



Post-acquisition integration and growth of farms: the case of Ukrainian agroholdings

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Table S1. Operationalization of the variables and grouping.¹

Group of variables	Subgroup	Variable name	Description	Units	
Organic growth	-	Organic growth in TP (CP, AP)	Absolute difference in TP (CP, AP) value in constant prices	1000 UAH	
Profits	-	Absolute profit in CP (AP)	Absolute value of profit obtained in CP (AP)	1000 UAH	
		Profit margin in CP (AP)	Profitability (profit margin): profit in CP (AP) per CP (AP) value	%	
		Absolute profit in CP per ha	Absolute value of profit obtained in CP divided by the number of hectares	1000 UAH/ha	
Performance	Yields	CP value per ha	Value of CP per hectare in constant prices	1000 UAH/ha	
		Milk production value per cow	Value of produced milk per cow per year in constant prices	1000 UAH/cow	
	Partial productivities	CP (AP) value per employee in CP (AP)	CP (AP) value per employee in CP (AP)	1000 UAH/employee	
		CP (AP) value per 1 UAH of depreciation	CP (AP) value per 1 UAH of depreciation in CP (AP)	-	
		CP (AP) value per 1 UAH of material costs	CP (AP) value per 1 UAH of material costs in CP (AP)	-	
		Share of CP	Ratio of CP value to TP value	%	
	PAI	Resource allocation	Share of cash crops	Ratio of cash crops ² production value to CP value	%
			Share of milk in AP	Ratio of milk production value to AP value	%
Ratio of harvested area to arable land			Ratio of harvested area to farm's arable land	%	
I/D – variable inputs			Material costs in CP (AP)	Material costs in CP (AP)	1000 UAH
		Seed costs in CP	Seeds costs	1000 UAH	
		Fertilizer costs in CP	Fertilizers costs	1000 UAH	
		Feedstuff in AP	Feedstuff costs in AP	1000 UAH	
I/D – fixed assets & labor		Depreciation in CP (AP)	Depreciation costs in CP (AP)	1000 UAH	
		Total land area	Total farm land	hectares	
		Milk herd size	Number of cows in milk production	cows	
I/D – services	Labor units in CP (AP)	Number of employees in CP (AP)	employees		
	3 rd party services in CP (AP)	Costs of services, provided by third-party organizations in CP (AP)	1000 UAH		
	Share of 3 rd party services in total CP (AP) costs	Ratio of costs of services, provided by third-party organizations, to total costs in CP (AP)	%		
	SG&A costs in CP (AP)	Overhead costs: selling, general and administrative expenses in CP (AP)	1000 UAH		
	Resource redeployment	Salary per employee in CP (AP)	Average annual salary per employee in CP (AP)	1000 UAH/employee	
Land rent per ha		Land lease price per hectare	1000 UAH/ha		

¹ TP = total production; CP = crop production; AP = animal production; I/D = investment/divestment.² Cash crops include wheat, barley, corn, sunflower, soya, and rapeseed.

Table S2. Descriptive statistics of the covariates, 2005-2014.¹

Variable name		Control group: non-acquired non-holding farms, 41,770 observations				Treated group: acquired farms, 518 observations			
		Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Total production value, 1000 UAH	average	3,710	6,545	1	280,920	6,812	14,414	34	247,116
	growth	470	3,005	-87,218	139,488	315	8,860	-75,744	146,570
Land area, hectares	average	1,988	2,241	0	146,067	3,726	7,622	0	145,838
	growth	11	2,139	-166,521	288,839	208	2,658	-9,084	48,887
Share of crop production, 1 = 100%	average	0.83	0.25	0	1	0.80	0.26	0	1
Share of vegetables and fruits, 1 = 100%	average	0.03	0.14	0	1	0.004	0.03	0	0.4
Material costs in total production per 1 UAH of total production value, UAH	average	0.78	10.9	0.004	2073	1.1	7.8	0.19	179
	variation	0.26	0.19	0.0004	1.7	0.29	0.22	0.01	1.7
Depreciation costs per 1 UAH of total production value, UAH	average	0.07	1.8	0	358	0.05	0.11	0	1.9
	variation	0.46	0.38	0	1.7	0.56	0.42	0	1.7
Share of cost of services provided by 3 rd party organizations in total costs, 1 = 100%	average	0.06	0.07	0	1	0.09	0.08	0	0.56
	growth	0.01	0.09	-0.95	0.95	0.03	0.13	-0.57	0.79
Labor costs per 1 UAH of total production value, UAH	growth	-0.02	0.76	-95	72	-0.004	0.54	-0.91	12
Overhead costs per 1 UAH of total production value, UAH	average	0.05	1.37	0	277	0.07	0.19	0	4.08
	average * share of CP	0.04	0.91	0	185	0.06	0.19	0	4.08
Land rent, 1000 UAH/hectare	average	0.18	3.71	0	434	0.14	0.10	0	1.2
	variation	0.26	0.22	0	1.7	0.30	0.27	0	1.5
Crop production per hectare, 1000 UAH/hectare	average	3.1	35.9	0	1585	1.2	0.7	0	4.1
	growth	0.24	37	-4428	4428	0.10	0.78	-2.6	4.0
	variation	0.29	0.22	0	1.7	0.35	0.25	0	1.7

¹ We also control for 25 regions and 6 organizational forms.

Table S3. Descriptive statistics of the outcome variables, change in t+1 comparing to t-1, 2008-2016.¹

Variable name		Control group: non-acquired non-holding farms, 11,673-41,770 observations				Treated group: acquired farms, 150-518 observations			
		Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Organic growth	TP	272	3,048	-56,051	139,488	1,969	8,350	-49,417	87,108
	CP	214	2,130	-55,929	72,482	2,121	7,550	-20,446	87,108
	AP	59	2,114	-57,390	139,457	-152	2,603	-42,118	22,786
Absolute profit	CP	290	1,972	-79,531	65,284	524	9,414	-181,311	51,095
	AP	26	1,002	-29,696	41,916	-11	2,590	-11,361	30,413
Profit margin	CP	0.014	0.42	-14	14	0.045	0.53	-2	4
	AP	-0.010	1.17	-47	52	-0.005	1.29	-12	6
Absolute profit per hectare in CP		0.01	15	-2,052	703	0.18	1.0	-4.8	5.5
CP per hectare		-0.16	27	-4,428	1,110	0.55	1.4	-3.5	15
Milk production per cow per year		0.17	3	-149	150	0.36	1.5	-5.9	6.4
CP per 1 UAH of depreciation		13	1,430	-37,262	216,966	328	4,287	-5,356	81,610
CP per 1 UAH of material costs		-0.11	3.1	-316	319	-0.12	1.5	-9	17
CP per employee		12	185	-7,833	10,928	124	415	-2,130	3,775
AP per 1 UAH of depreciation		4	745	-26,835	76,408	51	502	-1,753	5,528
AP per 1 UAH of material costs		0.05	5.0	-504	243	-0.01	2.3	-25	14
AP per employee		4.1	103	-4,899	4,807	12	52	-64	353
Share of CP in TP		0.01	0.11	-1	1	0.05	0.18	-0.94	1
Share of milk production in AP		0.02	0.13	-0.88	0.92	0.06	0.14	-0.56	0.58
Share of harvested to available arable land		-1.8	313	-48,330	8,450	0.11	1	-1	12
Material costs	CP	289	10,729	-548,792	2,027,707	1,233	6,007	-38,739	75,099
	AP	54	1,665	-37,484	87,694	-142	2,908	-30,885	23,235
Seeds		50	2,290	-87,958	441,614	204	1,313	-9,124	16,151
Fertilizers		109	3,499	-24,097	692,774	454	2,034	-14,174	20,251
Feedstuff		40	1,258	-30,950	47,324	-40	2,401	-26,246	16,887
Depreciation	CP	23	2,066	-194,763	365,438	29	630	-8,973	4,710
	AP	1.8	143	-5,028	4,639	26	460	-2,319	5,752
Total land area		-52	2,792	-316,558	288,839	61	2,996	-17,518	31,867
Milk herd size		-4.7	71	-4,089	4,052	-15	148	-1,877	1,323
Labor units	CP	-2.6	29	-2,739	2,621	-8.9	111	-2,094	665
	AP	-4.6	22	-871	839	-11.1	67	-890	303
Costs of 3 rd party services	CP	30	498	-24,494	24,891	543	2,269	-4,867	37,995
	AP	-0.6	178	-13,680	11,159	44	546	-2,132	11,246
Share of 3 rd party services costs in total costs	CP	0	0.10	-1	2.9	0.05	0.19	-0.73	0.93
	AP	0	0.05	-0.85	1	0.02	0.08	-0.15	0.93
Overhead (SG&A) costs	CP	28	974	-39,898	160,917	369	2,082	-5,990	20,289
	AP	-0.67	236	-9,481	11,186	36	613	-4,106	3,817
Salary per employee	CP	0.36	168	-22,051	22,051	0.53	4.7	-14	50
	AP	-0.01	5.1	-275	275	0.77	4.4	-13	33
Land rent costs per hectare		0.07	4.6	-433	511	0.06	0.13	-0.22	1.9

¹ TP = total production; CP = crop production; AP = animal production. Considering the longitudinal nature of our data as well as that monetary variables are affected by inflation, we performed the deflation procedures. For the inflation adjustments, we used producer price indexes for costs and fixed prices for commodities to estimate sales.

