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Ageing of farmers in the Czech Republic and the support from the EU funds

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Abstract

The age structure of managers of agricultural holdings is not favourable in the Czech Republic and follows the general trend of population ageing. The lack of young farmers represents a threat to generation renewal and the competitiveness of the sector, as younger farmers tend to be more open to innovation and more often learn new approaches to farming and business. Therefore, the European Union supports generation renewal through Common Agricultural Policy instruments – direct payments and investment subsidies from the Rural Development Programme. The aim of the paper is to assess the ageing of the farm manager population and to evaluate whether the support from the EU is well targeted on the regional level based on correlation analysis. Using statistical and administrative data, we find that the subsidies from the Rural Development Programme in the year 2016 were granted in line with the seriousness of the ageing problem. When there was a larger share of older farmers in a region, the share of young farmers supported was larger. Vice versa, the correlation coefficient between the share of supported farmers and the share of young farmers in the region is negative, meaning that the greater was the share of young farmers, the smaller was the share of supported farmers.

Keywords

Common Agricultural Policy, European Union, Rural Development Programme, subsidies, young farmers.

JEL Classification: Q18, H25, J11

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1. Introduction

The age structure of managers of agricultural holdings is not favourable in the Czech Republic (CR) and follows the general trend of population ageing. The lack of young farmers represents a threat to generation renewal and the competitiveness of the sector, as younger farmers tend to be more open to innovation and more often learn new approaches to farming and business. Despite the analysis of farm business data performed by Davis et al. (2009) not revealing any significant differences in farmers' performance related to age, younger farmers have a longer planning horizon and tend to invest more heavily in business growth than comparable older farmers. Besides, younger farmers are more likely to expand their production than their older counterparts, as shown by Francksen et al. (2012) in the case of German dairy farms. In addition, farmers who are open to sustainable agricultural practices, such as organic farming, tend to be younger (Lobley et al., 2009). Gryčová (2013) found a positive relationship between the number of young farmers, the gross agricultural product and labour productivity and the amount of subsidies devoted to them. Young farmers also seem to be more technically efficient than older farmers, although not statistically significantly (Pechrová, 2015).

However, generation renewal in agriculture is difficult. Carbone and Subioli (2008) found that the ageing of farm holders is caused by many different factors, among which the most important are the presence of entry barriers and exit barriers, the persistent low level of factor productivity in agriculture and the inter-sectoral labour force movements in the intermediate age classes. The barriers that hinder the transfer of farms from older generations to younger ones are of an administrative and legal character as well as being related to the personal features and motivation of young persons (Šimpachová Pechrová, 2017). The initial motivator to enter agriculture for young people and new entrants to the sector is often the knowledge obtained from family members, and Šūmane et al. (2018) declared that there are certain barriers that hinder the practical entrance to the sector. Certain socioeconomic factors, such as difficult access to land and credit and a lack of rural infrastructure, drive young people away from a career in the agrarian sector (Rovný, 2016). Besides, as found by Zagata and Sutherland (2015), there is a problem of limited opportunities for young people to access agricultural land, particularly in Eastern Europe. Among the intrinsic factors, willingness to continue farming or enter the sector also plays a role. Agriculture might not be seen as attractive by some graduates, even those from agricultural schools. To attract young people into agriculture, it is also important to implement new technologies, support agricultural education and present agriculture positively in the media (Hosnedlová, 2018).

For those reasons, generation renewal has also been supported by sources of the Common Agricultural Policy (CAP) of the European Union (EU) since the MacSharry reform in 1992 (through the early retirement measure).

For policy purposes, a young farmer is considered to be either a natural person who owns or establishes a holding as its manager, who is not more than 40 years old, or a legal entity that is owned in the majority by a young farmer who performs effective and long-term control over management decisions, profits and financial risks (such as a majority shareholder). The CAP currently constitutes two pillars. From the first pillar, there is a special claimable payment additional to the single area payment of as much as 25% of the first 90 hectares for the first 5 years since the foundation of the business. The measure for the *setting up of young farmers' businesses* of the Rural Development Programme provides investment support of up to 70 thousand hectares for a young farmer starting up a business and is provided based on the business plan. The RDP measure *setting up young farmers* aims to fight the demographic problems of these areas (Bournaris et al., 2016). Unlike the situation in previous and current programming periods, it will not be possible to finance early retirement after 2020.

