

COMPARATIVE CHARACTERISTICS OF THE RATE OF RETURN ON INVESTMENTS IN A FOREST PLANTATION AND OTHER REAL ESTATES IN BULGARIA

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Abstract

A comparative analysis of the rate of return on investments in a fast-growing poplar plantation in South Bulgaria and in two-room residential apartments in Sofia (average area 68 sq.m.) (including a room and a bedroom), differentiated by districts has been made. The investigation is based on the concept accepted in the normative basis, which determined these kinds of estates as real. It is motivated by the necessity to reveal suitable and perspective variants for investments, according to the utilities and abilities of a wide range of potential investors. Both static and dynamic methods have been applied for assessment of the rate of return on investments in a medium-period perspective. As a result of the carried out investigations it is determined that the rate of return is 4.01 % and it is expected to raise along with raising of the demand of poplar wood material. The advantage of this kind of investment is that it does not require a large amount of capital; it is ecological and allows using lands in rural areas. The rate of return of investment in residential real estates varies from 6.27 % to 15.26 % depending on the location and the result is always positive.

Key words: fast-growing tree species, financial efficiency, real estates, two-room residential apartments, profit.

Introduction

The investments in real estates are well-studied field of research and are of real interest for contractors from all over the world. In a study based on 121 sources covering the markets in Europe, Asia, North America and Australia, Benjamin et al. (2001) pay attention to the following key points: the expected risk and return on investments in real estates, compared to other assets and to inflation; benefits

from optimization of investment portfolios through including of real estates; results from the society activities with specific investment purpose. The obtained results reveal that:

- The return in real estates is more easily to be prognosticated and higher than the rate of return in other kinds of assets.
- Presence of real estates makes the investment portfolios less vulnerable from inflation in long-term aspect. The reason is the high correlation with real inflation.

- Investment portfolios, including real estates, are less risky in long-term aspect from investments only in stocks and bonds.

According to Djaparidze (2013) the share of real estates in the total amount of investments in Russia is 21 %.

Some authors share their point of view that the investments in residential real estates bring better return than the stocks and at the same time are poorly volatile as the bonds (Jordà et al. 2017). They come to this conclusion on the basis of numerous analyses of the annual return from residential estates, stocks, bonds and depositary bonds from 1870 to 2015 in 16 economically developed countries, eg France, Norway, Great Britain, USA, etc.

In a research Kopf (2018) establishes that in developed countries the annual return from lodgings during the last two decades has been about 7 % (corrected with the inflation), and the return from the stocks has been a little under 7 %. Iman et al. (2012) consider that in the process of selection and purchase of estate one should assess and take into account suitable characteristics of the estate to maximize the expected benefit. In this case it is particularly valuable to know the characteristics and range of the real estates market.

Summarising the national and international experience in the determination of this term, Iliev et al. (2007) present a classification of real estate markets, depending on the kind of the target (commodity), in which they include the markets of: 1) land (land estates); 2) buildings and single targets in buildings; 3) facilities and networks; 4) complexes; 5) perennial plant stands; 6) laws of estate; 7) other targets. This classification allows revealing the range of the term 'real estate' and to look for possibilities for including of all its va-

rieties in an economic turnover, some of them until now being underestimated.

Usually, the investment in a real estate in Bulgaria is related to the purchase of a land or estate with various functions (lodging, office, shop, etc.). Less studied is the investment in perennial stands and forest plantations as a form of immovable property. It gives the opportunity to obtain economic benefit from the territories of rural regions, as well, where the land is the basic source of income. During the last 25 years, the world market shows deficit of forest products (Glauner et al. 2012, Indufor 2012). It stimulates the investments in forestry activities and investors can differentiate into two groups – institutional and small- and medium-sized enterprises (SME). The first ones invest mainly in plantations of fast-growing tree species in the southern hemisphere and the USA. These investments are attractive because have enough high rate of return. In this relation it should be mentioned that the average return on investments in forest plantations in some countries is as follows: Argentina – 14.8 %; Brazil – 21.6 %, Uruguay – 18.0 %; USA – 14.9 % (Campanale 2009, Macqueen 2013, Brotto 2015).

