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Agricultural land: Balancing ownership and leasing and its impact on the economic performance of agricultural farms

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Abstract

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Agricultural land is a fundamental resource for agricultural activity and is essential to the economic success of agricultural farms. In this respect, the way this resource is managed – through ownership or renting – can have a significant impact on the efficiency and sustainability of farms. The article provides a comprehensive analysis of the distribution of used land among Bulgarian agricultural farms, the choice between owning or renting agricultural land, and the relationship between the share of owned land and the economic sustainability of agricultural farms. The conclusions in the article are based on a review of literature, as well as an analysis of data from Eurostat, the Bulgarian National Statistical Institute and the Agricultural Accounting Information System of the Ministry of Agriculture and Food. Various methods are used for the analysis – comparative analysis, descriptive analysis, panel regression analysis with fixed effects, and multiple regression analysis. Data for the period from 2014 to 2020 are analysed for six categories of agricultural farms classified by economic size.

Keywords: agricultural land; ownership; rent; economic sustainability; Bulgaria

Introduction

Agricultural land is a fundamental resource for agricul tural activity and is essential for the economic viability of farms. In this regard, the way this resource is managed – whether through ownership or lease – can significantly impact the efficiency and sustainability of the farms. De pending on various factors, such as market conditions, in stitutional environment, financial capabilities, and strategic objectives, farms can choose between different forms of ag ricultural land ownership – ownership or lease. Ownership provides the farm with the right to manage, use, and dispose of the land it owns. Leasing agricultural land, on the other hand, provides the right to use the land for a certain period in return for paying a certain amount to the owner (Slangen & Polman, 2008). The balance between ownership and lease can significantly influence the productivity, efficiency, prof itability, and sustainability of farms.

There are several advantages and disadvantages to both ownership and leasing. Ownership gives farmers the security of possession and the ability to make long-term decisions about how to manage their land. This can lead to higher productivity and efficiency, as farmers are more likely to invest in their land and make improvements that will increase its productivity. Ownership also gives farmers the flexibility to sell or lease their land if necessary, which can provide them with a source of income or allow them to relocate to another area. However, ownership is associated with several expenses. These include the costs of purchasing the land, the costs of maintaining the land, and the costs of taxes and other fees associated with land ownership. Ownership can also be a barrier to entry for new agricultural producers, as it requires a significant amount of capital.

Leasing agricultural land can be a more accessible option for farmers, as they do not have to purchase the land. This can be particularly beneficial for new farmers or farm-

ers who do not have much capital. Leasing can also give farmers more flexibility, as they can choose to lease land for a shorter period if they are unsure how long they want to stay in a particular area. However, leasing also has several disadvantages. Farmers who lease land do not have the same security of possession as owners and may be at risk of being evicted if the landlord decides to sell the land or develop it. Tenants also have less control over how the land is managed and may not be able to make long-term improvements to the land.

The best way to manage agricultural land will vary depending on the specific circumstances of each farm. Farmers need to carefully consider the advantages and disadvantages of both ownership and leasing before deciding how to manage their land.

The ratio between owned and leased land used in agriculture is a complex phenomenon that depends on many factors – land price (Feder & Feeny, 1991), the availability of land, land fragmentation (Demetriou et al., 2013), available financial resources, the collapse of the nationalised model (Burger, 2006; Dannenberg & Kuemmerle, 2010; Bański, 2017), the structure of farms (Hartvigsen, 2012; Boliari, 2013; Hartvigsen, 2014; Mihailova et al., 2022), tax implications of ownership and leasing (Grover & Walacik, 2019) and others. In different European countries, this ratio varies (Figure 1). In some countries, like Spain and Poland, owned land significantly exceeds leased land. In other cases, like Italy and the United Kingdom, owned and leased land are closer in size. In some countries, such as Germany and France, leased land exceeds owned land.