The aim of the paper is to assess the ageing of the farm manager population and to assess whether the support from the EU is well targeted on the regional level in the CR. The next section describes the data and methods. The results section characterizes the problem of the ageing of farmers on the regional level in the CR and the support provided. The findings are discussed in the context of other research on the efficiency and targeting of the policy. The last section concludes.

2. Data and Methods

The general description of the generation renewal problem is based on Eurostat (2018) data from the Farm Structure Survey (FSS). However, the data are not fully comparable, as the methodology has changed. In 2010, an agro-census survey started to take into account only farms with acreage over 5 ha, while previously farms with over 1 ha had been considered. Hence, we use data from the year 2010 onwards. Besides, data for farmers in the age category 35 to 39 years are available only since June 2018, and it is not possible to describe the development of young farmers aged under 40 years before then. The last FSS took place in 2016; hence, we compare the statistical data with the corresponding administrative data from the year 2016.

The data about subsidies were provided by the Ministry of Agriculture from the information system of the State Agricultural Interventional Fund as of March 2018 for the second and fourth rounds of calls for subsidies. However, only for the second round, which took place in 2016, are complete data available. The third round occurred in 2018, but the final results are not available yet. We took into account only the agreed projects eligible for financing in the second round of calls. Hence, we can compare data from the same year, 2016.

First, the size of the problem of farm managers' ageing on the regional NUTS 2 level – cohesion regions in the Czech Republic – is described statistically. The magnitude of the problem is assessed based on the indicators of the share of young farmers and old farmers in the total population and the ratio of old (older than 65 years) to young farmers (under 40 years). The holdings of young farmers are characterized based on the acreage of utilized agricultural land (UAA), the number of livestock units (LU), the standard output (SO) in euros and the labour force directly employed on a farm (number of annual work units (AWUs)).

Second, the support provided by the CAP is described. The main focus is on subsidies from the RDP, as direct payment data are not available on the regional level. We describe the data for the year 2016 that are comparable to the Eurostat data. Whether there was a relationship between the share of young farmers in the regions and the number of subsidized farmers and between the young to old farmer ratio and the number of supported farmers is assessed by correlation analysis. We use the Pearson correlation coefficient (r), which determines the direction and magnitude of the linear statistical dependence of two numeric variables. It takes values from -1 to 1, which means perfect correlation. The closer the value is to zero, the weaker the linear dependence is. It is calculated as (1):

$$r_{xy} = r_{yx} = \frac{s_{xy}}{s_x s_y}, \tag{1}$$

where s_{xy} is the standard deviation of the multiplied values of variable x and variable y, s_x is the standard deviation for variable x and s_y is that for variable y.

The advantage of the coefficient is that it shows the magnitude of the relation and independence of the units. When the order of variables changes, the correlation coefficient remains the same. On the other hand, the disadvantage is that it does not express the functional relation between the variables; it only indicates whether there is a linear relation. In addition, the relation might not be linear. Besides, it is valid only in the range of the data used.

Nevertheless, there are not many other instruments that would show whether the financial means are proportional to the needs of the region. Only regression analysis would be possible, but multinomial regression would require more explanatory variables and more data.

3. Results

The ageing of farmers is a phenomenon that follows the general trend of ageing. While 11.7% of farmers were aged under 35 years in 2010, this figure was only 4.6% in 2013 and 4.4% in 2016. The steepest decrease is noticeable in the North West region (in 2010, 13.7% of farmers in the region were young, but the share was only 4.0% in 2016). The decrease in the Moravian Silesian region was also significant. The situation did not change for Prague, where there were no young farmers at all. Otherwise, a decline in the number and the share of young farmers in the total number of farmers in the region was apparent. On the other hand, the share of farmers older than 65 years increased from 12.8% in 2010 to 23.0% in 2013 and 26.8% in 2016 in the CR. The largest increase happened in the North West region (while 9.7% of farmers in the region were older than 65 years, in 2016, this figure was already 31.8%) and the Moravian Silesian region (from 12.3% to 27.6% between 2010 and 2016).