Table S4. The results of the logistic regressions. The factors affecting the probability of farm acquisition, odds ratios.¹

			Acquisitions in		
			2010-2012	2013-2015	
Variable name					
Total production value, mln UAH	average		1.065***	1.359***	
	average squared		0.9996***	0.992**	
	growth		0.979	0.925	
	coefficient of variation		1.004	0.999	
Land area, 1000 hectares	average		1.138***	-	
	growth		1.170***	1.095	
	coefficient of variation		0.997	0.991	
Share of crop production, % (based on quartiles)	average - groups (based on quartiles)	group 0 – 0%	0.605	-	
		group 1 – 0-55%	0.439*	0.742	
		group 2 – 55-80%	0.325***	0.632	
		group 3 – 80-94%	0.689	0.669	
		group 4 – 94-100%	0.455**	0.389	
		benchmark (reference) group			
	growth		1.003	1.013	
	coefficient of variation		0.999	1.009	
Share of vegetables and fruits, %	average		0.960*	-	
	growth		1.014	-	
	coefficient of variation		1.001	-	
Material costs in total production per 1 UAH of total production value, UAH	average		3.429***	126.608	
	average squared		0.788**	0.093	
	coefficient of variation		0.992**	0.998	
Depreciation costs per 1 UAH of total production value, UAH	average		0.009***	-	
	growth		3.401	-	
	coefficient of variation		1.003*	-	
Cost of services provided by 3 rd party organizations per 1 UAH of total production value, UAH	average		0.680	3.23E+09***	
	average squared		-	5.55E-25**	
	growth		1.873	9.832*	
	coefficient of variation		-	1.003	
Share of cost of services provided by 3 rd party organizations in total costs, %	average		1.091***	-	
	average squared		0.998**	-	
	growth		1.011	-	
	coefficient of variation		1.003*	-	
Labor costs per 1 UAH of total production value, UAH	average		0.172	-	
	growth		0.223***	-	
	coefficient of variation		0.997	-	
	average x share of crop production	group 0		376.124*	-
		group 1		95.576*	-
		group 2		50.394	-
		group 3		10.357	-
group 4			26.870	-	
	benchmark (reference) group				
Overhead costs per 1 UAH of total production value, UAH	average		8.008	0.090	
	average squared		3.70E-08**	-	
	growth		2.442	0.288	
	coefficient of variation		0.998	1.001	
		group 0		6,490.065	-
	group 1		1,238.008**	1.63E-05	

Variable name		Acquisitions in	
		2010-2012	2013-2015
average x share of crop production	group 2	2,600.100**	361.639
	group 3	52.925	6.50E+06**
	group 4	17,525.110***	12.529
	group 5	benchmark (reference) group	
Land rent, 1000 UAH/hectare	average	8.877**	82,462.650*
	average squared	0.637*	8.40E-06
	growth	1.112	0.279
	coefficient of variation	1.002	1.018**
Crop production per hectare, 1000 UAH/hectare	average	0.780**	-
	growth	0.929**	0.999
	coefficient of variation	1.011***	0.999
Milk production per cow, 1000 UAH/cow/year	average	0.928	0.962
	growth	1.046	-
	coefficient of variation	1.002	1.006
Dummy of farm presence during entire period		0.451***	-
Legal form	business partnerships	benchmark (reference) group	
	private enterprises (sole proprietorships)	0.678***	0.331**
	cooperatives	0.140***	-
	farming household	0.161***	-
	other legal forms	0.553	-
Regions		Yes	Yes
Constant		0.022***	6.39E-05***
Number of observations		6,655	3,388
Prob > chi ²		0.000	0.000
Pseudo R ²		0.212	0.224

¹ The number of observations in the second model reduced substantially due to lower number of acquisitions during 2013-2015 that resulted in their absence in particular regions and with regard to particular legal forms. The regional coefficients are compressed to save the space, but in the first period the majority of regional dummies were statistically significant. 'x' denotes interaction term.

Table S5. The result of the factor analysis estimation.¹

Variable name	Factor number						Uniq.	Factor name
	1	2	3	4	5	6		
Seeds	0.71	-0.03	-0.08	-0.01	-0.03	0.001	0.49	I/D – variable
Fertilizers	0.65	-0.11	0.04	0.01	0.04	0.01	0.56	inputs
Labor	-0.20	0.45	-0.02	0.01	0.02	-0.10	0.75	I/D – fixed
Land area	-0.07	0.41	0.11	0.03	-0.05	0.08	0.81	assets & labor
Depreciation	-0.31	0.37	0.20	-0.04	0.06	0.03	0.72	
Third-party services	-0.34	0.21	0.35	0.09	0.09	0.03	0.70	I/D – services
SG&A	-0.03	0.07	0.32	0.01	-0.08	0.01	0.89	
Share of crop production	0.01	0.03	0.09	0.31	0.03	-0.01	0.89	Resource
Share of cash crops	-0.02	-0.01	0.01	0.30	0.04	0.01	0.91	allocation
Land rent	-0.02	0.003	0.04	0.05	0.30	0.01	0.91	-
Ratio of harvested to available arable land	-0.01	0.05	0.01	0.03	0.28	0.02	0.92	
Average salary	0.04	-0.09	0.11	-0.01	0.06	0.21	0.93	

¹ I/D = investment/divestment; uniq. = uniqueness. To ensure the quality of our factor analysis, we conducted a number of standard tests. Particularly, the determinant of the correlation matrix returned the value of 0.370 (meaning that multicollinearity does not affect our results), the Bartlett test of sphericity is significant on 1% level (i.e. the intercorrelation is sufficient to conduct factor analysis), and Kaiser-Meyer-Olkin measure of sampling adequacy showed the value of 0.620 (i.e. sufficient overlap between the pairs of variables).

The factor analysis is based on absolute changes of variables from crop production specialization. Joint analysis of both specializations leads to lower efficiency of grouping due to the high correlation among some variables across specialization that result in the necessity to account for fewer variables for each specialization. Additionally, animal production specialization experiences limited integration. It therefore performs worth in terms of factor analysis.

Among six factors identified, four have sufficient factor loadings (i.e. exceed the threshold of 0.3) and thus can be grouped together.

Covariate balance testing

The results of covariate balance testing using standardized mean differences (SMDs) in different time periods and production lines are presented in the Tables S6-S8. The SMD scores below 0.2 are considered as ‘very small’, 0.2-0.5 – as ‘small’, 0.5-0.8 – as ‘medium’, and greater than 0.8 – as ‘large’ (Cohen, 1988; Hernandez-Jimenez *et al.*, 2019). The highest absolute SMD of the matched sample is 0.46 and is therefore considered as ‘small’. Moreover, the average absolute SMD scores improve across all models. Despite the SMDs of some variables increase after matching, they generally stay in the same SMD classification, i.e. ‘very small’ before and after matching. In turn, most of the variables, which show the change in SMD classification from ‘very small’ to ‘small’, are not persistently significant in our acquisition target selection models (see Table S4). However, we still include these variables in order to satisfy the unconfoundedness assumption.

Table S6. Standardized mean differences of covariates in total production models.

