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Sources of financing for investments in agricultural holdings in Bulgaria – assessment of financial instruments

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Abstract

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The aim of the study is to assess the sources of investment finance (including land and fixed assets) that farms use most frequently. FADN data for the first two programming periods after Bulgaria's accession to the EU were used for the assessment. The analysis is based on variations in the value of farm assets and changes in capital sources for financing investments. The assessment is for farms in Bulgaria by type and by economic size. It is shown that, in most cases, farms use their own capital to finance their investments, with external financing mainly coming from subsidies and to a lesser extent from bank loans. The lower external financing may be due to financial management difficulties and insufficient use of financial leverage. This adds to the need for policy interventions to facilitate the relationship between farmers and lenders.

Keywords: agricultural investment; financing of agriculture; financial performance; source of funding; FADN

Introduction

For more than fifteen years and two full programming periods, Bulgarian agriculture has operated in the context of public support through the European Union's Common Agricultural Policy. During these years, a number of transformations have taken place, linked to a reduction in the number of farms, an increase in their size, the restructuring of production sectors, and the introduction of models for increasing environmental friendliness. Changes in approaches to resource use have led to a number of changes in farming patterns and systems (Doychinova, et al., 2022). These changes have had a significant impact on the financial performance and investment activity of Bulgarian farms. The financial performance of Bulgarian agricultural holdings in recent years has been the subject of relatively limited independent study (Koteva, 2015; Yalamov, Vutsova, & Arabajieva, 2021; Kirechev, 2022). The evaluation of on-farm investment activity is relatively less well studied, mainly down to the use of Rural Development Programme instruments and their impact on farm economic performance (Nikolov & Anastasova-Chopeva, 2017). Investment activity on farms is focused on acquiring a variety of assets. For Bulgarian farms, investments in land and perennial crops and land improvements, machinery and equipment are decisive, with priorities varying across different sectors of agriculture. The valuation of investments in land have been studied in more depth in previous studies (Yovchevska, и др., 2021); (Vlaev, 2021); (Yovchevska, Mihailova, & Koteva, 2022).

Insofar as the evaluation of investments in technical assets for agriculture is based on the general approach of economic feasibility, research is mainly focused on the evaluation of their efficiency. Relatively more limited in the research are the sources about financing of investments in Bulgarian agriculture (Branzova, 2019), the extent to which farms of different specialization and size rely on their own financing or use external financial instruments in the form of loans (Kirechev & Vlaev, 2019) or public support (Nikolov & Anastasova-Chopeva, 2017; Galluzzo, 2023). In this sense, the aim of the study is aimed at: Assessment of the financing of

investments in agricultural holdings in Bulgaria, classified by type of farming and by economic size; Evaluation of the sources of financial resources for financing investments; Assessment of public support for investment financing.

Materials and Methods

The proposed study aims to assess the sources of financing of fixed asset investments in Bulgarian agricultural holdings. The analysis is based on the calculation of changes in the components of the financial statements of farms over the years. A similar approach was applied in a study of investment financing in Italian agriculture (Carilloa, Licciardo, & Corazzab, 2022).

The analysis is based on a calculation of the changes in the components of the farm financial statements between the first and second programming periods. The comparison between the balance sheet data allows the difference between the different asset and liability items to be calculated, which can be used to assess the amount and type of investments made in the farms and the means by which they are financed.

Farm balance sheet data is analysed to determine the size of the investment, the asset structure and the associated financial support. Through changes in fixed assets occurring over the years and present on the balance sheet, new investments in land and improvements, permanent crops, buildings, machinery and equipment, breeding livestock, etc. are identified.

Calculating the changes in the components of the liability side of the balance sheet makes it possible to assess the way in which farms are financed, either through equity capital or by increasing indebtedness.

The research methodology includes: Study the dynamics of the composition and structure of fixed assets and gross investment; Study the dynamics of fixed assets by type; Comparisons between the average values of the indicators for the two programming periods: 2007-2013 and 2014-2021; Analysis of financial sustainability indicators that ensure the implementation of investment activities, including:

– *Availability of free equity source (Equity – Fixed Assets).*
– *Availability of net working capital (Current Assets – Current Liabilities).*
– *Ratio of borrowed capital to equity capital employed (Total Liabilities / Total Equity).*

And analyzing the level of support for investment activity under Rural Development Programs.

The data used are from the Farm Accountancy Data Network (FADN) over the period 2007–2021.

The analysis differentiates the changes in investments in the two programming periods (Rural Development Programme): 2007–2013 and 2014–2021.

The analysis includes farms of 7 types of farming: Field-crops; Horticulture; Wine and other permanent crops; Milk; Other grazing livestock; Granivores; Mixed. Previous research (Galluzzo, 2018) has shown the positive relationship between farm specialisation and the funds allocated for investment through the CAP.

The analysis includes farms of 4 economic sizes: Small – 2000–25 000 €; Medium – 25 000–100 000 €; Medium-large – 100 000–500 000 € and Large – over 500 000 €, in order to assess which sources are used to finance farms according to their size.

Results and Discussion

Evaluation of agricultural holdings in Bulgaria (all farms)

The study of all categories of farms in Bulgaria shows that in the average farm, gross investment in fixed assets increases almost 5-fold from 2007 to 2021, from €2,422 per farm to €14,625 per farm. The high growth is a consequence of the recovery and restructuring of farms in Bulgaria after the accession period. This has also determined the significant increase in the volume of fixed assets on farms. Over the same period, total fixed assets increased more than 5.7 times, from €21,242/farm to €122,913/farm. The share of gross investment in fixed assets varies between 8% and 20%, and has remained around 12% in recent years (Figure 1).

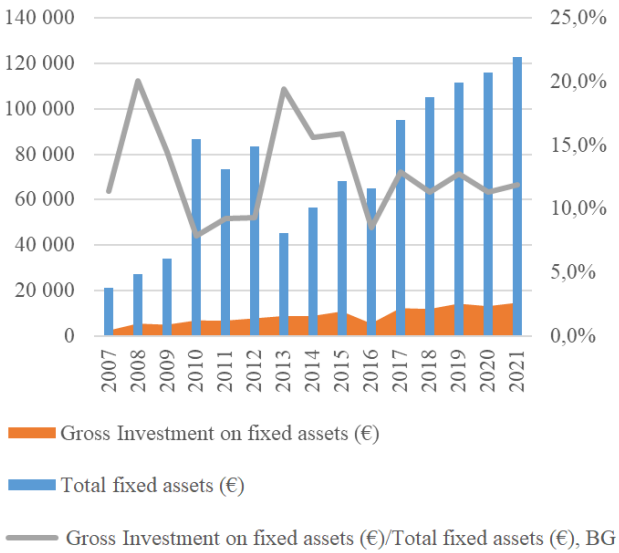

Fig. 1. Fixed asset and gross investment dynamics, Bulgaria

Source: FADN and own calculation

The structure of fixed assets for 2021 is dominated by land and permanent plantations (38.4%), followed by machinery and equipment (31.6%), buildings (19.2%) and breeding animals (6.5%). The growth of fixed assets in the period 2010–2012 is due to the growth of investments in land. Currently, demand for investment capital is focused on machinery and equipment (63%), land (29%) and land improvements (17%) (fi-compass, 2020; Kirechev, 2021).

Changes in the balance sheet structure show an absolute increase in the amount of fixed assets, current assets, equity and indebtedness. Structurally, however, the share of current assets is growing faster than that of fixed assets, with the importance of borrowed capital for farm financing increasing (Table 1). Compared between the first and the second programming period, indebtedness is rising, which determines the dependence of gross investment in fixed asset increasingly on external financing. At present, the demand for capital is mostly focused on the need for working capital (fi-compass, 2020; Kirechev, 2021).

