

Effect of Non-Investment Measures upon the Stability of Agricultural Enterprises in the South Bohemian Region

Jarmila Straková, Petra Pártlová, Jan Váchal

Institute of Technology and Business in České Budějovice

Abstract

The contribution deals with parametrization of multifunctional potential of enterprises with non-investment measures, including basic subsidy programs applicable in the programming period 2007 – 2013, using a set of agricultural enterprises in the South Bohemian region. Models of non-investment measures have been proposed, including basic subsidy programs, which have been, due to the expected increase of subsidies in 2014 – 2020, increased by coefficients in the interval 1.1 – 1.3. At the same time, we applied degression of the payments in three variants and based on the size category of the agricultural enterprise. The proposed models of non-investment measures investigated changes in solvency or financial health of the agricultural enterprises in 3 production categories typical for the South Bohemian region (mountain type, potato-oats type, potato type).

Key words: non-investment measures, multifunctionality, subsidies, enterprise solvency, financial health

Introduction

“Multifunctionality“, a significant element in the current agricultural policy, has been totally misunderstood in global discussions conducted in OECD by delegations from other continents. Initially, the term was difficult to explain and difficult to translate. It was only in 1998 when multifunctionality was included into the official language of the Organization for Economic Cooperation and Development (VÚZE, 2002). The concept has been understood differently by different authors. Miškolci (2005) generally defines multifunctionality as a characteristic of economic activity and in connection with agriculture it is perceived as multiple functions provided for by agricultural activity. Durand and Huylenbroeck (2003) deal with multifunctionality of agriculture in the context of association with multifunctional commodity and non-commodity outputs in agricultural production. Prestegard (2005) associates the multifunctionality concept

also with the function of national food security, benefits for the environment and sustainability of rural regions. Van der Ploeg and Roep (2003) describe multifunctional agriculture as multiple activities. Recent conceptual models of multifunctional agriculture stress the potential of processes from the bottom up and links between social and environmental systems that support multifunctionality (Manson and al. 2016).

Seják, Dejmal and Cudlínová, (2005), Hrabánková et al. (2007) describe two basic opinion groups in respect to multifunctionality. On one side there are USA and other countries promoting free trade (Australia, New Zealand, South Africa, Canada and the biggest exporters from Latin America and countries in Southeast Asia) and holding the opinion that multifunctionality of agriculture is already included in the concept of sustainable agriculture and therefore it should not be used to justify additional national interventions and subsidies in agriculture. On the other side, there is a group of countries that recognize multifunctionality of agriculture and the need to respect values such as healthy food, biodiversity of landscape, cultural heritage, respect to clean environment and sustainable rural living (EU, Japan, Korea, Island, Norway, Switzerland and many other countries). In order to understand decision of the farmers it is very important to take into account the type of multifunctional activity, type of agricultural enterprise and its location (Hassink, Agricola a Thissen 2016).

In a liberalized system multifunctionality evokes the question how the activities should be evaluated and how non-market function of agriculture should be included into the gross national product because market prices of agricultural products do not encompass activities associated with multifunctionality of agriculture. The program of “Rural development” offers suitable methods to effectively and in an integrated manner complement classical tools of agricultural policy and, particularly, to ensure multifunctionality in key categories (McLaughlin and Mineau 1995).

In the Czech Republic the need of multifunctional agriculture is recognized in the official agricultural policy and it is included in the overall concept of the economic policy. According to the Concept of Agrarian Policy of the Czech Republic, multifunctional agriculture is agriculture which, apart from traditional commodities (private goods) allocated by the market, produces also the so-called non-commodity outputs (Concept of Agrarian Policy 2004). The objective of multifunctional agriculture is to ensure sustainable development of countryside in integration with agriculture, forest and water management and thus to achieve adaptation of the Czech agriculture to the European model through multifunctional competitive agriculture and forest management in the regional scope, while improving quality of rural infrastructure (Váchalová et al. 2003).

A multifunctional character of agriculture undoubtedly contributes to the sustainability objectives, particularly through its social-economic and environmental functions (Pillariseti, Lawrey and Ahmad 2013). Research efforts seeking to support development of policies for multifunctional agriculture cannot focus on filling of gaps in knowledge

and technologies but they should concentrate mainly on the process of knowledge utilization (Rossing et al. 2007).