Variable name		2008-2015		2008-2009		2010-2012		2013-2015	
		Raw	Matched	Raw	Matched	Raw	Matched	Raw	Matched
Total production value	average	0.28	0.20	0.09	0.15	0.28	0.21	0.45	0.23
	growth	-0.03	0.02	0.09	0.11	-0.15	-0.05	0.17	0.10
Land area	average	0.31	0.22	0.23	0.24	0.27	0.20	0.53	0.32
	growth	0.08	0.09	0.20	0.23	0.05	0.04	0.12	0.13
Share of crop production	average	-0.11	0.00	0.00	0.01	-0.17	-0.05	0.06	0.10
Share of vegetables and fruits	average	-0.28	-0.03	-0.24	0.00	-0.29	-0.05	-0.31	-0.22
Material costs in total production per 1 UAH of total production value	average	0.03	0.07	-0.02	0.31	0.09	0.09	0.00	0.00
	variation	0.14	0.24	0.11	0.20	0.12	0.24	0.25	0.32
Depreciation costs per 1 UAH of total production value	average	-0.02	-0.01	-0.02	0.13	-0.02	0.05	-0.07	-0.20
	variation	0.25	0.27	0.29	0.33	0.20	0.26	0.46	0.34
Share of cost of services provided by 3 rd party organizations in total costs	average	0.34	0.28	0.41	0.25	0.32	0.29	0.45	0.36
	growth	0.20	0.14	0.25	0.24	0.19	0.16	0.20	0.07
Labor costs per 1 UAH of total production value	growth	0.02	-0.01	0.05	0.02	0.02	0.02	-0.03	-0.12
	average	0.01	0.13	-0.01	0.25	0.10	0.27	0.20	0.09

Variable name	2008-2015		2008-2009		2010-2012		2013-2015		
	Raw	Matched	Raw	Matched	Raw	Matched	Raw	Matched	
Overhead costs per 1 UAH of total production value	average x share of crop production	0.02	0.11	-0.02	0.18	0.14	0.25	0.21	0.08
Land rent price	average variation	-0.02	0.17	-0.01	0.22	-0.01	0.11	0.00	0.30
		0.15	0.18	0.11	0.10	0.18	0.22	0.12	0.21
Crop production per hectare	average growth variation	-0.07	-0.05	-0.06	-0.02	-0.07	-0.05	-0.07	-0.05
		-0.01	0.04	-0.01	-0.07	0.00	0.05	0.01	0.05
		0.24	0.27	0.18	0.20	0.27	0.31	0.22	0.27
Legal form	public joint-stock companies	-0.01	0.00	0.00	0.00	-0.04	0.02	0.06	-0.01
	family farms	-0.31	-0.01	-0.31	-	-0.28	-0.02	-0.31	-0.02
	limited liability companies	0.33	0.00	0.37	0.05	0.28	0.00	0.43	0.09
	sole proprietorships	-0.21	-0.03	-0.22	-0.06	-0.18	-0.04	-0.35	-0.14
	others	0.02	0.05	-0.06	0.00	0.02	0.07	0.02	0.06
Regions	Cherkasy	0.00	0.00	0.23	0.00	-0.04	0.01	-0.17	-0.02
	Chernihiv	0.20	0.02	0.22	-0.01	0.18	0.02	0.28	0.03
	Chernivtsi	-0.04	0.00	-0.15	-	0.01	-0.01	-0.14	-
	Dnipro	-0.11	0.00	0.08	0.00	-0.19	0.00	-0.04	-0.03
	Donetsk	-0.05	0.01	0.00	0.00	-0.08	0.00	-0.13	0.00
	Ivano-Frankivsk	0.12	0.00	0.02	0.00	0.16	0.00	0.11	0.00
	Kharkiv	0.09	-0.01	-0.15	-0.02	0.14	-0.01	0.10	-0.01
	Kherson	-0.16	0.01	-0.26	-	-0.13	-0.01	-0.14	0.06
	Khmelnysky	0.08	0.00	-0.17	0.00	0.17	0.01	-0.12	0.00
	Kirovograd	0.02	-0.01	0.22	0.00	-0.08	-0.01	0.11	0.00
	Kyiv region	-0.05	0.01	0.06	0.00	-0.07	0.02	-0.07	-0.01
	Kyiv city	0.04	0.00	0.10	0.00	0.05	0.00	-0.09	-
	Luhansk	-0.13	0.00	-0.29	-	-0.10	-0.01	-0.23	-
	Lviv	0.02	0.01	-0.01	0.00	0.03	0.02	-0.03	-0.02
	Mykolaiv	-0.03	0.01	-0.01	0.00	-0.09	0.00	0.13	0.02
	Odesa	-0.22	0.00	-0.19	0.00	-0.17	0.00	-0.44	-
	Poltava	0.25	-0.01	0.32	0.00	0.23	-0.01	0.27	-0.02
	Rivne	0.09	0.00	-0.01	0.00	0.12	0.04	0.07	-0.02
	Sumy	0.16	0.00	-0.06	0.00	0.25	0.00	-0.03	0.00
	Ternopil	0.05	0.00	-0.17	0.00	0.11	0.00	0.03	0.00
	Vinnysya	-0.03	0.01	-0.05	0.02	-0.10	0.01	0.18	0.04
	Volyn	-0.07	0.00	-0.06	0.00	-0.12	0.00	0.04	0.00
	Zaporizhzhya	-0.28	-0.02	-0.31	-	-0.29	-0.03	-0.20	-0.03
	Zhytomyr	0.01	-0.01	-0.03	0.00	0.05	-0.01	-0.15	0.00
Average absolute SMD score		0.12	0.06	0.13	0.08	0.14	0.07	0.17	0.09

Table S7. Standardized mean differences of covariates in crop production models.

Variable name		2008-2015		2008-2009		2010-2012		2013-2015	
		Raw	Matched	Raw	Matched	Raw	Matched	Raw	Matched
Total production value	average	0.27	0.19	0.10	0.15	0.27	0.21	0.42	0.21
	growth	-0.03	0.01	0.09	0.11	-0.17	-0.06	0.16	0.11
Land area	average	0.31	0.22	0.22	0.24	0.28	0.21	0.53	0.31
	growth	0.08	0.09	0.20	0.22	0.05	0.04	0.12	0.13
Share of crop production	average	-0.12	-0.02	-0.02	0.02	-0.18	-0.05	0.05	0.05
Share of vegetables and fruits	average	-0.28	-0.03	-0.25	0.01	-0.29	-0.06	-0.31	-0.23
Material costs in total production per 1 UAH of total production value	average	0.03	0.07	-0.02	0.31	0.09	0.08	0.02	0.01
	variation	0.14	0.25	0.12	0.22	0.12	0.24	0.26	0.35
Depreciation costs per 1 UAH of total production value	average	-0.02	-0.03	-0.02	0.13	-0.04	0.03	-0.06	-0.20
	variation	0.26	0.28	0.30	0.32	0.20	0.28	0.47	0.35
Share of cost of services provided by 3 rd party organizations in total costs	average	0.35	0.27	0.41	0.25	0.33	0.29	0.45	0.35
	growth	0.20	0.14	0.26	0.25	0.19	0.15	0.20	0.06
Labor costs per 1 UAH of total production value	growth	-0.04	-0.13	0.01	-0.19	-0.15	-0.16	-0.05	-0.11
Overhead costs per 1 UAH of total production value	average	0.01	0.12	-0.02	0.22	0.17	0.27	0.21	0.09
	average x share of crop production	0.02	0.10	-0.02	0.19	0.14	0.26	0.21	0.08
Land rent price	average	-0.02	0.15	-0.02	0.22	-0.01	0.16	0.00	0.32
	variation	0.15	0.18	0.11	0.10	0.19	0.21	0.12	0.21
Crop production per hectare	average	-0.07	-0.06	-0.06	-0.03	-0.07	-0.03	-0.07	-0.05
	growth	-0.01	0.04	-0.01	-0.06	0.00	0.05	0.01	0.04
	variation	0.26	0.27	0.16	0.18	0.30	0.33	0.24	0.28
Legal form	public joint-stock companies	0.00	0.00	0.00	0.00	-0.03	0.02	0.07	0.00
	family farms	-0.31	-0.01	-0.31	-	-0.29	-0.02	-0.32	-0.02
	limited liability companies	0.33	0.01	0.36	0.05	0.29	0.00	0.43	0.09
	sole proprietorships	-0.21	-0.03	-0.22	-0.06	-0.18	-0.04	-0.35	-0.15
	others	0.01	0.04	-0.06	0.00	0.02	0.06	0.03	0.06
	Regions	Cherkasy	-0.02	0.00	0.23	0.00	-0.07	0.02	-0.17
	Chernihiv	0.21	0.02	0.22	-0.01	0.19	0.02	0.28	0.03
	Chernivtsi	-0.04	0.00	-0.15	-	0.01	0.00	-0.14	-
	Dnipro	-0.11	0.00	0.08	0.00	-0.19	0.00	-0.04	-0.03
	Donetsk	-0.05	0.01	0.00	0.00	-0.07	0.00	-0.13	0.00
	Ivano-Frankivsk	0.11	0.00	0.03	0.00	0.15	0.00	0.03	0.00
	Kharkiv	0.09	-0.01	-0.15	-0.02	0.14	-0.01	0.11	-0.02
	Kherson	-0.16	0.01	-0.26	-	-0.13	-0.01	-0.14	0.06
	Khmelnitsky	0.08	0.00	-0.17	0.00	0.17	0.01	-0.12	0.00