Analysing the sources of funding over the two programme periods, there are available free capital resources. Farms maintain positive net working capital, but debt to equity is increasing (Table 2). Farms are increasingly using external sources of finance, mainly bank loans, to finance their operations and investments.

In the first programming period 2007–2013, current subsidies and taxes were lower than gross fixed asset investments (-€676/farm), but in the second programming period 2014–2021 there was an excess of current subsidies and taxes over gross fixed asset investments of €6,886/farm. In the period 2014–2021, the share of subsidies on agricultural investments in relation to gross investments in assets is 6.7% (Table 3). Although with a relatively small share, public investment support has a place in financing farm investments. Equity remains the main source of financing, but external financing, mainly through bank loans, plays an increasing role.

Evaluation of agricultural holdings in European Union (all farms)

According to FADN data, in the EU average farm, gross fixed asset investment is growing only 1.7 times, from €7,982/farm in 2007 to €13,607/farm in 2020. In contrast to Bulgarian farms, European farms are growing in a more planned way. The growth of gross investment in European farms coincides with the growth in the volume of their fixed assets, while the share of gross investment in fixed assets is only 4% (Figure 2).

In the structure of fixed assets for 2020, the largest share is occupied by land and permanent crops (69.4%), followed

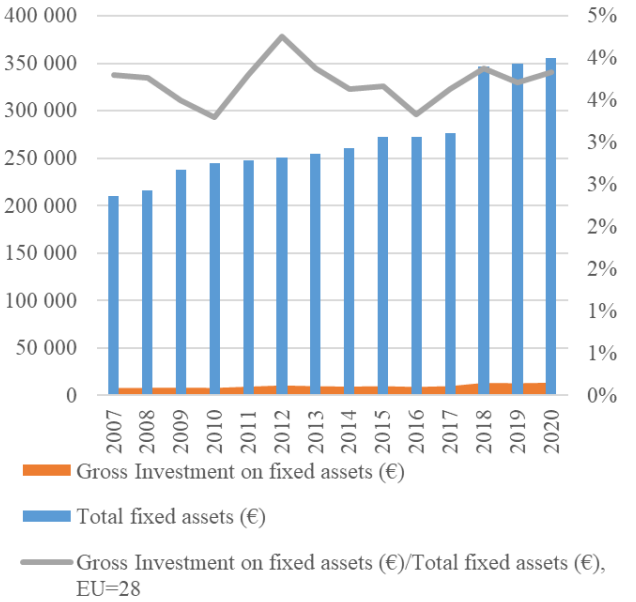

Fig. 2. Fixed asset and gross investment dynamics, EU = 28

Source: FADN and own calculation

by buildings (13.8%), machinery and equipment (12.8%) and breeding animals (4.0%). Currently, the demand for capital for investment in EU farms is mostly directed towards machinery and equipment (67%), followed by investment in land improvements (15%) and investment in land (11%) (fi-compass, 2019).

Changes in the balance sheet structure show an absolute increase in the amount of fixed assets, current assets, equity and indebtedness. Structurally, however, the share of fixed assets is growing faster than that of current assets, and, as in Bulgaria, the importance of borrowed capital for farm financing is increasing (Table 1). The capital structure of European farms is stable.

Analysing the sources of funding over the two programming periods, there are available free capital resources. Holdings maintain, although lower, positive net working capital. Indebtedness is increasing marginally but at a relatively low level (Table 2). Farms are increasing their indebtedness, but the high share of equity shows that own sources are determining the financing of European farms.

In both programming periods, the balance of subsidies and taxes exceeded, albeit by a small level (around €1,430/farm), gross fixed asset investment. In the 2014–2020 period, the share of subsidies on agricultural investments in relation to gross investment in assets is 5.8% (Table 3). The Common Agricultural Policy plays a positive role in financing investment in European farms.

Comparison of gross investments in fixed assets in the agricultural holdings of Bulgaria and the agricultural holdings of the countries of the European Union (all farms).

In comparative terms, gross investments in fixed assets in Bulgarian farms have increased systematically since 2007, outpacing those in European farms during the second programming period. The share of gross investments in fixed assets in Bulgarian farms exceeds 3 times that of the average European farm. Investment activity is a consequence of the desire to expand production, modernise farms and increase competitiveness (Ivanov, B. 2021). This process is supported to some extent by the Common Agricultural Policy, but implies an increase in the need for additional financing of investments, both through own capital and attracted capital.

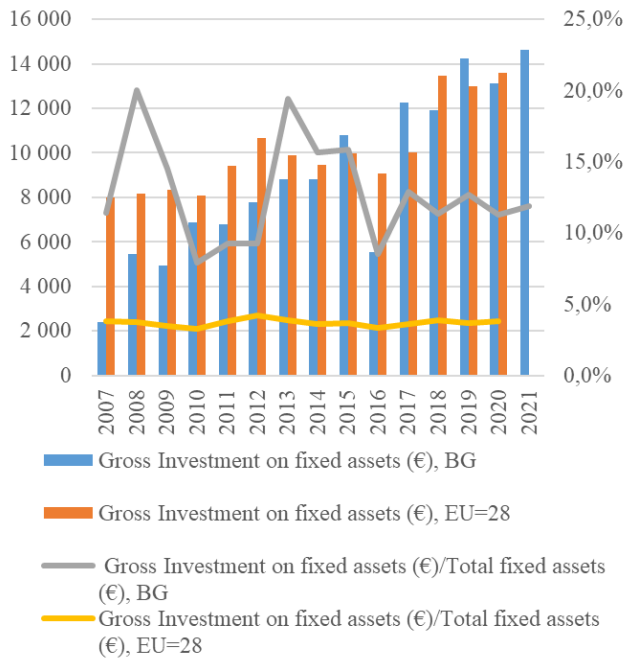

Fig. 3. Dynamics of gross investments in fixed assets in agricultural holdings in Bulgaria and the EU
Source: FADN and own calculation

Assessment of agricultural holdings by specialisation (Fieldcrops).

On fieldcrop farms, gross fixed asset investment increases more than 3-fold, from €7,992/farm in 2007 to €25,195/farm in 2021. Over the same evaluation period, the share of gross fixed asset investment was highest (38.8%) in 2008 and has remained at 13–15% in recent years (Figure 4).

In the structure of fixed assets for 2021, the largest share is occupied by land (46.5%), followed by machinery and

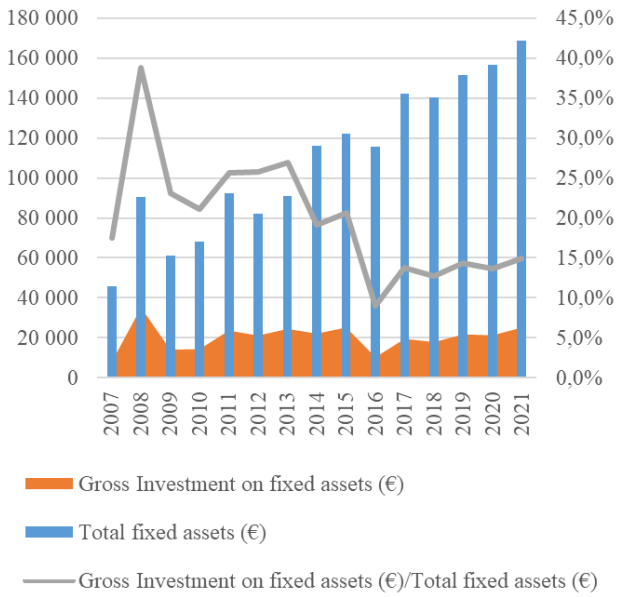

Fig. 4. Fixed asset and gross investment dynamics, Fieldcrops
Source: FADN and own calculation

equipment (35.2%), buildings (14.9%) and breeding animals (0.4%). By 2014, machinery and equipment dominated the fixed asset structure, followed by land. Field crop production is directly linked to the need for land and a significant amount of technical assets, which determines the main direction of investment in the sector.