To assess the financial health of companies there is (alongside the financial analysis) a big number of variety of methods, approaches and tools that enable a comprehensive view of business performance (Kislingerová 2007, Froněk, Jelinek and Medonos 2007). Gurčík (2002), Chrastinová (1998), Kopta (2006), Novák (2008) are some of the authors dealing with an objective evaluation of financial-economic situation of agricultural enterprises. Also the research teams from research institutes such as ÚZEI can be mentioned. Novák (2008) states that the objective evaluation of the financial-economic situation of agricultural enterprises requires finding a suitable method that would respect interrelationships among the factors determining this level as much as possible, both in short and long terms. For a comprehensive assessment of business he proposes five-financial and five non-financial indicators respecting the specificities of agricultural production, namely financial indicators (capital returns, cost profitability, level of indebtedness, current liquidity, turnover of total assets) and non-financial indicators (quality of the management, used production technologies and equipment, the structure of production, ownership structure and enterprise relationship to the environment, surroundings and society). Rating using so called non-financial indicators is subjective, however, according to Novak (2008) it represents a more comprehensive and structured look at various aspects of agricultural enterprises.

Kopta (2006), in his contribution to the research project MSM 6007665806, discussed methods of prediction of financial distress of agricultural enterprises and the level of their meaningful level. The research shows that the appropriate index from the group of bonity or bonity-proprietary indicators achieving a better explanatory power is Gurčík 's index, whose composition of used ratios reflects the specifics of agricultural enterprises better. Out of the bankruptcy indicators the index of financial health under the operational programme whose success in identifying bankrupting enterprises amounted to 73 % seems to be appropriate. The causes of the failure of the other indexes according to Kopta (2006) are related mainly to:

- agricultural production specifics (dependency on natural conditions, variability of input prices, etc., which causes typical especially for businesses producing in low-lying areas, focusing more on crop production),
- improper composition of financial indicators not reflecting the specifics of agricultural production (this cause can be solved by adjusting the weights assigned to individual indicators),
- construction of individual indexes (use of non-standardized partial indicators), (Kopta 2006).

In early 2012 the agency of ČEKIA (based on the rating) noted that business in the agricultural sector still belongs to the riskiest in our country. They said that almost every second company (48.8 %) operating in agriculture is endangered by bankruptcy and that decline threatens 123 % other firms. Reactions of professional

public on these published results were quite critical. Havel (2012) following these results literally said that "rating based on a compilation unilaterally arranged negative media data has absolutely no meaningful potential". He stressed that in 2011 the agriculture of the Czech Republic reported the highest ever profit of about 13.5 billion CZK, mainly due to higher prices of most of major agricultural commodities. He said that farming is also the only sector which can annually count on considerable amounts of subsidies, the amount of which is about 35 billion CZK, which represents about a quarter million CZK converted a person. This condition certainly does not predict vision of bankruptcies.

Material and methods

The tested set included 452 agricultural enterprises from the South Bohemian region, all of them legal persons, which operate on most of the farming land in the South Bohemian region. For the testing purposes the enterprises were in cooperation with the Czech Statistical Office (ČSÚ) divided based on the prevailing character of their land into production districts typical for the South Bohemian region as follows:

- Mountain category (47 enterprises),
- Potato-oats category (83 enterprises),
- Potato category (166 enterprises),
- Beet category (3 enterprises).

After filtering off the data we eliminated enterprises in the beet category due to their low number, enterprises dealing mostly with non-agricultural activities and enterprises with insufficient economic data and data about the received subsidies that we needed for the analysis of their financial health in 2010; the final set consisted of 214 agricultural enterprises. In respect to subsidy programs we took into account basic subsidy programs applicable in the programming period 2007-2013 (i.e. payment from SAPS, LFA, agro-environmental measures, Natura 2000 and Top-Up). For the set of agricultural enterprises defined in this manner we have proposed models of non-investment measures, including applicable subsidy programs (agro-environmental measures), and we applied mathematical-statistical models to the tested group of 214 enterprises. Financial health of agricultural enterprises was then calculated using solvency models (solvency index, Gurčík's index).

As the subsidy programs are expected to increase in the following programming period in 2014 – 2020 the basic rates in the models were increased by coefficients 1.1, 1.2 and 1.3. At the same time, we applied degression of payments for the categories of enterprises with 500 - 1000 ha and over 1000 ha, in contrast with the anticipated increase of payments for the category of enterprises up to 500 ha. Based on the described adjustments we investigated how solvency of the enterprises changes in the individual production categories.

