THE ECONOMICS OF MILK PRODUCTION IN THE CZECH TRANSITION AGRICULTURE

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Abstract:

The paper examines the development of the Czech transition agriculture through profitability without supports (R-S) and profitability with supports (R+S) of the dairy breeding, resp. milk production on the period 2002 – 2011. For this particular branch of agriculture the accession of the CR to the EU has meant an important change of the agrarian policy, which transformed from the pure national (Czech) agrarian policy into the European CAP. There was proved that profitability R+S in the pre-accession period (period I = 2002-2003) was slightly positive for dairy sector. In connection with the membership of CR in EU agricultural supports significantly increased for dairy sector as the consequence of applying of CAP on the Czech agriculture. Therefore there were monitored in the period II (2004-2008) important positive changes of the indicator R+S for milk commodity. In the connection with the volatility of producer prices and costs increasing in the period III (2009-20011) there was found important downgrade of this indicator.

Keywords: Common Agricultural Policy, milk, transition economics, supports, profitability.

JEL classification: Q12, Q18

1. Introduction

In this paper there is analyzed economic development of dairy profitability– milk production in the period 2002-2011.

For the branch of agriculture the accession of the CR to the EU has meant important change into the agrarian policy, which changed from the pure national (Czech) agrarian policy on the European Common Agricultural policy (CAP). The CAP represents especially common principles and purposes of agrarian policy, and at the same time is superior to national policies and includes common rules and conditions for administration of supports to farmers of all member states with the maintaining of some national specificities of the short-term character (e.g. sequential approximation of pretended direct payments of farmers in the new member states to conditions of farmers in the EU 15) or the long-term character (e.g. supports of state-aid type).

From this reason, the time horizon 2002-2011 was divided in period before accession CR to the EU (period I: years 2002-2003) and period after accession with consistent producer prices of milk (period II: 2004-2008) and with volatility of producer milk prices and another costs increasing (estimation of period III = 2009-2011)., for searching the principal changes, which occurred in period II and III as compared to period I in the Czech agriculture represented by the milk commodity.

On the base of these circumstances, the main goal of this paper is to give an objectives information about influence of agrarian policy on development of economic position of Czech milk producers in the period I, II and III.

For the milk commodity and all periods there was selected an access which enable natural-climatic conditions, agrarian-political conditions (level of supports before and after accession to the EU) and national production-economic conditions (especially intensity of production, production costs, producer prices) and to evaluate impacts of these conditions on the production profitability for milk commodity.

2. Material and methods

Analysis starts from the annual inquiry about costs and production intensity of agricultural products provided by the former Research Institute of Agricultural Economics Prague (VÚZE), renamed on the Institute of Agricultural Economics and Information (ÚZEI) (Poláčková *et al.*, 2003-2011) and own estimation of average of period 2009 and 2011, which have been processed on the base of the VÚZE methodology (Novák, 1996) and also modeling methodology (Foltýn *et al.*, 2009). At the same time there were used principles and rules of the Czech agrarian policy before and after accession to the EU described in „Green Reports" (Ministry of Agriculture of the Czech Republic, 2001- 2009) and in the internal database of agrarian policy in CR for the period 1993-2007 (Doucha, 2008).

For economic effectiveness evaluation of the key commodity production there was used the mathematical model AENVI-1 (Foltýn *et al.*, 2008a), which enables to evaluate 2 indicators of

profitability, i.e. profitability without supports (R-S) and profitability with supports (R+S) for milk commodity, 3 production regions K+R, B, Bo+H (described further) and the average results of the CR (CR total) and for the time horizon 2002-2011 divided to period I, II and III.

Profitability R-S represents share of producer prices per the unit production and unit costs of the given commodity, in the given region. Profitability R+S present share of producer prices and unit support related the unit costs for the given commodity. The term "unit support" means all possible supports (direct and indirect) divided by the production size allocate on the given commodity (Foltýn *et al.*, 2008b).

Unit costs for milk are defined as the total costs divided by production intensity - milk yield.

