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What drives post-acquisition farm growth? Empirical evidence from Ukraine

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Abstract: This study contributes to the limited body of research on mergers and acquisitions in primary agriculture by examining how large corporate agroholdings achieve profitable post-acquisition growth for the farms they acquire. Using System GMM estimation, we analyse farm-level data from 648 farms acquired by agroholdings in Ukraine between 2005 and 2016. Our findings show that agroholdings facilitate post-acquisition growth and performance improvements by employing several integration strategies. Specifically, they leverage horizontally integrated structures to: (*i*) consolidate land resources of acquired farms to achieve scale economies; (*ii*) reallocate farm resources toward more profitable production lines; and (*iii*) intensify production on acquired farms. These results support established firm growth theories, namely, the independence of firm growth rates from firm size (Gibrat's law) and the existence of Penrosean limits to growth.

Keywords: agroholdings; farm resources; mergers and acquisitions; organic growth; post-acquisition integration

The rapid development of so-called agroholdings in several post-Soviet countries is a well-documented phenomenon (Gagalyuk et al. 2021). Agroholdings are very large, horizontally and, quite often, vertically integrated farming entities, typically comprising a parent company that owns and hierarchically manages numerous subsidiary commercial farms (Ostapchuk et al. 2021a). Over recent decades, agroholdings have become key players in the agricultural and land markets of countries such as Kazakhstan, Russia, and Ukraine (Gagalyuk et al. 2021). However, empirical evidence indicates that agroholdings do not systematically outperform independent farms (Walther 2014). Their advantages in resource access and capital allocation may be offset by operational inefficiencies, coordination challenges, and managerial constraints.

One potential source of such inefficiencies may lie in the rapid expansion of agroholdings. Their swift growth, enabling the consolidation of dozens, or even hundreds of thousands, of hectares, is largely achieved through the acquisition of standalone farms, which are often underperforming (Ostapchuk et al. 2021b). Moreover, the time- and resource-intensive processes of reorganising and integrating acquired entities cast doubt on the long-term viability of agroholdings as a business model. Agricultural investment, particularly in transition economies, is further complicated by uncertainty and sunk costs, which may introduce asymmetries in decision-making and resource reallocation (Chavas 1994; Lansink and Stefanou 1997). The distinctive context of transition economies accentuates these challenges, where farm investment

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decisions are frequently shaped by a tension between immediate financial constraints and long-term strategic objectives (Bokusheva et al. 2009).

Despite these factors, agroholdings as an organisational form have not only endured but continue to play a significant role in agricultural production and food security. UCAB (2019) shows that Ukrainian agroholdings operate approximately 27% of commercial farmland and account for 21% of gross agricultural production. Similarly, Matyukha et al. (2015) report that Russian agroholdings cultivate around 20% of the country's total arable land and generate 25% of total farm profits. In Kazakhstan, agroholdings are estimated to manage about 30% of the nation's arable land.

Given the persistence of structural inefficiencies alongside their prominent role in the sector, it is crucial to understand the factors that enable successful acquisitive growth, i.e. growth achieved through the takeover of other farms, within these large farming enterprises.

In this context, previous empirical research has generally lacked a detailed examination of whether, and how, agroholdings succeed in generating profitable growth for the farms they acquire. This gap arises primarily from the tendency to treat agroholdings as uniform entities, with insufficient attention paid to their internal dynamics, such as integration strategies, investment behaviour, and managerial approaches. The present study seeks to address this gap by analysing post-acquisition changes in the production and financial indicators of farms acquired by agroholdings in Ukraine. We examine the effects of these changes on organic growth, that is, growth driven by more efficient internal resource utilisation, productivity improvements, and enhanced performance, by applying the system GMM (generalised methods of moments) method to farm-level data from 648 agricultural enterprises acquired by agroholdings between 2005 and 2016.

Ukraine was selected for this study due to its unique combination of structural, institutional, and economic conditions, which distinguish it from other countries with prominent agroholdings (e.g. Argentina, Brazil, Kazakhstan, Russia). In particular, its specific land tenure regulations, fragmented market structure, and institutional environment make it an especially insightful case for analysing post-acquisition farm growth.

First, the Ukrainian farmland market is characterised by land ownership restrictions, most notably, the official moratorium on land sales, which remained in effect until 2021, as well as land fragmentation and consolidation-related challenges. As a result, farmland is predominantly leased rather than owned (Gagalyuk et al. 2021). Moreover, the relatively small average landholding size (4.2 ha) and the high transaction costs of negotiating and managing numerous lease contracts with individual landowners have made it more practical for agroholdings to expand through the acquisition of existing farms, along with these farms' lease portfolios. By contrast, in countries such as Argentina and Brazil, agroholdings typically own a substantial proportion of their farmland, which facilitates long-term, asset-based investment strategies. In Ukraine, however, lease-based land consolidation imposes unique financial and operational constraints (Varrotti et al. 2022). Consequently, Ukrainian agroholdings are more reliant on efficient post-acquisition integration than on land acquisition as an asset in itself.

Second, Ukrainian agroholdings are highly export-oriented. According to FAO (2022), Ukraine occupies leading positions in global exports of wheat, barley, maize, and soybeans. This strong reliance on international commodity and investment markets renders agroholdings particularly sensitive to global price fluctuations and capital dynamics. In contrast to the state-backed and agroholding-supportive policies observed in Kazakhstan and Russia (see e.g. Petrick et al. 2011; Matyukha 2017), Ukraine's agricultural sector functions within a more liberalised economic framework. Here, agroholdings are exposed to market-driven pressures that demand continual improvements in farm productivity and the effective integration of acquired farms to sustain competitiveness.

Third, unlike agribusinesses operating in countries with relatively stable financial systems and mature agricultural ecosystems, Ukrainian agroholdings function in a volatile macroeconomic environment marked by currency fluctuations, credit constraints, and geopolitical risks (Ostapchuk et al. 2021b). These conditions may alter the priorities and outcomes of post-acquisition integration, with a tendency to favour short-term gains over long-term, capital-intensive expansion.

Finally, Ukrainian agroholdings have evolved rapidly in response to institutional voids, such as underdeveloped land and financial markets, whereas agribusinesses in Western economies have followed more gradual paths to corporate integration (Bokusheva et al. 2009). Over the past decades, agroholdings have become significant actors in Ukraine's agricultural sector, accounting for 20% of crop production and 28% of livestock output (Gagalyuk et al. 2021).

Together, these factors make Ukrainian agroholdings a compelling setting in which to examine how farms are integrated post-acquisition and what effects such

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integration yields in an environment where land ownership restrictions and macroeconomic instability necessitate alternative growth strategies.

Our study contributes to the existing literature in several ways. First, unlike most empirical research on firm performance and growth, it distinguishes empirically between two growth modes – mergers and acquisitions (M&A) and organic growth – and explicitly examines the relationship between them. In doing so, we investigate whether post-acquisition organic growth is constrained by firm size and previous growth rates, thereby extending fundamental concepts in firm growth theory, such as Penrosean limits to growth (Penrose 1995) and Gibrat's law (Gibrat 1931). Furthermore, we assess how the post-acquisition integration of resources by an acquiring firm contributes to the organic growth of the acquired entity.

Second, this paper adds to the limited body of literature on M&A-driven growth in primary agriculture, particularly within the context of transition economies.

