

INFLUENCE OF FINANCING METHOD ON EFFICIENCY OF INVESTMENTS IN BLUEBERRY PRODUCTION¹

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Abstract

Serbian producers have favorable natural conditions for blueberry production, while this production is recognized for its potential for achieving high economic effects. Various ways of financing blueberry production influence economic efficiency of investments needed to establish blueberry production, as well as liquidity of such investments. Investments in blueberry production are usually financed by combination of own and borrowed funds. The goal of this research is to investigate effects of financing sources on investments in blueberry production. Thus, authors discussed possible participation of borrowed funds in the financial structure of investments in blueberry production.

Key words: *blueberry, investments, financing, borrowed funds.*

Introduction

In line to available climate and natural potentials, export possibilities and rise in global demand for blueberry, areas under the blueberry plantations have been increase for almost 9 times in last decade (from 220 ha in 2015 to 1,900 ha in 2020), (Zlatković et al., 2022).

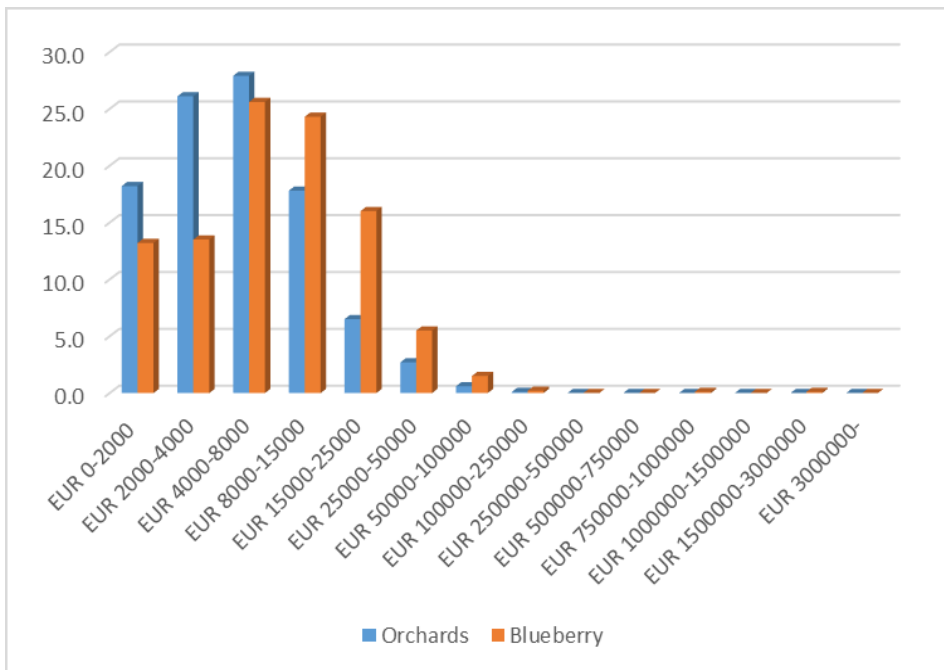
Despite the satisfactory conditions for blueberry growing in several areas of Serbia, the high yields are usually lacking as a consequence of poor use of optimal varieties and modern growing technology (Leposavic et al., 2020). On the other hand, constant growth in produced quantities (globally and locally) is the result of quite a health impact that blueberry has in human nutrition (Rodriguez Mateos et al., 2014), as well as good profitability derived from made investment in

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plantations, and high merchantability of final product (in fresh condition or as processed), (Leposavić et al., 2016; Gallardo, Zilberman, 2016).

Although establishment of blueberry plantations and its sustainable production the most often follow the high level of investments (Subić et al., 2022), mitigation of noticed limitation is usually done by the use of available public incentives (in Serbia they range from 50-70% of invested amount), (Kljajić, Grujić Vučkovski, 2022). According to Farm structure survey, the most of the farms involved in fruit growing (SORS, 2018) have the economic size in range 2,000-4,000 EUR (26,1%) or 4,000-8,000 EUR (27,9%). At the farms that are involved in blueberry production, the current state is much more favorable, there are the most of the farms with the economic size in range 4,000-8,000 EUR (25,6%), or 8,000-15,000 EUR (24,3%), (Graph 1.).