Changes in the balance sheet structure show an absolute increase in the amount of fixed assets, current assets, equity and indebtedness (Table 1). The increase in equity fully covers the growth in the size of fixed assets, while in structural terms equity grows at the expense of indebtedness. Given the export nature of the output, farms have the greatest potential to generate profits and maintain a favourable capital structure.

Analysing the sources of funding over the two programme periods, there is a significant level of available free capital resources. Farms maintain a very high level of net working capital and the level of indebtedness is decreasing (Table 2). Field crop farms show an enviable financial sustainability and the determining source of financing is equity.

In the first programming period 2007-2013, current subsidies and taxes were lower than gross fixed asset investments (-€1,599/farm), but in the second programming period 2014-2021, there was an excess of current subsidies and taxes over gross fixed asset investments of €9,466/farm – the highest value compared to other sectors. In the 2014-2021 period, the share of farm subsidies to gross asset investment

is only 4%, the lowest level relative to other sectors (Table 3). Although relatively small, public investment support has a place in financing farm investment. The main source of financing is equity, with external financing less important.

Assessment of agricultural holdings by specialisation (Horticulture).

On vegetable crop farms, gross fixed asset investment decreases slightly from €3,944/farm in 2007 to €3,273/farm in 2021. High values of gross investments were realized in 2010 – 15,079€/farm, 2017 – 11,968€/farm and 2019 – 21122€/farm. For the same evaluation period, the share of gross fixed investment was highest (30.5%) in 2019 and has remained at a new 5–7% in recent years (Figure 5).

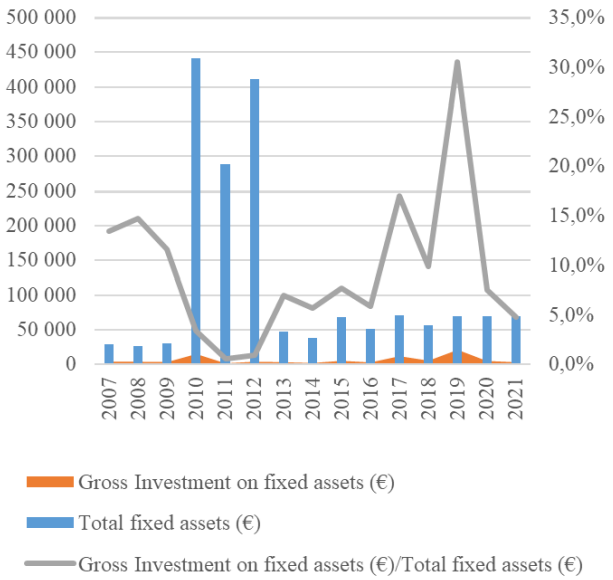

Fig. 5. Fixed asset and gross investment dynamics, Horticulture

Source: FADN and own calculation

In the structure of fixed assets for 2021, the largest share is occupied by buildings (39.6%), followed by machinery and equipment (36.6%) and land and (16.5%). Between 2010 and 2012, the sector made significant investments in land, as a result of farms' desire to rebuild the sector after the reform. The production of vegetable crops is directly linked to the need for land, machinery and equipment for production, the construction of greenhouses and greenhouses, which also determines the main lines of investment in the sector in the post-2007 period.

Changes in the sector's balance sheet structure show significant fluctuations. In the second programming period, compared to the first, there has been a contraction in total fixed assets and an absolute increase in current assets. Indebtedness increased while equity declined dramatically. However, the capital structure of farms remained relatively stable (Table 1). The decline in the average size of fixed assets coincides with the rate of decline in equity. The increase in indebtedness is faster than the increase in current assets, which means that part of the funds for fixed asset investment are financed by debt, mostly in the form of bank loans.

Analysing the sources of funding over the two programming periods, there has been a significant reduction in the available capital resource. Although at a relatively low level, farms in the sector have maintained positive net working capital. The fact is that indebtedness increased significantly (by 30 percentage points), which determines the increasing role of external financing of activities and investments (Table 2).

In both the first and the second programming period, current subsidies and taxes are smaller than gross fixed investment. This shows that the level of subsidies to the sector is not sufficient to support investment activity. At the same time, in the period 2014–2021, the share of agricultural investment subsidies to gross investment in assets is the highest for the agricultural sector at 19.4% (Table 3). Although heavily supported through public intervention, the horticulture sector is critical in terms of maintaining its financial sustainability, and dependence on external sources for financing is increasing.

Assessment of agricultural holdings by specialisation (Wine and other permanent crops).

On orchard and vineyard farms, gross fixed asset investment declined significantly from €20,251/farm in 2007 to €4,067/farm in 2021. Over the same evaluation period, the share of gross fixed asset investment was highest in 2007 (24.8%), and has remained at 3–8% in recent years (Figure 6). Investment activity in the sector has a continuous downward trend. Public support for fruit production is under the Rural Development Programme and for of 3,612€/farm. In the period 2014–2021, the share of agricultural investment subsidies in gross investment in assets was 10.0% (Table 3). It can be noted that public investment support has a place in financing the investment of farms growing permanent crops. Equity remains the main source of financing, while external financing is more important to support current activities.

Assessment of agricultural holdings by specialisation (Milk)

On farms specialised in milk production, gross investment in fixed assets increases almost 5-fold, from €861/farm in 2007 to €3,982/farm in 2021. For the same eval-

uation period, the share of gross fixed asset investment is around 6%, being more significant in the period 2012–2015, and the amount of fixed assets is increasing at a steady rate (Figure 7).

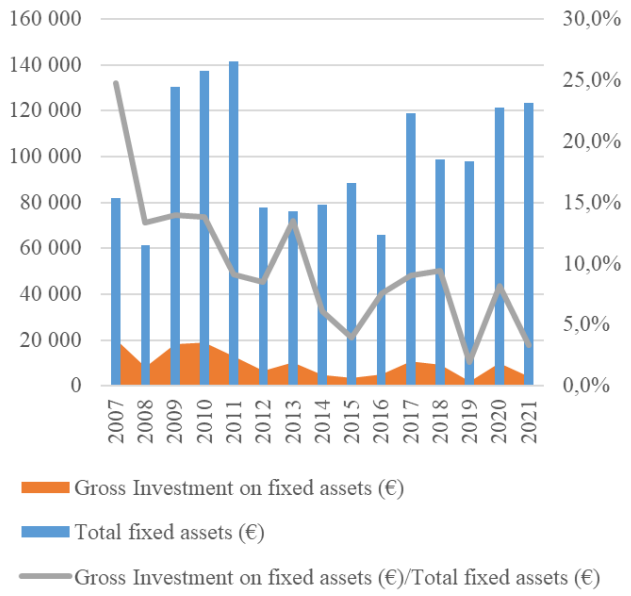

Fig. 6. Fixed asset and gross investment dynamics, Wine and other permanent crops
Source: FADN and own calculation

