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Simulation of the impacts of the proposed direct payment scheme – The case of the Czech Republic

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Abstract: The draft Strategic plan of the Common Agricultural Policy (CAP) for the Czech Republic has provoked the displeasure of many entrepreneurs in agriculture due to the redistributive payments, to which 23% of the total volume of direct payments will be directed instead of the originally planned 10%. According to the creators of the Strategic plan, this should support the fairer distribution of payments, respecting the benefits arising from the scale of production of large companies. Critics of the plan claim that operating subsidies are already degressive and fear an adverse impact on medium-sized companies, which, given the structure of the companies in the Czech Republic, will affect a large part of agriculture. This article aims to identify the farm size for which direct payments will be reduced and the likely degree of the impact on the farm economy. Our results suggest that the new payment system will lead to a reduction in direct payments for farms larger than 313 ha and, from a farm size of 873 ha, direct payments will fall below 85% of the average, which may cover around 50% of the agricultural land in the Czech Republic.

Keywords: acreage; breakpoint; direct payments; subsidies; profitability

The new Common Agricultural Policy (CAP) for 2023–2027 will be based on a new policy implementation model that moves 'from compliance to performance'. Under this model, Member States will have increased subsidiarity in the planning and implementation of the CAP (Kremmydas and Tsiboukas 2022). As a key novelty of the new CAP, Member States have to dedicate at least 10% of their financial allocation for direct payments to the redistributive income support tool to increase payments received by smaller and medium-sized farms. At the same time, however, the new CAP continues to reduce differences in the unitary level of direct payments within Member States. All basic income support payments on a Member State's territory must have a per-hectare value of at least 85% of the national average by 2026 (EC 2022).

The draft Strategic plan of the CAP for the Czech Republic, published by the Ministry of Agriculture in January 2022 (EC 2022), contains a significant change compared to previous versions. This concerns

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a redistributive payment, to which 23% of the total volume of direct payments will be directed elsewhere instead of the originally planned 10%. Critics of the government's plan from the ranks of agricultural organisations are primarily concerned about shifting a significant amount of funds from livestock production and demanding crops to field production. In addition, they point to the likely formal division of larger companies to obtain more subsidies. Figure 1 provides an overview of the amount of the redistribution rate in other European Union (EU) states.

Representatives of the Agrarian Chamber of the Czech Republic (ACCR) and the Agricultural Union of the Czech Republic warned that the current setting would lead to further growth in food prices and reduced production. They point out that the current setting of the subsidy policy will seriously endanger the production of some foods, mainly animal production. Proponents of the change say the redistribution will only affect a few of the largest farmers. According to critics, the change will affect a large number of medium-sized and larger companies, the leading food producers in the Czech Republic. In addition, they point out that, in other EU countries, the share of redistributive payments is around 12% or 13%, and Czech farmers will not be able to compete with them.

According to the European Commission (EC), the agricultural policy should be in line with national conditions and reflect the conflict in Ukraine, which has led to a sharp rise in agricultural commodity prices. According to most specialised breeding, cultivation or processing organisations, the government approaches the issue of setting subsidies counterproductively and passively. In the future, many Czech households will face food poverty and the current energy poverty.

Theoretical background. Since 2023 [EC 2021, Regulation (EU) 2021/2115 of the European Parliament and of the Council of December 2, 2021 establishing rules on support for strategic plans to be drawn up by Member States under the Common Agricultural Policy (CAP Strategic Plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD)], the CAP aims to increase environmental and climate performance, create the fairer distribution of direct payments between farms and improve compliance with sustainable policies of the United Nations. The new CAP is expected to support a fairer, healthier, and greener European food system. According to Petsakos et al. (2022), there is still a lack of quantitative information, especially at the farm level, that could contribute to the political debate on the CAP after 2023. The reason is the emphasis on a more decentralised design that allows the Member States to prepare their strategic plans ac-

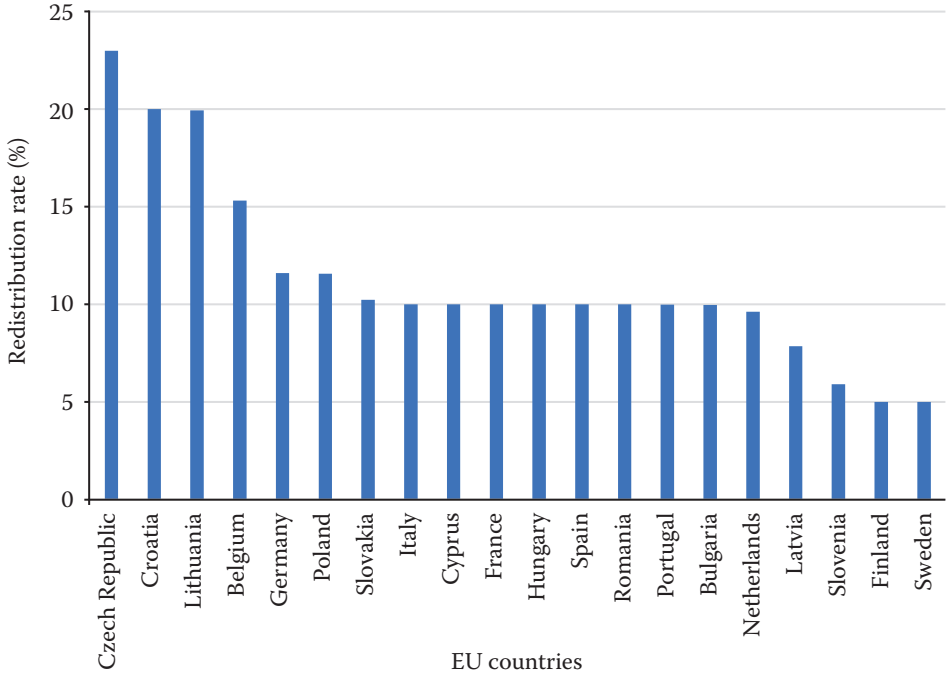

Figure 1. Share of Complementary redistributive income support (CRISS) in direct payments