Unit supports contain all supports allocate on the given commodity. For milk commodity there are considered supports on production and head (milk production, LU for cattle, etc.) and all indirect supports connected with consumption of own feeding stuffs (like SAPS – Single Area Payment System form EU budget, Top-Up – National Adding Special Supports form national budget, set-aside, certified seeds etc.).

2.1 Methodological approach to computing profitability of milk commodity

Computation of profitability is based on the cost inquiry of VÚZE for feeding plant and milk commodity per annum 2002-2008 and own estimation 2009 - 2011. This inquiry is provided on the set of representative Czech agricultural enterprises and their results are divided into 3 types of production regions, namely

K+R	corn and sugar beet production region
B	potatoes production region
Bo+H	potatoes-oats and mountain production region
CR	average values for the Czech Republic.

Assumption (about relation between agricultural production region and LFA classification in the CR): For needs of this paper there were associated production region K+R with regions except of LFA (non-LFA), production region Bo+H with regions LFA-H of the mountain type (LFA-HA and LFA-HB) and production region B with regions partly non-LFA and partly with regions LFA-O (type OA, OB and S) of the other LFA types (except of LFA-H).

From the point of view of supports in LFA which are connected only with TTP (permanent grassland) area in the Czech Republic, there is considered the share of TTP in the individual regions. On the basis of the LPIS (The database of the Czech agricultural land monitoring) detailed data we suppose that

- to the production region K+R coincides with 0 % of TTP in LFA
- to the production region B coincides with 75 % of TTP in LFA-O and with 25 % of TTP in non-LFA
- to the production region Bo+H coincides with 100 % of TTP in LFA-H.

The model assignment of TTP to the production region starts from data application of ČÚZK (Czech Office for Surveying, Mapping and Cadastre) on the statistical data system LPIS about accounting of agricultural land for needs of the support assignment system (with the total area 3 469 ths. ha of UAA, i.e. utilized agricultural land).

2.2 Model AENVI-1 – denoting (Foltýn et al., 2009)

For milk commodity was created by the help of aggregation of individual costs the model structure of the 9 main cost items. For milk commodity there are considered next cost items per feeding day:

Symbol	For animal commodities
x1	Feeds - purchased
x2	Feeds - own
x3	Medicaments and desinfection assets
x4	Mechanization costs
x5	Other direct costs and services
x6	Total labor costs
x7	Material fixed assets depreciation

x8 Depreciation of animals
x9 Fixed costs

Let us denote for milk commodity[1]

i = D1, MLE, and for every production region j = K+R, B, Bo+H, CR total:

Nks total cost per average head in the given category of animals
Nkd total costs per feeding day in the given category
Nkg costs per kg of final l.w. of the given category
Nlt costs on 1 liter of milk
CN total costs per hectare (for plant commodities),
resp. total costs per dairy cow and year (D1),
resp. total costs per liter of milk
UZI animal production efficiency, e.g. annual milk yield,
pocKD number of feeding days in the category of animals
nat natality, i.e. number of born heads per 100 mother heads
JN unit costs per final production
RC producer price of the final production
POD total supports - sum of direct (PP) and indirect (NP) supports allocate on hectare of plant feeding commodities for dairy, resp. per the average head of the appropriate milk commodity
JPOD unit support of the final production
R+S profitability with supports
R-S profitability without supports

Calculation of total costs

For all commodities i and all production regions j the next relations hold:

Nha(i,j), resp. Nkd(i,j) = x1(i,j) + x2(i,j) + …+ x9(i,j) for all i and j (1)

Dairy - milk[2]

CN(MLE,j) = Nkd(D1,j) * 365 * 0,94 (2)

Calculation of unit costs

JN(i,j) = Nlt(MLE,j) = CN(MLE,j) / UZI(D1,j) for i = MLE (3)

Producer prices

Average producer prices of all commodities in production regions and in the CR were taken from the periodic cost inquiry of VÚZE, resp ÚZEI.