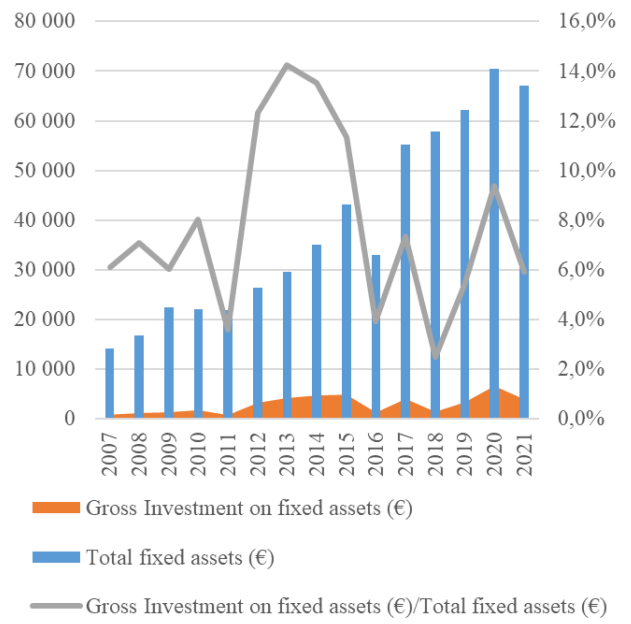

Fig. 7. Fixed asset and gross investment dynamics, Milk
Source: FADN and own calculation

In the structure of fixed assets for 2021, the largest share is occupied by breeding animals (34.1%), followed by buildings (24.7%), machinery and equipment (21.5%) and land (16.8%). The growth in investment since 2012 is in response to the increasing demands on dairy farms to rear animals and improve milk quality. The direction of investment in the dairy sector is mainly focused on herd maintenance, reconstruction and modernisation of livestock facilities and equipment improvements.

The changes in the balance sheet structure over the two periods analysed show an absolute increase in the level of fixed assets, current assets, indebtedness and equity (Table 1). Although in relative terms the share of equity has decreased slightly, dairy farms show a very good capital structure given the significant increase in equity.

Analysing the sources of funding over the two programming periods, there has been a significant increase in equity (€27,889/farm) and a significant amount of net working capital (€9,534/farm). The increased indebtedness to external creditors is mostly directed towards covering the increased current assets, i.e. the change in indebtedness is more directed towards short-term financing, while the financing of investments is mostly based on own capital sources (Table 2). There is considerable financial sustainability of dairy farms.

In both programming periods there was an excess of the balance of subsidies and taxes over the gross investment in fixed assets – by 827 €/farm for the first programming period and 9,154 €/farm for the second programming period respectively. In the period 2014-2021, the share of subsidies on agricultural investments over gross investments in assets was 13.1% (Table 3), which is evidence of the strong public support to the sector, including for investments. Although well subsidized, the dairy sector continues to use mostly its own capital sources to finance fixed assets.

Assessment of agricultural holdings by specialisation (Other grazing livestock)

On farms specialising in grazing livestock, gross fixed asset investment is at a relatively low level, but increasing 5-fold from €383/farm in 2007 to €1,915/farm in 2021. For the same assessment period, the share of gross fixed asset investment is in the range of 4- 6%, with more significant levels in 2017 (12.4%) and 2019 (11.2) (Figure 8).

In the structure of fixed assets for 2021, the largest share is occupied by breeding animals (39.1%), followed by machinery and equipment (23.3%), buildings (18.3%), and land (12.8%). The structure of investment in the sector is mainly determined by herd reproduction, the reconstruction of buildings and the renovation of livestock facilities.

Changes in the balance sheet structure show an absolute

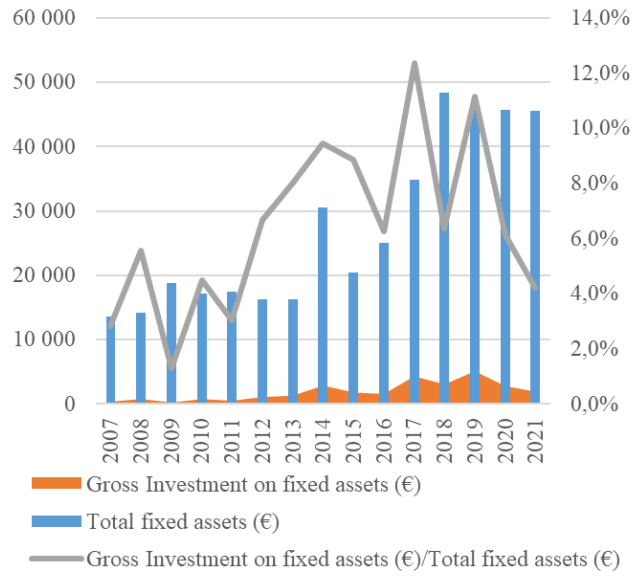

Fig. 8. Fixed asset and gross investment dynamics, other grazing livestock
Source: FADN and own calculation

increase in the level of fixed assets, current assets, indebtedness and equity (Table 1). Structurally, the share of fixed assets is relatively lower relative to total assets, while the level of indebtedness in the sector is increasing. Overall, the sector has a very good capital structure despite the increase in liabilities. The increase in indebtedness is greater than the increase in current assets, which means that part of the liabilities is directed towards the formation of fixed assets.

Analysing the sources of funding over the two programming periods, there is sufficient spare free capital resource. The sector has also realised growth in the net working capital, which is a prerequisite for good financial sustainability. However, over the same period, financial independence declined as a result of an increase in indebtedness from 6.1% to 21.2%. Although the level of self-financing is high, the grazing livestock sector is also financed by external capital sources, some of which are directed towards financing investments.

In both programming periods there was an excess of the balance of subsidies and taxes over the gross investment in fixed assets – by 1,505 €/farm for the first programming period and 9,237 €/farm for the second programming period, respectively. In the period 2014–2021, the share of subsidies on agricultural investments in relation to gross investments in assets is 16.5% (Table 3), which is evidence of the strong public support to the sector, including for investments and current activities. There is a high degree of public support, a significant part of which is directed towards financing fixed asset investment.

Assessment of agricultural holdings by specialisation (Granivores)

On farms specialising in granivores animals (pigs and poultry), gross fixed asset investment is growing at an exceptional rate. Over the period analysed, they grew 17.7 times, from €4,080/farm in 2007 to €103,700/farm in 2021. Over the same evaluation period, the share of gross fixed asset investment in recent years is around 10% (Figure 9). The significant growth of the sector indicators is very much a consequence of the consolidation of farms and a reduction of almost 10 times in the number of farms.

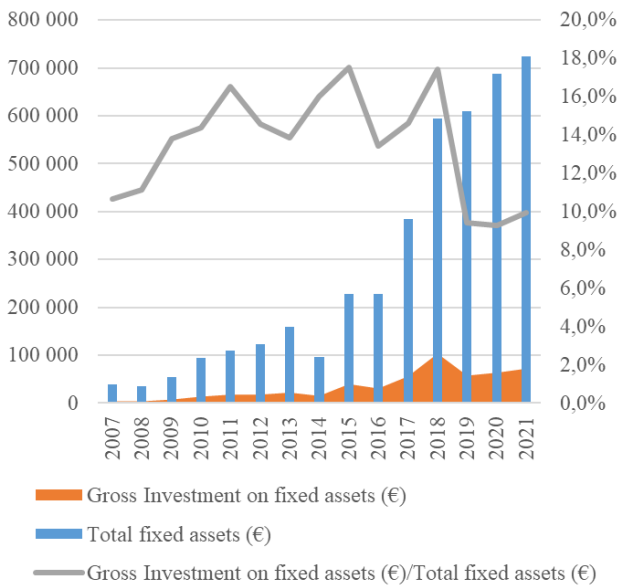

Fig. 9. Fixed asset and gross investment dynamics, Granivores
Source: FADN and own calculation

In the structure of fixed assets for 2021, the largest share is occupied by buildings (38.7%), followed by machinery and equipment (38.2%). The share of land (7.6%) and breeding animals (5.1%) is at a relatively low level. The structure of investment in the sector is mainly determined by farm expansion and farm modernisation. Significant investments have been made in the sector in relation to animal welfare and maintaining safety on farms.