Theoretical background

This section establishes the theoretical foundation for our analysis of the post-acquisition growth of farms within agroholdings. We begin by distinguishing between the two primary growth modes: organic growth and growth through M&A. We then introduce post-acquisition integration (PAI) as a critical mechanism that facilitates organic growth following acquisition. Building on this, we outline relevant theoretical perspectives on firm size and managerial constraints, and examine how performance influences growth. Each conceptual block corresponds to one of the explanatory variable groups employed in our empirical model.

Growth modes: Organic vs. acquisitive growth. Broadly speaking, firms can grow through two primary modes. The first is so-called organic growth, i.e. expansion through the firm's own internal resources (Penrose 1995; Davidsson et al. 2009). This mode is often considered a 'healthy' form of growth, as it is based on performance improvements achieved by leveraging existing strengths. It is typically associated with lower risk, allows investments to be phased over time, and offers greater control over resources and business processes (Davidsson et al. 2009; Lockett et al. 2010).

Alternatively, firms may grow through M&A. The general M&A literature associates this mode with faster expansion, the potential for economies of size, access to consolidated bundles of (complementary) resources, and the realisation of synergistic effects (Capron et al. 1998). Although M&A research in the primary agricultural sector remains limited, some emerging evidence points to improved resource management, scalability, and operational efficiency resulting from acquisitive growth (Hýblova 2014). Nonetheless, extensive engagement in acquisitions may constrain organic growth and, in some cases, reduce firm performance (Hitt et al. 1991). In agriculture, the risks of negative outcomes may be exacerbated by sunk costs and temporal uncertainty, which can affect the timing and scale of investments (Chavas 1994). Additionally, resource adjustment processes are often asymmetric, particularly under conditions of rapid expansion or financial distress (Lansink and Stefanou 1997). These factors suggest that acquiring firms must strike a balance between the two growth modes – organic and acquisitive – to fully realise growth potential and enhance performance (Stettner and Lavie 2014). Penrose (1995) explicitly notes that, despite the distinct characteristics of these growth paths, they are interrelated, arguing that 'the significance of merger can best be appraised in the light of its effect on and limits to internal growth'.

Post-acquisition integration (PAI). One way for an acquiring firm to avoid impediments to post-acquisition organic growth is by aligning the acquired firm's structures, processes, and resources with its own strategic objectives. In the M&A literature, this alignment is referred to as post-acquisition integration (PAI), and it is widely regarded as a decisive factor in the success of acquisitions (Shrivastava 1986; Capron and Mitchell 1997; Steigenberger 2017). However, empirical studies examining the impact of PAI on the organic growth of acquired firms remain limited.

The literature highlights four core instruments of PAI: resource reallocation, investment and divestment, and resource redeployment (Capron and Mitchell 1997; Capron 1999; Bodner and Capron 2018).

Resource reallocation entails the redirection of firm resources towards alternative markets, more productive uses, or core business functions, and may also involve diversification into less declining industries (Anand and Singh 1997).

Investment serves to address resource gaps within acquired firms and is especially pertinent in cases involving distressed targets (Bodner and Capron 2018).

Conversely, divestment involves the removal of redundant or obsolete resources and may include the closure or sale of assets, product lines, facilities, or services, as well as personnel reductions aimed at enhancing performance and achieving scale efficiencies (Anand and Singh 1997; Capron 1999).

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Resource redeployment refers to the redistribution of tangible or intangible resources between the acquiring and acquired firms (Bodner and Capron 2018).

These instruments are interrelated rather than mutually exclusive. For example, investment and divestment can occur simultaneously within a single restructuring strategy, while redeployment may involve not only physical assets but also incentive systems or managerial practices. Their effectiveness is context-specific and may vary significantly across sectors. In agriculture, for instance, where seasonal dynamics and land use are central, PAI may include unique measures such as land consolidation or the outsourcing of field operations.

PAI is widely considered a critical determinant of post-acquisition firm growth, as it is designed to improve operational efficiency, enhance resource utilisation, and elevate overall performance (Capron and Pistre 2002). Empirical research demonstrates that effective integration supports more rapid growth compared to weaker integration approaches (Capron 1999). Consequently, the generally positive relationship between PAI and firm growth is expected to apply equally to the context of post-acquisition integration in farming.

Firm size and managerial capacity. Firm size has long been debated as a determinant of growth. While larger firms may benefit from economies of scale (Hart 2000; Rasmussen 2012), they can also experience diseconomies arising from coordination challenges and bureaucratic complexity (Geroski 1999). This has led to suggestions of an inverted U-shaped relationship between firm size and growth. However, empirical findings often instead indicate L-shaped cost curves, with substantial variation in firm performance (Hart 2000). This may imply that firms differ in their ability to manage the costs associated with operating large organisations, and that managers may be disinclined to pursue further expansion when confronted with significant diseconomies of scale.

A key insight into growth constraints is provided by Penrose's (1995) concept of managerial limits. As firms expand, the complexity of resource allocation increases, and managerial capacity may become a critical bottleneck. Adjustment costs and inefficiencies tend to rise, especially in organisations integrating multiple subsidiaries, such as agroholdings.

By contrast, Gibrat's law posits that firm growth rates are independent of firm size. While some empirical studies support this hypothesis (Samuels and Smith 1968), others suggest that smaller firms tend to grow faster (Gardebroek et al. 2010). Whether Gibrat's law holds in post-acquisition contexts remains an open empirical question, and it is directly addressed in this study.

Firm performance. The final conceptual block concerns firm performance, which is commonly examined in relation to profitability, debt management, and growth rates. Traditional models of firm growth assume that more profitable firms grow faster, as they can reinvest retained earnings and more easily access external finance (Kaen and Baumann 2003; Gilbert et al. 2006). However, empirical findings remain inconclusive. While some studies report a positive relationship between profitability and growth (Robson and Bennett 2000; Nakano and Kim 2011), others highlight the possibility of reverse causality; for instance, rapid or aggressive expansion may temporarily depress profitability (Jang and Park 2011). In the agricultural post-acquisition settings, farms undergo strategic restructuring, where the primary emphasis may be on scaling operations and aligning newly acquired entities with agroholding standards, rather than on immediate financial returns (Gagalyuk et al. 2021). Particularly in the case of distressed acquisitions, low profitability may not indicate limited capacity but rather an urgent need for transformation. In such contexts, acquisitions serve as a vehicle for revitalising underperforming farms. Consequently, the relationship between profitability and growth is expected to be negative in cases of post-acquisition farm integration.

Another relevant performance indicator is indebtedness. Previous research shows that acquisitions are frequently accompanied by increased leverage (Lubatkin and O'Neill 1987). While moderate debt can foster growth through financial leverage, excessive debt may lead to short-termism and constrain reinvestment (Boubakri et al. 2013). As with profitability, empirical findings on the debt-growth nexus are mixed: high debt levels may either hinder or stimulate growth, depending on the context. In post-acquisition scenarios, however, the relevance of indebtedness at the target firm level becomes less clear-cut. When agroholdings adopt centralised financial management structures, the debt profile of an individual subsidiary becomes less significant, as financial flows and obligations are often pooled across the group (Gagalyuk et al. 2021). Thus, even where an acquired farm carries a high debt burden, its subsequent growth is likely to be determined more by the parent firm's capital allocation strategy than by the farm's pre-acquisition financial position.

We also examine growth persistence, which constitutes another conceptual aspect of performance. The second proposition of Gibrat's law assumes that

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growth follows a random walk, implying no autocorrelation over time. However, empirical research yields mixed evidence. On the one hand, persistence in growth rates may occur due to economies of scale, sustained competitive advantage, or favourable industry conditions (Weiss 1998; Chan et al. 2003). On the other hand, negative correlations may arise owing to diminishing returns, managerial limits to growth, and resource constraints (Geroski and Gugler 2004; Bottazzi and Secchi 2006).