Variable name	2008-2015		2008-2009		2010-2012		2013-2015	
	Raw	Matched	Raw	Matched	Raw	Matched	Raw	Matched
Kirovograd	0.02	-0.01	0.22	0.00	-0.08	-0.01	0.11	0.00
Kyiv region	-0.05	0.01	0.07	0.00	-0.08	0.02	-0.07	0.00
Kyiv city	0.04	0.00	0.11	0.00	0.05	0.00	-0.09	-
Luhansk	-0.13	0.00	-0.29	-	-0.10	-0.01	-0.23	-
Lviv	-0.02	0.01	-0.09	0.00	0.00	0.03	-0.02	-0.02
Mykolaiv	-0.03	0.01	-0.01	0.00	-0.09	0.00	0.13	0.02
Odesa	-0.22	0.00	-0.19	0.00	-0.17	0.00	-0.44	-
Poltava	0.26	-0.01	0.33	0.00	0.23	-0.01	0.27	-0.02
Rivne	0.10	0.00	0.00	0.00	0.13	0.04	0.08	-0.02
Sumy	0.16	0.00	-0.06	0.00	0.26	0.00	-0.03	0.00
Ternopil	0.06	0.00	-0.17	0.00	0.12	0.00	0.03	0.00
Vinnitsya	-0.03	0.01	-0.05	0.02	-0.09	0.01	0.18	0.04
Volyn	-0.07	0.00	-0.06	0.00	-0.12	-0.01	0.04	0.00
Zaporizhzhya	-0.28	-0.02	-0.32	-	-0.29	-0.03	-0.20	-0.03
Zhytomyr	0.01	-0.01	-0.03	0.00	0.06	-0.01	-0.15	0.00
Average absolute SMD score	0.12	0.06	0.14	0.08	0.14	0.07	0.17	0.09

Table S8. Standardized mean differences of covariates in animal production models.

Variable name	2008-2015		2008-2009		2010-2012		2013-2015		
	Raw	Matched	Raw	Matched	Raw	Matched	Raw	Matched	
Total production value	average	0.24	0.21	0.04	0.10	0.28	0.25	0.39	0.28
	growth	0.01	0.05	0.06	0.10	-0.12	-0.03	0.30	0.21
Land area	average	0.25	0.20	0.20	0.14	0.26	0.21	0.40	0.31
	growth	0.17	0.19	0.28	0.22	0.24	0.14	0.28	0.29
Share of crop production	average	-0.08	-0.02	0.04	0.06	-0.19	-0.05	0.16	0.09
Share of vegetables and fruits	average	-0.21	-0.01	-0.15	0.06	-0.24	-0.05	-0.26	-0.02
Material costs in total production per 1 UAH of total production value	average	0.00	0.24	-0.02	0.27	0.11	0.37	-0.01	0.46
	variation	0.17	0.21	0.14	0.19	0.16	0.28	0.19	0.25
Depreciation costs per 1 UAH of total production value	average	-0.01	0.08	-0.02	0.23	-0.02	0.17	-0.09	-0.28
	variation	0.22	0.29	0.25	0.27	0.21	0.26	0.19	0.39
Share of cost of services provided by 3rd party organizations in total costs	average	0.18	0.21	0.30	0.19	0.09	0.21	0.35	0.35
	growth	0.10	0.12	0.26	0.24	0.06	0.07	0.04	0.03
Labor costs per 1 UAH of total production value	growth	0.05	0.04	0.06	-0.01	0.05	0.04	-0.01	-0.44
Overhead costs per 1 UAH of total production value	average	0.00	0.37	-0.02	0.20	0.10	0.42	0.21	0.36
	average x share of crop production	0.00	0.29	-0.02	0.15	0.17	0.34	0.43	0.30
Land rent price	average	-0.01	0.18	0.00	0.25	-0.01	0.22	0.02	0.21
	variation	0.18	0.14	0.17	0.16	0.14	0.14	0.36	0.25
Crop production per hectare	average	-0.05	0.00	-0.04	0.10	-0.04	0.02	-0.07	-0.22
	growth	0.00	-0.02	-0.03	-0.06	0.02	0.03	-0.03	-0.34

Variable name	2008-2015		2008-2009		2010-2012		2013-2015	
	Raw	Matched	Raw	Matched	Raw	Matched	Raw	Matched
variation	0.23	0.25	0.22	0.25	0.27	0.27	0.06	0.25
Legal form								
public joint-stock companies	0.07	0.02	0.07	0.01	0.05	0.07	0.15	0.04
family farms	-0.32	-0.01	-0.31	-	-0.29	-0.01	-0.45	-
limited liability companies	0.37	-0.04	0.42	0.06	0.35	-0.05	0.39	0.00
sole proprietorships	-0.27	-0.03	-0.29	-0.07	-0.26	-0.05	-0.31	-0.07
others	-0.08	0.10	-0.15	0.00	-0.06	0.16	-0.06	0.11
Regions								
Cherkasy	0.00	-0.01	0.15	-0.01	-0.04	0.03	-0.16	-0.04
Chernihiv	0.17	0.02	0.23	0.02	0.17	0.02	0.03	0.16
Chernivtsi	-0.04	0.00	-0.16	-	0.01	-0.01	-0.15	-
Dnipro	-0.05	0.00	0.13	-0.01	-0.12	0.00	-0.11	0.00
Donetsk	0.05	0.01	0.11	0.00	-0.01	0.02	0.09	0.00
Ivano-Frankivsk	0.16	0.00	0.05	0.00	0.21	0.00	0.16	0.00
Kharkiv	0.01	-0.01	-0.19	0.00	0.07	-0.01	0.05	0.00
Kherson	-0.14	0.00	-0.22	-	-0.10	-0.01	-0.22	-
Khmelnysky	0.08	0.00	-0.17	0.00	0.19	0.02	-0.27	-
Kirovograd	0.02	0.00	0.15	0.00	-0.08	0.00	0.18	0.00
Kyiv region	-0.03	0.03	0.04	-0.01	-0.08	0.03	0.01	-0.03
Kyiv city	0.02	0.00	-0.05	-	0.05	0.00	-0.08	-
Luhansk	-0.07	0.00	-0.26	-	-0.02	-0.02	-0.20	-
Lviv	0.00	-0.01	0.02	0.04	0.00	0.00	-0.20	-0.13
Mykolaiv	-0.13	0.00	0.04	0.00	-0.21	0.00	-0.27	-
Odesa	-0.18	-0.01	-0.20	-0.02	-0.15	0.00	-0.40	-
Poltava	0.21	-0.01	0.28	0.01	0.16	-0.03	0.29	0.00
Rivne	-0.01	-0.01	0.00	-0.02	0.00	0.00	-0.21	-0.13
Sumy	0.10	0.00	-0.03	0.00	0.16	-0.01	0.08	0.00
Ternopil	-0.06	0.00	-0.26	-	-0.04	0.00	0.18	0.00
Vinnysya	-0.04	0.00	-0.06	0.03	-0.08	0.02	-	-
Volyn	-0.10	0.00	-0.06	0.00	-0.15	-0.01	0.01	0.00
Zaporizhzhya	-0.20	-0.01	-0.29	-	-0.20	-0.06	-0.04	0.00
Zhytomyr	0.06	0.00	-0.02	-0.03	0.11	-0.01	-0.06	0.00
Average absolute SMD score	0.11	0.07	0.14	0.09	0.13	0.09	0.18	0.15

Overlap tests

The overlap tests are used to ensure that ATET estimations are not biased by poor matches and the effect stems from the treatment. This way, we use the variables from the list of our covariates simultaneously as outcomes. The results of the overlap tests suggest that the set of selected covariates ensures good quality of matches and sufficient overlap between treated and control groups, considering that all of the estimated coefficients are statistically insignificant (see Table S9).

Table S9. Results of the overlap tests, 2008-2015.

Variable name		2008-2015		2008-2009		2010-2012		2013-2015	
		Number of observations: 42,236		Number of observations: 8,632		Number of observations: 16,779		Number of observations: 16,825	
		Coef.	$P> z $	Coef.	$P> z $	Coef.	$P> z $	Coef.	$P> z $
Total production value	average	-17	0.94	-93	0.55	336	0.27	-577	0.55
	growth	-132	0.40	-83	0.74	79	0.63	347	0.49
Land area	average	83	0.54	-32	0.78	47	0.74	229	0.59
	growth	64	0.44	122	0.31	-36	0.49	204	0.56
Share of crop production	average	-0.002	0.79	-0.004	0.85	-0.013	0.57	-0.013	0.42
Share of vegetables and fruits	average	-0.003	0.26	-0.006	0.52	0.0003	0.91	-0.002	0.38
Material costs in total production per 1 UAH of total production value	average	0.31	0.30	0.07	0.17	0.21	0.66	-0.14	0.26
	variation	0.007	0.43	-0.019	0.28	0.016	0.16	-0.003	0.91
Depreciation costs per 1 UAH of total production value	average	-0.022	0.16	0.007	0.36	-0.024	0.19	-0.030	0.12
	variation	0.011	0.61	0.003	0.88	0.032	0.15	0.053	0.11
Share of cost of services provided by 3 rd party organizations in total costs	average	0.004	0.44	-0.001	0.61	0.012	0.12	0.010	0.15
	growth	0.005	0.18	0.007	0.27	0.009	0.12	0.004	0.74
Labor costs per 1 UAH of total production value	growth	-0.030	0.78	0.007	0.78	-0.002	0.95	-0.008	0.48
Overhead costs per 1 UAH of total production value	average	-0.0001	0.97	0.004	0.25	0.0001	0.98	0.001	0.35
	average x share of crop production	0.0003	0.93	-0.003	0.30	0.0004	0.89	-0.001	0.35
Land rent price	average	0.004	0.39	0.023	0.11	0.001	0.81	-0.021	0.23
	variation	0.007	0.31	-0.036	0.41	-0.006	0.71	0.018	0.46
Crop production per hectare	average	0.009	0.70	-0.006	0.85	0.033	0.31	0.017	0.84
	growth	0.002	0.94	-0.002	0.98	0.007	0.85	-0.093	0.15
	variation	0.03	0.11	-0.62	0.34	0.14	0.64	0.27	0.12