Changes in the balance sheet structure show a significant increase in the level of fixed assets (5.1 times), current assets (4.9 times), indebtedness (4.1 times) and equity (5.4 times).

Structurally, the share of fixed assets is relatively smaller relative to total assets, and the level of indebtedness in the sector in total financing. Indebtedness is mainly geared towards meeting current capital needs. The sector has a very good capital structure, deleveraging and maintaining a high level of equity (Table 1).

Analysing the sources of funding over the two programming periods, there is a remarkable increase of 6.5 in the second programming period in available capital resources. Net working capital also increased almost 5 times. At the same time, financial autonomy improved as a consequence of a reduction in the relative share of indebtedness (Table 2). The granivorous livestock sector shows an enviable financial sustainability, which identifies own financing as the main source for financing investments.

In both the first and the second programming period, current subsidies and taxes are smaller than gross fixed investment. This shows that the level of subsidies to the sector is not a determinant of investment activity. At the same time, in the period 2014-2021, the share of agricultural investment subsidies to gross investment in assets is relatively high at 9.4% (Table 3). The sector has significant public support, which is mostly directed to maintaining current activity, to the extent that investment activity is financed to a greater extent with own capital resources.

Assessment of agricultural holdings by specialisation (Mixed)

On mixed farms, the level of gross fixed investment is growing at an extraordinary rate. Over the period analysed, they have increased more than 50-fold, from € 382/farm in 2007 to € 19,547/farm in 2021. Over the same evaluation period, the share of gross fixed asset investment increases from 3.8% in 2007 to 18.4% in 2021 (Figure 10). The significant growth in the sector's indicators is very much a consequence of farm consolidation and a reduction of almost 10-fold in the number of farms monitored.

In the structure of fixed assets for 2021, the largest share is occupied by land and permanent crops (34.2%), followed by machinery and equipment (28.8%), buildings (21.4%) and breeding animals (10.3%). The structure of investment in the sector is a consequence of the increase in investment in land and modernisation of technical assets for crop and livestock production.

Changes in the balance sheet structure show an absolute increase in the level of fixed assets, current assets, indebtedness and equity (Table 1). Structurally, the share of fixed assets increased. There is also an increase in the level of indebtedness. Despite the increasing indebtedness, the growth of equity is higher, which maintains the good capital structure of the farms. On mixed farms, the level of indebtedness is increasing more than that of current assets, indicating that part of the capital resources raised are being used to finance fixed asset investments.

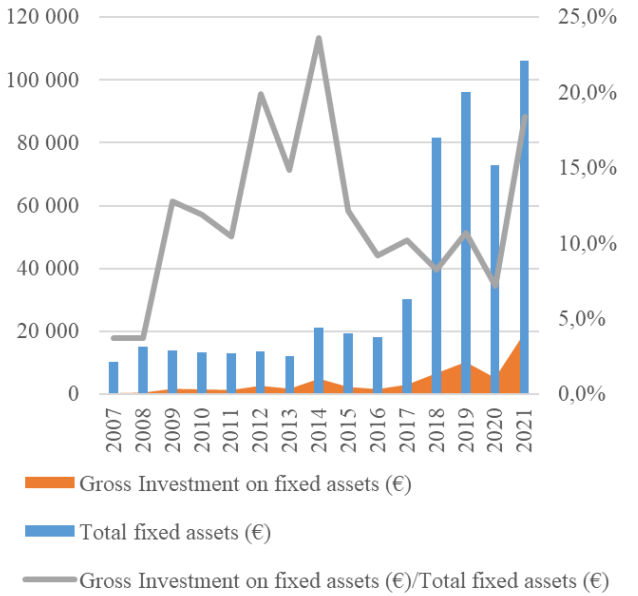

Fig. 10. Fixed asset and gross investment dynamics, Mixed

Source: FADN and own calculation

Analysing the sources of funding over the two programming periods, there is sufficient spare capital resource (€18,855/farm). The sector has also realised a growth in net working capital (9,432€/farm), which is a prerequisite for good financial sustainability. But over the same period, financial independence declined due to an increase in indebtedness from 9.8% to 36.4% (Table 2). This leads to the conclusion that despite the significant opportunities for own financing of investments, the capital resource raised from external sources is of increasing importance for financing fixed asset investments.

In both programming periods, there was an excess of the balance of subsidies and taxes over gross fixed asset investment, although by a relatively small amount – €279/farm for the first programming period and €4,084/farm for the second programming period, respectively. In the period 2014–2021, the share of subsidies on agricultural investments in relation to gross investment in assets was 16.5% (Table 3), which is evidence of the importance of public support to the sector, including for investments. There has been a significant increase in subsidies to the sector after 2018, reaching €20,590/farm in 2021.

Assessment of agricultural holdings by size (Small Farm, 2000–25000 €)

On small farms, the level of gross investment is at a relatively low level and growing at a low rate. Over the period analysed, they increase from €210/farm in 2007 to €605/farm in 2021, with higher levels in 2008 (€1,972/farm), 2010 (€1,325/farm), 2014 (€1,596/farm), 2017 (€1,214/farm) and 2020 (€1,676/farm). For the same period, the share of gross fixed investment is in the range of 5–8%, with only 3.0% for 2021 (Figure 11). There has also been a reduction in the number of farms by about 4 times.

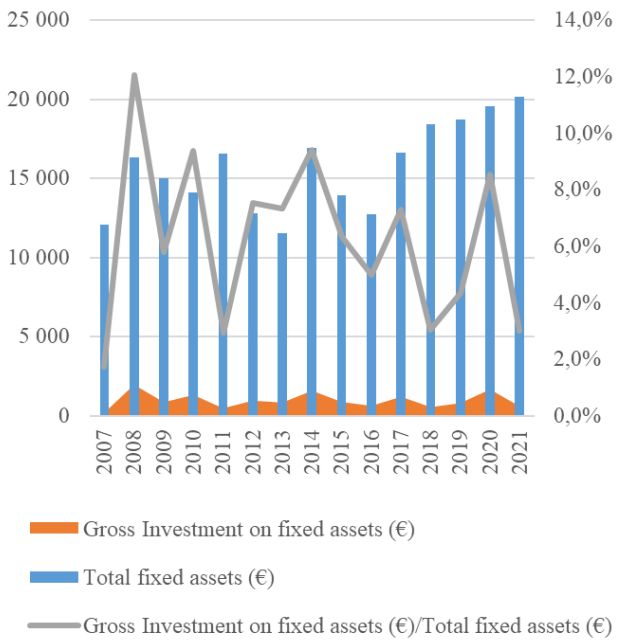

Fig. 11. Fixed asset and gross investment dynamics, Small Farm, 2000–25 000 €

Source: FADN and own calculation

In the structure of fixed assets for 2021, the largest share is occupied by land and permanent crops (45.5%), followed by machinery and equipment (17.9%), breeding animals (16.7%) and buildings (15.7%). The structure of investments is mainly directed towards investments in land and permanent crops (in crop production) and increasing the number of animals (in livestock production), as well as towards the modernisation of technical assets for agricultural production.

Changes in the balance sheet structure show an absolute increase in the level of fixed and current assets as well as an increase in equity. In small farms, the capital resource attracted decreases in absolute and relative terms (Table 1). Small farms have an exceptionally good capital structure, relying mainly on their own funds to finance their activities, while the capital raised is entirely directed towards covering current capital needs.

Analysing the sources of financing over the two program periods, small farms sufficiently realized free capital resource but failed to realize positive net working capital. This creates conditions for limiting their liquidity and solvency. At the same time, the willingness to use borrowed funds is decreasing, which is evident from the decrease in the share of borrowed capital in the capital stock (Table 2). This suggests that small farms use equity exclusively to finance their fixed asset investments.