Source: Own elaboration based on National strategic plans (EC 2022)

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cording to national and local specificities. According to the authors, few studies deal with the quantitative assessment of the economic or environmental impacts of the new CAP due to insufficient information on the details of the CAP implementation (Barreiro Hurle et al. 2021; Beckman et al. 2020; Bremmer et al. 2021). Despite the differences between these studies, there is a consensus that the new CAP can reduce the environmental footprint of EU agriculture at the expense of lower production and higher food prices. Although these findings are essential, the farm-level impacts are not well mapped.

The new CAP Regulation (EC 2021) sets a minimum convergence threshold of 85%. This means that by 2027, not every farm should have a payment per ha below 85% of the average. This limit is much closer to the single payment per ha than 60% of the previous CAP limit (Kremmydas and Tsiboukas 2022).

National strategic plans should address the specific needs of EU countries (including the environment and climate) and are expected to deliver results for EU-level targets. Mandatory environmental and climate commitments are based on enhanced conditionality, with the Member States also proposing more ambitious measures, known as ecological regimes.

Direct payments ensure income stability and reward farmers for their environmentally friendly management and the provision of public goods that markets do generally not pay, such as rural care. Direct payments are intended to ensure the farms' long-term and less vulnerable economic viability so that they are less dependent on fluctuations in agricultural product prices. A substantial part of direct payments is decoupled from the production volume. The financing of direct payments represents 71% of the total CAP funding (EC 2017; Volkov et al. 2019).

The farm size can significantly impact many economic aspects (Kryszak et al. 2021). Still, it can also affect the socio-economic aspects of rural development and the environmental impacts of agricultural production (Galluzzo 2018). According to Volkov et al. (2019), family farms form the most vulnerable subsector the agricultural sector. The depth of the problem is also determined by the fact that there is no clear boundary and methodology establishing boundaries between small, medium and large farms. The utilised agricultural area (UAA) is one of the most common criteria used for distinguishing between minor and other farms used in the economic analysis. Small farms are often defined as those having less than 2 ha, 5 ha, or 10 ha UAA (Gioia 2017). In addition to the above absolute thresholds, a relative threshold corresponding to the 10^{th} percentile declared by the UAA may be used. However, these definitions are often misleading because they do not consider the differences between countries and farm types (Hubbard 2009).

Small farms lag behind large ones in both productivity and technical efficiency (Čechura et al. 2022). According to the authors, targeting support on small farms leads to a relatively small increase in overall productivity compared to targeting larger farms.

EU statistics show the unequal distribution of direct payments among agricultural holdings that have lasted for many years (Grochowska et al. 2021). The closure of small farms may have a broader impact on the socio-economic fabric (Kremmydas and Tsiboukas 2022). Very small farms correspond to poor rural households, so their agricultural income is a kind of social buffer (Davidova et al. 2013) and, in some cases, contributes significantly to the local food availability (Rivera et al. 2020). However, according to the study by Grochowska et al. (2021), the EU agricultural policy contributes to strengthening farm income inequalities and instruments, such as capping, and the degressive will only change this situation if the CAP stops linking the payments to the agricultural land.

Similar conclusions were reached by Appel et al. (2019), who analysed the effects of the restrictions on the direct payments and the redistributive payment scheme. Their simulations reveal that this policy reduces the number of small farms, allowing them to grow to the next larger class, but only to a set size limit. In contrast, according to this study, large farms are almost unaffected by the redistributive payment scheme. Capping would most likely lead to dividing large farms into farms below the limit. The authors concluded that for a fairer redistribution between farms or the strengthening of smaller farms, there is no need to redistribute direct payments, but they would have to be abolished. Another effect of abolishing direct payments would be the desired stagnation of rental prices (Appel et al. 2019).

This paper aims to model the effects of the change in the direct payments from 2023 on Czech agricultural holdings to identify the size groups of the agricultural holdings affected by the change and the likely degree of impact on the holding economy. Specifically, changes in multi-component direct area payments provided under Pillar I were compared with the probable payments in 2023. The predictions of payments and their impact on the economy of Czech agricultural enterprises were assessed depending on the *UAA*.

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MATERIAL AND METHODS

A new framework of payments. The draft Strategic plan of the CAP, which was submitted by the Ministry of Agriculture of the Czech Republic to the European Commission on Jan 28, 2022, was used in this work. According to this proposal, the decoupled payment, which, until 2022, consisted of two components, SAPS (Single area payments) and Greening, will be newly replaced by three payments – Basic income support (BISS), Complementary redistributive income support (CRISS) and Eco-scheme (Schemes for the climate, the environment and animal welfare). In addition, for small farmers up to an area of 4 ha of agricultural land, an alternative payment to the payments mentioned above will be set (EC 2022). Payments for young farmers are not taken into account in this work.

BISS aims to stabilise the income of all active farmers in the form of a payment per ha of *UAA*. The intervention will be set in the form of an annual payment fully decoupled from the production for the eligible area of the agricultural area declared by the active farmer. The planned support rate is 72.48 EUR/ha, and the planned area is 3 531 022 ha.