The agricultural enterprises (214) were divided based on the rate of tillage (0 - 20 %, 21 - 50 % and over 50 %) and multiplied with rates of the proposed subsidies for the corresponding category allocated to the given measure. With regard to the partial calculations of financial health with the selected solvency models (solvency index and Gurčík's index) it was necessary to adjust the indicators, such as total revenues with newly proposed subsidies, with the newly proposed agro-environmental measures and also with the price coefficient (average price index of agricultural production, including the price increase of the inputs in 2011 and 2012), but also the profit before tax. The following formulas indicate the adjustments:

$$Z' = V' - N$$

$$V' = (V - \text{Dot}_{\text{existing}}) * k_{\text{cen}} + \text{Dot}_{\text{newly proposed}}$$

where:

V' revenues adjusted with a price coefficient and change in the subsidies,

$\text{Dot}_{\text{existing}}$ subsidies - existing

$\text{Dot}_{\text{newly proposed}}$ subsidies – newly proposed

N costs

k_{cen} price coefficient (average price index of agricultural production, including the price increase of inputs in 2011 and 2012).

The proposed models of non-investment measures, including subsidy programs.

Mountain category

Tab. 1: Mountain category – variant 1 – Rate of tillage 0 - 20 % (59 % from the total category of agricultural land in this category)

Subsidy programs	Subsidy - 2012 CZK/ha	Coefficient		
		1.1	1.2	1.3
APS	5 387	5 925	6 464	7 003
LFA	4 213	4 634	5 055	5 476
Grassland, pastureland	2 824	3 106	3 388	3 671
Permanent grassland non- fertilized - ECO regime	4 602	5 062	5 522	5 982
Payment for ruminants	630	693	756	819
Payment for a born calf	1 400	1 540	1 680	1 820
Total CZK/ha	19 056	20 960	22 865	24 771

Source: Authors

Table 2: Mountain category - variant 2 - rate of tillage 21-50 % (36 % from the total category of agricultural land in this category)

Subsidy programs	Subsidy - 2012 CZK/ha	Coefficient		
		1.1	1.2	1.3
SAPS	5 387	5 925	6 464	7 003
LFA	4 213	4 634	5 055	5 476
Grassland, permanent grassland (meadows and pastureland)	2 358	2 594	2 830	3 065
Payment for ruminants	630	693	756	819
Payment for a born calf	1 400	1 540	1 680	1 820
Total CZK/ha	13 988	15 386	16 785	18 183

Source: Authors

Tab. 3: Mountain category - variant 3 - rate of tillage over 50 % (5 % from the total category of agricultural land in this category)

Subsidy programs	Subsidy - 2012 CZK/ha	Coefficient		
		1.1	1.2	1.3
SAPS	5 387	5 925	6 464	7 003
LFA	4 213	4 634	5 055	5 476
Grassland, permanent grassland (meadows and pastureland)	2 358	2 594	2 830	3 065
ECO - arable land	3 909	4 300	4 691	5 082
KTPM – cows kept in the system with market production of milk	1 399	1 538	1 678	1 818
Total CZK/ha	17 266	18 991	20 718	22 444

Source: Authors

Potato-oats category

Tab. 4: Potato-oats category - variant 1 - rate of tillage 0 - 20 % (8 % from the total category of agricultural land in this category)

Subsidy programs	Subsidy - 2012 CZK/ha	Coefficient		
		1.1	1.2	1.3
SAPS	5 387	5 925	6 464	7 003
LFA	4 213	4 634	5 055	5 476
Grassland, permanent grassland (meadows and pastureland)	2 358	2 594	2 830	3 065
Permanent grassland non-fertilized - ECO regime	4 602	5 062	5 522	5 982
Payment for ruminants	630	693	756	819
Payment for a born calf	1 400	1 540	1 680	1 820
Total CZK/ha	18 590	20 448	22 307	24 165

Source: Authors

Tab. 5: Potato-oats category - variant 2 - rate of tillage 21-50 % (5 % from the total category of agricultural land in this category)

Subsidy programs	Subsidy - 2012 CZK/ha	Coefficient		
		1.1	1.2	1.3
SAPS	5 387	5 925	6 464	7 003
LFA	4 213	4 634	5 055	5 476
Grassland, permanent grassland (meadows and pastureland)	2 358	2 594	2 830	3 065
KTPM – cows kept in the system with market production of milk	1 399	1 538	1 678	1 818
Total CZK/ha	13 357	14 691	16 027	17 362