Although relatively small in size, both programming periods saw the balance of subsidies and taxes exceed gross fixed investment by €456/farm for the first programming period and €38914/farm for the second programming period, respectively. In the period 2014–2021, the share of subsidies on agricultural investments in relation to gross investments in assets is 11.0% (Table 3), which is evidence of the importance of public support to the sector, including for investments. Over the period analysed, the level of support for small farms (balance of subsidies and taxes) increased 22-fold from €300/farm in 2007 to €6,650/farm in 2021. Despite the increased level of subsidies, small farms are more flexible in maintaining their personal finances and try to maintain a high degree of financial autonomy from creditors.

Assessment of agricultural holdings by size (Medium Farm, 25 000–100 000 €)

On medium-small farms, gross investment levels are at a relatively high level and fluctuate significantly. Over the period analysed they decrease from 10,418 €/farm in 2007 to 7,506 €/farm in 2021. Higher levels in gross investment were observed in 2008 (28508€/farm) and 2014 (17,024€/farm), while the lowest levels were observed in 2016 (-5,188€/farm) and 2018 (5,859€/farm). The share of gross investment also shows significant dynamics and decreases from 15.4% in 2007 to 8.2% in 2021 (Figure 12). Over the period analysed, the number of farms increased 2 times, with a dominance of crop farms specialised in vegetables, permanent crops and livestock farms.

In the structure of fixed assets for 2021, the largest share is occupied by land and permanent crops (32.8%), followed by machinery and equipment (24.9%), buildings (22.2%) and breeding animals (13.4%). The structure of investment is mainly determined by the expansion of production and is directed towards investments in land and permanent crops (crop production) and breeding animals (livestock production), as well as the modernisation of technical assets.

Changes in the balance sheet structure show significant fluctuations in the amount of fixed assets, which decreased

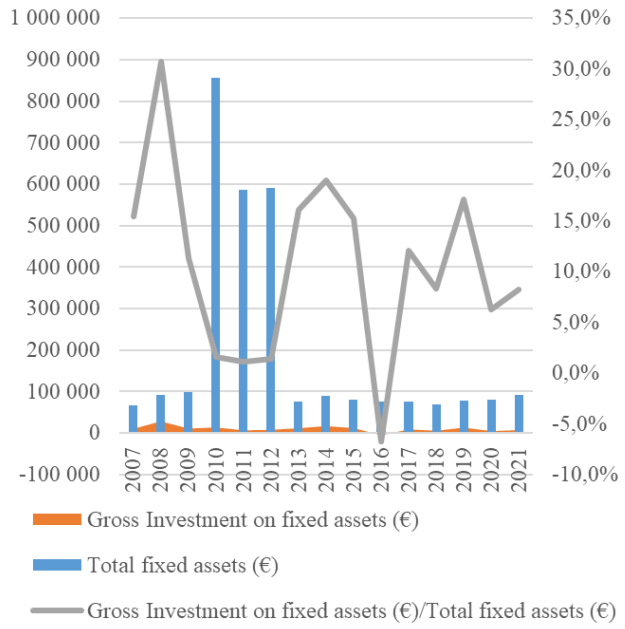

Fig. 12. Fixed asset and gross investment dynamics, Medium Farm, 25 000–100 000 €
Source: FADN and own calculation

more than 4.2 times in the second compared to the first programming period, while current assets increased more significantly. In the structure of capital sources, borrowings decreased marginally and the average amount of equity decreased more than 3 times (Table 1). In the structure of the farm balance sheet, fixed assets decreased significantly at the expense of current assets, and the share of own capital resources decreased at the expense of attracted capital. Although the indebtedness has increased, the farms in the group maintain sufficient own capital resources, which provides them with a relatively good capital structure.

Analysing the sources of financing over the two programming periods, the medium-sized farms realised a significant decrease in free equity (-€244,049/farm) but managed to realise a positive net working capital (€10,330/farm). At the same time, the willingness of medium-sized farms to use borrowed funds is increasing which is evident from the increase in the share of borrowed capital in the capital stock (Table 2). This suggests that medium-sized farms are taking advantage of their favourable structure to finance themselves with their own funds, but that the role of borrowed capital in financing fixed asset investments is increasing.

In the first programming period 2007–2013, current subsidies and taxes were lower than gross fixed asset investments (-625€/farm), but in the second programming period 2014–2021 there was an excess of current subsidies and taxes over gross fixed asset investments of 13,439€/farm. In the period 2014–2021, the share of subsidies on agricultural investments in relation to gross investment in assets is 11.6% (Table 3). Public investment support is increasingly important for financing farm investments. Equity remains the main source of financing, but external financing plays an increasing role.

Assessment of agricultural holdings by size (Medium-Large Farm 100 000–500 000 €).

On medium-sized farms, the level of gross fixed investment has been declining over the years. Over the period analysed, they vary from €78,141/farm in 2007 to €45,047/farm in 2021, with the highest level in 2011 (€123,136/farm). Over the same evaluation period, the share of gross fixed investment declined from 32.8% in 2007 to 14.3% in 2021 (Figure 13). Over the period analysed, the number of farms increased by 2 times, with a predominance of arable crop farms and granivorous livestock farms.

In the structure of fixed assets for 2021, the largest share is occupied by machinery and equipment (40.8%), followed by land and permanent crops (33.8%), buildings (18.0%) and breeding animals (5.1%). The structure of investment in medium-sized farms is mainly determined by the desire to modernise technical assets and expand land and permanent crops.

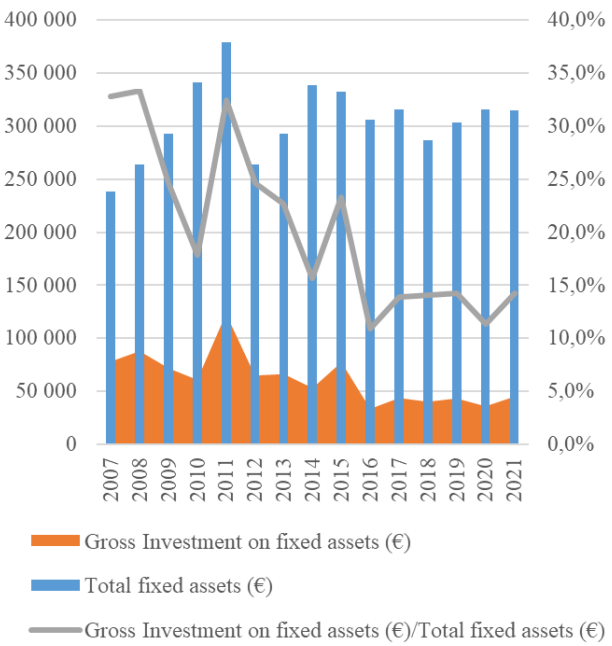

Fig. 13. Fixed asset and gross investment dynamics, Medium-Large Farm 100 000–500 000 €
Source: FADN and own calculation

Changes in the balance sheet structure show an absolute increase in assets and equity, while the level of indebtedness decreases. In relative terms, the amount of fixed assets on the balance sheets increased, mainly on account of an increase in equity. The indebtedness of farms in this category is decreasing both in absolute and relative terms (Table 1). The farms maintain significant own capital resources, which determine the nature of their financing, but they also benefit from opportunities to finance themselves from external sources.