Table S10. The results of the NNM analysis (ATET).¹

Group of variables	Variable name	Period of acquisitions	min-max number of observations		Number of years after acquisitions (t) / ATET						
			incl.treated		t+1	t+2	t+3	t+4	t+5	t+6	t+7
Organic growth	Organic growth in total production	2008-2015	6,216-42,236	58-517	959**	1,537***	3,006*	692	3,105	-376	6,093*
		2008-2009	6,213-8,632	58-97	1,974**	3,596**	3,757*	5,025**	3,065	121	6,093*
		2010-2012	14,000-16,779	261-329	262	973**	623	331	-	-	-
		2013-2015	16,825	91	2,911***	-	-	-	-	-	-
	Organic growth in crop production	2008-2015	6,156-41,500	58-509	1,249***	1,733***	1,662**	1,160(*)	1,751(*)	2,373*	5,525*
		2008-2009	6,156-8,480	58-96	2,050**	3,570**	3,794*	4,814**	5,943**	5,077**	5,525*
		2010-2012	13,831-16,476	256-323	594(*)	1,342***	1,044**	581	-	-	-
		2013-2015	16,544	90	2,821***	-	-	-	-	-	-
	Organic growth in animal production	2008-2015	4,689-20,404	41-278	-715***	-507**	2,143	-500	2,565	-1,044*	496
		2008-2009	4,689-6,454	41-74	-106	-26	52	234	375	-79	496
		2010-2012	7,734-9,078	144-176	-704**	-874***	-660(*)	-836(*)	-	-	-
		2013-2015	4,872	28	-1,255	-	-	-	-	-	-
Profits	Absolute profit in crop production	2008-2015	6,040-40,846	57-504	341	122	819**	81	111	344	885
		2008-2009	6,040-8,400	57-95	278	1,364***	643*	-539(*)	1,464***	1,298	885
		2010-2012	13,608-16,232	255-320	439*	349	1,419***	987(*)	-	-	-
		2013-2015	16,214	89	-840	-	-	-	-	-	-
	Absolute profit in animal production	2008-2015	3,318-16,527	21-221	-35	-314*	100	154	76	31	251*
		2008-2009	3,318-5,975	21-61	-33	104	14	103	382***	113	251*
		2010-2012	6,004-8,249	96-144	125	-499**	204	118	-	-	-
		2013-2015	2,303	16	-2,531(*)	-	-	-	-	-	-
	Profit margin in crop production	2008-2015	6,040-40,846	57-504	0.03	0.04(*)	0.05(*)	0.06*	0.11*	0.05	0.11
		2008-2009	6,040-8,400	57-95	0.07	0.16*	0.02	-0.02	0.20**	0.04	0.11
		2010-2012	13,608-16,232	255-320	-0.01	0.02	0.07**	0.07*	-	-	-
		2013-2015	16,214	89	0.13***	-	-	-	-	-	-
	Profit margin in animal production	2008-2015	3,318-16,527	21-221	0.19*	0.09	-0.19	0.14*	0.14*	0.17	0.30*
		2008-2009	3,318-5,975	21-61	0.66***	0.12	0.34*	0.39**	0.31*	0.30	0.30*
		2010-2012	6,004-8,249	96-144	-0.14	0.07	-0.33	0.10	-	-	-
		2013-2015	2,303	16	-0.111	-	-	-	-	-	-
	Absolute profit per hectare in crop production	2008-2015	5,992-40,412	57-495	0.11**	0.14***	0.25***	0.35***	0.27**	-0.13	-0.80
		2008-2009	5,992-8,305	57-92	0.18***	0.27***	0.14(*)	-0.21**	0.20**	-0.27	-0.80
2010-2012		13,475-16,057	251-314	0.05	0.12*	0.38***	0.50***	-	-	-	
2013-2015		16,050	89	0.20*	-	-	-	-	-	-	
Performance	Crop production per hectare	2008-2015	6,089-41,010	58-500	0.38***	0.43***	0.34***	0.29***	0.22***	0.20**	-0.04
		2008-2009	6,089-8,380	58-93	0.30***	0.37***	0.22***	-0.08	0.40***	0.22*	-0.04
		2010-2012	13,666-16,271	252-317	0.41***	0.50***	0.41***	0.30**	-	-	-
		2013-2015	16,359	90	0.41***	-	-	-	-	-	-
	Milk production per cow per year	2008-2015	1,997-9,472	16-146	-0.06	0.53(*)	0.60***	0.72***	0.30	1.06	1.06
		2008-2009	1,997-3,638	16-39	0.05	0.18	0.36	0.69(*)	-0.07	2.28	1.06
		2010-2012	3,379-4,556	66-96	-0.44(*)	-0.10	0.65**	0.81**	-	-	-
		2013-2015	1,278	11	-0.399	-	-	-	-	-	-

Group of variables	Variable name	Period of acquisitions	min-max number of observations		Number of years after acquisitions (t) / ATET						
			incl.treated		t+1	t+2	t+3	t+4	t+5	t+6	t+7
	Crop production per 1 UAH of depreciation	2008-2015	6,087-41,129	56-501	343*	252***	1,346***	1,094**	1,473***	720**	-421
		2008-2009	6,087-8,354	56-92	-58	-40	-48	-23	246	-61	-421
		2010-2012	13,714-16,328	252-319	404(*)	377***	1,916***	1,483	-	-	-
		2013-2015	16,447	90	522	-	-	-	-	-	-
	Crop production per 1 UAH of material costs	2008-2015	6,105-41,204	57-503	-0.21	0.18*	-0.07	-0.36	0.06	0.03	-0.07
		2008-2009	6,105-8,379	57-92	0.17	0.03	-0.05	-0.12	-0.05	0.20	-0.07
		2010-2012	13,739-16,356	252-321	0.03	0.23(*)	-0.19**	-0.47	-	-	-
		2013-2015	16,469	90	-1.43*	-	-	-	-	-	-
	Crop production per employee	2008-2015	6,052-40,829	55-490	112***	237***	217***	78**	119**	51	57(*)
		2008-2009	6,052-8,381	55-93	27*	53***	83(*)	52	147(*)	70*	57(*)
		2010-2012	13,611-16,224	243-309	96***	251***	244***	90***	-	-	-
		2013-2015	16,224	88	231***	-	-	-	-	-	-
	Animal production per 1 UAH of depreciation	2008-2015	3,365-16,815	21-216	99***	75 **	80**	208***	127(*)	105	-137*
		2008-2009	3,365-6,020	21-57	109	67	-62	100**	-384***	-128	-137*
		2010-2012	6,137-8,428	95-141	117***	69(*)	147**	265***	-	-	-
		2013-2015	2,367	18	-35	-	-	-	-	-	-
	Animal production per 1 UAH of material costs	2008-2015	3,392-16,899	21-218	0.09	0.59	0.17	0.23	0.09	0.60	-0.44
		2008-2009	3,392-6,046	21-58	-0.51	1.27	-0.30	-0.19	-1.07	1.08	-0.44
		2010-2012	6,184-8,476	95-142	0.36	0.50	0.50	0.48	-	-	-
		2013-2015	2,377	18	0.86	-	-	-	-	-	-
	Animal production per employee	2008-2015	3,373-16,798	21-214	5.53	5.63	21.69	5.05	29.23	23.86	4.37
		2008-2009	3,373-6,011	21-57	9.18	13.73	2.74	0.94	-7.18	0.57	4.37
		2010-2012	6,142-8,433	95-143	-2.73	1.35	2.93	-1.53	-	-	-
		2013-2015	2,354	14	260	-	-	-	-	-	-
Resource allocation	Share of crop production	2008-2015	6,121-41,354	57-506	0.044***	0.056***	0.049***	0.061***	0.064***	0.053***	0.057**
		2008-2009	6,121-8,441	57-95	0.048**	0.055***	0.066***	0.128***	0.102***	0.105***	0.057**
		2010-2012	13,772-16,416	249-321	0.041***	0.053***	0.043***	0.035***	-	-	-
		2013-2015	16,497	90	0.028*	-	-	-	-	-	-
	Share of cash crops in crop production	2008-2015	6,054-41,024	55-499	0.021*	0.032***	0.045***	0.055***	0.037**	-0.012	-0.027
		2008-2009	6,054-8,316	55-90	0.021	0.023	0.033	0.084**	0.015	-0.015	-0.027
		2010-2012	13,665-16,292	248-319	0.032**	0.031*	0.051***	0.060***	-	-	-
		2013-2015	16,416	90	-0.018	-	-	-	-	-	-
	Share of milk production in animal production	2008-2015	2,009-9,563	16-146	0.028**	0.047***	0.052**	0.079***	0.055**	0.112***	0.136***
		2008-2009	2,009-3,668	16-39	0.071***	0.072**	0.021	0.089***	0.077*	0.142**	0.136***
		2010-2012	3,400-4,607	66-96	0.009	0.014	0.021	0.056**	-	-	-
		2013-2015	1,288	11	0.018	-	-	-	-	-	-
Share of harvested to available arable land	2008-2015	6,089-41,010	58-500	0.109***	0.089**	0.092**	0.321	0.025	0.006	-0.017	
	2008-2009	6,089-8,380	58-93	0.086***	0.089***	0.118***	-0.181*	0.076*	-0.006	-0.017	
	2010-2012	13,666-16,271	252-317	0.107**	0.068(*)	0.062**	0.356	-	-	-	
	2013-2015	16,359	90	0.291***	-	-	-	-	-	-	
Investment / divestment -	Material costs in crop production	2008-2015	6,104-41,189	57-503	373	392	717(*)	271	664	823	2,022
		2008-2009	6,104-8,379	57-92	1,890**	1,926(*)	2,329	2,110**	2,152**	2,321(*)	2,022