The goal of CRISS is to address some weaknesses in the Czech agriculture; especially the long-term lower incomes of smaller companies and the fairer distribution of payments respecting the benefits resulting from the scale of production of large companies. The intervention will be set in the form of an annual payment fully decoupled from the production on a maximum of 150 ha of the eligible area of the agricultural area declared by the active farmer, regardless of the total cultivated area. The planned support rate is 153.90 EUR/ha, and the planned area is 1 230 730 ha.

The Eco-scheme is a company-wide eco-payment, which, if the established procedures and conditions are followed, can be provided for the entire cultivated agricultural land. The farm-wide eco-payment consists of several requirements which cannot be chosen separately, and that the farmer must meet all the crops he or she manages. The planned aid rate is 67.83 EUR/ha, and the maximum area is 3 531 022 ha.

The payment for small farmers aims to stabilise the income of active farmers with a cultivated agricultural area up to a maximum size of 4 ha. It is an alternative to the above payments and is slightly financially overestimated compared to the simple sum of the above payments, making it more attractive for small entities. The maximum support for one applicant can be 1 250 EUR, and the planned area is 10 642 ha (EC 2022).

In 2020, the SAPS rate was 137.8 EUR/ha, and the Greening rate was 76.16 EUR/ha, while the total area was 3 541 220 ha, and there were 30 167 applicants (MZe 2021). The farm accountancy data network (FADN) database was used to compare the direct payments in the EU in 2020 (Table 1). In the Czech Republic, the average farm size has the second largest area after Slovakia. According to the amount of the decoupled payments, the Czech Republic is in 16th–17th place (with Poland), and according to the total direct payments, it is in 10th place in the EU.

Data acquisition. This work used data from the Albertina database, which contains data from com-

Table 1. Direct payments in 2020

Member State	*UAA* (ha)	Decoupled payments (EUR/ha)	Total direct payments (EUR/ha)
EU-28	40	221	265
Austria	33	224	227
Belgium	52	282	352
Bulgaria	70	192	239
Croatia	15	283	355
Cyprus	11	285	364
Czech Republic	247	211	305
Denmark	132	295	313
Estonia	137	168	177
Finland	68	182	386
France	90	207	255
Germany	95	274	293
Greece	9	389	501
Hungary	45	222	295
Ireland	47	270	281
Italy	21	280	357
Latvia	66	138	190
Lithuania	46	158	189
Luxembourg	87	271	288
Malta	3	218	606
Netherlands	41	358	369
Poland	20	211	251
Portugal	24	150	223
Romania	18	186	237
Slovakia	438	175	211
Slovenia	11	257	297
Spain	47	167	207
Sweden	105	190	238
United Kingdom	154	217	222

UAA – utilized agriculture area
Source: FADN (2022a)

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panies published in the Commercial Register. For our purposes, entrepreneurs in agriculture were selected according to the Statistical Classification of Economic Activities in the European Community (NACE), for which the main economic activities, according to NACE, are 011 to 016. The data were supplemented by publicly available data of subsidy recipients for 2020 from the State Agricultural Intervention Fund (SAIF 2021). According to the area payment paid, the area of UAA (i.e. the area for which the SAPS payment was paid) was estimated. After excluding non-beneficiaries and incomplete data, the final observations were 846 farms. The total area of these holdings was 863 699 ha of agricultural land, representing 24.4% of the eligible agricultural area for direct payments in 2020.

The limiting factor of this work is the absence of farms of natural persons for whom financial statements are not available. However, according to the Czech Statistical Office (CZSO 2022), more than 70% of the agricultural land in the Czech Republic is managed by legal entities, and more than 86% of the agricultural land is managed by enterprises with an area of more than 100 ha.

According to the total area of agricultural land for which the SAPS payment was provided in 2020, the enterprises were divided into groups related to the proposed payments (i.e. up to 4 ha and up to 150 ha). For further subdivision, the categorisation used to determine the degressivity of Areas with Natural Constraints payments (Rudinskaya et al. 2019) was used, so the resulting number is eight groups. These groups are established based on these upper acreage limits (4, 150, 300, 500, 900, 1 800, 2 500 ha, unlimited).

A simulation of new payments. The modelled payments were calculated for 2023 and were calculated as the product of the area of the supported land in 2020 and the proposed rates (EC 2022). The difference between the received decoupled payments for 2020 (i.e. SAPS + Greening) and the maximum possible payments for 2023 (i.e. BISS + CRISS + Ecoscheme) was calculated for the individual companies. An alternative payment was also used for small entities up to 4 ha of agricultural land. The financial statements for the simulation were adjusted for the differences in the subsidies. In the income statement, the adjustment relates to the total revenues and profit or loss through a change in other operating revenues (operating subsidies received are reported within them). In the balance sheet, the adjustment relates to the current assets (through a change in cash) and the total assets.

Subsequently, the differences in the values of the basic financial ratios are tested using the Wilcoxon paired test. This is the difference between their real value in 2020 and the simulated value based on the new subsidy scheme. The differences are tested for the following financial ratios:

Return on assets (*ROA*) = operating profit / assets (1)

Return on sales (*ROS*) = operating profit / sales of goods, products and services (2)

Current ratio (*CR*) = current assets / current liabilities (3)

Interest coverage ratio (*ICR*) = operating profit / interest expense (4)

Index of dependence on subsidies (*IDS*) = = costs / (revenues – operating subsidies) (5)

Share of subsidies in total revenues (*StoR*) (6)

RESULTS AND DISCUSSION

The sample does not differ significantly from the structure of the legal entities farming on agricultural land (CZSO 2022). Only the share of the category of the smallest enterprises with an area of agricultural land of less than 4 ha is lower in the sample. The essential statistical characteristics of the assets, revenues and profits per UAA are given in Table 2, which provides information on the economic size of the observed groups.