Analysing the sources of funding over the two programming periods, medium-sized farms realised a significant increase in their own available capital resources – in the first programming period (45,831 €/farm) and increasing in the second programming period (99,966 €/farm). The level of indebtedness is high but decreased from 47.8% to 38.1% (Table 2). The level of indebtedness does not exceed the level of current assets; hence indebtedness is mainly used to finance current activities and to a lesser extent used to finance fixed asset investments. The capital structure of farms provides a favourable opportunity for medium-sized farms to establish equity financing as the main source of financing their investments.

In the first programming period 2007–2013, current subsidies and taxes were lower than gross fixed asset investments (-€12,422/farm), but in the second programming period 2014–2021 there was an excess of current subsidies and taxes over gross fixed asset investments of €18,803/farm. In the period 2014–2021, the share of subsidies on agricultural investments in relation to gross investment in assets is 9.3% (Table 3). Farms of this size are relatively highly subsidized, with a 65% increase in subsidies in 2021 compared to 2007. In recent years, the average amount of gross subsidies and taxes on average per farm has remained around €65 thousand. Public support is important for this category of farms to support operations and investment activity. But the larger scale of production and the balanced capital structure make self-financing the most important source of financing fixed asset investments.

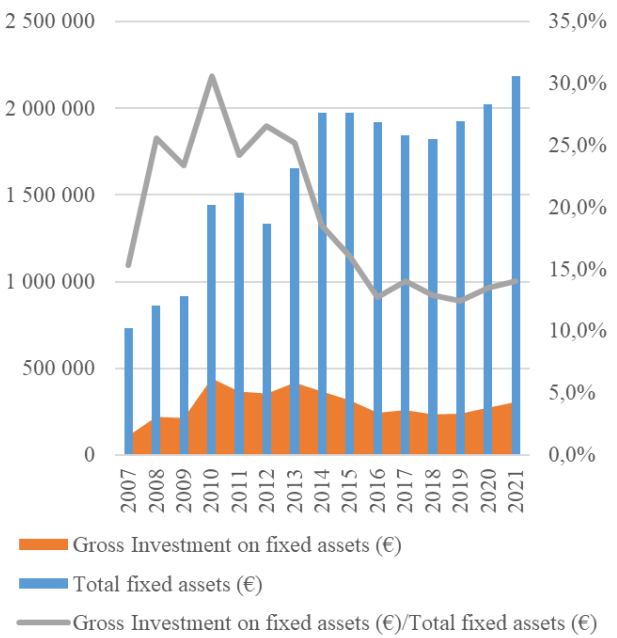

Fig. 14. Fixed asset and gross investment dynamics, Large Farm, over 500000 €
Source: FADN and own calculation

Assessment of agricultural holdings by size (Large Farm, over 500 000 €).

On large farms, the level of gross fixed capital formation has tended to rise steadily over the years. Over the period analysed, they vary from €122,328/farm in 2007 to €306,198/farm in 2021, with the highest level in 2010 (€442,758/farm). Over the same evaluation period, the share of gross fixed asset investment declined from 25.6% in 2008 to 13–14% in recent years (Figure 14). The number of large farms increased by 2.7 times, as cereal crop farms predominated.

In the structure of fixed assets for 2021, the largest share is occupied by land (40.8%), followed by machinery and equipment (33.1%), buildings (19.4%) and breeding animals (2.6%). The structure of investment in large farms is mainly determined by the desire to modernize technical assets and increase land resources. Changes in the balance sheet structure show an absolute increase in assets, indebtedness to creditors and equity. In relative terms, the amount of fixed assets on the balance sheets increased, mainly on account of an increase in equity. The indebtedness of farms in this category decreased in relative terms (Table 1). This group of farms also maintains significant own capital resources, which determine the nature of their financing, but they also benefit from opportunities to finance themselves with external financial resources.

Analysing the sources of funding over the two programming periods, large-sized farms realised a significant increase in their available own capital resources – in the first programming period (849,607€/farm) and increasing in the second programming period (1 360,817€/farm). The level of indebtedness is high but decreased from 42.2% to 38.2% (Table 2). The level of indebtedness does not exceed the level of current assets; therefore, indebtedness is mainly used to finance current activities and to a lesser extent used to finance fixed asset investments. The capital structure of farms provides a favourable opportunity for large-sized farms to

Table 1. Changes in the balance sheet structure of farms by type and by programme period

Type of farm	Total fixed assets (€)			% from assets			Total current assets (€)			% from assets		
	2007-2013	2014-2021	Change	2007-2013	2014-2021	Change	2007-2013	2014-2021	Change	2007-2013	2014-2021	Change
Bulgaria	53 103	92 581	39 478	70,5%	63,8%	-6,7%	22 224	52 470	30 246	29,5%	36,2%	6,7%
EU-28	237 624	304 837	67 213	80,6%	81,0%	0,4%	57 143	71 561	14 417	19,4%	19,0%	-0,4%
Fieldcrops	75 878	139 158	63 280	59,5%	61,9%	2,4%	51 635	85 640	34 005	40,5%	38,1%	-2,4%
Horticulture	182 136	61 349	-120 787	91,3%	70,0%	-21,3%	17 300	26 293	8 993	8,7%	30,0%	21,3%
Wine and other permanent crops	100 892	99 110	-1 782	80,0%	80,2%	0,2%	25 162	24 467	-696	20,0%	19,8%	-0,2%
Milk	21 915	53 002	31 086	64,5%	67,9%	3,3%	12 049	25 097	13 047	35,5%	32,1%	-3,3%
Other grazing livestock	16 272	37 064	20 792	62,9%	69,4%	6,5%	9 605	16 349	6 744	37,1%	30,6%	-6,5%
Granivores	87 791	444 030	356 239	54,6%	55,5%	0,9%	73 115	355 976	282 860	45,4%	44,5%	-0,9%
Mixed	13 069	55 719	42 650	53,6%	66,9%	13,3%	11 308	27 583	16 275	46,4%	33,1%	-13,3%
Small Farm, 2000-25000 €	14 070	17 147	3 077	61,4%	64,7%	3,3%	8 857	9 354	497	38,6%	35,3%	-3,3%
Medium Farm, 25000-100000 €	338 189	80 357	-257 832	89,4%	61,1%	-28,3%	39 948	51 191	11 243	10,6%	38,9%	28,3%
Medium-Large Farm 100000-500000 €	295 994	314 335	18 341	61,4%	65,1%	3,7%	185 880	168 329	-17 551	38,6%	34,9%	-3,7%
Large Farm, over 500000 €	1 208 047	1 958 518	750 471	57,8%	64,3%	6,5%	882 524	1 087 324	204 800	42,2%	35,7%	-6,5%

Type of farm	Total liabilities (€)			% of liabilities			Net worth, equity (€)			% of net worth, equity		
	2007-2013	2014-2021	Change	2007-2013	2014-2021	Change	2007-2013	2014-2021	Change	2007-2013	2014-2021	Change
Bulgaria	12 813	34 180	21 367	17,0%	23,6%	6,6%	62 514	110 871	48 357	83,0%	76,4%	-6,6%
EU-28	44 111	61 920	17 809	15,0%	16,5%	1,5%	250 656	314 477	63 822	85,0%	83,5%	-1,5%
Fieldcrops	34 417	55 000	20 583	27,0%	24,5%	-2,5%	93 096	169 798	76 702	73,0%	75,5%	2,5%
Horticulture	12 850	23 613	10 763	6,4%	26,9%	20,5%	186 586	64 029	-122 557	93,6%	73,1%	-20,5%
Wine and other permanent crops	33 929	29 852	-4 077	26,9%	24,2%	-2,8%	92 125	93 724	1 599	73,1%	75,8%	2,8%
Milk	5 205	13 327	8 122	15,3%	17,1%	1,7%	28 760	64 771	36 012	84,7%	82,9%	-1,7%
Other grazing livestock	1 494	9 335	7 841	5,8%	17,5%	11,7%	24 383	44 079	19 695	94,2%	82,5%	-11,7%
Granivores	50 237	204 990	154 753	31,2%	25,6%	-5,6%	110 669	595 016	484 347	68,8%	74,4%	5,6%
Mixed	2 178	22 212	20 034	8,9%	26,7%	17,7%	22 199	61 089	38 890	91,1%	73,3%	-17,7%
Small Farm, 2000-25000 €	2 247	1 886	-361	9,8%	7,1%	-2,7%	20 680	24 616	3 936	90,2%	92,9%	2,7%
Medium Farm, 25000-100000 €	28 342	27 072	-1 270	7,5%	20,6%	13,1%	349 796	104 477	-245 319	92,5%	79,4%	-13,1%
Medium-Large Farm 100000-500000 €	155 752	133 232	-22 520	32,3%	27,6%	-4,7%	326 122	349 432	23 311	67,7%	72,4%	4,7%
Large Farm, over 500000 €	620 482	842 512	222 030	29,7%	27,7%	-2,0%	1 470 089	2 203 329	733 241	70,3%	72,3%	2,0%

