit) = 1200 EUR
Source: Farm Accountancy Data Network FADN CZ

SUMMARY

It is obvious that the subsidized price is above the equilibrium price, whereby arises the dominance of the supply of agricultural product per year. To keep the price at the same level, the government has to buy back certain amount of agricultural production from recent year. If the government did not do so, the farmers would be forced to lower their prices, which would lead to a decline in their incomes. Marginal costs and average costs functions in a long-run will be used here in a mathematical analysis.

Several practical conclusions arise from the presented facts. Government price interventions can fulfil political goals in the short-run, but from the economic point of view is their effectiveness problematic. More suitable tools can be for example the use of some tax instruments (lowering the income tax) or, in an extreme case, directly addressed support. Using subsidies can ensure that prices of agricultural products are at such a level that farmers have appropriate incomes. However, an efficiency loss can occur because of the subsidy, as the surplus, which is purchased by the government, actually stays unused. For example, in the consequence of price support, all households happen to have increased food budgets. Also, small-scale producers are disadvantaged compared to big agricultural companies. From every single crown of the supported price, the prosperous large-scale companies experience larger total utility compared to the small-scale ones, on whom the subsidy is usually focused. Defenders of the price subsidies of agricultural goods argument with possible social consequences, that is by wider understanding of all contexts.

Dependence of Czech farmers on subsidies is constantly growing. The proportion of subsides in farmers' revenues reached 22.56% in 2009, more than one fourth of all sources during production comes from subvention. Subsidies have been increasing every year since 2005, which is expressed in growing yields per hectare. At the same time, the value of Czech farmers' products is decreasing, which in turn increases the dependency on subsidies. Agricultural companies divided into four groups according to their economic size expressed in ESU units do not show big differences in the amount of subsidies and aid in CZK per hectare. Average level for the period 2004–2009 and also the growth rate of subsidies are relatively balanced, while the lowest level of noted characteristics is registered in the group of very large companies, the highest growth rate of subsidies on the other hand by small companies. If a comparison of microeconomic theoretical conclusions with practical results is done, a justified concern of farmers about restricting subsidies based on farm sizes after 2013 exists, as well as a risk of growing prices of subsidized agricultural products from small farms.

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