In contrast to more authors, who focus on the financial result from the investment in a forest plantation, others pay attention to ecological and social contributions of plantation forestry, underlining its significance for some branches of the national economy, like agriculture, water management, transport, tourism, etc. (Milev et al. 2017).

As a result of their research (Campanale 2009, Macqueen 2013, Brotto 2015) come to the conclusion that investments in forest plantations are characterized with lower level of investment risk, compared to investments in other assets, pro-

viding same rate of return.

The lower risk of the investments in forest plantations is a consequence of the positive correlation subordination between return and inflation and the absence of correlation between the return on investments in forest plantations and return on investments in financial instruments.

All this determines the preferences of institutional investors to investment in forest plantations in times of financial uncertainty for diversification and reduction of the total risk of the portfolios, which they possess (Brotto 2015). The investments of SME in the field of forestry provide wood and non-wood products, and employment in poorly developed regions. The significance of the topic provokes numerous investigations (Elsou 2012, Macqueen 2012, Davies et al. 2015). All they distinguish two categories – investments in real assets and enabling investments. The aim of the first ones is to establish real assets, which would accumulate profit and increase the value for SME owners. The aim of the second ones is to establish conditions for financially efficient investments in real assets. The conditions are related to clearly defined rights of ownership on forest resources, proper management and positive net money flows, covering the investment expenses. The so-called ‘enabling investments’ are provided by non-governmental organizations, philanthropists, governments, etc. The combination of investments in real assets and enabling investments should provide a balance between financial results, social fairness for local inhabitants and environmental protection (Macqueen 2013).

Most of the investments in real assets, quoted in the above-mentioned articles, contribute to the sustainable management of forest territories and provide profits for SME, producing wood and non-wood

products. In the forest sector of Bulgaria the institutional investors are not present. Meanwhile investments in SME in real assets are insufficient and are predominantly in wood processing equipment, because the main forest product in the country is round wood (Kolev 2017).

One of the explanations about the absence of enough investments in real assets in forestry in Bulgaria is the low return (Kolev 2017). As far as the return of investments in forest plantations in Bulgaria is concerned, by the time being it is still insufficiently investigated.

It is known that poplars (*Populus* spp.) are recognized as the fastest-growing forest tree species at temperate continental climate. They possess many other valuable characteristics, such as easy propagation, aptitude to hybridize, pleasing appearance and many uses (Isebrands and Richardson 2014).

Wang et al. (2014) present results of their study in China, which shows that the management of poplar plantations is twice more profitable compared to natural forests. It is based on the possible varying of the average annual increment, inflation percentage and rate of interest. The calculated net present value (*NPV*) is from 1024 to 6925 USD·ha⁻¹, the equivalent annual income is from 120 to 623 USD·ha⁻¹·year⁻¹ and the internal rate of return (*IRR*) is from 13.2 to 29.3 %.

The aim of the present study is to compare the rate of return of investments in two different kinds of real estates – buildings and single targets (namely two-room residential apartments) and perennial stands (in this particular case – forest plantation of fast-growing tree species).

Although a study like this has not been carried out until now, the two types of real estates are methodologically included in the term ‘real estate’. Venedikov (1995)

defines the immovable things (often called real estates) as distinct parts of ground surface and everything, which is related to this surface and cannot be moved without destroying this correlation.

Objects

Object of investigation is a plantation established in 2017 year on the territory of the municipality Bratya Daskalovi, Stara Zagora district, with co-ordinates 42°10'0" N and 25°8'0" E. Economic characteristics are calculated for an area 1 ha. Afforestation has been carried out with *Populus × canadensis* (*Populus × euro-america*) cv. 'I-214' at planting spacing 5×5 m and density 40 plants/dka. The selection of the object is determined by the fact that 'I-214' cultivar is the mostly used for afforestations with poplars in Bulgaria. In the period 2012–2019, the plantations with it occupy 44 % (2012) to 64 % (2014) of the total area of poplar plantations in Bulgaria (EFA 2012–2019).