Table 2 shows that group 1 (up to 4 ha acreage) is significantly different from the other groups in terms of the level and variability. On the one hand, due to the nature of the database used, it is the least numerous (only legal entities registered in the Commercial Register). The economic size of the companies in the group is very diverse. Hence, both the average and median revenues per ha (production intensity), asset per ha and profit before taxation per ha of the UAA are significantly higher than for the other groups. The total revenues per ha of agricultural land do not show significant differences in the other groups. The lowest production intensity is in groups 4, 5 and 6, i.e. in the enterprises affected by the planned reduction in direct payments. The profit per ha of UAA in 2020 was below average in groups 4, 5, 6 and 7, i.e. for holdings with an area of 300 ha to 2 500 ha. On the other hand, the

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Table 2. Total assets, total revenues, and profit before tax to *UAA* in 2020 (EUR/ha)

Group	Group size	Total assets to *UAA*			Total revenues to *UAA*			Profit before tax to *UAA*		
		mean	SD	median	mean	SD	median	mean	SD	median
1	22	1 385 775	2 657 881	155 666	1 281 699	2 851 551	52 981	60 725	159 031	1 701
2	140	23 986	195 798	5 868	20 110	226 775	2 255	443	6 701	59
3	47	5 694	9 551	2 745	3 821	11 835	1 705	209	588	100
4	108	3 568	2 734	2 802	2 414	2 825	1 629	160	476	63
5	159	3 974	4 428	3 113	2 198	1 928	1 696	131	195	98
6	232	4 965	3 567	4 355	2 604	1 863	2 231	170	169	140
7	74	5 348	2 340	4 942	2 638	917	2 573	165	164	138
8	64	5 628	2 055	5 545	2 883	1 085	2 608	230	209	165
Total	846	5 270	29 393	4 100	2 864	31 866	2 179	186	1455	117

UAA – utilized agriculture area

Source: Own processing on a sample of companies

highest profit (in terms of per ha of UAA) was realised by enterprises in groups 1 and 2 (Table 2).

The operating subsidies paid out in 2020 are, on average, significantly higher in groups 1 and 2 (Figure 2). The median operating subsidies paid out in 2020 to companies in the sample is 380.69 EUR/ha, with a significant declining trend in acreage above 150 ha. In groups 5 and 6, the median difference is slight, the most significant drop, of 8%, is between groups 4 and 5, and the reduction in the median be-

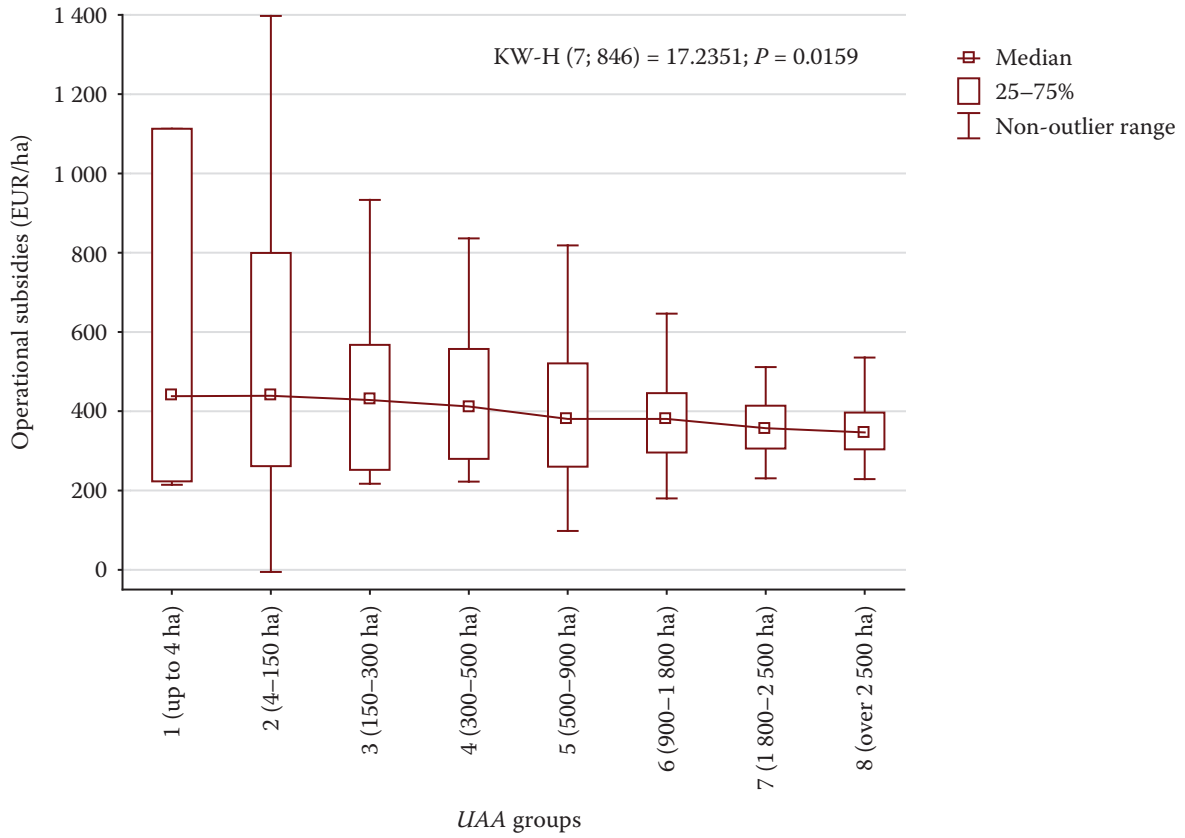

Figure 2. Operational subsidies per ha of utilized agriculture area (*UAA*) in 2020

UAA – utilized agriculture area; KW-H – Kruskal-Wallis H Test

Source: Own elaboration on a sample of companies

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tween groups 1 and 8 is 21%. Group 1 is significantly different, but in group 2, a significant difference between the weighted average and the median means a large variability in the companies in the group.