In Bulgaria over the last decade, there has been a trend towards an increase in leased land and a decrease in owned land by farmers. As observed from Figure 2 over the period 2010–2020, leased land increased by about 1261 281.0 ha., while owned agricultural land decreased by 314 093.3 ha. The total agricultural land also continuously grows, with an increase of about 947 187.7 ha at the end of the period. This

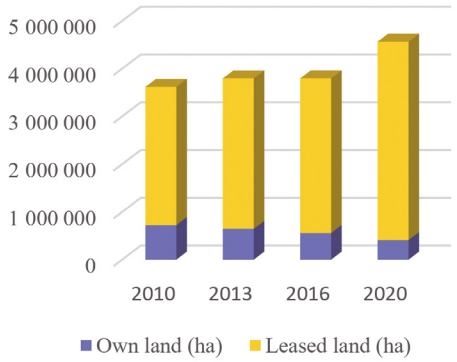

Fig. 2. Owned and leased land in Bulgarian agriculture for the period 2010–2020

Source: Own calculations based on Ministry of Agriculture data

could be related to economic, social, and political factors that influence farmers' choices regarding land ownership and leasing.

This study investigates the issue of the balance between ownership and leasing of agricultural land and its impact on the economic success of farms in Bulgaria. It analyses land ownership and leasing, focusing on their advantages and disadvantages. Leased land in the study refers to both short-term and long-term leases. The article also explores how agricultural land ownership and leasing can impact the economic success of farms, considering factors such as productivity, profitability, and farm sustainability. The results from this article may be useful for farmers seeking the optimal balance between land ownership and leasing to achieve maximum economic success for their farms.

Literature Review

Haynie et al. (2022) analyse land ownership patterns worldwide in order to investigate the factors that shape them. They suggest that land ownership is a complex phenomenon

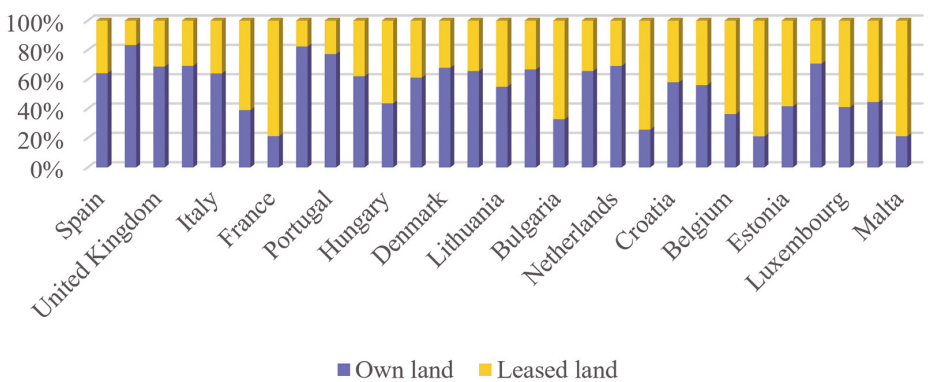

Fig. 1. Ratio between owned and leased land in agriculture in some European countries in 2013

Source: Own calculations based on Eurostat data

influenced by a multitude of factors such as geography, history, culture, and economics. The authors note that land ownership has been a central aspect of human societies for millennia and that the way land is owned and managed varies significantly across time and space. For instance, they point out that land ownership is usually more concentrated in areas with a long history of agriculture, such as Europe and Asia. They also emphasise the importance of cultural factors, such as the significance of family and clan ties, in shaping land ownership patterns.

Studies focusing on the practice of leasing agricultural land in various European countries (Georgiev, 2011; Kowalczyk et al., 2019, 2021; Kaletnik et al., 2020) underscore the importance of legislation that regulates the relationships between landowners and tenants to ensure balanced and sustainable resource use.

Salmerón-Manzano & Manzano-Agugliaro (2023), after researching scientific publications from 1950 to 2020, conclude that issues with land rights can contribute to food insecurity, limited livelihood opportunities, and consequently poverty. Uncertainty in land tenure can lead to improper land use, which can ultimately result in environmental damage (Reydon et al., 2015; Zhang et al., 2007). Environmental conditions are closely linked to land rights, as land use practices can either promote sustainability or negatively impact the environment due to poor management. For example, excessive use of nitrogen fertilisers can contaminate groundwater (Padilla et al., 2018), and poorly implemented land rights policies can contribute to deforestation in some parts of the world (Robinson et al., 2014).