To date, there is no empirical evidence on growth rate persistence specifically in the context of agricultural acquisitions. However, the existing PAI literature (e.g. Ostapchuk et al. 2021a) shows that agroholdings tend to acquire distressed farms and engage in active integration. Hence, mean reversion may be expected: acquired farms often experience rapid growth during the early post-acquisition years as they recover and align with agroholding performance standards, followed by a deceleration of growth once integration is completed. A negative correlation in growth rates over time would thus point to the existence of adjustment costs and managerial limits to growth.

Conceptual model. Based on the preceding arguments and in line with existing literature (e.g. Gardebroek et al. 2010), we propose the following conceptual model adapted to the context of post-acquisition organic firm growth:

$$g_{it+1} = f\left(PAI_{it}, S_{it}, P_{it}\right) \tag{1a}$$

where: g — the growth rate of the acquired firm i in the period $t + 1$; PAI — the vector of variables operationalising PAI instruments; S — the farm size; P — the vector of performance variables. This conceptual model enables the identification of persistent or structural relationships, as it focuses on the levels of the analysed indicators. However, it is less suited to capturing the effects of rapid and dynamic post-acquisition adjustments. To address this, we reformulate the model to reflect short-term changes:

$$g_{it+1} = f\left(\Delta PAI_{it}, \Delta S_{it}, \Delta P_{it}\right) \tag{1b}$$

In this specification, post-acquisition integration, size, and performance variables are expressed as first differences. By testing both conceptual models, we can examine the relationships between post-acquisition organic growth of acquired farms and the explanatory variables from both structural and dynamic (change-based) perspectives.

MATERIAL AND METHODS

Data. To construct the sample for our empirical analysis, we drew on several datasets. First, we used a longitudinal dataset from the State Statistics Service of Ukraine (SSSU), which includes detailed farm-level production and accounting data for Ukrainian commercial farms over the period 2005–2016, comprising approximately 105 000 farm-year observations. Second, we obtained financial data for the same period from the SPARK Interfax database (SPARK Interfax 2019), which contains around 126 000 observations based on annual financial reports, such as balance sheets and profit and loss statements, at the farm level. The SPARK database includes more observations, as it also captures small family farms that are not legally obliged to report detailed production statistics to the SSSU and, accordingly, are not included in the SSSU database. However, this does not affect our analysis, as agroholdings typically target larger farms for acquisition (Ostapchuk et al. 2021b).

The two datasets were merged using unique farm identifiers – public registration numbers –available in both databases. Financial information was not available for approximately 8% of the farms from the SSSU dataset. Consequently, we estimated separate models using two samples: one based solely on production accounting data and another incorporating both production and financial data. This approach allowed us to assess the sensitivity of our models to changes in sample size and specification.

Data cleaning procedures were undertaken to minimise the effect of outliers. Specifically, we applied a three-standard-deviation threshold in combination with histogram visual inspection to all absolute variables used in the analysis (including those used to calculate ratios; see Table 1 for the list of variables). This process led to the elimination of approximately 14% of observations. Cleaning was conducted across the entire dataset of farms, after which we generated a subsample of acquired farms to address our research questions. The final sample of acquired farms was less affected by this procedure, with only around 1% of observations removed.

To account for inflation, all monetary values were deflated using cumulative producer price indices (PPI) for agricultural products, adjusting them to 2005 price levels as reported by the State Statistics Service of Ukraine (SSSU 2011, 2017). All continuous variables were subsequently log-transformed to stabilise variance and improve model fit.

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Table 1. Descriptive statistics of variables used in analysis

Group of variables		Variable	Description	Measurement type	Mean	SD	Min	Max
Farm size		crop production value	value of produced crops (USD 1 000)**	absolute	7.151	1.298	1.445	11.806
Performance	farm growth	crop production value change*	change in the value of produced crops [as per Equation (2)]**	change	0.138	0.679	–4.262	3.851
	profitability	EBITDA	earnings before interest, taxes, depreciation, and amortization (USD 1 000)**	change	0.000	0.101	–2.832	2.805
		profit margin	ratio of profit to total sales	absolute	0.103	0.351	–3.244	0.895
	indebtedness	debt-to-assets	ratio of total debt to total assets of a farm	absolute	0.699	0.707	0.002	8.115
				change	–0.001	0.531	–6.473	9.992
		current liquidity	ratio of current assets to current liabilities	absolute	5.500	15.267	0.000	272.500
				change	0.368	19.528	–270.172	336.910
Post-acquisition integration (PAI)	resource reallocation	share of crop production	share of the revenue in crop production to total production	absolute	0.889	0.184	0.027	1.000
				change	0.009	0.092	–0.775	0.828
		ratio of harvested to arable land	ratio of harvested area to total farm area	absolute	0.837	0.202	0.000	1.000
				change	0.020	0.181	–0.996	1.000
	investment/divestment – variable inputs	material costs	cost of materials in crop production, (USD 1 000)**	absolute	6.209	1.525	–11.323	10.536
				change	0.042	1.224	–16.233	15.649
		seeds	seed costs (USD 1 000)**	change	0.027	2.075	–18.333	16.244
		fertiliser	fertiliser costs (USD 1 000)**	change	0.150	3.206	–17.674	16.685
		other material costs	cost of other materials in crop production (USD 1 000)**	change	0.028	4.073	–19.157	17.705
	investment/divestment – fixed assets & labour	depreciation	depreciation in crop production (USD 1 000)**	change	–0.074	3.076	–17.214	16.551
				absolute	1.878	4.207	–10.829	8.333
		land area	farmland area, hectares**	change	–0.020	0.322	–3.109	3.068
		labour units	number of employees in crop production**	absolute	3.572	1.251	0.000	8.095
				change	–0.064	0.596	–4.580	4.248

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Table 1 to be continued

Group of variables		Variable	Description	Measurement type	Mean	SD	Min	Max
Post-acquisition integration (PAI)	investment/divestment – services	third-party services	cost of services, provided by third-party organisations in crop production (USD 1 000**)	change	0.234	3.088	–16.712	17.028
				absolute	4.059	3.255	–10.829	9.529
		SG&A	selling, general, and administrative costs in crop production (USD 1 000**)	change	–0.201	3.267	–16.667	17.110
				absolute	0.980	6.502	–10.829	8.929
	resource redeployment	land rent payment	farmland rent per hectare (USD 1 000/ha**)	change	0.119	1.734	-8.764	9.246
				absolute	–3.293	1.408	–10.829	–0.432
		salary	average annual gross salary per employee in crop production, (USD 1 000/employee/year**)	absolute	–0.022	1.612	–10.829	2.825
				change	–0.111	1.997	–13.505	12.272
Control variables		restructuring dummy	dummy variable, equals 1 if the farm was liquidated, 0 – otherwise	0/1	0.178	0.383	0.000	1.000
		dummy of acquisition from another agroholding	dummy variable, equals 1 if a farm was acquired from another agroholding, 0 – otherwise	0/1	0.051	0.221	0.000	1.000
		n of years after the acquisition	number of years after the acquisition event	–	3.013	0.905	1.000	10.000

*change in crop production values is used to operationalise farm size, while its lagged value – as a measure of previous farm performance; ** denotes natural logarithm

Monetary values were deflated; log transformation with a shift was applied considering that the dataset contains zero and negative values; model estimations were performed using variables expressed in the national currency (UAH), for compliance with the journal's reporting requirements, the table presents the corresponding log-transformed values previously converted to USD using the official exchange rate of the National Bank of Ukraine as of 2005 (1 USD = 5.05 UAH)

EBITDA – earnings before interest, taxes, depreciation, and amortisation; SG&A – selling, general, and administrative

Source: Own performance based on SSSU, SPARK, UCAB, and YouControl databases

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To identify agroholding-affiliated farms, we used unique data from the Association 'Ukrainian Agribusiness Club' (UCAB), covering the period 2011–2016, comprising approximately 5 000 observations. This information was cross-validated and extended using ownership data from the SPARK Interfax and YouControl databases (SPARK Interfax 2019; YouControl 2019) to cover the years 2005–2010, for which UCAB data were unavailable. We excluded farms associated with agroholdings that had unclear ownership structures or where affiliation could not be reliably verified. The resulting sample of agroholding-affiliated farms contained 6 138 farm-year observations.