Source: Authors

Tab. 6: Potato-oats category - variant 3 - rate of tillage over 50 % (87 % from the total category of agricultural land in this category)

Subsidy programs	Subsidy - 2012 CZK/ha	Coefficient		
		1.1	1.2	1.3
SAPS	5 387	5 925	6 464	7 003
LFA	4 213	4 634	5 055	5 476
Grassland, permanent grassland (meadows and pastureland)	2 358	2 594	2 830	3 065
EKO - arable land	3 909	4 300	4 691	5 082
KTPM – cows kept in the system with market production of milk	1 399	1 538	1 678	1 818
Bio-strips per ha of arable land	202	222	242	263
Intercrop per ha of arable land	262	288	314	341
Total CZK/ha	17 730	19 501	21 274	23 048

Source: Authors

Note: bio-strips , intercrops are related only to the category of arable land

Potato category

Tab. 7: Potato category - variant 1 - rate of tillage 0 - 20 % (2 % from the total category of agricultural land in this category)

Subsidy programs	Subsidy - 2012 CZK/ha	Coefficient		
		1.1	1.2	1.3
SAPS	5 387	5 925	6 464	7 003
LFA	4 213	4 634	5 055	5 476
Grassland, permanent grassland (meadows and pastureland)	2 358	2 594	2 830	3 065
Payment for ruminants	630	693	756	819
Payment for a born calf	1 400	1 540	1 680	1 820
Total CZK/ha	13 988	15 386	16 785	18 183

Source: Authors

Tab. 8: Potato category - variant 2 - rate of tillage 21-50 % (1 % from the total category of agricultural land in this category)

Subsidy programs	Subsidy - 2012 CZK/ha	Coefficient		
		1.1	1.2	1.3
SAPS	5 387	5 925	6 464	7 003
LFA	4 213	4 634	5 055	5 476
Grassland, permanent grassland (meadows and pastureland)	2 358	2 594	2 830	3 065
KTPM – cows kept in the system with market production of milk	1 399	1 538	1 678	1 818
Bio-strips per ha of arable land	202	222	242	263
Total CZK/ha	13 559	14 913	16 269	17 625

Source: Authors

Note: bio-strips, intercrops are related only to the category of arable land

Tab. 9: Potato category - variant 3 - rate of tillage over 50 % (97 % from the total category of agricultural land in this category)

Subsidy programs	Subsidy - 2012 CZK/ha	Coefficient		
		1.1	1.2	1.3
SAPS	5 387	5 925	6 464	7 003
LFA	4 213	4 634	5 055	5 476
Grassland, permanent grassland (meadows and pastureland)	2 358	2 594	2 830	3 065
KTPM – cows kept in the system with market production of milk	1 399	1 538	1 678	1 818
Payment for a calf of meat type	700	770	840	910
Bio-strips per ha of arable land	202	222	242	263
Intercrop per ha of arable land	262	288	314	341
Total CZK/ha	14 521	15 971	17 423	18 876

Source: Authors

Note: bio-strips, intercrops are related only to the category of arable land

Degression of payments in 3 variants and depending on the size of the agricultural enterprises.

Tab. 10: Degression type I

Size of the enterprise	Degression I (in %)
≤ 500 ha	0
500 - 1000 ha	- 5
> 1000 ha	- 10

Source: Authors

Tab. 11: Degression type II

Size of the enterprise	Degression II (in %)
≤ 500 ha	+ 15
500 - 1000 ha	- 10
> 1000 ha	- 15

Source: Authors

Tab. 12: Degression type III

Size of the enterprise	Degression III (in %)
≤ 500 ha	+ 20
500 - 1000 ha	- 20
> 1000 ha	- 20