Forbord et al. (2014) examine changes in control of agricultural land (ownership and leasing) in Norway over the past fifty years to understand the driving factors behind these changes. They hypothesize that the change is driven by three main factors: techno-economic development leading to a growing need for scale economies; social norms that limit the transfer of farming properties outside the family; and political and legal instruments that reduce the volume of property transfers. Additionally, the decrease in compensations for smaller farmers since the 1990s has stimulated many of them to leave farming and increased the availability of leased land – ultimately leading to a rapid shift from traditional ownership to a predominantly lease-based system.

DeBoe (2020) explores the effects of income-supporting policies on farmers‘ choice of land tenure, noting that these policies can have a heterogeneous effect. For instance, direct payments can increase the preference for land as they raise the price of agricultural land and reduce the risk of tenure insecurity. However, these payments can also decrease the preference for land if they are linked to certain land management conditions or if they allow farmers to earn income without producing. In addition, investment support policies can encourage farmers to purchase or lease more land to increase their production capacity or expand their operations. The author concludes that a better understanding of the interaction between income support policies and land tenure choices, as well as between investment support policies and land use, is needed.

Bradfield et al. (2020) analyze the factors influencing the decision of Irish dairy farmers to lease or continue leasing land. The results show that farmers who lease land have a higher level of hired labor, intensive farming practices, and membership in discussion groups on sectoral issues. Also, the results suggest that lease contracts help farms achieve economies of scale. The authors suggest that government intervention, such as promoting tax incentives for leasing land and facilitating knowledge sharing in discussion groups, is justified.

Marks-Bielska (2021) investigates the factors influencing the decision to lease agricultural land in Poland. According to the author, all farmers desire land ownership as it gives them complete freedom to manage it. But when land is expensive compared to the income from farming, leasing can be an alternative for creating or expanding a farm, if the rights of both the owner (property protection) and tenant (guarantee of efficient and stable land use) are respected. The study results show that the smallest farms have an equal distribution between owned and leased land. The percentage of leased land is lowest (25.24%) in farms sized 10.1–15.0 ha. In other farm categories, leased land varies from 34.20% (in farms sized 30.1–50.0 ha) to 38.27% (50.1–100.0 ha). The largest subcategory of farms, covering 300.1–500.0 ha, has a full 59.44% leased land.

Pilarova et al. (2018) investigate how land ownership influences the adoption of sustainable agricultural practices in Moldova. Using logistic regression, they analyze data from 400 crop farmers. The results show that farmer-owners are more likely to adopt sustainable practices such as mulching, crop rotation, and organic fertilization compared to farmer-tenants. Adesida et al. (2021) examine the influence of land ownership on the adoption of sustainable agricultural practices in Nigeria. Using data from 288 small farmers, they find that farmer-owners are more likely to adopt mulching and less likely to adopt tree fertilization. Some studies (Abdulai et al., 2011; Abera et al., 2020; Totin et al., 2021) also underline the importance of land ownership for adopting sustainable farming practices. They note that long-term ownership or leasing of land can motivate farmers to invest in sustainable practices.

Adenuga et al. (2021) present a literature review explor-

ing the benefits of long-term land leasing for both agricultural producers and landowners. They find that the duration of the lease agreement significantly impacts land productivity and sustainability.

Kaneva (Kaneva, 2018) analyzes rental relationships and the rental market in Bulgaria, comparing them to those in the EU. She finds that Bulgaria is among the countries with the highest proportion of leased land, and the average size of the lease is higher than the EU average. Stanimirova (Stanimirova, 2021) finds that despite the increase in rent in Bulgaria, interest in owning agricultural land in the country is also growing, which she attributes to support under the Common Agricultural Policy.

The aim of the current study is to support the exploration of factors influencing Bulgarian agriculture by providing a comprehensive analysis of the distribution of used land among Bulgarian farms, the choice between owning agricultural land and leasing it, and the relationship between the share of owned land and the economic sustainability of farms. The research will contribute to a more profound understanding of how different farming practices, land tenure systems, and government policies can impact agricultural productivity and sustainability.

Research tasks:

- To analyze the distribution of land used among Bulgarian farms for the period 2014–2020 in order to understand how land ownership has changed in Bulgarian agriculture;
- To quantify the relationship between own and leased agricultural land and net farm income and to assess how these effects vary with economic farm size;
- To analyse the relationship between the share of own land and the economic success rate of agricultural holdings, as measured by the ratios of profitability, indebtedness, productivity, etc. by applying multiple regression analysis.