Group of variables	Variable name	Period of acquisitions	min-max number of observations		Number of years after acquisitions (t) / ATET						
			incl.treated		t+1	t+2	t+3	t+4	t+5	t+6	t+7
variable inputs		2010-2012	13,737-16,352	252-321	29	130	518	126	-	-	-
		2013-2015	16,458	90	599	-	-	-	-	-	-
	Material costs in animal production	2008-2015	3,365-16,781	21-216	-380*	-421(*)	-180	-681	-1,110	-890(*)	-489
		2008-2009	3,365-6,017	21-56	-44	56	110	352	229	-230	-489
		2010-2012	6,133-8,409	95-142	-458*	-458	-262	-945	-	-	-
		2013-2015	2,355	18	294	-	-	-	-	-	-
	Seeds	2008-2015	5,997-40,491	54-480	49	175*	191**	138	145	284(*)	445
		2008-2009	5,997-8,241	54-89	315*	379*	401	465*	550*	673**	445
		2010-2012	13,505-16,060	242-306	-46	177(*)	195**	102	-	-	-
		2013-2015	16,190	85	58	-	-	-	-	-	-
	Fertilizers	2008-2015	6,072-41,086	57-502	253***	107	120	90	179	66	644
		2008-2009	6,072-8,342	57-92	554**	405*	667	658*	571*	644(*)	644
		2010-2012	13,683-16,308	249-320	161**	106	-76	128	-	-	-
		2013-2015	16,436	90	472(*)	-	-	-	-	-	-
	Feedstuff	2008-2015	3,391-16,893	21-218	-245	-271	-97	-371	-817	-773*	-316
		2008-2009	3,391-6,043	21-58	-31	28	32	273	184	-193	-316
2010-2012		6,181-8,473	95-142	-350(*)	-315	-60	-734	-	-	-	
2013-2015		2,377	18	-130	-	-	-	-	-	-	
Investment / divestment - fixed assets & labor	Depreciation in crop production	2008-2015	6,087-41,129	56-501	-79**	-47(*)	-116***	-132***	-192***	1.43	5.44
		2008-2009	6,087-8,354	56-92	123***	55(*)	42	33	40	110	5.44
		2010-2012	13,714-16,328	252-319	-113**	-74*	-114***	-161***	-	-	-
		2013-2015	16,447	90	-39	-	-	-	-	-	-
	Depreciation in animal production	2008-2015	3,365-16,815	21-216	1.80	-1.89	-114 (*)	-42	-164**	-71	26
		2008-2009	3,365-6,020	21-57	-17	-8.18	-16	39	14	21	26
		2010-2012	6,137-8,428	95-141	29	78	-9.99	-65(*)	-	-	-
		2013-2015	2,367	18	-371*	-	-	-	-	-	-
	Total land area	2008-2015	6,156-41,500	58-509	112	346(*)	634***	669***	549 (*)	944*	1,969**
		2008-2009	6,156-8,480	58-96	617(*)	1024*	1,271**	2,118***	1,821**	1,943**	1,969**
		2010-2012	13,831-16,476	256-323	-111	70	354**	464**	-	-	-
		2013-2015	16,544	90	1,033**	-	-	-	-	-	-
	Milk herd size	2008-2015	4,689-20,404	41-278	-38***	-7.89	-20	-46*	-52	-57	70
		2008-2009	4,689-6,454	41-74	-12	3.70	13	45	81	40	70
		2010-2012	7,734-9,078	144-176	-25(*)	15	-8.07	-62***	-	-	-
		2013-2015	4,872	28	-175	-	-	-	-	-	-
Labor units in crop production	2008-2015	6,110-41,282	56-505	-12**	-11**	-5.65	-9.02	-6.94	16	33	
	2008-2009	6,110-8,418	56-94	15 (*)	15	29(*)	28(*)	42*	30(*)	33	
	2010-2012	13,764-16,383	256-321	-13*	-16**	-13*	-18*	-	-	-	
	2013-2015	16,481	90	-5.63	-	-	-	-	-	-	
Labor units in animal production	2008-2015	3,396-16,928	21-220	-4.61	-9.03	-10	-11	-31	-10	10	
	2008-2009	3,396-6,054	21-58	0.26	7.97	16*	20*	0.92	18	10	
	2010-2012	6,187-8,497	95-144	-2.67	-12	-16	-25(*)	-	-	-	
	2013-2015	2,377	18	10	-	-	-	-	-	-	

Group of variables	Variable name	Period of acquisitions	min-max number of observations		Number of years after acquisitions (t) / ATET						
			incl.treated		t+1	t+2	t+3	t+4	t+5	t+6	t+7
Investment / divestment - services	Costs of 3 rd party services in crop production	2008-2015	6,156-41,500	58-509	507***	632***	923***	612***	1,172***	622**	664(*)
		2008-2009	6,156-8,480	58-96	201*	297*	423**	478*	1,378**	949**	664(*)
		2010-2012	13,831-16,476	256-323	456***	484***	933***	806***	-	-	-
		2013-2015	16,544	90	907**	-	-	-	-	-	-
	Costs of 3 rd party services in animal production	2008-2015	4,689-20,404	41-278	85*	49**	88***	50**	20	-51	6.15
		2008-2009	4,689-6,454	41-74	4.65	-12	-29	-14	15	-31	6.15
		2010-2012	7,734-9,078	144-176	93	63**	108**	44(*)	-	-	-
		2013-2015	4,872	28	102	-	-	-	-	-	-
	Share of 3 rd party services costs in total crop production costs	2008-2015	6,113-41,233	57-503	0.072***	0.092***	0.086***	0.103***	0.105***	0.051***	0.043**
		2008-2009	6,113-8,390	57-92	0.028**	0.043**	0.048***	0.053**	0.058**	0.064***	0.043**
		2010-2012	13,755-16,362	253-321	0.074***	0.094***	0.093***	0.111***	-	-	-
		2013-2015	16,481	90	0.070***	-	-	-	-	-	-
	Share of 3 rd party services costs in total animal production costs	2008-2015	3,398-16,922	21-218	0.014**	0.027***	0.032***	0.047***	0.054***	0.043**	0.053
		2008-2009	3,398-6,056	21-58	0.010	0.015	0.023	0.039	0.029	0.045	0.053
		2010-2012	6,190-8,487	95-142	0.021***	0.033***	0.042***	0.054***	-	-	-
		2013-2015	2,379	18	0.012	-	-	-	-	-	-
	Overhead (SG&A) costs in crop production	2008-2015	6,088-41,148	56-502	243**	472***	1,395**	685***	237	584***	658*
		2008-2009	6,088-8,358	56-91	339*	556*	715(*)	480(*)	784**	925**	658*
		2010-2012	13,721-16,333	253-321	66	354***	1,722*	769***	-	-	-
		2013-2015	16,457	90	892**	-	-	-	-	-	-
Overhead (SG&A) costs in animal production	2008-2015	3,356-16,808	21-215	16	33	193	89	6.26	39	161	
	2008-2009	3,356-6,016	21-56	19	10	36	-13	-98	113	161	
	2010-2012	6,117-8,428	94-141	37	89	268	146	-	-	-	
	2013-2015	2,364	18	31	-	-	-	-	-	-	
Resource redeploy-ment	Salary per employee in crop production	2008-2015	5,991-40,401	55-464	0.25	0.67*	-0.15	0.27	-0.19	-0.55	-0.63
		2008-2009	5,991-8,316	55-89	0.18	0.56	0.93	0.87	-0.17	-0.39	-0.63
		2010-2012	13,445-16,054	232-294	0.34	1.01**	-0.30	0.32	-	-	-
		2013-2015	16,031	81	0.16	-	-	-	-	-	-
	Salary per employee in animal production	2008-2015	3,350-16,724	21-211	0.28	0.64	1.06**	0.35	1.98(*)	0.33	0.59
		2008-2009	3,350-5,989	21-56	0.66	2.08*	0.32	1.80**	-3.19	-0.16	0.59
		2010-2012	6,111-8,390	94-141	-1.31*	0.41	1.05	0.70	-	-	-
		2013-2015	2,345	14	5.18	-	-	-	-	-	-
	Land rent costs per hectare	2008-2015	5,609-37,719	52-457	0.025***	0.042	0.033***	0.022**	0.066***	0.039***	0.087**
		2008-2009	5,609-7,654	52-84	0.021**	0.039**	0.037**	0.002	0.001	0.022	0.087**
		2010-2012	12,637-14,977	234-290	0.022***	0.018	0.036***	0.031***	-	-	-
		2013-2015	15,088	83	0.011	-	-	-	-	-	-