However, these results do not correspond to the statement that small farms have lower incomes and that the subsidies' distribution is disadvantageous. Of course, in our case, the restriction is to legal entities, and entities with a small area are highly variable. However, by comparison with the results of the public FADN database (FADN 2022b), where the results of the weighted data are given for legal and natural persons broken down by acreage, the same trends are evident, i.e. operating subsidies per ha for the smallest farms of natural persons (up to 5 ha) and legal entities (up to 50 ha) significantly exceed the subsidies of larger farms and decrease with the size of the farm. The situation is similar for agricultural income per ha.

The actual direct payments paid in 2020 per ha of UAA essentially follow the set rates (213.96 EUR/ha); the minimum differences (up to 1.5%) are due to differences in the administration of payments. The new simulated payments per ha are the same for groups 1 and 2. If an enterprise up to 4 ha decides to apply for a combined payment for small enterprises, then it will receive a payment per ha that is 6% higher than enterprises of up to 150 ha in acreage. For other groups, the loss compared to the maximum payment is 17.3% for group 3, 32.6% for group 4, 41.1% for group 5, 46.2% for group 6, 48.6% for group 7 and 50.2% for group 8 (over 2 500 ha). A comparison of the current payments and predictions for new ones is shown in Figure 3.

Based on the knowledge of the ha rates of actual and planned aid, it is possible to determine the acreage, which is the so-called turning point. Direct payments will be reduced for enterprises with an area higher than this limit; direct payments will increase for lower areas. The breakpoint in respecting the actual and planned rates is the area of 313.44 ha.

Actual number of direct payments (X) corresponds to the actual SAPS and Greening rates (see the section Material and Methods for more details):

$$X = 137.8\,UAA + 76.16\,UAA \quad (7)$$

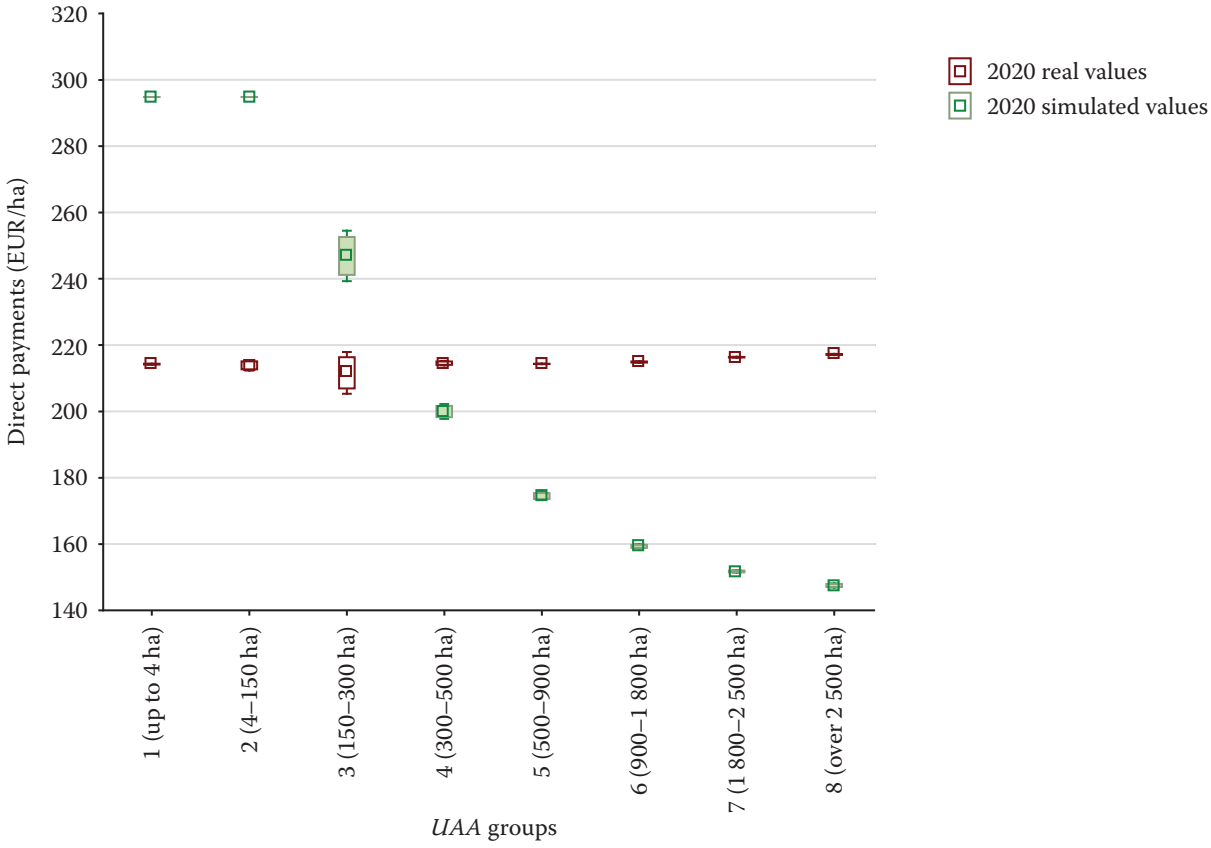

Figure 3. Simulation of direct payments from 2023 by size groups (EUR/ha)