Materials and Methods

A multitude of scientific materials relating to models of agricultural land management – through ownership or lease, in different parts of the world, have been reviewed and analysed. The literature review primarily includes articles from peer-reviewed scientific journals, as well as other academic resources available in scientific databases such as Scopus, Web of Science, etc. This comprehensive and diverse literature review allows the authors to create a complex picture and extract valuable conclusions, contributing to a better understanding of the topic under study.

Data from Eurostat and the Agricultural Accounting Information System (AAIS) of the Ministry of Agriculture and Food of the Republic of Bulgaria have been used in the study. The paper analyses data for the period 2014–2020 for six categories of farms by economic size: up to 8 thousand euros, 8–25 thousand euros, 25–50 thousand euros, 50-100 thousand euros, 100-500 thousand euros and over 500 thousand euros. The representative sample of the AAIS includes the following number of farms: 2229 for 2014; 2272 for 2015; 2261 for 2016; 2253 for 2017; 2241 for 2018; 2252 for 2019; 2235 for 2020. Various methods are used for the analysis – comparative analysis, descriptive analysis, panel regression analysis with fixed effects and multiple regression analysis.

A panel regression model with fixed farm effects is used to estimate the relationship between agricultural land and farm income, controlling for unobserved heterogeneity among farms. The model uses panel data and indicator variables to control for unobserved time differences among farms and overall time trends. The dependent variable is the net income of the farm, and the key independent variables are owned and rented agricultural land. The fixed effects of the farm control for omitted variables that vary between farms but are constant over time. The model is estimated using ordinary least squares (OLS) applied to transformed data, with the coefficients of owned and rented land directly estimated and standard errors corrected for heteroskedasticity and autocorrelation. This ensures unbiased estimates of effects. By using panel data and including fixed effects, the model identifies the relationship between agricultural land and income over time, controlling for time-constant factors, which allows for a stricter causal inference regarding the influence of land on farm incomes.

A multiple regression analysis is applied to investigate the relationship between various factors and the share of owned land in the farm, which is defined as the dependent variable. The independent variables chosen for analysis include farm profitability, factor productivity, level of indebtedness, as well as land rent expenses and the share of long-term assets in the total assets of farms. Each of these factors is expressed through their respective coefficients. The regression model analyses how each of these independent variables affects the share of owned land in the farm, controlling for other variables. This allows identifying key factors influencing the decision to purchase land in farms and to better understand how different financial and operational characteristics of farms affect their agricultural land management strategy.

Results and Discussion

Analysis of the distribution and use of owned and rented land

Figure 3 illustrates that in the period from 2014 to 2020,

the total amount of rented land from the studied population of farmers is significantly larger than the total amount of owned land. This indicates that rental contracts for land predominate in Bulgarian agriculture, rather than ownership contracts. The quantity of owned land remains relatively stable throughout the period and fluctuates around 267.08 ha. The quantity of rented land is also relatively stable and fluctuates around 1557.44 ha. This indicates that there is not a significant change in the distribution of land used for agricultural activity.

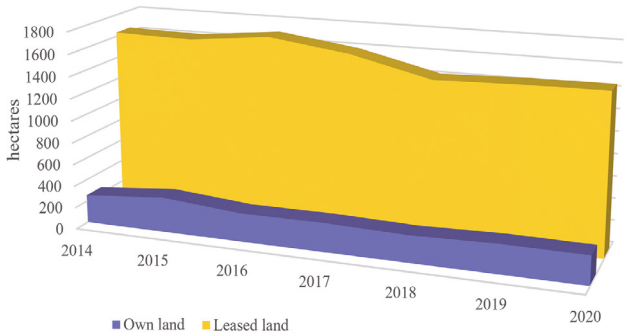

Fig. 3. Owned and rented land in hectares in the studied population during the period 2014–2020

Source: Own calculations based on Agricultural Accounting Information System data

Figure 4 shows that the largest percentage of used agricultural land – both owned and rented – belongs to farms with an economic size over 500 thousand euros: 83.06% for owned land and 71.22% for rented land. It is noted that the smallest percentage of used agricultural land – both owned and rented – belongs to farms with an economic size up to 8 thousand euros: 0.61% for owned land and 0.18% for rented land. The data indicate that there is a large concentration of used agricultural land in the hands of a few large farms, while many small farms use very little land.