2.3 Agrarian policy of the CR and Common Agricultural Policy of the EU

The Czech agrarian policy in pre-accession period was oriented especially on facilitation of overcome on the EU support system scheme and on stopping decrease of head numbers of ruminants. After accession CR to the EU the national support policy was already subordinated to CAP rules.

Model AENVI-1 starts from the theoretical assumption that to the calculation of R+S there are included all direct and indirect supports (claimed supports), i.e. only that supports, which are paid off on the basis of agricultural or arable land, head number of animals and production conditions (LFA payments).

Calculation of total supports

SUB(i,j,r) = PP(i,j,r) + NP(i,j,r) (4)

for i = all commodities, for j = all production regions and for r = years 2002-2011, where PP, resp. NP are the sum of all direct, resp. indirect supports allocate on the given commodity.

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1 *D1 – dairy cows, MLE – cow milk*

2 *Total costs on milk production are calculated as the 94 % share from total costs per cow and year (6 % of the total costs per cow and year is assigned for costs on the born calf).*

For the milk commodity there are considered both types of supports. Direct supports (PP) contain in animal production mostly supports per head in relation to livestock units (LU), while indirect supports (NP) contain all supports which are connected with the own feeds through supports of feeding plant commodities, included supports of TTP in LFA.

All allocate supports on the given commodity are divided by the total size of this commodity (total sum of head numbers of animals - dairy).

Supports PP and NP for every commodity can be regionally differentiated (e.g. LFA supports) and it is necessary to allocate them on production regions (K+R, B, Bo+H and CR total).

Direct supports for plant commodities

In the period I there were included to the PP supports for certified seeds and compensatory supports on arable land connected with the program set-aside. In the period II there were included especially SAPS and Top-Up, and supports for certified seeds, in accordance with yearly changes of support rules.

Direct supports for animal commodities

In the period I are includes compensatory payments on milk and supports of milking cows breeding. In the period II and III supports for cattle breeding (ruminants).

Indirect supports for animal commodities

To the NP there are counted in all periods supports of own feeds for of all cattle categories, which enter to the calculation of total costs for the milk commodity.

For dairy there are following feeding crops:

a) maize for silage (KUS) through the consumption of the silage maize,
b) perennial fodder crops (VLP) through the consumption of the higher dry matter silage,
c) permanent grassland (TTP) through the consumption of green masses or hey,
d) feeding cereals (PS, JC) through the consumption of the own cereals in feeding mixtures.

Fodder crops (KUS and VLP) were in the period I supported through compensatory supports on arable land in terms of program set-aside. In the period II then supports of these crops were different in individual years (SAPS was paid always and Top-Up for KUS each year and for VLP only in the year 2004 and 2006).

TTP in the period I were supported only with context of LFA payments, while in period II were supported both by SAPS, and regionally different LFA payments.

Supports of feeding cereals in both periods were included according to above-mentioned rules for supports of plant commodities.

Calculation of unit supports

For all production regions j and for all years r = 2002-2011 unit supports are constructed as the share of total supports and intensity of production:

$$JPOD(i,j,r) = POD(i,j,r) / HAvyn(i,j,r) \quad \text{for } i = \text{plant commodities} \quad (5)$$

$$JPOD(MLE,j,r) = POD(D1,j,r) / UZI(D1,j,r) \quad \text{for } i = MLE \quad (6)$$

where

HAvyn hectare yield. (7)

Calculation of profitability

For all commodities i, for all production regions j and years r = 2002-2010 we can define indicators of profitability without supports (R-S) and profitability with supports (R+S) by the next relations:

$$R\text{-}S(i,j,r) = RC(i,j,r) / JN(i,j,r) \quad (8)$$

$$R+S = (RC(i,j,r) + JPOD(i,j,r)) / JN(i,j,r) \quad .....(9)$$

2.4 Relations between supports and profitability

The original sense and aim of supports in agriculture was to improve income situation of milk producers with reference to common interests (e.g. so that farmers could further provide their agricultural activities and could exist in countryside and they do not abandon agricultural land etc.).