Source: Authors

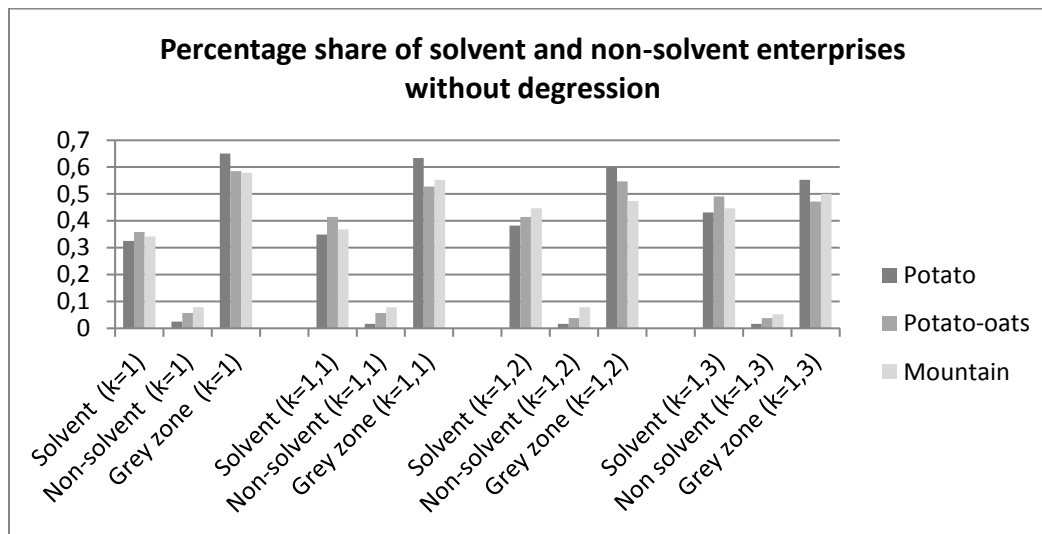
Results and discussion

The following results present application of degression and progression of the proposed models of non-investment measures on the individual production categories and their effect on financial health of agricultural enterprises (legal persons) with the use of solvency models (Gurčík's index and solvency index). The comparison figures have been developed at two basic levels:

- Modulation of the production potential of the enterprises with coefficients for increase of subsidies in the range 1.1 – 1.3, without and with application of size degression of the enterprises (comparison figures I),
- Modulation of the production potential of the enterprises as a result of degression in the range of degression I to III, with modulation of the variants with coefficients of subsidy increase 1.1 – 1.3.

Comparison figures I – without degression

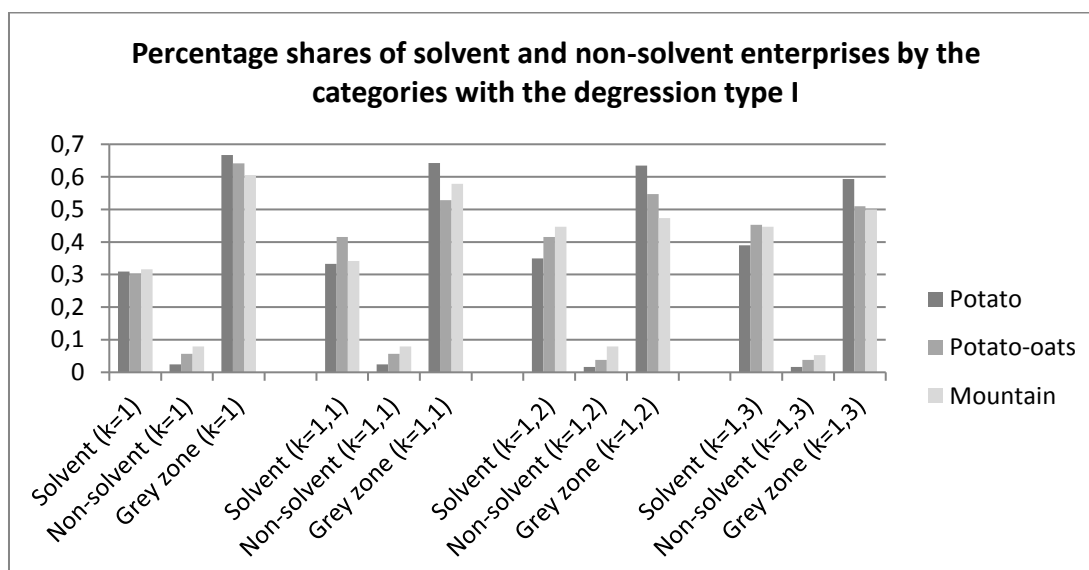
Figure 1: Comparison of percentage shares of solvent and non-solvent enterprises by the individual categories – without degression



Source: Authors

Results in the figure 1 indicate that the percentage share of solvent enterprises demonstrates a slight linear increase in relation to the coefficients 1.1 – 1.3 with a concurrent slight decrease of non-solvent enterprises, but with the opposite trend. The grey zone follows the trend of decreasing number of non-solvent enterprises. From the viewpoint of the modeled frequency of solvent and non-solvent enterprises without degression for the size of the enterprises, the most favorable variant is the one with $k=1.3$.