Comparing the percentages for owned and rented land for each category, the difference between them is noticeable. For example, farms with an economic size up to 25 thousand euros and farms with an economic size over 500 thousand euros use a larger percentage of owned land compared to rented agricultural land. Farms with an economic size from 50 thousand to 500 thousand euros use more rented land than owned land.

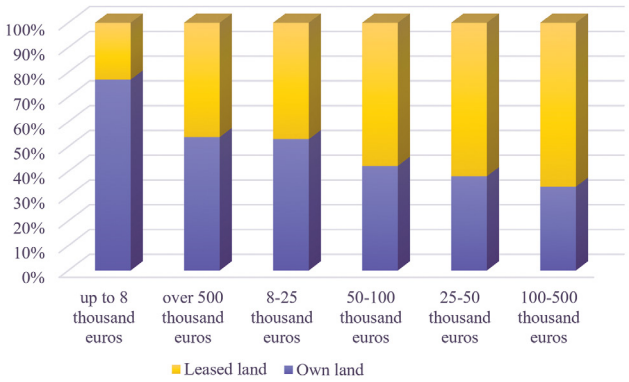

Fig. 4. Owned and rented land in percentages in the studied population for the year 2000 by economic size of the farms

Source: Own calculations based on Agricultural Accounting Information System data

Panel Regression Analysis with Fixed Effects

The panel regression model with fixed farm effects provides substantial evidence that both owned and rented agricultural land have a statistically significant positive relationship with the farm's net income, controlling for unobserved heterogeneity over time in the farms (Table 1).

The coefficient on owned land suggests that an increase in owned land by 1 hectare is associated with an approximate 1 644 euro increase in the farm's net income, averaged for farms and years. This effect is strongly statistically significant ($p < 0.001$). The coefficient on the variable for rented land suggests that an increase in rented land by 1 hectare is associated with an approximate 148 euro increase in the farm's net income. Although smaller in magnitude than the effect of owned land, this effect is also strongly statistically significant ($p < 0.001$). Taken together, these results provide compelling evidence that both owned and rented agricultural land are important determinants of net income for agricultural producers in Bulgaria. The findings are consistent with the hypothesis that increasing agricultural resources, whether through purchase or rental, increases agricultural production and leads to higher profits.

The very high R-squared of 0.998 indicates that owned and rented land explain almost all variations in the farm's net income, after controlling for farm heterogeneity through

Table 1. Panel Data Regression Results

	Coefficient	Std. Err	T-stat	p-value	lower 0.95	upper 0.95
Used agricultural land – owned	1643.8665	120.006	13.695	0.000	1398.613	1889.12
Used agricultural land – rented	147.6059	15.327	9.628	0.000	116.388	178.824

Source: Own calculations based on Agricultural Accounting Information System data

the fixed effects specification. This means that differences in agricultural land resources across different farms are a key driver of profitability differences.

The analysis is extended to assess whether the effects of owned and rented agricultural land on net income differ depending on the economic size of the farms. Separate fixed effects models were estimated for three groups of farms based on economic size: under 25 thousand euros, from 25 thousand to 100 thousand euros, and over 100 thousand euros (Table 2).

Agricultural farms with an economic size of up to 25 thousand euros own an average of 6.05 ha of land and rent an average of 14.48 ha. Their average net income is 10 934 euros. The forecast coefficient on owned land suggests that an increase of 1 ha is associated with an expected average 1271 euro higher net income for the farm ($p < 0.001$). The coefficient on rented land suggests that an increase in rented land by 1 ha is associated with an expected income increase of 224 euros ($p < 0.001$). The significant positive effects show that expanding the used agricultural area both through ownership and rental supports higher profitability for small Bulgarian farms. The size of the effect of owned land is larger, suggesting that owned land provides greater benefits for income.