The study on the investment in two-room residential apartments on the territory of the city of Sofia is determined by the fact that, according to the data from the National Statistical Institute in 2018, they represent biggest relative share of the housing in this city, grouped according to the number of rooms.

This allows forming of a large-scale totality, which is necessary for the correct calculation of compendious statistical indices. Basic source of information about the prices of residential real estates is the statistical heading of one of the biggest websites for sale-trade and rent (IMOT. BG 2019). The used data are according to months about the average offer prices for sale and rent for 2017 and 2018 to the end of the relevant month.

Methods

For the carrying out of the analysis, the following quantitative methods were used:

1. For calculation of the typical and regular annual levels of prices of residential real estates and the expected income from rent, the method of average quantities was used. Average annual chronological current individual quantity was used on the basis of the current prices to the end of the relevant months after formula (1) (Kaloyanov and Petrov 2014).

$$\bar{Y} = \frac{\sum_{i=2}^{N-1} Y_i + \frac{Y_1 + Y_N}{2}}{N-1}, \quad (1)$$

where: N is the number of elements in the dynamic row ($N=12$ in this case), and Y_i are the values of elements in the dynamic row.

2. To calculate the average annual rate of return (AARR) on investment in two-room residential apartments, the average annual expected income is compared through a static method (net cash flow). The correlation is presented through formula (2) (Stefanov 2018).

$$AARR = \frac{\overline{CF}}{IC} = \frac{\frac{\sum_{t=1}^T CF_t}{T}}{\sum_{t=0}^T I_t}, \quad (2)$$

where: \overline{CF} is average annual net cash flow; IC is invested capital; CF_t is net cash flow in future period t ; T is the number of periods within the investment term; I_t is the investment expense in period t .

We divide the expected average 10-monthly rental income from 1 m² of living area by the average purchase price of 1 m² of living area in the same neighbourhood. The rental income for the two

remaining months of the year is deducted for taxes, routine repairs and absence of occupancy.

3. The variation of the return indices (V_{σ}) is calculated with the help coefficient of variation based on the standard deviation. Formula (3) was used (Stoenchev 2013):

$$V_{\sigma} = \frac{\sigma}{\mu} \cdot 100, \quad (3)$$

where: σ is standard deviation and μ is arithmetic mean quantity.

In order to assess in a long-term period the economic efficiency of a potential investment project, involving the purchase and renting out of a residential property, and management of fast-growing tree species, some of the dynamic methods for return assessment have been used, and in particular:

1. The method of *NPV* as it has a number of advantages over the other methods (Stefanov 2018). The most significant is that it allows comparison between projects with different amounts of investment, net cash flow and periods of economic life. When applying the *NPV*, we calculate the sum of the discounted at the current moment, investment net and terminal cash flows, which were gained as a result of the investment by formula (4) (Tsoklinova 2017).

$$NPV = -\sum_{t=0}^m \frac{I_t}{(1+r)^t} + \sum_{t=m+1}^n \frac{CF_t}{(1+r)^t} + \frac{L_n}{(1+r)^n}, \quad (4)$$

where: I_t is the investment cash flow in year t , in leva; L_n is the future net income from possible sale of the assets at the end of the economic life of the project, in BGN; n is the number of years of the economic life of the project, in number of years; m is the number of years of the economic

life of the project during which investment cash flows are produced, in number of years; r is the required discount rate, part of 1.0; CF_t is the net cash flow during year t (positive or negative). In this particular case it is estimated by subtracting the expenses for year t from the income for the same year.

In the current study, as far as the investment in a poplar plantation is concerned, *NPV* is calculated at a discount rate 0.06 (6 %) and is conformable to the investigation of Cabbage et al. (2014).

The net cash flow from the investment is calculated through formula (5). It is the preferred in the present study since it represents the contractor's disposable income after all the expenses related to the project activities have been covered and the tax on the profits have been paid to the state budget (Georgiev et al. 2013).

$$CF_t = (R_t - C_t - A_t)(1 - T_t) + A_t, \quad (5)$$

where: R_t is net income from sales, in BGN; C_t is total expenses (not including the depreciation) during year t from the economic life of the project, in BGN; A_t is the depreciation expenses officially acknowledged by the tax authorities in year t from the economic life of the project, in BGN; T_t is the rate of the corporate income tax, part of 1.0.