State authorities, like providers of supports, decide about selection of supported commodities and about the level of supports in terms of their agrarian policy, i.e. national policy (before accession to the EU), or above-national (CAP EU after accession).

The aim of agrarian policy is then to ensure to agricultural producers a possibility to achieve in average conditions, regional conditions, or specific conditions of the given state with the help of targeted supports (direct or indirect) an adequate profit rate.

For every commodity KOM (in this case milk), region j and year r the following relations hold:

- $R+S(KOM,j,r) > R-S(KOM,j,r)$, if KOM is a supported commodity in the region j and in the year r (where $POD(KOM,j,r) > 0$ is the sum of allocate supports of the commodity KOM), (10,11)
- or $R+S(KOM,j,r) = R-S(KOM,j,r)$, in other case. (12)

For supported commodities the following common expectation hold that the supports will change the negative profitability without supports into the positive profitability with supports, i. e.

- $R-S(KOM,j,r) < 0$ and at the same time $R+S(KOM,j,r) > 0$ (13)
  for the commodity KOM, definite region j and definite year r.

In terms of agrarian political measures next cases can occur:

- $R-S(KOM,j,r) < 0$ and $R+S(KOM,j,r) < 0$, (14)
  i.e. the support level is unsufficient and does not solve the economic situation of producers for the given commodity,
- $R-S(KOM,j,r) > 0$ and $R+S(KOM,j,r) >> 0$, (15)
  i.e. supports yet raised the level of profitability of the given commodity.

The frequent case of targeted supports of agrarian policy there are regional differentiated supports (e.g. LFA payments). These supports start from the logical expectation that in the regions favorable for agriculture, the profitability R-S is significantly better than in areas less favorable for agriculture.

If we associate production regions with LFA (less favorable areas) regions as we mentioned above, i.e.:

- K+R = non-LFA, Bo+H = LFA-H, B = LFA-O,

then we can formulate the following assumptions:

- $R-S(KOM,K+R,r) > R-S(KOM,Bo+H,r)$, (16)
- $R+S(KOM,K+R,r) \approx R+S(KOM,Bo+H,r)$, (17)
  where $POD(KOM,Bo+H,r) > POD(KOM,K+R,r)$. (18)

Nevertheless in practice there is possible the following case:

- $R+S(KOM,K+R,r) < R+S(KOM,Bo+H,r)$. (19)

In this case we can say that support of LFA regions was too high and it could cause production migration of this commodity from the agriculturally convenient conditions (K+R) to less favorable conditions (Bo+H).

Through the "decoupled supports", i.e. supports separated from production size of the given commodity (decoupling) it is solved in agrarian policy the problem, how to support farmers income and not to stimulate production of the given commodity.

The result of this process is the same support for every hectare of agricultural or arable land or the same support for every head number of cattle by LU. These supports then are paid off to farmers in the same way (i.e. regardless of conditions, where they manage, and regardless of the production region).

Administration of decoupled supports leads to natural presupposition that if for the profitability without supports R-S for the definite commodity KOM the following relation hold

- $R-S(KOM, K+R, r) > R-S(KOM, Bo+H, r)$, (20)

then after granted support (whatever height of it) to farmers (e.g. decoupled payments per hectare) in the region K+R and Bo+H, we expect that the same relation hold even for the profitability with supports R+S, i.e.

- $R+S(KOM,K+R,r) > R+S(KOM,Bo+H,r)$, (21)
  providing $POD(KOM,Bo+H,r) = POD(KOM,K+R,r)$. (22)

Nevertheless, this logical expectation does not need to always hold. Under the definite assumptions there can occur a case, when the profitability R+S achieved in the region Bo+H will be higher than in the region K+R even at the same level of supports.