Agricultural farms with an economic size from 25 thousand to 100 thousand euros own an average of 23.95 ha of land and rent an average of 266.11 ha. Their average net income is 32 873 euros. The forecast coefficient on owned land shows that an increase of 1 ha is associated with an expected average 1097 euro higher net income for the farm ($p < 0.001$). The coefficient on rented land suggests that an increase in rented land by 1 ha is associated with an expected income increase of 187 euros ($p < 0.001$). Expanding the used agricultural area, both owned and through rental, has a positive and significant effect on the profitability of medium Bulgarian farms. The effect from owned land is significantly larger than the effect from rented land.

Agricultural farms with an economic size over 100 thousand euros own an average of 52.95 ha of land and rent an average of 390.06 ha. Their average net income is 140 432 euros. The data show that large farms own on average about twice as much land, rent on average about 1.5 times more land, and earn on average about 4 times more income compared to medium-sized farms. In particular, farms with an economic size of 500 thousand euros in Bulgaria cultivate on average over 1300 ha of land (1081.31 ha rented and 220.35 ha owned). This underlines how the size of the farm and land resources are linked to profitability. The forecast coefficient on owned land shows that an increase of 1 ha is associated with an expected average 1593 euro higher net income ($p < 0.001$). The coefficient on rented land suggests that an increase of 1 ha is associated with an expected income increase of 188 euros ($p < 0.001$). While both owned and rented land show significant positive effects on net income, the effect of owned land for large farms is significantly larger.

The comparison of the three panel regression models, estimated for different economic groups of agricultural farms in Bulgaria, allows us to draw the following conclusions:

- The models consistently show that both owned and rented agricultural land have a statistically significant positive relationship with the farm‘s net income, even after controlling for the farm‘s time-invariant heterogeneity through fixed effects.
- The size of the coefficient on owned land is larger than the coefficient on rented land in all models. This indicates that acquiring additional owned land provides a greater boost to farm profitability compared to renting more land.
- The explanatory power of the model increases from small to large farms, as seen from the increasing R-squared values. This suggests that land resources explain a larger share of the variations in income for larger farms.
- The marginal effect of additional land decreases for larger farms, as the coefficients decrease from small to large farms. This reflects diminishing returns to scale, where additional land improves income less for larger farms.

Multiple Regression Analysis

A multiple regression analysis has been performed in which the share of owned land in the agricultural holding is the dependent variable. Independent variables have been chosen that provide information about the economic and fi-

Table 2. Panel Data Regression Results by Economic Farm Size

Farmers by Economic Size	Coefficient of own land	p-value	Coefficient of rented land	p-value	R squared
up to 25 thousand euros	1271	<0.001	224	<0.001	0.967
25-100 thousand euros	1097	<0.001	187	<0.001	0.989
over 100 thousand euros	1593	<0.001	188	<0.001	0.995

Source: Own calculations based on Agricultural Accounting Information System data

nancial situation of the agricultural holding and can influence the share of owned land in the agricultural holding.

The dependent variables are:

- Profitability Ratio: The hypothesis is that if the agricultural holding is profitable and successful, this could influence the decision to expand the share of owned land;
- Coefficient of Factor Productivity: The efficiency of production. It reflects factors such as technology, managerial skills, resource allocation, economies of scale, and other unobserved factors that affect production beyond the measured inputs. It is assumed that if the agricultural holding is more productive, it is likely to strive for more owned land to increase its total production capacity;
- Land Rent: The size of the land rent could be inversely proportional to the share of owned land. The hypothesis is that if the land rent is high, the agricultural holding may turn towards purchasing more owned land to reduce its dependence on rented land;
- Debt Ratio: Analysing the debt financing of the agricultural holding can give an idea of its financial stability and the possibility of expanding the share of owned land. The hypothesis is that increased indebtedness may reduce the ability to invest in owned land;
- Share of Fixed Assets to Total Assets: The assumption is that more owned fixed assets could lead to a higher share of owned land.

The results of the multiple regression analysis show that profitability, productivity, land rent, indebtedness, and the share of fixed assets in total assets are statistically significant factors that can influence the share of owned land in agricultural holdings (Table 3). The correlation coefficient R is 0.958. This indicates a strong and positive correlation between the dependent variable and the independent variables. The coefficient of determination R Square is 0.919. This indicator means that about 91.9% of the variation in the dependent variable (share of owned land) can be explained by the variation in all the independent variables included in the model. The value of "Sig." is less than 0.001, indicating that the regression model is statistically significant. Tolerance and VIF (variance inflation factor) are statistical measures for multicollinearity – a problem when predictors are too strongly correlated with each other. In this case, all predictors have tolerance values above 0.1, indicating that there is no problem with multicollinearity in the model.