Source: FADN and own calculation

Table 2. Indicators of financial sustainability of farms by type and by programme period

Type of farm	Availability of free equity sources, €			Availability of net working capital, €			Ratio of borrowed capital to equity capital employed, %		
	2007-2013	2014-2021	Change	2007-2013	2014-2021	Change	2007-2013	2014-2021	Change
Bulgaria	49 701	76 692	26 991	16 993	34 169	17 176	20,5%	30,8%	10,3%
EU-28	206 544	252 557	46 012	47 098	56 927	9 830	17,6%	19,7%	2,1%
Fieldcrops	58 679	114 798	56 119	37 030	54 503	17 472	37,0%	32,4%	-4,6%
Horticulture	173 736	40 416	-133 320	13 068	14 705	1 637	6,9%	36,9%	30,0%
Wine and other permanent crops	58 196	63 872	5 676	15 291	11 665	-3 626	36,8%	31,9%	-5,0%
Milk	23 555	51 444	27 889	10 507	20 041	9 534	18,1%	20,6%	2,5%
Other grazing livestock	22 889	34 744	11 855	8 967	11 682	2 715	6,1%	21,2%	15,0%
Granivores	60 432	390 027	329 594	48 037	233 626	185 589	45,4%	34,5%	-10,9%
Mixed	20 021	38 876	18 855	10 415	19 847	9 432	9,8%	36,4%	26,5%
Small Farm, 2000-25000 €	18 433	22 730	4 297	8 601	8 494	-108	10,9%	7,7%	-3,2%
Medium Farm, 25000-100000 €	321 454	77 405	-244 049	28 191	38 521	10 330	8,1%	25,9%	17,8%
Medium-Large Farm 100000-500000 €	170 369	216 200	45 831	118 958	99 966	-18 992	47,8%	38,1%	-9,6%
Large Farm, over 500000 €	849 607	1 360 817	511 211	566 664	611 079	44 415	42,2%	38,2%	-4,0%

Source: FADN and own calculation

Table 3. Impact of public support under the Common Agricultural Policy on Gross investments in agricultural holdings by type and by programming period

Type of farm	Share of Subsidies on agricultural investments (€) from Gross Investment on fixed assets (€), 2014-2021, %	Excess of Balance current subsidies & taxes (€) over Gross Investment on fixed assets (€), 2007-2013	Excess of Balance current subsidies & taxes (€) over Gross Investment on fixed assets (€), 2014-2021
Bulgaria	6,7%	-676	6886
EU-28	5,8%	1434	1438
Fieldcrops	4,0%	-1599	9466
Horticulture	19,4%	-3879	-3059
Wine and other permanent crops	10,0%	-10115	3612
Milk	13,1%	827	9154
Other grazing livestock	16,5%	1505	9237
Granivores	9,4%	-8178	-15195
Mixed	11,6%	279	4084
Small Farm, 2000-25000 €	11,0%	456	3891
Medium Farm, 25000-100000 €	11,6%	-625	13439
Medium-Large Farm 100000-500000 €	9,3%	-12422	18803
Large Farm, over 500000 €	3,8%	-101537	11662

Source: FADN and own calculation

establish equity financing as the main source of financing their investments.

In the first programming period 2007–2013, current subsidies and taxes were lower than gross fixed asset investments (-€ 101,537/farm), but in the second programming period 2014–2021 there was an excess of current subsidies and taxes over gross fixed asset investments of € 11,662/farm. In the period 2014–2021, the share of subsidies on agricultural investments in relation to gross investments in assets is only 3.8% (Table 3). Farms of this size are relatively highly subsidized, with subsidies increasing by 2.8 in 2021 compared to 2007. In recent years, the average amount of gross subsidies and taxes on average per farm has remained around €285 thousand. Public support is important for this category of farms to support the activity, but less influences the investment activity. The large scale of production and the balanced capital structure identify self-financing as the determining source of financing fixed asset investments. The access to external financing of this group is considerably facilitated given the better possibility to benefit from financial instruments on the capital market.

Conclusions

The aim of the study was to assess the sources of financing of investments in agricultural holdings in Bulgaria, analysed by their specialization and size. The applied analytical approach covers a long-time horizon, structured in two sub-periods reflecting the programming periods 2007–2013 and 2014–2021. The dynamics of the data is significant, especially for some sectors, which makes the analysis somewhat difficult. To overcome these difficulties, average data for the two programming periods were used and the analysis incorporated the variations in the value of the indicators when comparing these two quantities.

The main results showed significant variability in the asset and liability structure and in terms of average investments. Separately, the propensity to invest in fixed assets varied across farms in terms of specialisation type and size. As indicated above, farmers in Bulgaria prefer to use their own capital to finance their operations and investments. In addition, the use of equity capital can be supplemented by capital raised for a short period of time, which will be compensated by subsidies at a later date.

For many farmers (especially the smaller ones), using borrowed capital is a difficult decision and they avoid resorting to it. But this prevents them from taking full advantage of the opportunities of financial leverage, which would increase the efficiency of equity. Since 2015, farm credit financing in Bulgaria has received a significant boost as a result of access to direct payments. However, other reasons hindering access to credit may be related to the cost of credit, required collateral for loans, lower financial literacy of farmers, fear of failure, etc. (fi-compass, 2020; Kirechev, 2021). Therefore, by using public intervention, facilitating relationships between farmers and lenders can be promoted.

To conclude the analysis, the following can be summarized:

- There is considerable variability in average farm investment by farm type and size.
- Individual industries have a varied fixed asset structure which determines the direction of investment. Investment in land and land improvements dominates.
- In general, investment financing from own sources prevails, but in some sectors there is a significant increase in indebtedness, which is also a consequence of external investment financing.
- According to their type of specialisation, farms specialising in Fieldcrops, Milk and Granivores animals are more likely to use own financing. More dependent on external financing are Horticulture and Wine and other permanent crops and to a lesser extent the other grazing livestock and mixed farms.
- Depending on their size, Small farms, Medium-Large farms and Large farms are more likely to rely on self-financing as a source of funds for investment, while medium-sized farms are more likely to use borrowed funds.
- There is a need for a careful and efficient capital structure on farms to make the most of the opportunities provided by financial leverage.
- The CAP will continue to play a significant role in supporting investment activity in agricultural sectors. The level of public support varies from farm to farm. Vegetable farming accounts for the largest share of project funding under the Rural Development Programmes, followed by other grazing livestock and Milk. Current subsidies and taxes are insufficient to support the investment activity observed in the Horticulture and Granivores sectors.

The analysis can serve as a basis for more detailed assessments under different options of specialisation and farm size

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