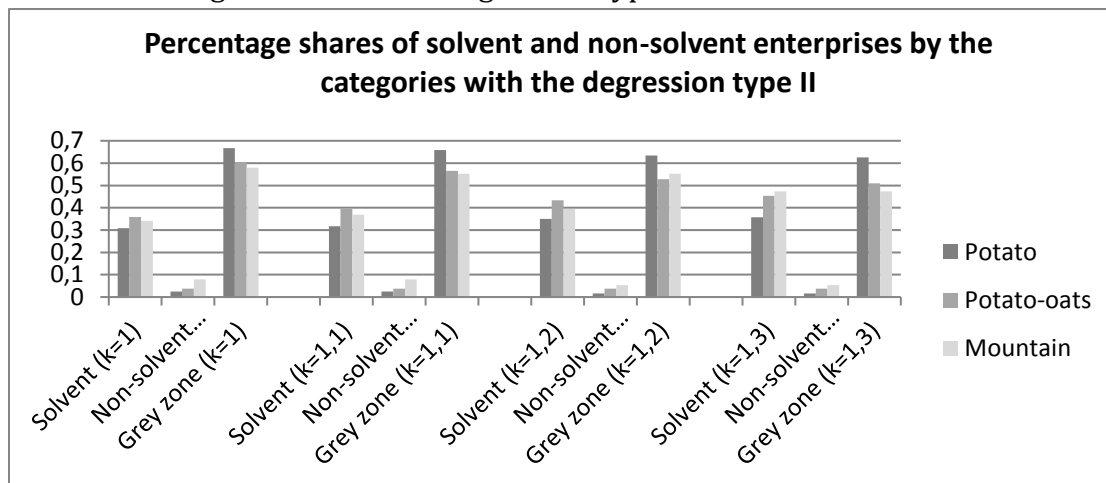
Figure 2: Comparison of percentage shares of solvent and non-solvent enterprises by the individual categories – with the degression type I



Source: Authors

Solvency results for the type I depression (Figure 2) indicate similar behavior for the set of the enterprises as the variant without depression, the only difference being that the increase of solvency of enterprises as a result of coefficient of subsidy increase (1.1 – 1.3) is more moderate, due to the depression applied for the medium and big enterprises (-5 to -10 %). From the viewpoint of the modeled frequency of solvent and non-solvent enterprises with the depression of type I for the size of the enterprises the most favorable variant is again that one with $k=1.3$.

Figure 3: Comparison percentage share of solvent and non-solvent enterprises by the individual categories – with the depression type II