Graph 1. Structure of farms according to economic size (in %)



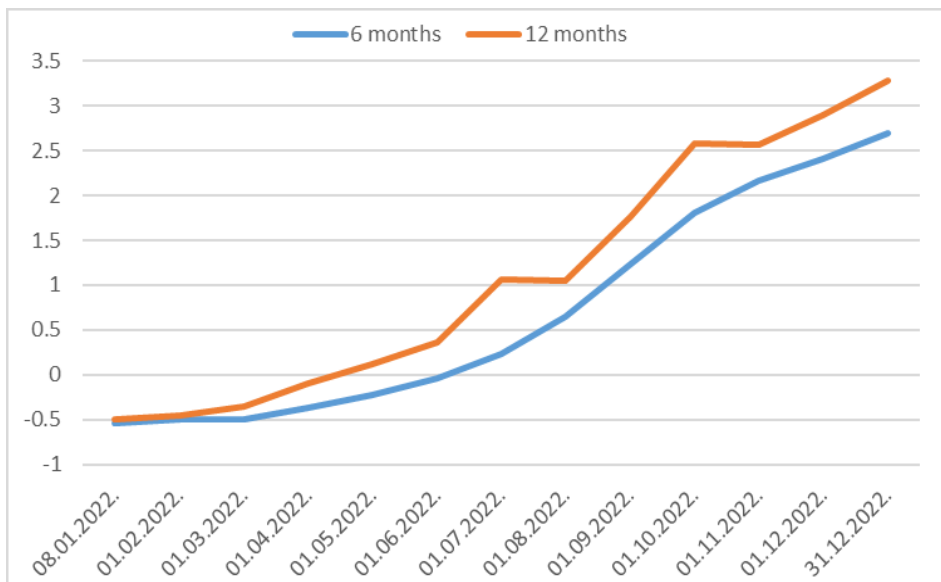
Source: SORS, 2022.

So, the majority of farms oriented to fruit production are economically so weak to follow the contemporary technological requirements or current plantation expansion, especially in blueberry production that is investment intensive line of fruit production (Sullca et al., 2019). As for establishment of blueberry plantations are

required large investments, farms that are planning to be involved in this production in the most cases are forced to go into the credit arrangement with certain commercial bank. Crediting conditions have significantly worsened in 2022, due to global rise in interest rates (Mulino, 2022). There is a common practice that farmers mostly take the loans with the variable interest rates, where the total level and amount of interest rate strongly depend on the value of EURIBOR (Delgado Tejero, 2022).

During 2022, there was not only an increase in general interest rates, but also an increase in the value of EURIBOR that is upgraded them. In calculating of overall interest, the six and twelve-month EURIBOR could be used, while their trends in 2022 are presented in next graph (Graph 2.).

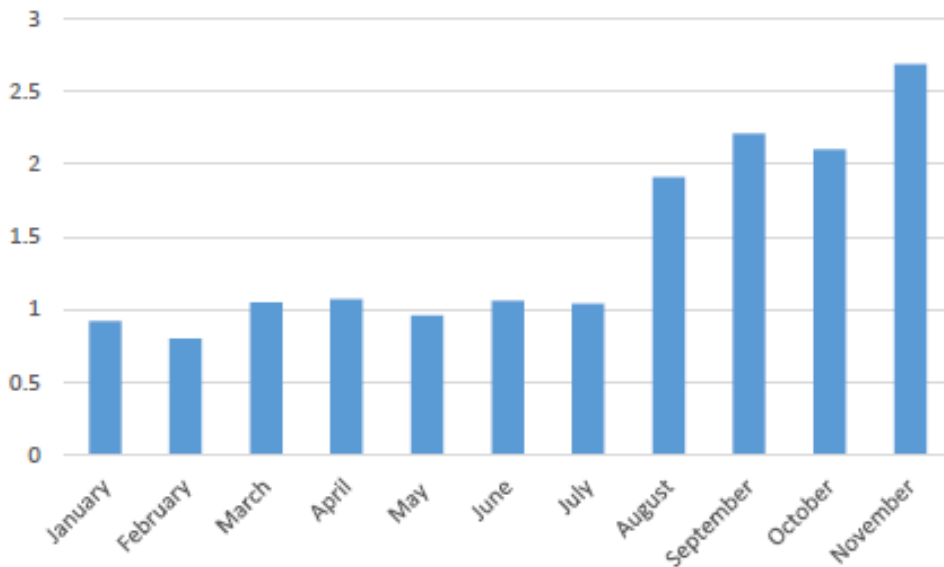
Graph 2. *Trend of 6 and 12 months EURIBOR rates in 2022 (in %)*



Source: NLB, 2022.