Box – mean ± 0.95 conf. interval; whiskers – mean ± 0.99 conf. interval; *UAA* – utilized agriculture area
Source: Own elaboration on a sample of companies

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The planned number of direct payments (Y) corresponds to the BISS, CRISS and Eco-scheme rates:

$$Y = 72.48\,UAA + 67.83\,UAA + \\ + 153.9 \times \min\left(150; UAA\right) \quad (8)$$

For UAA up to 150 ha, therefore:

$$Y = 72.48\,UAA + 67.83\,UAA + \\ + 153.9\,UAA \quad (9)$$

For UAA over 150 ha, therefore:

$$Y = 72.48\,UAA + 67.83\,UAA + \\ + 153.9 \times 150 \quad (10)$$

For UAA up to 150 ha, the planned number of direct payments is higher (294.21 EUR/ha vs 213.96 EUR/ha).

For UAA over 150 ha, the actual (X) and planned (Y) direct payments are equal if the UAA is equal to 313.44 ha.

$$137.8\,UAA + 76.16\,UAA = 72.48\,UAA + \\ + 67.83\,UAA + 23\,085 \quad (11)$$

$$UAA = 313.44 \quad (12)$$

The forecast of direct payments per ha for a sample of enterprises is shown in Figure 4. The average predicted payment is 196.58 EUR/ha, while the graph adds a limit of 85% (167.09 EUR/ha), which corresponds to an area of 873.48 ha. This acreage can be understood as another breakpoint. This means that a holding with a higher area of UAA will receive a direct payment per ha of less than 85% of the average. This applies to 382 companies (45%) in our sample. The share of enterprises (including both natural and legal entities) managing a land area of more than 1 000 ha is about 3%; however, they manage 48% of the used agricultural land in the Czech Republic (CZSO 2022).

In the case of operating profit, its median in the sample of companies decreased by 40%, which was also reflected in a decrease in profitability (*ROA* decreased by 0.1 pp, *ROS* decreased by 2.6 pp). The share of subsidies in total revenues fell by 1.8 pp. The Index of Dependence on Subsidies shows the same actual and simulated values with regard to the method of including subsidies in revenues. The company's short-term solvency, measured by the current ratio, decreased by 0.1. The ability of the enterprise to repay interest on bank loans, which is expressed in terms of the interest coverage ratio, fell from 6.4 to 4.5 (Table 3).

The fundamental indicators are shown in detail according to the individual size groups, which can be seen in Table 4. The differences between the actual and simulated values of the indicators were tested by the Wilcoxon paired test. In contrast, for all the in-

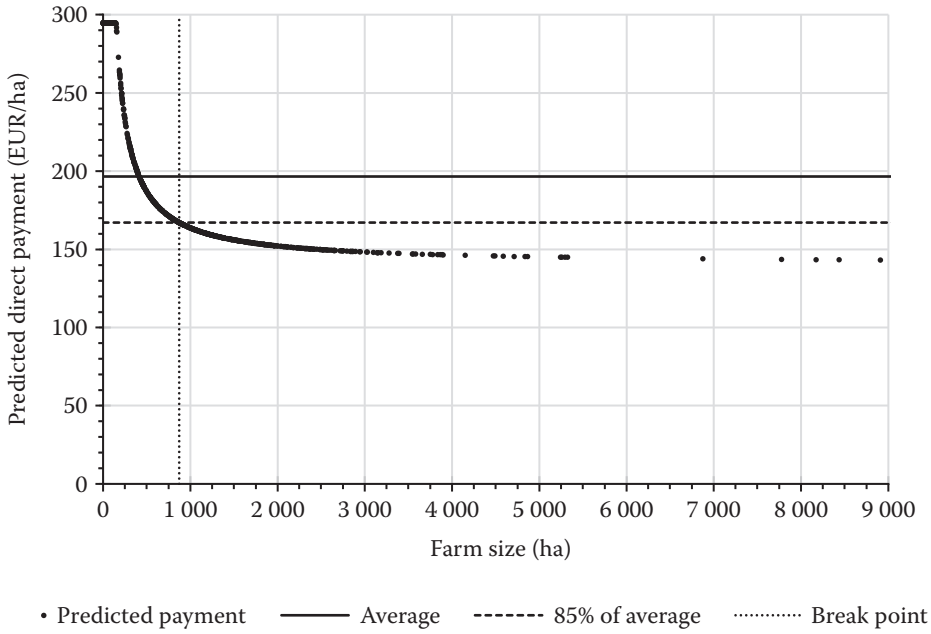

Figure 4. Prediction of direct payments from 2023 according to the acreage of the farm (EUR/ha)

Source: Own elaboration on a sample of companies

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Table 3. Basic statistics of actual and simulated indicators

Variable	*N*	Actual values				Simulated values			
		mean	lower quartile	median	upper quartile	mean	lower quartile	median	upper quartile
OP	846	219.7	12.2	96.3	275.4	163.0	3.5	57.6	204.0
ROA	846	0.031	0.013	0.036	0.068	0.030	0.004	0.027	0.059
ROS	841	0.079	0.031	0.098	0.193	0.069	0.010	0.072	0.166
CR	846	5.711	1.233	2.800	6.067	5.634	1.206	2.708	5.952
StoR	846	0.128	0.069	0.099	0.148	0.118	0.056	0.081	0.138
IDS	846	1.137	1.001	1.058	1.139	1.137	1.001	1.058	1.139
ICR	712	93.55	2.18	6.42	15.96	80.67	0.87	4.50	12.62