The ratio of young farmers (under 35 in 2010 and 2013; under 40 years in 2016) to old farmers (65 and over) is displayed in Figure 1 for the year 2016. There were 1.1 old farmers for every farmer under 35 years in 2010, but in 2013 this figure was already 5 and in 2016 it was 6.6. If we take into account farmers younger than 40 years, there were 2.6 older than 40 for every younger one. The worst situation was in the South West and North East regions, when there were 1.2 old farmers for every farmer younger than 35 in 2010. The situation worsened later – there were 4.7 and 5.3 old farmers per young farmer in 2013 and 5.2 and 5.9 in 2016. However, the worst situation occurred in the South East region in 2013 – there were 6 old farmers for 1 young one. The situation was also critical in 2016, when there

were 8.5 old farmers per young farmer. On the other hand, the best situation was apparent in the North West region in 2013, with only 0.7 old per young farmer, and the figures were 4.1 in Middle Moravia in 2013 and 5.1 in the South West region in 2016. Taking into account farmers under 40 years of age, the state is not particularly bad – the share increased from 2.2 in Middle Moravia to 3.3 in the South East in 2016.

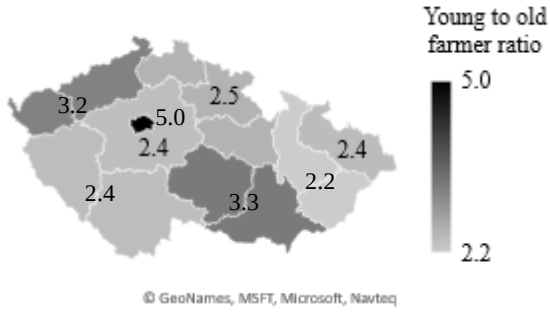

Figure 1 Young (under 40 years) to old (65 years and above) farmers in 2016; source: own elaboration

The share of UAA managed by young farmers under 35 decreased from 6.9% in 2010 to 5.0% in 2013 and to 3.1% in 2016. Not surprisingly, the largest share was in the Moravia Silesia region (10.5%), where 14.2% of farmers were under 35 in 2010. However, with the decrease in the number of young farmers, the share also decreased and was only 3.2% in 2013 and 2.1% in 2016. On the other hand, the largest share of land was managed by young farmers in the South East (5.6% in 2013) and the North West (4.6%) in 2016. If we consider the farmers aged under 40 years, they managed 11.9% of the total land in the CR, 13.3% in the North East and 13.2% in the South West and North West. The smallest share was in Moravia Silesia (8.6%). In addition, the average farm size decreased in this region (from 99.5 ha to 70.7 ha). In Middle Moravia, the average size of the holding decreased (from 85.9 ha to 44.5 ha). In other regions, the size increased, as it did in the whole CR. The largest farms managed by farmers aged under 40 years were in the North West region (201.7 ha on average), and the smallest were in Moravia Silesia (79.4 ha). On average, the farms of younger farmers were larger (151.4 ha) than the CR's average (130.2 ha).

Regarding the size measured in LUs, there was an increase only between 2010 and 2013, but then the young farmers reduced the livestock production. While 1 farm had 33.1 LUs in 2010, in 2013 the number was 65.4 LUs, but in 2016 it was only 47.9 LUs. This type of development was noted in the majority of regions; only in the North West and South West regions was there an increase in all the years. Considering farmers aged under 40 years, 1 farm had 79.5 LUs on average, while most of the LUs were on farms in Middle Bohemia (125.7) and the South East region (86.5).

It is positive that the size of holdings in terms of SO increased – while it was EUR 81.9 thousand in 2010, it was already EUR 166.3 thousand in 2013, but it decreased again in 2016 to EUR 134.8 thousand. This development was noted in the North East, South East and Middle Moravia regions. In Moravia Silesia, the average SO per farm decreased over the whole period (from EUR 113.3 thousand in 2010 to EUR 22.4 thousand in 2016). In 2016, the highest average SO was produced by farms in Middle Bohemia (EUR 351.1 thousand), then in Prague (EUR 350.0 thousand) and in the South East (EUR 297.5 thousand).

Young farmers employed on average 2.4 AWUs in 2010, then 3.5 in 2013 and in 2016 only 2.9 AWUs. The highest average numbers can be noted in Moravia Silesia in 2010 (3.5 AWUs per holding) and Middle Moravia (4.3 AWUs) and the South East (4.0 AWUs) in 2013 and in the South West in 2016 (3.9 AWUs). In 2016, the number of AWUs employed on the farms of young farmers was close to the CR average (4.0 AWUs in comparison with 3.9 AWUs). The highest employment rate was in Middle Bohemia (5.4 AWUs) and the lowest in Moravia Silesia (2.3 AWUs).