The share of agroholding-affiliated farms within the total population of commercial farms in our dataset ranged from 2% in 2005 to 8% in 2016. However, these farms accounted for up to 30% of the total operated farmland, ensuring their strong representation in the overall dataset.

In contrast to independent farms, agroholding subsidiaries benefit from economies of scale, centralised management, and access to greater financial resources (Walther 2014). While previous research on Ukrainian agroholdings has often focused on comparing them with independent farms, the present study adopts an alternative perspective by analysing post-acquisition growth and integration strategies within a defined organisational framework. Earlier studies have demonstrated notable differences between independent and agroholding-affiliated farms, which can be attributed to structural characteristics, operational models, managerial practices, financial constraints, and distinct growth modes. Accordingly, the exclusion of independent farms from our model helps to reduce heterogeneity and enables a clearer identification of post-acquisition effects among agroholding-affiliated farms.

Given our focus on the impact of acquisitions, it was essential to distinguish acquired farms from those that were founded or organically developed by agroholdings. For this purpose, we applied a two-step identification procedure. A farm was classified as acquired if it met the following criteria: (*i*) a full transition of ownership occurred, i.e. 100% of the farm's shares were transferred to an agroholding (either from an individual, an independent entity, or another agroholding); and (*ii*) the farm was economically active before acquisition, having produced agricultural output for at least one year before ownership change. Using this approach, we identified 648 acquired farms between 2005 and 2016, resulting in a final unbalanced panel dataset of 1 810 farm-year observations used in the empirical analysis.

The creation of the acquired-farm subsample meant that certain variables displayed extreme (minimum/maximum) values exceeding the three-standard-deviation threshold, if this threshold were recalculated for the smaller subsample (Table 1). However, we did not apply further data trimming. Many of these acquired farms have observable counterparts among non-holding farms, suggesting that such 'outliers' reflect the heterogeneity of agroholding acquisition strategies, variation in target selection, and diverse pre-acquisition conditions. Imposing stricter cleaning thresholds at this stage would risk a significant reduction in sample size and the potential loss of important data patterns and relationships relevant to our analysis.

Variable operationalisation. Our conceptual model of organic firm growth in the context of post-acquisition integration presents growth as a function of prior firm size, performance, and post-acquisition integration (PAI) instruments, which require operationalisation.

Firm (or farm) size is a fundamental determinant of growth dynamics, financial performance, and strategic decision-making (Penrose 1995; Geroski 1999). Although various measures of firm size exist – such as total assets, land area, and employment – the sales revenue indicator offers a dynamic, performance-based measure that reflects not only the operational scale but also market engagement and productivity (Delmar 1997; Davidsson et al. 2009; Shepherd and Wiklund 2009). In the context of post-acquisition integration, sales revenue-based indicators are particularly relevant, as they encapsulate the effects of integration strategies on operational efficiency, market access, and resource utilisation (Gagalyuk et al. 2021; Ostapchuk et al. 2021a). In agricultural production, however, the monetary value of agricultural production is widely accepted as an alternative to sales revenue, as it captures the actual production value rather than market transactions alone. This provides a more comprehensive assessment of a farm's operational scale, efficiency, and resource use (Chavas 1994). One notable limitation of sales revenue as a size indicator lies in its sensitivity to sales strategies, market timing, and price fluctuations. For example, agricultural producers may store crops and defer sales in anticipation of future price increases, leading to distortions in revenue within a given calendar year (Nakano and Kim 2011). By contrast, the monetary value of agricultural production more accurately reflects actual farm output, offering a more stable and production-oriented measure of farm size (Lansink and Stefanou 1997).

Given that agroholdings are predominantly specialised in the production of crops such as grains and oilseeds (Walther 2014), we use the real (deflated) value of crop production as our measure of farm size. Its year-on-year

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change serves as a proxy for the post-acquisition organic growth of the acquired farm (Table 1). The growth calculation method was selected based on the fit of the econometric model, and a logarithmic transformation was applied to obtain:

$$g_{it+1} = \ln S_{it+1} - \ln S_{it} = \ln\left(\frac{S_{it+1}}{S_{it}}\right) \quad (2)$$

An important prerequisite for firm growth is performance, as firms with higher performance are better positioned to recognise and exploit growth opportunities (Kaen and Baumann 2003). One of the most widely used constructs of firm performance is the ability to generate profit. We operationalise profitability using earnings before interest, taxes, depreciation, and amortisation (EBITDA), as well as profit margins.

Another dimension of performance is indebtedness, particularly relevant in the context of acquisitions, since both under- and over-indebted firms may be acquisition targets, with important implications for post-acquisition growth. We use the debt-to-assets ratio and current liquidity to measure the debt management performance of acquired farms.

Additionally, the firm's growth rate serves as a common indicator of performance and provides a basis for forecasting future adjustments. Including this variable in our empirical model also allows for testing the second proposition of Gibrat's law regarding the persistence of growth rates over time in the context of post-acquisition integration. A coefficient on the past growth variable that is statistically significantly different from zero would suggest persistence (i.e. dependence) of growth rates over time. Conversely, an insignificant coefficient would imply no persistence, thus indirectly supporting the hypothesis of independence in line with Gibrat's law.

To empirically operationalise performance (P_{it}), we specify it as a linear combination of firm performance indicators. While conceptually understood as a vector, given the distinct theoretical dimensions, this linear combination in empirical terms facilitates direct estimation within our regression framework.

The use of a linear functional form in our equations is motivated by several considerations. First, it aligns with theoretical frameworks commonly applied in the firm growth literature (e.g. Geroski 1999; Davidsson et al. 2009; Lockett et al. 2011). Second, linear forms are widely adopted in empirical research examining firm growth determinants, restructuring processes, and resource allocation. This approach enables direct comparison of our findings with previous firm growth studies (e.g. Kaen and Baumann 2003; Jang and Park 2011). Finally, given the complexity of our dataset, a linear specification simplifies diagnostics and testing, and enhances the robustness of estimates in panel data models, such as the System GMM employed in this study.

Accordingly, we operationalise firm performance in our empirical model as follows:

$$P_{it} = \beta_{P1} g_{it} + \beta_{P2} Pr_{it} + \beta_{P3} DA_{it} + \beta_{P4} LQ_{it} \quad (3)$$

where: g_{it} –the growth rate of farm i in period t; Pr – profits (operationalised using *EBITDA* – earnings before interest, taxes, depreciation, and amortisation, or *PM* (profit margin) depending on the model); *DA* – the debt-to-assets ratio; *LQ* – to current liquidity; P – firm performance; β_P – relative contribution of model components to the firm performance.