In line to rise in interest rate at the capital market (on credits), in 2022 there also come to increase in interest rates on citizens' savings (Graph 3.). Besides, this kind of growth in interest rates furtherly leads to increase in discount rates (linked to investments) that affects the level of economic effectiveness of investments (it initiates the lowering of their net present value).

Graph 3. *Interest rates on citizens' savings – new saving-accounts (in % at annual level)*



Source: NBS, 2022.

Therefore, in conditions of permanent growth in interest rates, both the economic effectiveness of investments and their financial acceptability (liquidity) could be called into the question. This problem is particularly pronounced due to the fact that there is still unknown the level to which the interest rates will continue to rise in next period. Therefore, for investors exists a need to determine the upper limit of discount rate up to which investments in blueberry production is profitable (i.e. the level of the internal interest rate), as well as the highest level of indebtedness that enables the investment liquidity.

Methodological framework

The research realization was based on next data sources: in-depth interviews with selected blueberry producers and fruit-growing experts, available scientific literature directed to technological aspects of blueberry production, as well as data sets of national bank and commercial banks linked to trends in interest rates towards credit arrangements in agriculture (in EUR), or interest rates on citizens savings (in EUR).

The research realization was based on the appliance of next methodological framework (analysis leans on methodological approach used by Gogić, 2009): It was determined the level of used investments in establishment of blueberry production in common pots at one hectare (Subić et al., 2022; Nastić, Bekić, 2022), while the analytic calculations of overall incomes and costs in blueberry production were developed. Economic effectiveness of made investments were assessed by the dynamic methods of investment analysis (Subić et al., 2011; Subić et al., 2021), i.e. the net present value and internal rate of return. Besides, there was determined the financial feasibility of made investments.

So, in paper was done the analysis of different share of borrowed and own financial assets used in overall investment. Investment analysis involves the blueberry growing in common pots. There were analyzed next examples of investment financing: 100% from own financial resources; 50% from own resources and 50% from the bank credit; and 100% from the bank credit.

Results with discussion

As blueberry has specific requirements towards the soil conditions and applied growing methods, there come to increase in number of producers that decide to apply the modern production system (growing in pots). So, caused by this fact in paper was assumed mentioned method of growing, i.e. its economic and financial evaluation was performed.

The total value of investment in establishment of 1 ha of blueberry plantation amounts to 160,457 EUR (calculations were made according to prices from 2022). In both variants that imply borrowed assets, the average interest rate of commercial banks that was valid in the mid of year (2022) was used. Grace period in credit repayment was two years. Of course, it is important to note that in practice there are significant difference between the farms related to level and way of investment, the level of interest rates and achieved business results (these is affected by several factors).

The applied method of financing the investment affects not only to the possibility of credit repayment, but also to the value of net present value as one of the main indicators used in assessment of the economic effectiveness of investment (Table 1.). It affects through the value of the discount rate, which is formed as a weighted average cost of used capital. Thus, it can be seen that there is a difference in derived net present value, i.e. it is for 51.7% lesser if investment is financed completely with borrowed assets compared to financing just with own farm assets.

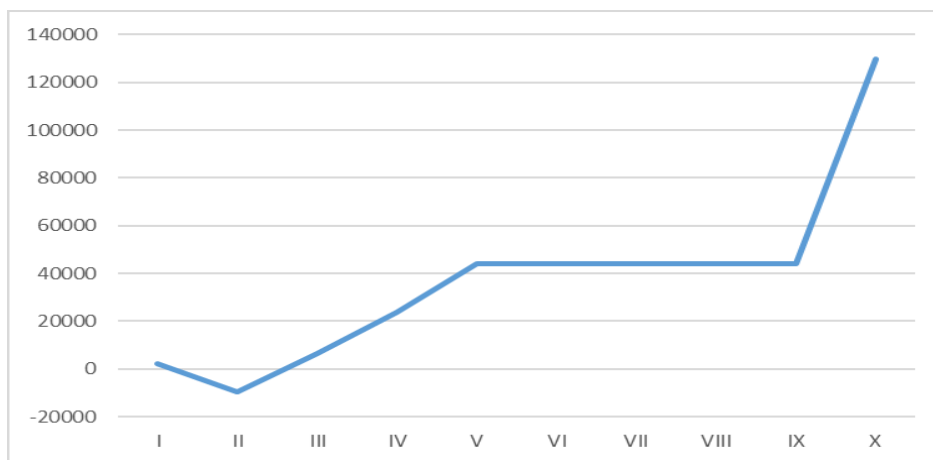
Table 1. Level of net present value and internal rate of return

Way of production financing	Discount rate (in %)	Net present value (in EUR)	Internal rate of return (in %)
100% - own resources	2.00	158,830.04	11.64
50:50% - own resources: credit	4.00	114,152.93	11.64
100% - credit	6.00	76,755.12	11.64

Source: IAE, 2022.