We can conclude that the worst generation renewal situation is in the South East region (only 8.1% of farmers under 40 years and 27.0% over 60 years). The farms of young farmers are larger in terms of the average acreage, number of LUs, SO and number of AWUs. The largest farms are in Middle Bohemia and the smallest in Moravia Silesia.

3.1 Distribution of the support for young farmers

Regarding the direct payments, no data are available on the regional level, so only total amounts can be assessed. The rate of additional support for young farmers was CZK 885 (25% from Single Area Payment Scheme (SAPS) that was CZK 3 543) in the year 2015 and CZK 878 (25% from CZK 3 514) in the year 2016, and the lowest was in 2017, only CZK 844 in addition to CZK 3 375 of SAPS. In 2015, 3 890 farms were supported, which represented 77 650 ha. In later years, the number of applicants was much higher (4 273 and 84 475 ha and 4 289 and 84 364 ha, respectively). Hence, the average supported acreage was around 20 ha in all the years. The total paid amount of subsidies was CZK 68.2 million in 2015, CZK 74.2 million in 2016 and CZK 71.2 million in 2017.

Regarding the RDP, between 2007 and 2013, more than 126 000 young farmers in the EU received financial assistance to start operations on their farms, a total amount of EUR 3.65 billion (ENRD, 2014). In the CR, 1 351 projects were repaid during the period.

Currently, over 600 projects have been approved, but only a few of them have been repaid. There were 3 rounds of calls for subsidies in which support for the *setting up of young farmers' businesses* was provided – the second, fourth and sixth rounds. Almost all the finance allocated has already been exploited.

We focus on the second round, which took place in 2016, and compare it with the data about young farmers in the same year. The shares of farmers supported by the RDP to the total number of farmers in the region are displayed in Figure 2 (the numbers are for NUTS 2 regions).

In line with the total number of agricultural entities in the Czech Republic, most beneficiaries come from the South East region (147), as it is the second region in terms of the number of young farmers, then the South West (89) and North West (81) regions. On the other hand, naturally the fewest were from Prague (9), then Moravia Silesia (45) and Middle Moravia (50). If we compare the number of supported farmers with the total number of young farmers, we can say that, on the national level, 20% of them were supported (543 of 2710) in the year 2016. However, the rate varied. In Prague, there were only 10 farmers aged under 40 years (according to the criterion of having more than 5 ha of land), and 9 of them were supported. Despite the majority of supported farmers being from the South East, only 28.8% of them were supported. On the other hand, in the North West, 40.5% of all young farmers succeeded in obtaining support.

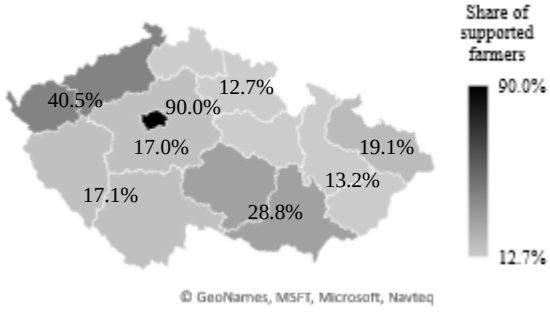

Figure 2 Share of farmers supported by the RDP in 2016; source: own elaboration

Hence, as can be seen from Figure 3, the highest amount of subsidies in absolute terms was granted to farms in the South East region (CZK 183.8 million) and the South West region (CZK 111.3 million) and the lowest to Moravia Silesia (CZK 52.5 million).

The highest average value of a project was in Middle Bohemia and the South East (CZK 2.45 million per project). The lowest was in Middle Moravia (CZK 2.13 million per project).

The total eligible costs out of which the subsidy is set are, in the vast majority, above the limit of CZK 1 250 000, which means that the support from the measure brings other expenses realized from foreign or own resources. The beneficiaries make additional investments, on average once, as high as the subsidy. For every 1 CZK invested from public sources, there was an additional CZK 0.85 from private sources. The highest investments were made in the South East, Middle Bohemia (in both, 1 CZK of public resources generated CZK 0.95 of private capital) and North East regions (CZK 0.84). On the other hand, the smallest were invested in Middle Moravia (CZK 0.70), Prague (CZK 0.78) and Moravia Silesia (CZK 0.81).