¹ The estimated coefficients represent average treatment effects on treated (ATET). ***, **, *, (*) denote 1, 5, 10, and 15% significance levels respectively.

Table S11. Median values and standard deviations of farms' pre-acquisition characteristics by groups.¹

Groups	TP value (size proxy), 1000 UAH		Share of CP, %		Land area, ha		Land rend price, 1000 UAH per ha		CP value per ha of land, 1000 UAH per ha		Profit margin in CP, %	
	median	st.dev.	median	st.dev.	median	st.dev.	median	st.dev.	median	st.dev.	median	st.dev.
1 – ‘Low effect’	4,336	5,570	0.94	0.21	2,728	3,061	0.131	0.122	1.19	0.667	0.15	0.29
2 – ‘Profit growth-oriented’	3,682	32,729	0.95	0.29	2,267	19,039	0.123	0.159	1.16	0.749	-0.01	0.70
3 – ‘Medium effect’	5,004	8,526	0.94	0.15	2,912	3,806	0.135	0.046	1.34	0.553	0.15	0.18
4 – ‘Size-growth oriented’	2,815	14,938	0.88	0.27	2,346	7,331	0.125	0.047	0.99	0.434	0.15	0.22
5 – ‘Star effect’	2,832	6,295	0.87	0.24	2,386	2,884	0.116	0.079	0.98	0.603	0.03	0.20
6 – ‘Extensive size growth’	971	15,495	0.82	0.32	979	1,020	0.103	0.044	0.98	0.854	-0.03	0.50
7 – ‘Merged or liquidated’	3,275	6,110	0.99	0.23	1,922	2,963	0.148	0.114	1.35	0.755	0.06	0.30
Total	3,423	14,149	0.94	0.24	2,367	7,599	0.128	0.100	1.17	0.680	0.10	0.36

Kruskal-Wallis equality-of-populations rank test
Ho of equality is rejected between the following groups

1&3**, 1&4**, 1&5**, 1&6**, 2&5*, 2&6**, 3&5**, 3&6**, 3&7**, 4&6**, 5&6**, 6&7**	1&4*, 1&7*, 2&7**, 3&5**, 3&6**, 4&7**, 5&7**, 6&7**	1&6**, 1&7**, 2&6**, 2&7**, 3&5**, 3&6**, 3&7**, 4&6**, 5&6**, 5&7*, 6&7**	1&6**, 1&7**, 2&6**, 2&7**, 3&5**, 3&6**, 4&6**, 4&7**, 5&6*, 5&7**, 6&7**	1&3**, 1&4**, 1&5**, 1&6**, 2&5**, 2&6*, 2&7*, 3&5**, 3&6**, 3&7*, 4&7**, 5&7**, 6&7**	1&2**, 1&5**, 1&6**, 1&7**, 2&7**, 3&5**, 3&6**, 3&7**, 4&5**, 4&6**, 4&7**, 5&7**, 6&7**
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Table S11. Continued.

Groups	Material costs per TP value, %		Depreciation, 1000 UAH		Depreciation per TP value, %		Depreciation CP per ha of land, 1000 UAH per ha		Share of 3 rd -party services in total costs, %	
	median	st.dev.	median	st.dev.	median	st.dev.	median	st.dev.	median	st.dev.
1 – ‘Low effect’	0.70	0.48	180	248	0.038	0.087	0.045	0.056	0.068	0.070
2 – ‘Profit growth-oriented’	0.76	0.73	128	2,561	0.034	0.068	0.043	0.065	0.056	0.068
3 – ‘Medium effect’	0.58	0.22	170	380	0.037	0.032	0.046	0.053	0.072	0.060
4 – ‘Size-growth oriented’	0.64	0.35	90	688	0.031	0.049	0.034	0.045	0.039	0.050
5 – ‘Star effect’	0.69	0.19	55	350	0.022	0.039	0.020	0.059	0.054	0.088
6 – ‘Extensive size growth’	0.72	0.39	20	1,167	0.024	0.061	0.026	0.043	0.065	0.139
7 – ‘Merged or liquidated’	0.69	16.32	78	365	0.026	0.185	0.029	0.063	0.080	0.095
Total	0.67	8.01	94	996	0.031	0.103	0.034	0.057	0.063	0.081

Kruskal-Wallis equality-of-populations rank test
Ho of equality is rejected between the following groups

1&3**, 2&7*, 3&5**, 3&6**, 3&7**	1&4**, 1&5**, 1&6**, 1&7**, 2&5**, 2&6**, 2&7**, 3&5**, 3&6**, 3&7**, 4&6**, 5&6*, 6&7*	1&4*, 1&5**, 1&7**, 2&5**, 2&7**, 3&5**, 3&7**	1&4**, 1&5**, 1&7**, 2&5**, 2&7**, 3&5**, 3&6**, 3&7**, 4&5*, 5&7*	1&4**, 1&7*, 2&7*, 3&5*, 4&5**, 4&6*, 4&7**, 5&7**, 6&7**
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¹ ***, **, * denote 1-, 5-, and 10% significance levels, respectively. For the purpose of better readability of the results, we included only the statistically significant Kruskal-Wallis test results of the groups of core interest, i.e. the comparisons of groups 1, 5, 6, and 7 to all other groups. TP = total production, CP = crop production; St.dev. = standard deviation.

Table S12. Median values of farms' PAI in crop production by groups (based on t+3 profit and size growth classification).¹

Groups	Material costs			Land area			Costs of 3 rd -party services			Depreciation			Labor units		
	t+1	t+3	t+5	t+1	t+3	t+5	t+1	t+3	t+5	t+1	t+3	t+5	t+1	t+3	t+5
1 – ‘Low effect’	1.03	0.72	0.53	0.965	0.937	0.833	1.32	1.56	1.33	0.49	0.06	0.23	0.96	0.90	0.69
2 – ‘Profit growth-oriented’	0.63	0.17	0.37	0.941	0.715	0.641	0.95	0.20	0.79	0.22	-0.45	-0.58	0.77	0.53	0.69
3 – ‘Medium effect’	1.07	1.02	1.02	1.005	1.019	1.008	1.36	1.31	1.15	0.72	0.58	0.22	0.99	1.00	0.93
4 – ‘Size-growth oriented’	1.28	1.59	1.65	1.001	1.140	1.070	2.39	5.99	7.05	0.69	0.64	0.08	1.02	1.06	1.06
5 – ‘Star effect’	1.23	1.10	1.14	1.047	1.247	1.146	2.45	4.61	5.47	0.52	0.07	-0.05	0.90	1.07	0.90
6 – ‘Extensive size growth’	2.89	9.60	7.77	2.171	4.332	2.935	5.19	37.96	16.75	1.43	4.40	4.07	2.06	3.76	4.28
7 – ‘Merged or liquidated’	0.95	-	-	0.981	-	-	1.34	-	-	0.35	-	-	0.77	-	-
Total	1.06	1.00	0.98	1.001	1.023	1.009	1.53	1.91	2.05	0.49	0.27	-0.004	0.91	0.99	0.91