The use of profit indicators is further elaborated in the *Method* section, alongside the full model specifications [Equations (8 and 9)].

According to our theoretical framework, post-acquisition growth is contingent upon the extent of PAI applied by an acquiring agroholding to an acquired farm, to reallocate, invest, divest, and redeploy resources. Accordingly, we define PAI as:

$$PAI_{it} = \gamma_1 RE_{it} + \gamma_2 ID_{it} + \gamma_3 RR_{it} \quad (4)$$

where: *RE* – resource reallocation; *ID* – to investment and divestment activities; and *RR* – resource redeployment; γ – relative contribution of individual PAI instruments to overall PAI.

Resource reallocation involves the dedicated allocation of resources to a specific production line. Consistent with previous studies (Buduru and Brem 2007; Petrick et al. 2013), we operationalise resource reallocation using the farm specialisation indicators, namely, the share of crop production in total farm production and the rate of productive land use, measured as the ratio of harvested to arable land. This provides:

$$RE_{it} = \gamma_{RE1} CS_{it} + \gamma_{RE2} LU_{it} \quad (5)$$

where: *CS* – crop specialisation or share of crop production; *LU* – to land utilisation or ratio of harvested to arable land.

Post-acquisition investment and divestment activities are measured by changes in the use of variable inputs, fixed assets, labour, and services. In particular, variable inputs are operationalised using the cost of production materials. Our models incorporate both

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the total cost of production materials and a breakdown of costs by category, specifically, seeds, fertilisers, and other material inputs.

Investments in, and divestments of, fixed assets are captured through changes in depreciation (used as a proxy for capital) and land area, while changes in labour are measured by the number of farm employees. We also control for developments in the monetary value of services provided to acquired farms by third-party organisations, as well as changes in selling, general, and administrative (SG&A) costs.

Accordingly, investment and divestment processes are expressed as follows:

$$ID_{it} = \gamma_{ID1} MC_{it} + \gamma_{ID2} D_{it} + \gamma_{ID3} L_{it} + \\ + \gamma_{ID4} SR_{it} + \gamma_{ID5} SGA_{it} \quad (6)$$

where: MC – material costs; D – depreciation; L – labour units; SR – third-party services; SGA – SG&A costs.

Equation (6) incorporates both monetary and physical variables, reflecting the multi-dimensional nature of integration strategies. This combination enables us to assess how capital-intensive changes and operational restructuring jointly influence post-acquisition organic growth. Consistent with Anand and Singh (1997) and Capron (1999), we treat these elements as complementary dimensions of the integration strategy.

Furthermore, by distinguishing labour into physical (number of employees) and monetary (average salary) indicators, we differentiate between workforce restructuring and shifts in labour incentives or quality. This approach aligns with Li (2013), who demonstrated that employee numbers and wages do not adjust at the same pace following acquisitions.

Post-acquisition resource redeployment involves the transfer of capabilities and management systems, such as incentive structures or stakeholder management approaches, from the acquiring firm to the acquired one. Given that commercial farmland use in Ukraine is primarily based on lease rather than ownership, securing landowner loyalty is a major priority for agricultural enterprises aiming to prevent landowners from leasing plots to competing enterprises. Accordingly, one of the indicators used to operationalise resource redeployment is land rent payments.

Employees also constitute a key stakeholder group for agroholdings, particularly in the context of labour shortages in Ukrainian agriculture (ibid.). Thus, we also include salaries as an indicator to assess whether, and how, the redeployment of incentive and compensation systems from the acquirer affects the subsequent growth of the acquired farm.

Post-acquisition resource redeployment can therefore be described as follows:

$$RR_{it} = \gamma_{RR1} LR_{it} + \gamma_{RR2} SA_{it} \quad (7)$$

where: LR – land rent payments; SA – salary.

Equation (7) also reflects the multifaceted nature of redeployment, whereby farms adjust not only the quantity but also the quality and contractual structure of existing resources. In combination with other PAI instruments, these variables capture the parallel operational shifts that farms undergo during restructuring. For instance, an increase in land rent may indicate a shift towards higher-quality land or renegotiated lease agreements, while changes in labour structure may reflect the redeployment of human resources across production units or functional areas. Following Capron (1999), we treat these variables as complementary indicators of strategic adjustments aimed at enhancing resource use efficiency in the post-acquisition phase.

In addition, we control for heterogeneity introduced by agroholding strategies. Specifically, some agroholdings may pursue optimisation through enlargement – merging or consolidating their subsidiaries. Accordingly, we control for differences between subsidiaries that were restructured in this manner and those that were not. We also account for whether a farm had previously been affiliated with another agroholding before acquisition, as such affiliation may influence subsequent growth due to a potentially high degree of structural and operational alignment with the acquiring agroholding's business model.

Method. We regress the growth rates of acquired farms using the model described above to examine whether, and how, PAI influences post-acquisition growth. Our theoretical framework requires controlling for the effect of the previous (lagged) growth rate. This renders conventional ordinary least squares (OLS) or fixed-effects panel regression techniques inappropriate, as they would produce biased estimates due to the correlation between the lagged dependent variable and the error term (Nickell 1981).

To address this issue, we apply the System GMM method (Arellano and Bover 1995), which offers efficient estimation in the presence of serial correlation and accommodates time-invariant variables (Gardebroek et al. 2010).

To empirically test our conceptual frameworks [Equations (1a and 1b)], we employ two complementary model specifications using System GMM estimation. The first specification (Equation 8) uses first differences of the covariates, capturing short-term dynamic adjustments in farm characteristics and costs associated

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Table 2. Estimation results of post-acquisition integration effects on organic growth using System GMM model, 2005–2016

Group of variables		Variable name	Model 1		Model 2		Model 3	
			coefficient	z-value	coefficient	z-value	coefficient	z-value
Farm size		crop production value[1]	0.006	1.61	0.005	1.51	0.004	1.27
Performance	farm growth	Δcrop production value[1]	–0.157	–1.80*	–0.163	–1.85*	–0.150	–1.89*
	profitability	ΔEBITDA	–	–	–	–	–0.023	–2.24**
	indebtedness	Δcurrent liquidity	–	–	–	–	0.000	–0.50
		Δdebt-to-assets	–	–	–	–	0.104	3.20***
Post-acquisition integration (PAI)	resource reallocation	Δshare of crop production	2.269	7.10***	2.253	7.12***	2.306	6.61***
		Δratio of harvested to arable land	1.134	6.32***	1.176	6.82***	1.113	6.26***
	investment/ divestment – variable inputs	Δmaterial costs[1]	0.062	1.22	–	–	–	–
		Δseeds[1]	–	–	0.007	0.45	0.003	0.19
		Δfertilisers[1]	–	–	0.017	1.96**	0.007	0.73
		Δother material costs[1]	–	–	0.004	0.55	0.014	1.50
	investment/ divestment – fixed assets & labour	Δdepreciation[1]	0.010	1.71*	0.012	1.99**	0.009	1.31
		Δland area[1]	0.840	8.72***	0.839	9.26***	0.828	8.90***
		Δlabour units in crop production[1]	–0.007	–0.18	-0.009	–0.23	–0.014	–0.40
	investment/ divestment – services	Δthird-party services[1]	0.020	2.34**	0.019	2.50**	0.018	2.09**
		ΔSG&A[1]	–	–	–	–	0.001	0.18
	resource redeployment	Δland rent payment[1]	–0.011	–1.21	–0.010	–0.98	–0.007	–0.63
		Δsalary[1]	0.011	0.83	0.009	0.72	–0.004	–0.28
Control variables		restructuring dummy	0.086	1.63	0.086	1.65*	0.114	2.35**
		acquired from another agroholding – dummy	0.105	1.98**	0.112	2.21**	0.089	1.44
		Observations	1 810		1 810		1 573	
		Number of instruments	38		40		51	
		Prob > chi^2	0.000		0.000		0.000	
		Hansen test	0.241		0.246		0.301	
		AR(2)	0.120		0.217		0.052	

[1]log-transformed variable

EBITDA – earnings before interest, taxes, depreciation, and amortisation; SG&A – selling, general, and administrative

Model 3 (as well as Model 6) contains fewer observations compared to Model 1 and Model 2 due to changes in the raw data reporting structure, which resulted in the unavailability of SG&A cost data for early acquisitions. Unlike OLS or fixed-effects models, the System GMM approach cannot interpolate missing values, as it relies on internal lags, requiring listwise deletion.