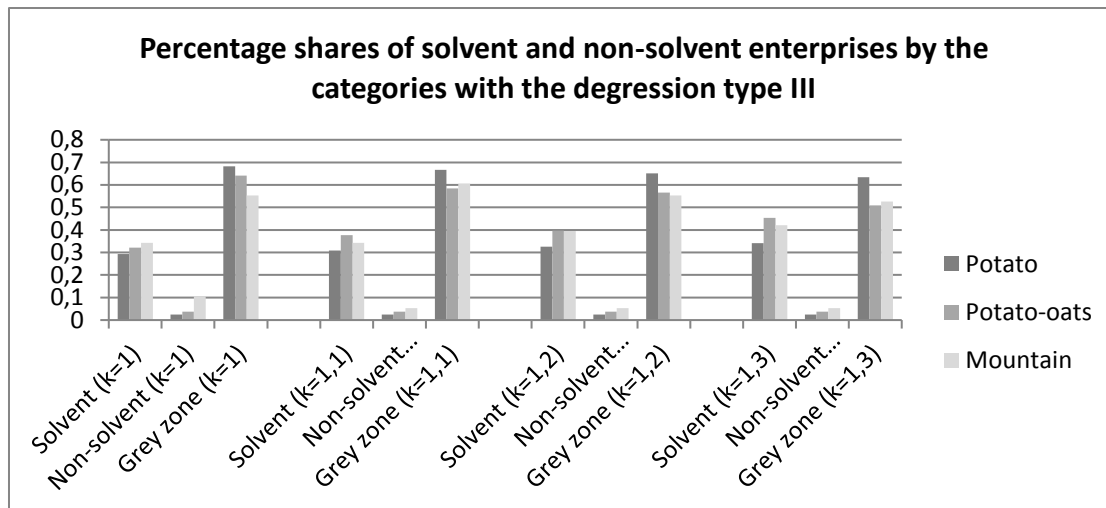


Source: Authors

Generally we can conclude that solvency results with the depression type II are similar to the two variants described above (see Figures 1 and 2), the only difference being that the increase of solvency of enterprises with the growing coefficients is even more moderate than in the previous cases as a result of the applied depression for medium and big enterprises (-10 to -15 %) with regard to their representation in the tested set of enterprises.

The type II depression, as shown by the Figure 3, can be in comparison with the other depression types identified as the most suitable variant with an effect on financial health of enterprises, nevertheless the expectation of significant increase of solvency for enterprises up to 500 ha has not been confirmed as the increase was 15 %; the explanation may be in the relatively low representation of enterprises in this size category in the tested set and also in the function of the enterprises, where their overheads, including administration costs, probably exceed their preferential terms of 15 % in the proposed models of non-investment measures, including subsidy programs. From the viewpoint of the modeled frequency of solvent and non-solvent enterprises with the type II depression for the size of the enterprises the most favorable variant is the one with $k=1.3$, equally as in the previous variants.

Figure 4: Comparison percentage shares of solvent and non-solvent enterprises by the individual categories – with the depression type III

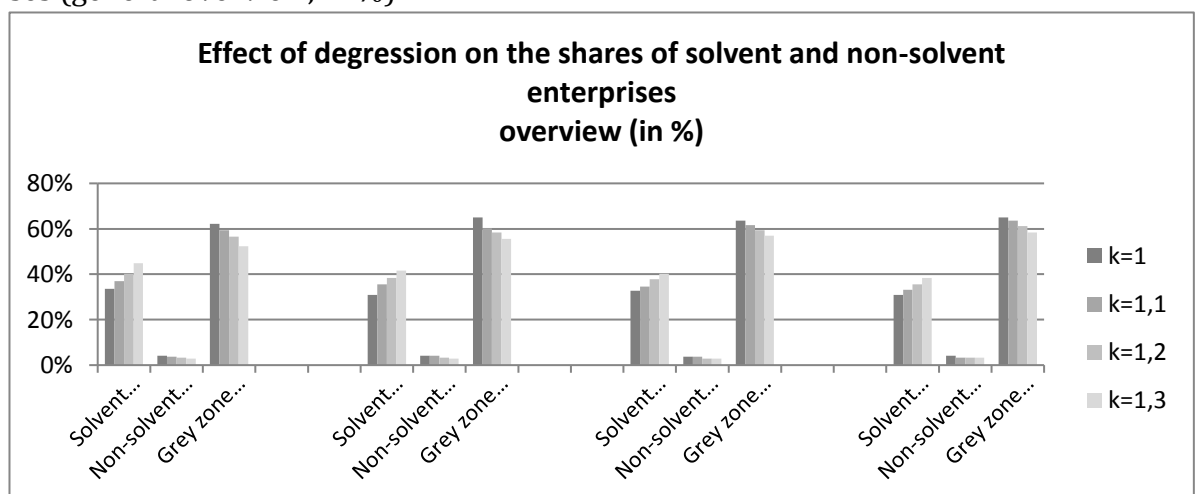


Source: Authors

For this type of depression the development trends of the financial health of the enterprises are similar, despite the significant preferential treatment of the enterprises up to 500 ha, specifically by 20 % for the proposed models of non-investment measures, including subsidy programs, with a concurrent significant reduction for the medium and big enterprises category, equally by 20 %. For the mountain category, with a slight prevalence of enterprises up to 500 ha, the solvency results were the same as in the previous case, nevertheless the increase or decrease of solvency in comparison with the variant $k=1$ was the least distinct in this category in comparison with the other categories, with regard to the slight prevalence of enterprises up to 500 ha. From the viewpoint of the modeled frequency of solvent and non-solvent enterprises with the type III depression for the size of the enterprises the most favorable variant is the one with $k=1.3$.