Kruskal-Wallis equality-of-populations rank test

Ho of equality is rejected between the following groups

1&2**	1&2***	1&3*	1&3**	1&2**	1&3***	1&2*	1&2***	1&4***	unsignifi	1&2*	1&2**	1&2**	1&2***	1&3**
1&4**	1&3**	1&4***	1&4**	1&3***	1&4***	1&4*	1&4***	1&5***	cant chi-	1&3**	1&6*	1&6***	1&3*	1&4**
1&5**	1&4***	1&5**	1&5***	1&4***	1&5***	1&5**	1&5***	1&6**	squared	1&4**	2&3***	1&7***	1&6***	1&5*
2&5***	1&5***	1&6***	1&6***	1&5***	1&6***	1&6*	1&6***	2&5***		1&6***	2&5**	2&3***	2&3***	1&6***
2&6***	1&6***	2&5***	2&5***	1&6***	2&5***	2&5***	2&5***	2&6***		2&5**	2&6***	2&4**	2&4***	2&5*
2&7**	2&5***	2&6***	2&6***	2&6***	2&6***	2&6***	2&6***	2&6***		2&6***	3&6*	2&6***	2&5***	2&6***
3&5*	2&6***	3&6***	3&5***	2&6***	3&5**	3&5***	3&5***	3&6***		3&6**	4&6*	3&5*	2&6***	3&6***
3&7**	3&5**	4&5**	3&6***	3&5***	3&6***	3&6*	3&6***	4&5**		4&5**	5&6**	3&6***	3&6***	4&6***
4&7***	3&6***	5&6***	3&7**	3&6***	4&6***	4&7**	4&6**	4&6**		4&6*	3&7***	3&7***	4&6***	5&6***
5&7***	4&6***		4&5**	4&6***	5&6***	5&7***	5&6**	5&6***		5&6***	4&6***	5&6***	5&6***	
6&7**	5&6***		4&6***	5&6***		6&7**					4&7***	4&7***	6&7***	
			4&7**								5&6***	5&6***		
			5&6***								5&7*	5&7*		
			5&7***								6&7***	6&7***		
			6&7***											

Table S12. Continued.

Groups	Share CP			Overheads			Land rent*			Share of harvested to arable land*		
	t+1	t+3	t+5	t+1	t+3	t+5	t+1	t+3	t+5	t+1	t+3	t+5
1 – ‘Low effect’	0.012	0.017	0.042	0.96	1.56	2.00	-0.003	0.041	0.038	0.056	0.037	0.071
2 – ‘Profit growth-oriented’	0.002	-0.005	-0.007	0.45	0.39	-0.51	0.016	-0.006	0.044	0.030	0.091	-0.055
3 – ‘Medium effect’	0.021	0.013	0.025	0.89	1.28	-0.08	0.023	0.023	0.008	0.057	0.056	0.017
4 – ‘Size-growth oriented’	0.009	0.067	0.011	1.44	1.45	0.07	0.029	0.034	0.079	0.097	0.193	0.039
5 – ‘Star effect’	0.040	0.045	0.031	0.56	1.28	0.55	0.018	0.009	0.066	0.077	0.170	0.057
6 – ‘Extensive size growth’	-0.017	0.019	0.027	1.54	22.92	7.30	-0.009	-0.007	0.040	0.041	0.077	0.026
7 – ‘Merged or liquidated’	0.003	-	-	0.86	-	-	0.007	-	-	0.058	-	-
Total	0.012	0.020	0.026	0.87	1.28	0.13	0.014	0.019	0.042	0.060	0.100	0.026

Kruskal-Wallis equality-of-populations rank test

Ho of equality is rejected between the following groups

1&3*	1&4***	unsignifi	unsignifi	unsignifi	unsignifi	unsignifi	1&2***	unsignifi	unsignifi	1&4***	unsignifi
1&5**	1&5***	chi-squared	chi-squared	chi-squared	chi-squared	chi-squared	1&6**	chi-squared	chi-squared	1&5**	chi-squared
2&5***	2&5***						2&5*			2&5**	
3&6**	3&5**						4&5*			3&5**	
3&7**	4&6*						4&6**			4&6***	
4&5**	5&6*									5&6*	
4&6*											
5&6***											
5&7***											

¹ The coefficients represent the median values of the respective variables' relative change based on predicted ATET or absolute change if the variable was already relative (marked with *). For the purpose of better readability of the results, we included only the statistically significant Kruskal-Wallis test results of the groups of core interest, i.e. the comparisons of groups 1, 5, 6, and 7 to all other groups. ***, **, * denote 1-, 5-, and 10% significance levels, respectively.

Table S13. Median values of farm-level acquisition outcomes by groups (based on t+3 profit and size growth classification).¹

Groups	Organic growth			Profit margin in CP- growth*			Profit margin in CP - absolute value			Profit growth			Crop production value per ha*		
	t+1	t+3	t+5	t+1	t+3	t+5	t+1	t+3	t+5	t+1	t+3	t+5	t+1	t+3	t+5
1 – ‘Low effect’	0.92	0.43	0.63	-0.107	-0.310	-0.113	0.151	0.081	0.274	0.16	-0.43	0.23	0.07	-0.28	0.03
2 – ‘Profit growth-oriented’	0.73	0.16	0.08	0.228	0.314	0.362	0.061	0.264	0.288	0.24	0.04	-0.63	0.10	-0.31	-0.32
3 – ‘Medium effect’	1.17	1.07	1.09	0.004	-0.001	-0.057	0.182	0.265	0.225	0.98	0.92	-0.12	0.27	0.09	0.12
4 – ‘Size-growth oriented’	1.42	2.24	1.92	-0.267	-0.308	-0.279	0.120	0.081	0.129	0.29	-0.03	-0.22	0.33	0.66	0.47
5 – ‘Star effect’	1.78	2.70	1.93	0.151	0.296	0.206	0.150	0.313	0.335	0.54	2.87	-0.92	0.63	0.82	0.51
6 – ‘Extensive size growth’	4.45	14.66	5.41	-0.042	0.110	0.086	-0.034	0.229	0.270	-0.63	-0.67	8.52	-0.12	0.42	0.01
7 – ‘Merged or liquidated’	1.11	-	-	0.028	-	-	0.159	-	-	0.39	-	-	0.26	-	-
Total	1.18	1.14	1.18	0.033	0.015	0.015	0.137	0.219	0.238	0.41	0.38	-0.14	0.25	0.20	0.17

Kruskal-Wallis equality-of-populations rank test
Ho of equality is rejected between the following groups

1&3***,	1&3***,	1&2*,	1&2***,	1&2***,	1&2***,	1&2*,	1&2***,	1&4**,	unsignifi	1&3***,	unsignifi	1&3*,	1&3***,	1&2*,
1&4***,	1&4***,	1&3**,	1&3***,	1&3***,	1&4*,	1&3*,	1&3***,	1&5*,	cant chi-	1&5***,	cant chi-	1&4**,	1&4***,	1&4***,
1&5***,	1&5***,	1&4***,	1&4*,	1&5***,	1&5***,	1&6*,	1&5***,	3&5**,	squared	2&5***,	squared	1&5***,	1&5***,	1&5***,
1&6***,	1&6***,	1&5***,	1&5***,	1&6***,	2&5*,	1&7*,	1&6***,	4&5***,		4&5***,		1&7**,	1&6***,	2&5***,
1&7**,	2&5***,	1&6***,	1&7***,	2&6**,	2&6***,	2&5**,	2&5*,	4&6**		5&6*		2&5***,	2&5***,	2&6**,
2&5***,	2&6***,	2&5***,	2&6***,	3&5***,	3&5***,	2&7***,	2&6*,					2&7*,	2&6***,	3&5***,
2&6***,	3&5***,	2&6***,	2&7***,	3&6**,	4&5***,	3&6***,	3&5***,					3&5***,	3&5***,	4&6**
2&7***,	3&6***	3&5***,	3&5***,	4&5***,	4&6**,	4&5*,	4&5***,					4&5*,	3&6*,	
3&5***,		3&6***,	4&5***,	4&6***,	5&6*	4&7**,	4&6**,					4&6**,	4&6*,	
3&6***,		4&6**,	4&6**,	5&6**		5&6**,	5&6**					5&6***,	5&6***	
4&5*,		5&6**	4&7***,			6&7***						5&7***,		
4&6*,			5&6***,									6&7*		
4&7***,			5&7***											
5&7***,														
6&7***														

¹ The coefficients represent the median values of the respective variables’ relative change based on predicted ATET or absolute change if the variable was already relative (marked with *). For the purpose of better readability of the results, we included only the statistically significant Kruskal-Wallis test results of the groups of core interest, i.e. the comparisons of groups 1, 5, 6, and 7 to all other groups. ***, **, * denote 1-, 5-, and 10% significance levels, respectively.