Then, there exists a case, when the following relations hold:

- R+S(KOM,K+R,r) < R+S(KOM,Bo+H,r), (23)
  under the definite level of support POD0
- POD0(KOM,Bo+H,r) = POD0(KOM,K+R,r). (24)

The detailed proof of this statement can be found in the study Foltýn *et al.* (2008b).

3. Results and discussion

The model computations of profitability R-S and R+S in the framework of individual commodities, considered years and production regions were done by arithmetic mean of the period I, II and III and processed to the summary tables. Exchange rate of CZK/EUR for the individual years is shown in Table 1.

Table 1. Exchange rate of CZK/EUR - arithmetic mean of the period I (2002-2003), period II (2004-2008) and the period III (2009-2011)

Indicator	unit	Period I			Period II						Period III			
		2002	2003	Total CR	2004	2005	2006	2007	2008	Total CR	2009	2010	2011	Total CR
Exchange rate	CZK/EUR	30,812	31,844	31,328	32,449	29,553	28,326	27,532	24,660	28,504	26,825	26,285	24,556	25,889

Source: The European Central Bank; own calculations

Milk there was analyzed and by factor cost analysis interpreted results of model calculations in all periods for individual production regions K+R, B, Bo+H and CR total.

3.1 Profitability of milk production

The measuring of profitability changes of milk production have been based on comparison of the chosen operational economic indicators in the periods I, II and III and had to show factors, which have led to changes of economic effectiveness (positive or negative) and influence of supports, which in connection with overcome of the Czech agriculture to the CAP affected profitability of milk commodity.

Development of milk profitability in period 2002-2011 sorting by production regions and CR total is shown in Table 2.

Table 2. Dairy & milk - arithmetic mean of the period I (2002-2003), the period II (2004-2008) and the period III (2009-2011)

Indicator	unit	Period I				Period II				Index	Period III				Index
		Production region			Total	Production region			Total	period II	Production region			Total	period III
		K+R	B	Bo+H	CR	K+R	B	Bo+H	CR	/period I	K+R	B	Bo+H	CR	/period II
Feeds (litters) - purchased	EUR/year	224	214	221	218	304	305	270	294	134,7	308	335	282	314	106,7
Feeds (litters) - own	EUR/year	386	329	297	334	491	425	389	429	128,4	513	540	495	521	121,4
Medicaments and desinfection ass	EUR/year	25	17	13	18	34	33	17	28	156,4	47	42	25	38	133,5
Mechanization costs	EUR/year	120	91	100	101	149	102	124	120	118,7	184	101	137	127	105,6
Other direct costs and services	EUR/year	156	142	139	145	220	209	197	208	143,2	291	250	233	251	121,0
Total labour costs	EUR/year	315	299	319	310	381	395	392	391	126,3	461	435	437	440	112,5
Material fixed assets depreciations	EUR/year	58	52	47	53	83	75	78	78	148,4	113	100	112	106	136,2
Depreciation of animals	EUR/year	156	150	148	151	208	197	191	198	131,1	197	212	194	204	103,1
Fixed costs	EUR/year	230	199	192	205	278	286	256	275	134,0	366	362	317	350	127,5
Milk yield	lt/year	6 039	5 552	5 320	5 612	6 758	6 299	5 814	6 263	111,6	7 308	7 033	6 697	6 999	111,8
Total costs	EUR/year	1 670	1 493	1 475	1 535	2 148	2 029	1 914	2 021	131,6	2 478	2 377	2 232	2 351	116,4
Unit costs	EUR/lt	0,26	0,25	0,26	0,26	0,30	0,30	0,31	0,30	117,4	0,32	0,32	0,33	0,32	106,3
Average of producer price	EUR/lt	0,25	0,26	0,25	0,26	0,29	0,29	0,29	0,29	114,8	0,28	0,29	0,29	0,29	97,5
Direct supports	EUR/head	14	14	14	14	69	69	69	69	483,2	110	110	110	110	159,6
Indirect supports	EUR/head	16	25	28	25	177	188	197	184	739,7	217	238	230	225	122,3
Total supports	EUR/head	30	39	42	39	246	257	266	253	646,1	327	348	341	336	132,5
Total supports per unit	EUR/lt	0,005	0,007	0,008	0,007	0,036	0,041	0,046	0,040	579,2	0,045	0,049	0,051	0,048	118,9
Profit with supports	EUR/lt	-0,001	0,011	0,002	0,005	0,028	0,035	0,032	0,032	-	0,003	0,022	0,010	0,013	-
Profit without supports	EUR/lt	-0,006	0,004	-0,006	-0,002	-0,009	-0,006	-0,013	-0,008	-	-0,042	-0,028	-0,041	-0,035	-
Profitability with supports	%	-0,2	4,4	0,7	2,1	9,6	11,5	10,9	10,8	-	0,5	6,5	2,7	3,8	-
Profitability without supports	%	-2,2	1,6	-2,3	-0,6	-2,7	-2,0	-4,0	-2,6	-	-13,4	-9,2	-12,8	-11,1	-