Logged change variables (labelled as lnΔX) represent the natural logarithm of the change in a variable between two consecutive years. The coefficients of these variables approximate the elasticity of post-acquisition organic farm growth with respect to relative changes in the rate of change (i.e. second-order growth). Although the interpretation of these coefficients is less direct, this specification enables robust estimation in the presence of skewed or highly volatile input variables.

Source: Own calculations

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with PAI (see Table 2 for estimation results). This model is specified in Equation (8).

In the models using logged differences [Equation (8)], the coefficients represent the elasticity of growth with respect to the relative change in the underlying variable. While this interpretation is less intuitive than level-based specifications, the log-difference transformation helps to address heteroscedasticity and enhances model stability. To improve interpretability, we complement the log-difference model with a level-based specification.

The second specification [Equation (9)] employs the levels of covariates, allowing us to examine structural or long-term relationships between post-acquisition organic growth and farm characteristics adjusted through PAI. This model assesses how the overall scale of operations and performance levels influence organic growth trajectories over time.

The results are presented in Table 3. Another key distinction between Equations (8 and 9) lies in the operationalisation of profits, which is necessary to capture complementary dimensions of profitability relevant to different analytical perspectives. Specifically, we use EBITDA in the differenced model [Equation (8)], as it directly reflects absolute short-term changes in operational profitability and cash-flow generation capacity. In contrast, profit margin represents long-term operational efficiency and financial stability and is therefore used in the level-based model [Equation (9)].

All variables were log-transformed to improve model fit and mitigate the effects of heteroscedasticity and influential observations. Given the presence of zero and negative values in the dataset, a log transformation with a shift was applied.

To address potential estimator bias, we employed Windmeijer's (2005) finite-sample correction procedure to the two-step covariance matrix, which is particularly effective in correcting bias in dynamic panel estimators (Gardebroek et al. 2010). Empirical estimation was conducted using Roodman's (2009) xtabond2 command in Stata 16.0, selected for its flexibility and ease of implementing Windmeijer's correction.

We tested the validity of our models through several diagnostic checks. First, the Arellano-Bond test for serial autocorrelation and the Hansen test for overidentifying restrictions indicated no second-order autocorrelation and satisfactory instrument validity, respectively. Second, we examined correlation coefficients to assess multicollinearity; the highest value observed was 0.74, which does not suggest problematic multicollinearity (Gardebroek et al. 2010).

Taken together, these diagnostic tests confirm the validity of our System GMM model, allowing us to proceed with a detailed interpretation of the results.

RESULTS

We present our findings thematically, grouped by categories of explanatory variables rather than sequentially by model, to enhance clarity and facilitate interpretation. This structure reflects our conceptual framework, which encompasses PAI instruments, performance indicators, and size and structural characteristics.

In addition, this thematic approach enables a more integrated discussion across the six estimated models. Models 1–3 [see Table 2 or Tables S1–S3 (Electronic Supplementary Material – ESM) for detailed estimation results] are estimated in first differences, while Models 4–6 [see Table 3 or Supplementary Tables S4–S6 (ESM)] are estimated in levels.

Post-acquisition integration (PAI) instruments. Variables related to PAI include proxies for resource reallocation, investment and divestment activities, and resource redeployment.

Changes in crop specialisation and the ratio of harvested area to arable land are positively associated

$$\begin{aligned}\ln(g_{it+1}) = {} & \alpha_0 + \alpha_1 \ln S_{it} + \beta_{P1} \ln g_{it} + \beta^{\Delta}_{P2} \ln \Delta EBITDA_{it} + \beta^{\Delta}_{P3} \Delta DA_{it} + \beta^{\Delta}_{P4} \Delta LQ_{it} + \\ & + \gamma^{\Delta}_{RE1} \Delta CS_{it} + \gamma^{\Delta}_{RE2} \Delta LU_{it} + \gamma^{\Delta}_{ID1} \ln \Delta MC_{it} + \gamma^{\Delta}_{ID2} \ln \Delta D_{it} + \gamma^{\Delta}_{ID3} \ln \Delta L_{it} + \gamma^{\Delta}_{ID4} \ln \Delta SR_{it} + \\ & + \gamma^{\Delta}_{ID5} \ln \Delta SGA_{it} + \gamma^{\Delta}_{RR1} \ln \Delta LR_{it} + \gamma^{\Delta}_{RR2} \ln \Delta SA_{it} + \sum_k \delta_k C^{(k)}_{it} + \mu_i + \varepsilon_{it}\end{aligned} \tag{8}$$

where: $C^{(k)}_{it}$ – the k^{th} control variable of farm i in period t; μ_i – the vector of fixed effects; ε_{it} – the error term.

$$\begin{aligned}\ln(g_{it+1}) = {} & \alpha_0 + \alpha_1 \ln S_{it} + \beta_{P1} \ln g_{it} + \beta^{abs}_{P2} PM_{it} + \beta^{abs}_{P3} DA_{it} + \beta^{abs}_{P4} LQ_{it} + \gamma^{abs}_{RE1} CS_{it} + \gamma^{abs}_{RE2} LU_{it} + \gamma^{abs}_{ID1} \ln MC_{it} + \\ & + \gamma^{abs}_{ID2} \ln D_{it} + \gamma^{abs}_{ID3} \ln L_{it} + \gamma^{abs}_{ID4} \ln SR_{it} + \gamma^{abs}_{ID5} \ln SGA_{it} + \gamma^{abs}_{RR1} \ln LR_{it} + \gamma^{abs}_{RR2} \ln SA_{it} + \sum \delta_k C^{(k)}_{it} + \mu_i + \varepsilon_{it}\end{aligned} \tag{9}$$

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Table 3. Estimation results of lagged farm characteristics effects on organic growth using System GMM model, 2005–2016