2. The method of the internal rate of return (*IRR*) is calculated through formula (6) (Tsoklinova 2017).

$$0 = -\sum_{t=0}^m \frac{I_t}{(1+IRR)^t} + \sum_{t=m+1}^n \frac{CF_t}{(1+IRR)^t} + \frac{L_n}{(1+IRR)^n}, \quad (6)$$

IRR determines the level of discount rate, at which it is possible to invest resources in the project without losses for the investor.

The assessment of the financial effi-

ciency of the investment in 1 ha of poplar plantation is made under the following limiting conditions:

1. All expenses are calculated based on the current prices towards 2017, VAT not included, prolonged with the inflation for 2017, which amounts to 2.06 % (NSI 2017).

The time necessary for manual activities is determined on the basis of administrative labour norms for afforestation activities (EFA 2008), and the time stake for manual operations amounts to 3.37 BGN/h. The prices of mechanized activities are determined as an average value of contracts signed for the relevant activity for 2017, carried out by the regional branch where the poplar plantation is situated, as follows: rooting out of logs – 650 BGN/ha; clearing logs – 600 BGN/ha; ploughing the soil in a depth of 60 cm – 1200 BGN/ha; levelling – 400 BGN/ha. The price of the planting material is 720 BGN (400 items × 1.80 BGN/item).

2. The rotation is 15 years.

3. The sale prices of the poplar wood material for 2017 are prolonged by the rotation of the trees with the updated prices of 2017, compared to 2016, for economic activity 'Production of timber and timber products, without furniture', which, according to data from the National Statistics Institute, amounts to 2.8 % (NSI 2017).

Based on the above-mentioned, the following statement presents the investment expenses, the net cash flow at the end of a 15th year and the financial efficiency of the investment.

Under investment expenses are considered the expenses for establishment of 1 ha of poplar plantation at planting scheme 5×5 m. They include:

I. Purchase of uncultivated agricultural land.

II. Preparation of the soil:

- preliminary preparation of the area – rooting out and clearing logs out of the site;
- ploughing the soil on a depth 60 cm.

III. Afforestation:

- purchase of 1-year-old saplings;
- excavation of holes 60/60/60 cm with a tractor drill and planting of saplings;
- whitewashing of the saplings a single time after planting.

IV. Maintenance of the plantation:

- expenses for completion during the second year (forecasted completion is 15 %);

- digging up of the saplings in plots and disc ploughing between the tree rows in two directions – three times in the first and second year and twice in the third year;

- watering – during the first three years – 3 times each year;

- nourishing with ammonium nitrate, norm 250 kg/ha, a single time during first, second and third year;

- whitewashing of the saplings a single time during second and third year;

- pruning a single time during second and third year;

- cutting a single time during fourth, fifth and sixth year;

- painting of the cutted branches a single time during fourth, fifth and sixth year.

V. Expenses for organization, implementation and control.

Results and Analyses

Financial dimensions of an investment in a poplar plantation

The amount of the investment expenses is presented in Table 1, according to years of implementation.

Table 1. Amount of the investments for the establishment of 1 ha of poplar plantation, BGN.

Expences according to the activities	1st year	2nd year	3rd year	4th year	5th year	6th year
I. Expences for purchase of uncultivated agricultural land	5380					
II. bExpences for the preparation of the soil						
2.1. Rooting out of logs	650.00					
2.2. Clearing logs	600.00					
2.3. Ploughing the soil in a depth 60 cm	1200					
2.4. Levelling	400.00					
Total for group II	2850					
III. Expences for purchase of 1-year-old poplar saplings	720.00					
IV. Expences for afforestation	1260					
V. Expences for completion		340.2				
VI. Expences for the maintenance						
6.1. Expences for disc ploughing between the tree rows	360	367,42	250			
6.2. Digging up of the saplings in plots	194.43	198.44	135.01			
6.3. Whitewashing of saplings		121.37	123.87			
6.4. Watering	148.65	151.71	154.83			
6.5. Nourishing with mineral fertilizers	71.35	72.82	74.31			
6.6. Pruning		151.70	154.83			
6.7. Cutting				303.20	477.34	671.96
6.8. Painting the cutted branches				322.55	493.80	839.96
Total for group VI	774.43	1063.46	892.85	625.75	971.14	1511.92
VII. Total (I+II+III+IV+V+VI)	10,984.43	1403.66	892.85	625.75	971.14	1511.92
VIII. Expences for organization, implementation and control – 5 % from the amount of the above-mentioned expences	549.22	70.18	44.64	31.29	48.56	75.60
IX. Total (VII+VIII)	11,533.65	1473.84	937.49	657.04	1019.70	1587.52