Comparative summary Figure II

Figure 5: Effect of the depression on frequencies of solvent and non-solvent enterprises (general overview, in %)



Source: Authors

The following can be concluded from the overall testing of the effect of degression for the size of enterprises on their production potential using the coefficients 1.1 – 1.3, as documented in Figure 5.

The biggest number of solvent enterprises was found for the basic variant, which is an expected result because in this case no degression for the size was applied and only the subsidy programs were increased by the coefficients 1.1 – 1.3.

For the type II degression there was a positive combination of the size categories of enterprises, particularly for the mountain and potato-oats production categories, which have a higher representation of enterprises up to 500 ha than in the potato category.

A question arises about suitability of size degression when planning new subsidy programs for the new programming period; it is not possible to draw general conclusions but we can guess that it is necessary to use a differentiated approach in case of any type of degression based on the production categories and percentage representation of the individual size categories of enterprises.

Conclusions

The following measures can be concluded from the results:

- The necessity of subsidy programs for stability of agricultural enterprises in the investigated production categories has been positively confirmed.
- The implementation of subsidy programs in the set of enterprises suggests that the proposed models correspond to real needs of enterprises operating in the individual production categories.
- The application of subsidy models with increase of coefficients (1.1 – 1.3) in the tested set of enterprises has shown the principal effect of their targeted allocation in comparison with their size (it was not demonstrated that a higher subsidy automatically improves financial health of an enterprise).
- The dominant payments from the entire subsidy system and non-investment agro-environmental measures are payments per area, as they address the enterprise as a whole and they address its natural, i.e. the basic, production potential, which turns out to be the central precondition of the overall prosperity and sustainability of the enterprise.
- In general we can conclude that the increasing of subsidy models with the coefficients 1.1 to 1.3 resulted in a slight linear increase of solvency; in the potato and potato-oats categories this effect was not so conclusive, probably due to the higher intensity of farming. It is very probable that there will be a higher impact of the factor of input/ output prices in the agricultural production.
- From the viewpoint of size degression we can make a general conclusion that modulation of this prepared preferential treatment of enterprises up to 500 ha did not bring positive results and again it has shown the necessity to focus on production categories and not to allocate subsidies without differentiation in terms territorial and soil-environmental aspects.

- The application of size depression most strongly indicates the grey zone which can be explained by the already mentioned necessity of structural changes in agricultural enterprises and correction of the ratio of inputs and outputs.
- The model verification suggests a potential negative effect of size depression on development of animal husbandry. Managers of family farms and of some legal persons also expressed their opinions to the effect they may limit animal husbandry as a result of the disadvantaged position of the farms over 500 ha, as their overheads are the highest and the ratio of input/output prices is the least profitable.
- Generally we can conclude that the size depression may be effective as long as it is applied in a targeted and differentiated manner; the optimum variant was an increase of payments to enterprises up to 500 ha by 15 %, a reduction by 10 % for farms 500 - 1000 ha and a reduction by 15 % for farms over 1000 ha.
- The challenge faced by the Ministry of Agriculture of the Czech Republic, scientific community and by the farmers themselves is to consider the possibility to increase intensity of their activities in mountain and submontane categories. The fact is that in 1930s those categories had been used much more for landscape protection. Such considerations are quite realistic as documented by the economic system in the neighboring countries.
- The controlled interviews with managers of family farms (physical persons) have clearly indicted their requirement that a part of subsidy programs should be directed outside the primary agricultural production (to support multifunctional activities), e.g. to support trades, agrotourism, accommodation and development of human resources. They also made comments about the use of the subsidies, their potential abuse and the need of consequent and objective on-site inspection. It was proposed that subsidies should be directed into administration of their farms and into shared services, similarly as it is the case in the neighboring countries.

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Contact address of the authors:

Ing. Jarmila Straková, Ph.D., Department of Management, Faculty of Corporate Strategy, Institute of Technology and Business, Okružní 517/10, 370 01 České Budějovice, Czech Republic, e-mail: strakova@mail.vstecb.cz

Ing. Petra Pártlová, Ph.D., Department of Management, Faculty of Corporate Strategy, Institute of Technology and Business, Okružní 517/10, 370 01 České Budějovice, Czech Republic, e-mail: partlova@mail.vstecb.cz

prof. Ing. Jan Váchal, CSc., Department of Management, Faculty of Corporate Strategy, Institute of Technology and Business, Okružní 517/10, 370 01 České Budějovice, Czech Republic, e-mail: vachal@mail.vstecb.cz

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