Group of variables		Variable name	Model 4		Model 5		Model 6	
			coefficient	z-value	coefficient	z-value	coefficient	z-value
Farm size		crop production value[1]	–	–	0.038	0.71	0.032	0.62
Performance	farm growth	crop production value change[1]	–0.228	–6.50***	–0.240	–7.30***	–0.173	–4.06***
	profitability	profit margin	–	–	–	–	–0.299	–2.29**
	indebtedness	current liquidity	–	–	–	–	0.002	1.62
		debt-to-assets	–	–	–	–	0.026	0.64
Post-acquisition integration (PAI)	resource reallocation	share of crop production	–0.170	–1.09	–0.231	–1.07	–0.238	–0.99
		ratio of harvested to arable land	–0.716	–4.62***	–0.769	–3.77***	–0.771	–3.59***
	investment/ divestment – variable inputs	material costs[1]	0.109	3.53***	0.076	1.86*	0.107	3.75***
	investment/ divestment – fixed assets & labour	depreciation[1]	–0.030	–3.61***	-0.027	–3.05***	–0.017	–2.03**
		labour units in CP[1]	0.138	2.28**	0.155	2.39**	0.103	2.88***
	investment/ divestment – services	third-party services[1]	–0.023	–2.75***	–0.028	–3.00***	–0.036	–3.12***
		SG&A[1]	–	–	–	–	–0.017	–3.15***
	resource redeployment	land rent payment[1]	–0.047	–1.92*	–0.044	–1.70*	–0.030	–1.17
		salary[1]	–0.029	–1.65*	–0.029	–1.55	–0.026	–1.42
Control variables		*n* of years after the acquisition	–0.052	–4.27***	–0.056	–3.71***	–0.039	–2.70***
		acquired from groholding – dummy another	0.067	0.87	0.063	0.80	0.002	0.01
		Observations	1810	–	1810	–	1568	–
		Number of instruments	49	–	58	–	72	–
		Prob > chi[2]	0.000	–	0.000	–	0.000	–
		AR(2)	0.745	–	0.775	–	0.277	–
		Hansen test	0.138	–	0.284	–	0.175	–

[1]log-transformed variable

CP – crop production; EBITDA – earnings before interest, taxes, depreciation, and amortisation

Source: Own calculations

with post-acquisition organic growth in the short term (Table 2). However, in the level-based models (Models 4–6, Table 3), past levels of crop specialisation are statistically insignificant predictors of post-acquisition organic growth, while the harvested-to-arable land ratio shows a statistically significant negative association. Taken together, these results suggest that the reallocation of internal resources plays a critical role in organic growth following acquisition.

Moreover, the negative coefficient of the harvested-to-arable land ratio supports earlier findings that agroholdings often target underutilised or distressed farms, which present greater growth potential once integrated (Bruton et al. 1994; Ostapchuk et al. 2021b).

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Post-acquisition investment and divestment activities were examined through changes in variable inputs, fixed assets, labour, and services. In the differenced models, the findings for variable inputs are inconclusive, as the coefficients are statistically insignificant, even when disaggregated into subcomponents. By contrast, in the level-based models, higher past levels of material costs are positively associated with post-acquisition organic growth.

Investments in fixed assets, operationalised through depreciation, contribute positively to the organic growth of acquired farms. However, this effect is not consistent across all models; it becomes statistically insignificant when financial indicators are included (Model 3), possibly due to the delayed nature of returns on capital investment. Notably, high capital intensity in previous periods is negatively associated with subsequent growth, suggesting that undercapitalised farms may offer greater growth potential post-acquisition. Nonetheless, the pace of organic growth appears to slow as fixed asset levels increase.

The results regarding land area investment show the expected positive association with growth. By contrast, changes in the number of employees do not exhibit a statistically significant effect on organic growth across all differenced model specifications. However, the level-based models indicate a positive association between past labour intensity and current growth.

The estimated coefficients suggest that, in addition to capital investment, capital sharing and outsourcing activities also contribute positively to the organic growth of acquired farms. For instance, the differenced models show a significant positive effect from services provided by third-party organisations to acquired farms. Notably, a substantial share of these services, such as fertiliser application, crop protection, or harvesting, may be delivered by other affiliates within the same agroholding. Although further research is needed to assess the prevalence of this intra-group service provision, the level-based models reveal a pattern similar to that observed for the harvested-to-arable land ratio and depreciation: higher past levels of third-party service use are negatively associated with current organic growth.

This finding is consistent with Ostapchuk et al. (2021a), who documented substantial organic growth and intensive use of third-party services during the early post-acquisition years of acquired farms, followed by a period of continued growth accompanied by stable, high service utilisation.

Divestments are not directly operationalised in our models. However, the inverse coefficients obtained for variable inputs, fixed assets, labour, and services may be interpreted as indicative of divestment effects. In this respect, the effects of variable inputs, depreciation, labour, and SG&A costs are inconclusive. By contrast, land divestment is negatively associated with post-acquisition organic growth. Given that one of the primary objectives of farm acquisitions is to secure land lease rights, large-scale land divestment appears unlikely, except in isolated cases, such as the disposal of remote land plots that are logistically inefficient to operate.

Resource redeployment variables, namely, land rent and salaries, do not show consistent effects on organic growth. Descriptive statistics likewise reveal no substantial adjustment in salaries following acquisition. By contrast, land rent exhibits a positive trend over time. However, the lack of a statistically significant relationship with organic growth may suggest that increasing land rent payments reflect contract stabilisation (e.g. renewal or prolongation) rather than expansion into more productive land.

Taken together, these findings imply that short-term growth following acquisition is driven more by resource restructuring and operational optimization, including outsourcing, than by investment alone.

Performance indicators. Performance indicators include measures of prior farm growth, profitability, and indebtedness. A notable finding is the negative relationship between growth rates over time in the post-acquisition period, suggesting that growth is not time-invariant, as lagged growth rates negatively affect current growth. In other words, a one percent higher growth rate in the previous period is associated with a 0.15–0.24% (depending on the model) lower growth rate in the current period. This result is consistent across all specifications and points to the presence of growth adjustment costs.

Growth adjustment costs refer to the frictions or diminishing returns that firms face as they expand, such as increased coordination complexity, managerial overstretch, or inefficiencies arising from rapid scaling (Penrose 1995). In this context, our findings indicate that growth is not frictionless: it is constrained by internal limitations or saturation effects that undermine the ability to sustain high growth momentum over time. This outcome is also in line with Penrose's theory of the firm, which posits that managerial and organisational limits impose constraints on sustained high growth. We interpret this as evidence of post-acquisition integration limits, whereby farms may experience an initial performance boost following acquisition, but increasingly struggle to maintain that pace in subsequent periods.

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Another important finding is the negative relationship between profitability and growth. Although this may appear counterintuitive, it may be specific to the dynamics of post-acquisition growth. On the one hand, evidence suggests that agroholdings often target underperforming farms, and that integration effects take time to materialize, with positive impacts on profitability observed only several years after acquisition (Ostapchuk et al. 2021a, b). On the other hand, highly profitable farms may scale back growth efforts once they approach their efficient size (e.g. Jang and Park 2011).

The debt-to-assets ratio is positively associated with growth, suggesting that financial leverage may facilitate organic expansion. By contrast, changes in current liquidity, i.e. the ability to repay short-term debts, do not appear to have a statistically significant effect on growth across model specifications.

Taken together, these results point to a nuanced role for performance indicators. On the one hand, profitability does not seem to directly drive post-acquisition growth. On the other hand, the findings suggest that lower profitability may not pose a barrier to expansion and, in some cases, may even act as a stimulus, whereas high-performing farms are more likely to slow down or stabilise their growth trajectories.

Size and structural characteristics. The results indicate that lagged farm size, measured as the absolute value of crop production, does not significantly affect growth rates, as the corresponding coefficients are statistically insignificant. This supports Gibrat's law in the context of post-acquisition growth, suggesting independence between farm size and growth rates.

Neither the restructuring dummy nor the variable indicating whether a farm was acquired from another agroholding shows consistent statistical significance across specifications. This implies that the pathway through which a farm is acquired does not systematically influence post-acquisition organic growth.