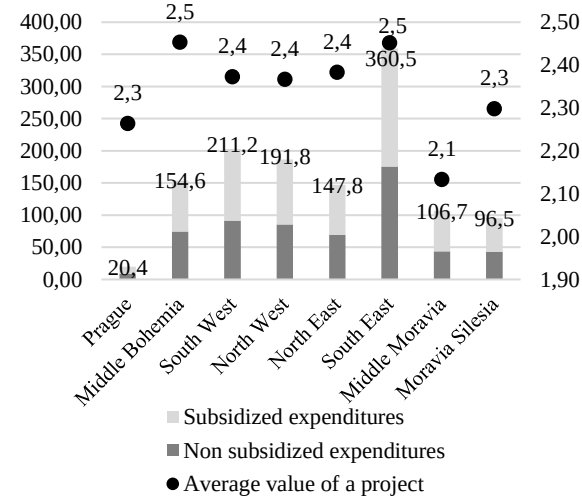

Figure 3 Value of subsidized and non-subsidized expenditures and total value of expenditures; source: own elaboration

If we compare the seriousness of the ageing situation in the regions with the number of supported farmers, we can see that the situation in Prague was the worst, and the share of supported farmers was the largest. In the North West, there were 3.2 old farmers per young farmer, so supporting 40.5% seems to be justified. However, a slightly worse situation occurred in the South East region (3.3 old farmers per young farmer), but the rate of supported farmers was only 28.8%.

Similarly, the smallest share of young farmers was in Prague (7.7%), and the rate of supported farmers was high. The second smallest was in the South East region (8.1%), but the support rate was the third highest (28.8%). The second-largest share of supported farms was in the North West region, where the share of young farmers was not as serious (10.0%).

The correlation coefficient between the share of young to old people and the share of supported farmers is positive and close to 1 (0.98), which points to a strong correlation. It means that, when there is a larger share of older farmers in the region, the share of supported young farmers is larger. Vice versa, the correlation coefficient between the share of supported farmers and

the share of young farmers in the region is negative (-0.78). This means that the larger the share of young farmers, the smaller the share of supported farmers. We can conclude that the distribution of public financial means corresponds to the seriousness of the ageing problem (at least in the year 2016).

Regarding the financing situation during both programming periods displayed in Figure 4, 2007–2014 and 2014–2020, we can see that the number of young farmers was continuously decreasing independently of the number of repaid projects. At the beginning of the programming period in 2007, the number of repaid projects was increasing every year, but it decreased after 2009. In 2012, only 47 projects were repaid, due to a lack of finance. Then there was a gap before the new programming period started. Currently, after three rounds of calls for subsidies, the financial allocation is almost over. The majority of projects will be financed at the beginning in 2016, and a lack of finance can be expected at the end of the period.

The decrease in the number of farmers aged under 35 years is also caused by the methodological change, so the data for 2005, 2007 and other years are not fully comparable. Starting in 2010, only farmers with more than 5 ha are taken into account by the Czech Statistical Office (CZSO). We can assume that the situation is not critical, as there are still some farmers with smaller farms.

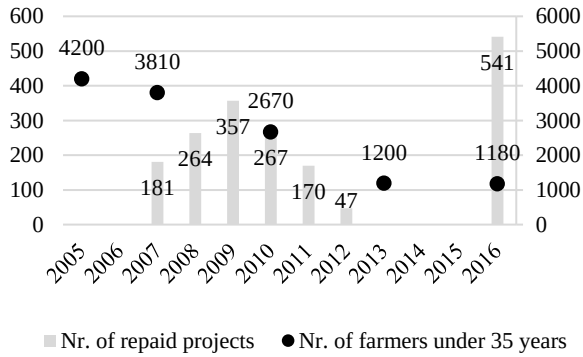

Figure 4 Number of repaid projects vs. number of farmers under 35 years; source: own elaboration