Source: Annual inquiry about costs and intensity of agricultural products of legal enterprises (VÚZE); own estimation of the period III; own calculations

3.2 Results for CR total

Milk yield: in the period I reached 5 612 lt/cow/year and increased in the period II to 6 263 lt/cow/year (increase by 11,6 %, i.e. by 651 lt/cow/year), resp. increased in the period III to 6 999 lt/cow/year (increase by 11,8 % with compare period II, i.e. by 736 lt/cow/year) in the consequence of technical-biological progress and increasing share of the milk productive type of dairy cows in the CR.

Exchange rate of CZK/EUR: (period II/I) - decrease by 9,0 %; (period III/II)- decrease by 9,2 %.

Feeds costs:

- purchased feeds: (period II/I) - significant cost increase by 34,7 %; (period III/II)- cost increase by 6,7 %;
- own feeds: (period II/I) cost increase by 28,4 %; (period III/II)- cost increase by 21,4 %.

Total costs: in the period II have grown against period I by 31,6 %, i. e. about 20 percent point (p. p.) faster than milk yield and in the period III have total costs grown against period II by 16,4 %, i. e. about 5 percent point (p. p.) faster than milk yield, which were negatively shown in the level of unit costs.

Unit costs: (period II/I) - increase by 17,4 %; (period III/II)- increase by 6,3 %.

Producer prices: (period II/I): increase by 14,8 %; (period III/II)- decrease by 2,5 %.

Total supports: in the period I producers obtained the following supports - milk compensation payments as a consequence of the milk quota in the pre-accession period, support of dairy cows breeding (program 1.G.), further indirect supports derived from the program set-aside and supports of certified cereal seeds in a total level 0,007 EUR/lt.

In the period II supports increased on the level 0,040 EUR/lt, resp. 0,048 EUR/lt in the period III as the sum of direct supports on livestock unit of cattle and indirect supports derived from supports on the area of feeding plants for own feedings (green maize and maize silage, perennial fodder crops, permanent grassland-TTP), including supports for TTP in LFA (regions B and Bo+H).

Profitability: in the periods I and II the profitability R-S has been slightly negative.

Nevertheless, in the period II it was reached the less economic effectiveness of the milk production (increasing negative profitability) than in the period I in a consequence of the inadequate growth of costs, especially feeding costs and depreciations of fixed assets.

In the period III it was reached the significantly less economic effectiveness of the milk production (increasing negative profitability) than the period II, mainly in a consequence of the important decrease of milk price and costs increasing.

The influence of supports has shown in the profitability R+S, which in the period I practically only compensated loss (2,1 %), while in the period II supports significantly influenced positive results of profitability (10,8 %), but in the period III in spite of growth total supports per head about 33 % practically only suppress loss (3,8 %) (Figure 1.).