Net cash flow in the year of felling

The expenses for felling and initial processing of 1 m³ of poplar wood towards 2017 amounts to 7 BGN, and the wholesale prices of wood are as follows: big-sized – 70 BGN/m³; medium-sized – 45 BGN/m³; small-sized – 45 BGN/m³; firewood – 45 BGN/m³. The quantity of wood expected to be obtained during roation is 299 m³ and is with the following assortment structure: big-sized – 204 m³; medium-sized – 61 m³; small-sized – 7 m³; firewood – 27 m³. In the year of felling it is forecasted to sale the agricultural land, which value is determined through prolongation of its initial price with the inflation rate for the year 2017. On the basis of specifications made and applying formula (5) it was established that the amount of the net cash flow in the year of felling is 29,286.46 BGN.

Financial efficiency of the investment

At a discount rate 0.06, *NPV* of the assessed investment in a poplar plantation is negative (-4083.86 BGN), i.e. it is financially inefficient. In the same time *IRR* of the investment in the plantation is 0.0401 (4.01 %), which in fact is the unsatisfactory rate of return in comparison with the rate of return on market portfolio in Bulgaria and one of the reasons that currently forest plantations in Bulgaria are still not in an industrial stage of exploitation.

The above-mentioned obtained results are in conformity with the results of a similar investigation carried out by Pra and Pettenella (2017) in the river Po valley (Northern Italy). Authors establish that the investment in a poplar plantation provides *IRR*, which values vary from 4.4 %

to 11 %. They underline that the investments in poplar stands provide interesting opportunities for income only when average prices of the wood are high. In other cases the investments are at the limit of economical viability. To our opinion, it is realistic to expect increasing of the average prices of wood in medium-term and long-term perspective. Reason for this are the perspectives for replacement of some plastic products, which disintegrate slowly in nature and significantly pollute the environment, by wood products. In support of this vision is also the point of view of McEwan et al. (2019), who claim that the demand of round wood towards 2050 is forecasted to reach 6 billion m³, which would stimulate the investments in forest plantations.

Analysis of the return of the investment in two-room residential apartments in Sofia according to residential districts

On the basis of the monthly data in euro until now in BGN and in single residential areas, the annual average chronological price was calculated for purchase and rent of a square meter residential area in euro. The analysis was made according to homogenous bulks of lodgings taking into account factors like number of rooms and location, because there are significant differences in the return in the varieties of these factors.

Table 2 shows the average annual norm of return of the investment in two-room residential apartments in some residential areas in Sofia in 2017 and 2018 for the first five and last five residential areas, arranged according to the amount of the return norm in 2017.

Table 2. Average annual return of the investment.

Residential areas with highest return	Average annual return, %		Residential areas with lowest return	Average annual return, %	
	2017	2018		2017	2018
Gorublyane	6.69	4.42	Nadezhda 3	3.44	4.48
Karpuzitsa	5.67	3.54	Strelbishte	3.44	4.11
Lyulin 2	5.53	3.84	Kremikovtsi	3.34	4.23
Lyulin – centre	5.52	5.09	Doktorski pametnik	3.29	4.59
Lyulin 8	5.50	4.33	Yavorov	3.00	2.73

The average return for all residential areas decreases from 4.46 % in 2017 to 4.38 % in 2018. Slump was also recorded in the variation coefficient of the index of return, calculated according to residential areas. From 15.06 % in 2017 it decreases to 13.19 % in 2018.