The regression equation is as follows:

$$y = -0.148 - 0.421x_1 + 0.096x_2 + \\ + 0.0002x_3 - 0.234x_4 + 0.002x_5, \quad (1)$$

where: y – Share of owned land; x_1 – Profitability ratio; x_2 – Coefficient of factor productivity; x_3 – Land rent; x_4 – Debt Ratio; x_5 – Share of fixed assets to total assets.

The results from Table 3 provide information about the standardised and normalised regression coefficients for the dependent variables, as well as the statistical values associated with them. The relationships between the independent variables and the dependent variable and their influences on the share of owned land in agricultural holdings can be interpreted as follows:

- The constant (Constant) in the multiple regression analysis represents the predicted value of the dependent variable (Share of owned land) when all independent variables are zero. The constant coefficient in the table is -0.148. This means that when all independent variables are zero (i.e., profitability, coefficient of productivity, land rent, debt ratio, and share of fixed assets are zero), the predicted value of the dependent variable (Share of owned land) is -0.148.
- Profitability ratio: The coefficient before this variable is -0.421, which means that for every unit increase in the profitability of the agricultural holding, the share of owned land decreases by approximately 0.421 units ($p = 0.001$).
- Coefficient of factor productivity: The coefficient before this variable is 0.096. For every unit increase in the

Table 3. Multiple Regression Results

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-0.148	0.038		-3.928	0.000
Profitability ratio	-0.421	0.119	-0.493	-3.523	0.001
Coefficient of productivity	0.096	0.009	0.990	10.299	0.000
Land rent (thousand euros)	0.0002	0.000	0.286	4.613	0.000
Debt Ratio	-0.234	0.073	-0.463	-3.199	0.003
Share of fixed assets to total assets	0.002	0.001	0.250	3.500	0.001

Source: Own calculations based on Agricultural Accounting Infor mation System data

factor productivity coefficient, the share of owned land increases by approximately 0.096 units ($p < 0.001$).
- Land rent (euros): The coefficient before this variable is 0.0002. For every euro increase in land rent, the share of owned land increases by approximately 0.0002 units ($p < 0.001$).
- Debt Ratio: The coefficient before this variable is -0.234. For every unit increase in the agricultural holding's indebtedness, the share of owned land decreases by approximately 0.234 units ($p = 0.003$).
- Share of fixed assets to total assets: The coefficient before this variable is 0.002, which means that for every unit increase in the share of fixed assets in total assets, the share of owned land increases by approximately 0.002 units ($p = 0.001$).

Standardised coefficients are significant when comparing the influence of different independent variables in the regression model. With these coefficients, we can determine which factors have a stronger or weaker influence on the dependent variable. The coefficient of factor productivity (0.990) has the strongest positive influence on the share of owned land. A higher coefficient of factor productivity is associated with a higher share of owned land. The profitability coefficient (-0.493) and the debt ratio (-0.463) have the strongest negative influence on the share of owned land. Higher profitability and higher indebtedness are associated with lower shares of owned land. Land rent (0.286) and the share of fixed assets (0.250) have a weaker, but still positive, influence on the share of owned land. Higher rent and a higher share of fixed assets are associated with slightly higher shares of owned land.

The analysis helps to understand how each of these variables influences the decision of agricultural farmers to acquire ownership or rent land:

1. Agricultural farms with higher productivity have a larger share of owned land because they:
- Increase the efficiency and profitability of their agricultural activities by producing more with fewer resources and investments.
- Enhance the resilience and competitiveness of their business by adapting to changing conditions and utilising the best agricultural practices and technologies.
- Invest in modernisation, education, and expanding their production capacities, which allows them to purchase or develop additional agricultural lands.
- Earn larger revenues and financial opportunities from their agricultural production, which enables them to afford a larger share of owned land or to obtain loans for purchasing or expanding agricultural lands.