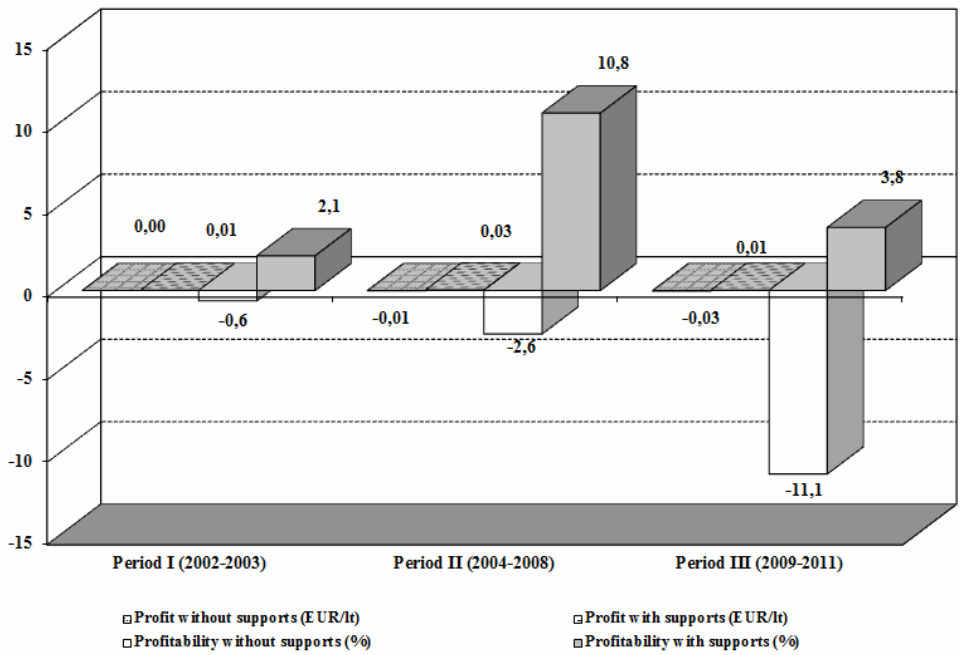

Figure 1. Total profitability development of milk production

Development of milk production profitability in the period I and II according to production regions

Source: Annual inquiry about costs and intensity of agricultural products of legal enterprises (VÚZE); own estimation of the period III; own calculations

3.3 Comparisons related to production regions

The mentioned economic indicators in production regions do not copy results achieved for CR total regarding to the different breeding productive type of cows in the different production regions K+R and Bo+H (Kopeček et al., 2003-2012, Poláčková et al., 2003-2011) and regarding to differentiation of regional oriented supports – e.g. LFA supports (Ministry of Agriculture of the Czech Republic, 2003-2012).

Hypothesis for dairy cow - milk:

a) $UZI(K+R) > UZI(Bo+H)$ (25)

b) $Nks(K+R) > Nks(Bo+H)$ (26)

c) $Nlt(K+R) \leq Nlt(Bo+H)$ (27)

d) $RC(K+R) \leq RC(Bo+H)$ (28)

e) $R\text{-}S(K+R) \geq R\text{-}S(Bo+H),\ R+S(K+R) \geq R+S(Bo+H).$ (29)

Assumption d) of the hypothesis about producer prices of milk is based on the expectation that the higher milk yield reached in the favorable production regions are negatively influenced by the height of producer prices in consequence of the lower content of milk components in the milk (negative correlation between milk yield level and producer prices).

Assumption e) of the hypothesis about profitability R-S comes out from thesis that the intensive breeding of dairy cows, resp. more intensive milk production goes parallel with decreasing of unit costs, i.e. the intensity growth will overcome the worse (eventually the same) producer price of milk (Kopeček, 2002; Poděbradský, 1992; Poděbradský et al., 1992).

Findings:

For the average results of period I, II and III were found next findings:

a) – d): assumptions were confirmed

e): assumptions of hypothesis were not proved in the indicator R+S, because total supports, mainly "indirect" supports, allocate on milk of production region *Bo+H* were bigger about 4 % - 39 % than total supports of production region *K+R* (Figure 2.).