By contrast, the number of years under agroholding ownership demonstrates a consistently negative association with growth. This suggests that, while acquisitions may initially accelerate growth, the pace of growth tends to decline over time. This interpretation is further reinforced by the negative coefficient on lagged growth, pointing to a decelerating growth trajectory in the years following acquisition.

Taken together, these findings imply that farm size and structural characteristics are not primary drivers of post-acquisition growth. Instead, the allocation and management of resources appear to be more influential than the absolute quantity of resources available. Moreover, the behaviour of coefficients across the differenced and level models suggests that organic growth is, to some extent, linked to the improvements made by agroholdings on underperforming or distressed farms.

DISCUSSION

This study contributes to the firm (farm) growth literature by examining the effects of post-acquisition restructuring on the growth of acquired firms (farms). Existing research on acquisitions in primary agriculture remains scarce, but available evidence suggests that distressed, i.e. poorly performing and indebted, farms are the primary targets for acquirers, as they offer opportunities to access additional land and realise scale economies at a lower cost (Ostapchuk et al. 2021b). Accordingly, it is of managerial, political economy, and academic interest to test this proposition and explore how the advantages of acquisitive growth in agriculture are realised.

In the context of rapidly expanding Ukrainian agroholdings, our findings build on previous evidence concerning the motivations for acquisitive growth. In particular, we find that agroholdings pursue sustained organic growth for their acquired subsidiaries and apply several identifiable strategies to enable and support it.

First, agroholdings appear to have developed a capability for the effective restructuring of acquired farms, including the consolidation of multiple acquisitions into larger, more coherent operational structures. While our analysis does not directly measure land fragmentation or tenure reconfiguration, the results point to the positive effects of organisational consolidation on post-acquisition performance. In this context, acquired farms benefit not only from access to the acquirer's resources, such as service provision or relief from financial leverage, but also from more productive use of their own resources through improved allocation.

Second, the organic growth of acquired farms is positively associated with a focus on core competencies aimed at enhancing overall profitability. This involves reallocating resources towards higher-value crops to capitalise on favourable commodity market trends. The focus on core competencies includes both specialisation in commercial crop production and the divestment or outsourcing of non-core or capital-intensive operations.

Interviews conducted with managers of Ukrainian agroholdings to verify the findings of this analysis further support this interpretation. For example,

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harvesting services are increasingly being outsourced to specialised non-farming companies.

Third, to enhance the productivity and profitability of acquired farms, agroholdings intensify agricultural production. This involves both technological upgrades and improvements in agronomic practices. Investments in modern machinery, along with the adoption of advanced crop management techniques and precision agriculture, improve yields, increase efficiency, and optimise input use. Furthermore, by leveraging their scale, agroholdings can procure high-quality seeds, fertilisers, and crop protection products at lower costs (Walther 2014). They also transfer expertise and best practices from their existing operations to support the performance of newly acquired farms.

Such profit-maximising behaviour contrasts with earlier suggestions that land accumulation and 'empire building' were the sole motivations behind the rapid expansion of large farming entities (e.g. Nivievskyi et al. 2013). More generally, the investment strategies of agroholdings in Ukraine are consistent with findings from other transition economies, where farm investment decisions are shaped by both economic pressures and institutional factors, including a high incidence of financially distressed farms and largely imperfect agricultural factor markets (Bokusheva et al. 2009;).

Our findings suggest that, upon becoming part of a larger agroholding, an acquired farm gains improved access to the resources required to fuel its growth. Ostapchuk et al. (2021a) show that acquired farms tend to experience significant growth during the early post-acquisition years. Our results complement this by revealing a negative association between the number of years since acquisition and current growth, as well as a negative correlation between past and current growth rates. This pattern suggests that the initial growth surge following acquisition gradually fades, possibly due to diminishing returns on integration efforts or the stabilisation of farm operations. In this context, acquisitions appear to serve as short-term growth accelerators, after which organic growth slows as farms reach new operational equilibria.

The negative effect of profitability on organic growth (measured by changes in crop production value) may be linked to factors such as debt repayment obligations, profit distribution, or investments in non-productive infrastructure.

Our empirical setting also allows us to test one of the central concepts in firm growth theory: Gibrat's law. However, our results should be treated as a context-specific extension of this concept and are not directly comparable to studies applying it to the broader population of firms. Gibrat's law was originally developed to assess growth patterns across an entire industry or economy, whereas we examine a specific sample of acquired firms within one industry.

Nonetheless, our estimations support the principle of independence between firm size and growth rates, which may be explained by the fact that agroholdings predominantly acquire medium and large farms. At the same time, we reject Gibrat's law in terms of the independence of past and current growth rates. Our results indicate persistence in growth rates over time, although the coefficients are negative. This finding aligns with Edith Penrose's (1995) theory, which posits that adjustment costs and managerial limits constrain sustained growth. However, even this result should be viewed as specific to the context of acquisitive growth. Since agroholdings are simultaneously profit-oriented and focused on acquiring distressed farms, they may prioritise implementing the most critical changes required to stimulate organic growth in the early post-acquisition period. In contrast, the transformation of other key business segments may be postponed.

Furthermore, the negative relationship between profitability and organic growth may indicate that once a farm reaches a certain level of profitability, its expansion decelerates, potentially due to a shift in strategic priorities or the attainment of optimal operational scale. This interpretation is consistent with findings in the firm growth literature, which suggest that firms may prioritise profit stabilisation over continued expansion (Jang and Park 2011). While we do not empirically test for a specific profitability threshold beyond which growth slows, future research could explore this further by employing non-linear specifications or interaction effects between profitability and farm size.

Finally, the effectiveness of acquisitions in achieving desired outcomes is strongly influenced by post-acquisition integration strategies. The positive effects of resource reallocation are consistent with Penrose (1995), who emphasises the critical role of resource integration in focusing on core functions and aligning acquired firms with the acquirer's strategy to realise synergies and enhance growth potential. Another key finding highlights the importance of investment in fixed assets for farm growth, corresponding to Capron's (1999) observation regarding the central role of capital investments in modernising operations and improving efficiency during integration.

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Additionally, in line with Anand and Singh (1997), our results underscore the value of investments during the restructuring phase, as they help align the target firm's capabilities with the acquirer's strategic objectives. However, our findings on the limited role of labour adjustments in driving post-acquisition organic growth differ from earlier studies that emphasised the significance of workforce restructuring (Lubatkin and O'Neill 1987). This discrepancy may reflect the specific context of Ukrainian agroholdings, where labour costs are relatively low and capital investment plays a more prominent role in enhancing farm performance. These findings also underscore the importance of tailoring post-acquisition integration strategies to specific economic and institutional contexts.

CONCLUSION

This study presents an analysis of post-acquisition integration effects based on a sample of farms acquired by agroholdings. Within this scope, several limitations emerge that offer directions for future research. First, the exclusion of independent (non-holding) farms may limit our understanding of alternative growth mechanisms. Second, the farm-level focus does not allow for conclusions about post-acquisition integration and growth at the level of the agroholding as a whole.

Future research could build on our findings by decomposing organic growth into contributions from farm size expansion and productivity improvements, ideally using detailed physical input and output data at the crop level. Such an approach would offer a more granular understanding of the mechanisms through which post-acquisition integration drives performance. Additionally, a mixed-methods approach, combining quantitative modelling with qualitative case studies, could yield deeper insights into the specific managerial strategies and institutional constraints that shape integration outcomes. Further studies could also examine the long-term sustainability and strategic implications of agroholding expansion models.

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