2. Agricultural farms with a larger share of fixed assets have a larger share of owned land because they:
- Invest in modern and efficient machinery and equipment, which increases the productivity and efficiency of agricultural activities.
- Have greater production power and potential for expansion, which allows them to purchase or develop additional agricultural lands.
- Are more financially stable and resilient to economic fluctuations, which provides them better opportunities for financing and expanding agricultural lands.
- Have suitable infrastructure and long-term development plans, which contribute to more efficient and sustainable use of agricultural land.

3. Why is an increase in land rent associated with an increase in the share of owned land?

When the rent of the land increases, it usually means that the income from agricultural activity is also higher. The increased income may allow agricultural farms to invest more resources in acquiring additional land, thereby increasing their share of owned land. The increase in rent could be a result of successful development and growth of the agricultural farm. Larger and more successful farms may attract more resources and investments, which can be used to purchase additional land for expanding production and increasing profitability.

When the rent of the land increases, it can also affect the supply and demand for agricultural land. The increased rent may reduce the supply of agricultural land for rent, as owners may prefer to retain or sell their land rather than lease it out. At the same time, the increased rent may reduce the demand for agricultural land for rent, as farms may seek alternative sources of income or optimise the use of their own land. These factors can lead to a decrease in the share of rented land and an increase in the share of owned.

When the rent of the land increases, it may also have a psychological effect on agricultural farms. The increased rent may encourage farms to invest in their own land, thereby ensuring greater stability and independence from fluctuations in market conditions. Owned land may be perceived as a more valuable and secure asset that can provide greater freedom and control over production. Owned land can also serve as collateral for obtaining loans or other financial resources.

4. Higher profitability and indebtedness of agricultural farms can lead to a lower share of owned land because:
- Higher profitability may imply higher risk and instability, which might make farms prefer less debt and more financial freedom. Instead of investing in owned land, they might keep more liquid assets for other financial opportunities and investments. Also, they might specialise in certain crops or activities that are closer to

their strengths and resources, without expanding the agricultural areas.

- Greater indebtedness can limit the financial capabilities and dependency of farms on financial institutions. This can hinder the acquisition and retention of owned land, leading to a lower share of owned land. Instead of investing in expanding agricultural areas, these farms might use a larger portion of their income for debt repayment or other short-term financial commitments.

This analysis provides a more nuanced understanding of the relationship between ownership and rent and its impact on the economic success of agricultural farms. By controlling for other factors, such as profitability, productivity, and indebtedness, this analysis can help isolate the effect of ownership on economic success. The results can be used to develop policies that encourage either ownership or rent, depending on the desired outcome. For instance, if the goal is to increase the economic success of agricultural farms, then policies that promote ownership may be more effective. This is because ownership provides farmers with a greater sense of security and control over their land, which can lead to increased investments and productivity. However, if the goal is to increase access to land for agricultural producers, then policies that promote rent may be more effective. This is because renting allows farmers to have access to land without having to make large upfront investments, which can be particularly beneficial for new or small farmers.

Conclusions

In Bulgarian agriculture, land rental agreements predominate over land ownership. The total amount of rented land is substantially larger than that of owned land, with both quantities remaining relatively stable throughout the period under review. A large portion of the utilised land belongs to farms with an economic size above 500 thousand euros, a very small percentage of the land is in the hands of smaller economic size farms. This indicates a concentration of agricultural land in the hands of a few large farms.

The study found that both land ownership and land rental have a positive and significant effect on farm profitability. However, the effect of land ownership is greater than the effect of rented land. The results also show that there is diminishing return to scale on land, meaning that additional land does not improve income as much for larger farms.

Profitability, productivity, land rent, indebtedness, and the share of long-term assets have a significant impact on the share of owned agricultural land, with productivity and long-term assets having the strongest positive impact, and profitability and debt having the strongest negative impact. Farms with higher productivity and more long-term assets are likely to have a larger share of owned land to support investments, capacity expansion, and long-term growth. An increase in land rent is associated with an increase in the share of owned land, likely due to higher farm income and psychological effects. Nevertheless, higher profitability and debt can reduce the share of owned land due to increased risk, instability, and reliance on external financing. These relationships suggest that policies promoting ownership can improve the economic outcomes of farms by providing greater security and control over land.

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