4. Discussion

Studies have assessed the distribution and allocation of subsidies among individual farms, regions or countries. For example, Kravcakova Vozarova and Kotulic (2016) sought the pattern in which the subsidies are distributed. They found statistically significant dependence between the amount of gross agricultural production and the volume of subsidies granted in the Slovak regions. Furthermore, the article by Sinabell et al. (2013) examined the concentration of direct payments in the EU 27 based on various concentration measures in the period from 2000 to 2010. First, they used the ratio between the mean and the median of payments as an indicator of unequal distribution. In the Czech Republic, the ratio between the mean and the median was relatively large, indicating that the distribution was considerably skewed. Second, they calculated the concentration ratio (similar to the Gini coefficient), which ranges from zero, indicating absolute equality (all holdings receive proportionally the same amount of direct payments) to one, showing absolute inequality (one holding receives all the direct payments). By the end of the period, the concentration of direct payments was relatively low in the Czech Republic. *It seems that country-specific factors determine the concentration of direct payments and its change over time* (Sinabell et al., 2013). Our results show that higher subsidies for young farmers are granted to the problematic regions, where the ageing of farmers is the worst. The subsidies are not distributed equally but according to the needs of the region (at least in the year 2016).

Amores and Contreras (2009) suggested that the subsidies should be allocated according to an efficiency score, which incorporates the positive and negative externalities of agricultural activity. They calculated efficiency through data envelopment analysis and set a score for each olive oil farm in Andalusia. However, the calculation of the efficiency score would be problematic here, as the farmers are only starting their business (it cannot have existed for longer than 2 years) and, if they do not take over or inherit the farm, it is probable that their performance will be less efficient than that of farmers who did not start from scratch. The subsidies' allocation would then prefer farmers who took over a functioning business.

Cong and Brady (2012) discussed ways to target the agricultural subsidy system according to equity and efficiency. They suggested several instruments as alternatives to the current subsidy system (the pure loan, the harvest tax and the income-contingent loan). The results of the research conducted by Rocchi (2009) outlined *the existence of a structural trade-off between targeting and equity in supporting Italian agriculture through payments to farms and suggest flexibility in the application of reformed payments [Health Check] according to different distributive features of agriculture in member countries*. Hence, targeting the payments is difficult.

The finances should be equally distributed and lead to the convergence of the states. Quiroga et al. (2017) assessed the effect of subsidies on technical efficiency in EU countries and the convergence in payments. They find out that, while, in some states, a certain type of subsidy reduces the technical efficiency of agricultural holdings, in other countries, the effect is positive. *In*

general, the CAP promotes technical efficiency convergence within Europe (Quiroga et al., 2017). It is questionable whether this also happens in the case of payments for young farmers. Due to a lack of comparable and continuous data about young farmers in previous years, it is not possible to calculate the coefficient of convergence for the regions. It will be a challenge for future research to obtain data from a register of agricultural entrepreneurs about young farmers in each year since the investment subsidies started to be provided.

5. Conclusion

The age structure of managers of agricultural holdings is not favourable in the Czech Republic and follows the general trend of population ageing. Agriculture appears unattractive to young graduates, and they often prefer other branches that they have studied. A lack of young farmers can be a threat to generation renewal and the competitiveness of the sector, as younger farmers tend to be more open to innovation and more often learn new approaches to farming and business. The EU is therefore trying to support generation renewal in agriculture. Instruments of the Common Agricultural Policy include direct payments and investment subsidies from the Rural Development Programme. The question is whether the subsidies are allocated equally in NUTS 2 regions of the CR or according to the seriousness of the ageing problem.

The aim of the paper was to assess the ageing of the farm manager population and to evaluate whether the support from the EU is well targeted on the regional level based on correlation analysis. Using statistical and administrative data, we found that the subsidies from the Rural Development Programme in the year 2016 were granted in line with the seriousness of the ageing problem. When there was a larger share of older farmers in a region (the worst situation was in the South East region – 3.3 old farmers for 1 under 40 years of age, with a share of young farmers of only 8.1%), the share of supported young farmers was larger (28.8% in this case). Vice versa, the correlation coefficient between the share of supported farmers and the share of young farmers in the region was negative, meaning that the larger was the share of young farmers, the smaller was the share of supported farmers. We can conclude that the subsidies are not distributed equally in all regions but according to the needs of the region (at least in the year 2016). The size of the subsidies corresponded to the seriousness of the problem of generation renewal.

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