OP – operational profit in 1 000 EUR; *ROA* – return on assets; *ROS* – return on sales; *CR* – current ratio; *StoR* – share of subsidies in total revenues; *IDS* – index of dependence on subsidies; *ICR* – interest coverage ratio

Source: Own processing on a sample of companies

dicators in all the groups, this test showed a significant statistical difference. The median operational profit under the otherwise unchanged conditions is growing in groups 1–3, i.e. in the company area up to 300 ha, at the fastest pace in group 2, which almost doubled. In contrast, for the smallest companies of up to 4 ha, the median profit increased by only 3%. For size groups over 300 ha, we recorded a decrease in the median

Table 4. Medians of actual and simulated values according to farm acreage

Group	Variable	Actual	Simulated	*W*	Group	Variable	Actual	Simulated	*W*
1	*OP*	6.4	6.7	0*	5	*OP*	82.9	57.4	0*
	ROA	0.053	0.055	0*		*ROA*	0.044	0.029	0*
	ROS	0.064	0.064	0*		*ROS*	0.126	0.082	0*
	CR	1.009	1.014	0*		*CR*	2.629	2.566	0*
	StoR	0.004	0.006	0*		*StoR*	0.126	0.103	8*
	ICR	6.494	6.520	0*		*ICR*	7.046	4.089	145*
2	*OP*	3.3	6.6	0*	6	*OP*	212.0	133.5	0*
	ROA	0.011	0.022	0*		*ROA*	0.04	0.026	0*
	ROS	0.033	0.066	0*		*ROS*	0.107	0.068	0*
	CR	1.227	1.347	819*		*CR*	3.344	3.233	337*
	StoR	0.095	0.126	140*		*StoR*	0.097	0.073	0*
	ICR	1.873	4.100	0*		*ICR*	7.529	4.460	0*
3	*OP*	28.5	33.7	1*	7	*OP*	341.8	209.3	0*
	ROA	0.043	0.048	1*		*ROA*	0.035	0.02	0*
	ROS	0.119	0.166	1*		*ROS*	0.092	0.056	0*
	CR	1.681	1.754	110*		*CR*	3.02	2.921	0*
	StoR	0.121	0.138	1*		*StoR*	0.084	0.061	0*
	ICR	8.239	9.500	1*		*ICR*	6.214	3.309	0*
4	*OP*	38.2	33.8	77*	8	*OP*	722.0	472.0	0*
	ROA	0.035	0.03	110*		*ROA*	0.036	0.026	0*
	ROS	0.102	0.088	248*		*ROS*	0.113	0.07	0*
	CR	2.899	2.895	518*		*CR*	3.796	3.634	0*
	StoR	0.132	0.122	123*		*StoR*	0.083	0.058	0*
	ICR	5.900	5.378	53*		*ICR*	8.745	5.085	0*

*P-level < 0.001; *W* – test statistics of Wilcoxon matched pairs test; *OP* – operational profit in 1 000 EUR; *ROA* – return on assets; *ROS* – return on sales; *CR* – current ratio; *StoR* – share of subsidies in total revenues; *IDS* – index of dependence on subsidies; *ICR* – interest coverage ratio

Source: Own elaboration on a sample of companies

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profit, the largest for group 7 (1 800–2 500 ha), which would fall to 61% of 2020.

The lowest profitability in 2020 was in group 2 (4–150 ha), where the median *ROA* also increased the most (by 1.1 pp), whereas the median *ROS* increased the most in group 3 (150–300 ha) by 4.7 pp. In contrast, in the group with the smallest area of up to 4 ha, the median of the tested indicators increased only very slightly. The simulation of the tested indicators shows a decrease for the other size groups above 300 ha in acreage. The median *ROA* decreased the most in groups 5 and 7, and the median *ROS* decreased the most in group 5. The actual current liquidity is lower in groups of up to 300 ha; in the other groups, the differences are insignificant; however, the predicted decrease is the largest in group 8 (above 2 500 ha). Although the results show significant statistical differences in liquidity, these differences are insignificant from a factual point of view.

The median interest coverage ratio was the lowest (as well as profitability) in group 2; in the other groups, the differences are insignificant; the predicted decline is the largest in group 8, while in group 2, the increase in interest coverage ratio is more than doubled. The share of subsidies in the total revenues is the lowest in groups 1 and 2, where the predicted increase is the largest in group 2, and in groups over 500 ha, the decrease of this indicator is almost identical.

It can be stated that the new payment system will improve the economic situation of farms with an area of up to 300 ha. Still, for larger companies, the economic situation will deteriorate under otherwise unchanged conditions. Of the tested eight groups, the smallest enterprises with an area of agricultural land of up to 4 ha stands out for several reasons. First, the results are affected by the nature of the database, as the number of companies in the group is small. In addition, the group is very diverse in other economic indicators. As they are legal entities, they are not primarily small family farms, but they may be farms with a production focus independent of the land (fattening pigs and poultry) or the production of crops with a high workload (vineyards, fruit, vegetables), or a higher proportion of the non-agricultural output, possibly with the further processing of the production. This is also indicated by the intensity of the output (share of the total revenues per ha), which is significantly higher than in the other groups and, also, the index of dependence on the subsidies is less than one for most of these enterprises, which is not typical for agricultural entrepreneurs (e.g. Lososová et al. 2017). Thus, these are enterprises for which, due to their economic size and minimal acreage, the change in the direct payment system does not affect their economy, and some studies (Schmidt et al. 2019; Petsakos et al. 2022) also point to the lowest acceptance of ecological schemes for these types of companies.