Gained results show that the investment is economically justified in all applied methods of investment financing, as the all net present values are positive. The analysis has been also shown that the upper limit of discount rate (i.e. the internal rate of return) for all financing methods is higher than the used discount rates. Influence of financing method on financial acceptability in case when the overall investment is financed by own assets is shown at the Graph 4.

Graph 4. Net receipts from the cash flow if the investment is financed entirely by own assets



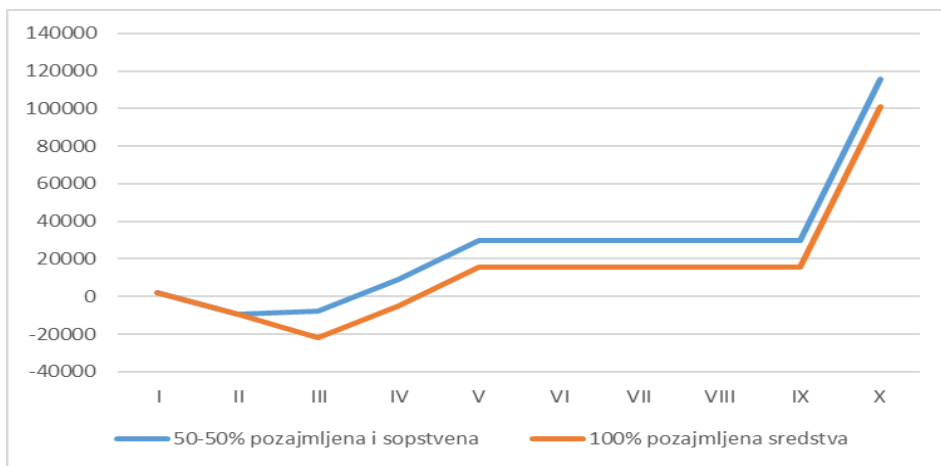
Source: IAE, 2022.

As it can be seen, only the net receipts from the cash flow in second year of the investment exploitation is negative, while all other have a positive value. The positive value in the first year mainly derives as result of the use of available public incentives for establishment of fruit plantations (OGRS, 2021). Since in the second year are gained negative receipts from the cash flow (investment is financially unacceptable in that year what is primarily caused by low initial yields),

it is necessary for farmer to provide additional financial assets for further production functioning. As the blueberry yield gradually increases within the next couple years, there come to rise in gained net income from the financial flow.

Contrary to financing the investment completely from farm's own assets, there are also possibilities in borrowing the certain part of required financial assets from commercial banks. There are analyzed two options (Graph 5.), borrowing of 50% or 100% of needed financial assets. At these two options, the investment is not financially acceptable not only in the second, but also in the third year. In some extent the more favorable situation in the third year of investment exploitation is within the financing option 50-50%. Meanwhile, if the investment is financed entirely from the credit, it is not financially acceptable even in the fourth year of exploitation.

Graph 5. Net receipts from the cash flow if the investment is financed form the credit and own assets (50-50%) or entirely from the credit



Source: IAE, 2022.

In order to affect the better farm business operations, there are calculated the exact share of required farms' own and external financial assets that will enable achieving the positive net income in cash flow within the third year of investment exploitation. Such results can be achieved during the investment financing by the 77.1% of own assets and 22.9% of borrowed financial assets, whereby (by the use of appropriate discount rate) is gained the net present value of investment in value of 137,276.7 EUR. So, with mentioned structure of investment financing it could be achieved its financial acceptability.

Conclusion

Performed analysis have been showed that the shift in structure of financing sources towards external sources affects the liquidity of investments more than their economic effectiveness. Indebtedness over the established limits leads to ruined financial acceptability (liquidity) of investment in second, third, or even fourth year of investment exploitation, while the investment is economically justified in entire period. Mentioned facts may affect investors that have not available sufficient sum of own financial assets to give up investing in blueberry production, what could be even more worsened in conditions of further increase in interest rates at national capital market.

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