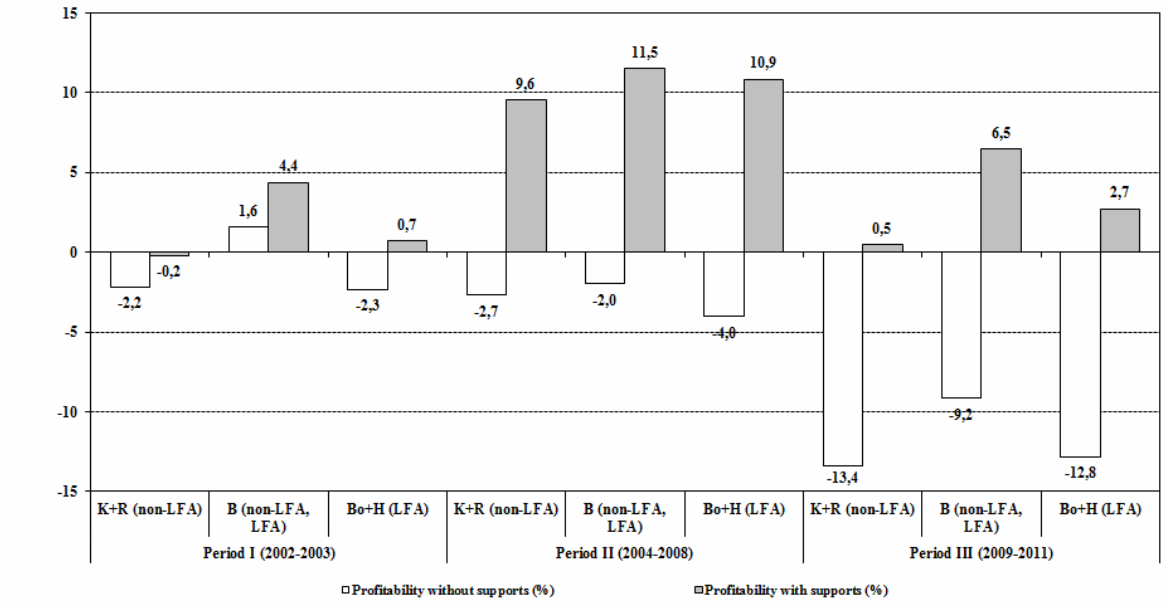

Figure 2. Regional profitability development of milk production

Source: Annual inquiry about costs and intensity of agricultural products of legal enterprises (VÚZE); own estimation of the period III; own calculations

4. Conclusions

In the period I was profitability of milk production without supports (R-S) slightly negative. There was proved that profitability with supports (R+S) changed to positive values, but near level of break point.

In the period II the profitability R-S stayed negative. In connection with the membership of CR in EU agricultural supports expressively have grown up as the consequence of applying of CAP on the Czech agriculture. Therefore there were monitored in the period II important change of the indicator profitability R+S for milk commodity. The positive profitability R+S in the period I has grown up in the period II.

In the period III it was reached the significantly less economic effectiveness (R-S) of the milk production (increasing negative profitability) than the period II, mainly in a consequence of the important decrease of milk price and increase of costs.

The influence of supports has shown in the profitability R+S, which in the period III in spite of growth total supports per head practically only suppress loss.

As a summary of findings in this paper we can state that the profitability (R-S) of milk commodity has been worse, but the profitability (R+S) has been improving for the time horizon 2002-2011. This proves the positive influence of the CR accession to the EU on the milk economics of the Czech agricultural sector. In connection with the membership of the CR in the EU agricultural supports significantly increased economics indicators in dairy sector as a result of application of the Common Agricultural Policy (CAP) on the Czech agriculture. Therefore there were monitored important positive changes of the indicator (R+S) for milk commodity in period II. In the connection with the decrease of producer prices and costs increase in period III (2009-2011) an important downgrade of this indicator was found. In the Czech Republic there were reached these milk production values of R+S in period I, resp. II and III: 2,1 %, resp. 10,8 and 3,8 %.

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