Another group concerns companies from 4 to 150 ha. This group showed the worst economic indicators in 2020, and the predicted changes show the most significant improvement in all the indicators. For farms from 150 to 300 ha, the new system of direct payments means a slight improvement and the stabilisation of the current income. For companies with an area of agricultural land over 300 ha, the new system represents a reduction in subsidies and, under the otherwise unchanged conditions, a decrease in profit, profitability and liquidity. For groups over 300 ha, the values of the financial indicators are similar, and their change (deterioration) is almost constant between groups. These findings do not correspond to the conclusions of Appel et al. (2019). It is necessary to consider regional differences, which was also the intention of the new CAP from 2023 (EC 2021).

The main changes in the structure of Czech agriculture since 2000 have been the transition of natural persons to some form of company, with the average size of a farm increasing from 93 ha to 121 ha (for natural persons, it increased, for companies, it decreased). The trend of increasing the UAA is evident in small farms where the number of farms from up to 5 ha of UAA and those over 2 000 ha have decreased the most, while the number of farms between 50 ha and 1 000 ha has increased, and the number above 1 000 ha has decreased. Farms focused only on animal production, and mixed production decreased significantly, whereas farms focused only on plant production increased (CZSO 2022). The new direct payment system will likely accelerate these trends while greater support for small farms will enable their enlarging. On the contrary, in the case of large farms, it may cause their formal division into smaller farms, as Appel et al. (2019) claimed, which is not advantageous in terms of their economic performance (Svobodová et al. 2022). A likely consequence of the new system will also be a continuing trend towards pure plant production, as ACCR officials fear.

Limitations of the study. The study is based on the companies' financial statements, and there are farms of natural persons that are absent for which financial statements are unavailable. Furthermore, it is based on statements from 2020, the last year available at the time of preparation of this study. However, extending the data sample to include previous years would not

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affect the meaning of the conclusions. Our simulation is based on expressing the net effect of the change in the selected direct payments assuming the other factors are constant. The planned payment parameters for 2023 were used to express the impact of their changes on the actual values of 2020 without including the current turbulent development.

CONCLUSION

According to the creators of the CAP Strategic plan for the Czech Republic, the current system of direct payments is unfair for small farms with lower incomes in the long run, and the redistribution payment should support the fairer distribution of payments respecting the benefits of large business production. According to the FADN public database, income from agricultural activities is highest for the smallest farms, both natural and legal persons (FADN 2022b). Critics point to the fact that operating subsidies are already degressive, i.e. higher payments per ha of land used are provided to the smallest farms and are declining with the farms' size (ACCR 2022), which is also confirmed by our results. According to them, the newly set distribution system of direct payments is not fairer is. Still, it is a political decision caused by the wrong motivation to reduce subsidies to the largest companies. In their view, however, medium-sized companies, in particular, will be harmed. The risks arising from this decision are primarily the reduction in animal production, the reduction in food self-sufficiency and the weakening of the competitiveness of Czech agriculture.

Our results suggest that the new payment system will improve the economic situation of farms with an area of up to 300 ha but that the economic situation of larger companies will worsen under otherwise unchanged conditions. Enterprises from 4 ha to 150 ha showed the worst economic indicators in 2020, and the simulated changes show the greatest improvement in all the indicators. For businesses from 150 ha to 300 ha, the new system of direct payments means a slight improvement and stabilisation of the current income. For companies with an area of agricultural land over 300 ha, the new system means a reduction in subsidies and, under the otherwise unchanged conditions, a decrease in profit, profitability and liquidity. There are no significant differences in the individual groups over 300 ha, and the deterioration of the tested indicators is almost constant. These companies are primarily focused on mixed agricultural production, and their economy is very sensitive to changes in external farming conditions (Lososová and Zdeněk 2014). For enterprises with an area of more than 874 ha of UAA, the predicted direct payments do not reach 85% of the average, which may concern around 50% of the area of UAA in the Czech Republic. After 2026, it may be in non-compliance with CAP conditions. The expected income declines due to subsidies will likely be exacerbated by the rapidly rising costs and slower growth in agricultural producer prices.

The new system of direct payments will deepen the already existing degressive of subsidies towards companies with a larger area of agricultural land. The significant diversity of small farms necessarily leads to the question of whether the appropriate size criterion for the degressive of subsidies is the acreage of the UAA (or only the acreage) and whether, for example, the economic size of the farm, or its combination with the acreage, would not be a more appropriate criterion. In addition, in connection with other recently discussed issues caused by the crisis, such as food self-sufficiency, the sharp drop in livestock production and rising food prices, it raises the question of the appropriateness of decoupled payments as support for competitive agriculture. It is up to policymakers to consider whether supporting agricultural production in compliance with environmental requirements would not be more appropriate in terms of production self-sufficiency and agricultural competitiveness.

The contribution of the work is an empirical study at the farm level, which is missing in the literature. The results can benefit policymakers, contribute to the discussion on the future direction of agricultural policies and stimulate further research. Our analysis is not exhaustive and should not be considered an assessment of the impacts of the new CAP. The simulation offers an insight into the impacts of the changes induced by specific measures of the CAP reform after 2023 through crucial economic indicators in agricultural holdings regarding their acreage.

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