The conclusion is made that market mechanisms very quickly neutralize the significant differences in investment profitability according to residential areas, revealed in 2017.

Residential areas like Hipodruma, Ivan Vazov, Belite brezi, Doktorski pametnik, Strelbishte, Oborishte, Iztok, which are traditionally preferred for living, are not on the top of the charts according to return of investments due to the too high prices for purchase of a real estate, which could not be compensated by the amount of the rents.

In the application of dynamic methods for calculation of the expected efficiency of investment in two-room residential apartments in Sofia, the following economic parameters were used:

- As investment cash flow (value of the investment), the average offer price for purchase of a two-room lodging according to residential areas in 2018 is set.

- For covering of the average annual cash expenses during the implementation of the project, the two-month expected rent is forecasted according to average data about 2018 (expenses for maintenance, taxes and insurances, lost profits

by changing tenants, etc.).

- Cash income from the investment is the expected yearly 10-month rent according to average data about 2018 and the expected income from sale of the lodging at the end of the planned 5-year period of the project.

The rate of the used norm of discount is determined on the basis of the achieved average annual return for 2018 for the relevant residential area.

The expected selling price of the lodging at the end of the project's duration is obtained on the basis of the hypothesis that the prices of the two-room residential apartments lodgings in various residential areas will change over the next 5 years following the same trend as during the previous 5 years, namely the period 2013–2018. The forecasted prices in various areas are estimated via multiplying the average offer prices of the two-room lodgings by residential area for 2018 by the coefficient of increase of the prices during the previous basic period.

The results obtained from the investment and represented by the net present value of the income and internal rate of return after a 5-year period of utilisation and sale of the property are presented in Table 3. The residential areas in the table are listed in descending order of the investment's net present value. The arrangement of the residential areas according to the internal rate of return is identical.

Table 3. NPV and IRR of the investment in two-room lodging in Sofia for a 5-year period from 2018 to 2023.

Residential areas	NPV, euro	IRR, %	Residential areas	NPV, euro	IRR, %
Yavorov	87,102.85	15.26	Slatina	16,676.53	10.89
Medical academy	67,173.82	15.03	Nadezhda 2	17,242.99	10.83
Poligona	47,917.20	14.54	Gotse Delchev	25,151.21	10.79
Doktorski pametnik	82,880.42	14.25	Ovcha kupel	18,118.64	10.68
Ivan Vazov	63,721.88	14.25	Levski G	16,842.64	10.68
Krasna polyana 1	28,790.44	14.24	Malinova dolina	17,454.67	10.66
Vrabnitsa 1	23,222.78	13.94	Lyulin 2	18,941.97	10.65
Obelya 2	25,218.90	13.67	Nedezhda 3	17,288.26	10.59
Iztok	53,394.05	13.51	Lyulin 1	11,368.45	10.44
Sveta Troitsa	33,699.08	13.49	Zapaden park	15,706.86	10.38
Mladost 2	37,525.14	13.45	Krasno selo	20,899.68	10.25
Lyulin 4	25,001.21	13.40	Mladost 3	18,585.96	10.19
Tolstoy	24,643.79	13.34	Serdika	17,141.08	10.09
Gorublyane	21,365.15	13.26	Lyulin 7	12,623.95	10.01
Lyulin 9	23,946.99	13.12	Geo Milev	23,369.40	9.93
Levski V	26,393.00	13.07	Knyazhevo	15,911.22	9.88
Mladost 1	29,986.07	12.72	Lyulin 6	12,438.87	9.82
Hadzhi Dimitar	23,481.85	12.67	Lyulin 3	13,800.80	9.82
Lyulin 5	16,153.70	12.66	Nadezhda 4	10,661.51	9.77
Krasna polyana 2	21,745.58	12.64	Nadezhda 1	10,216.97	9.77
Svoboda	18,228.14	12.53	Hladilnika	19,523.55	9.76
Krastova vada	35,720.43	12.52	Slavia	15,176.35	9.73
Lyulin 8	23,146.72	12.49	Zona B-19	16,212.52	9.70
Obelya 1	20,786.38	12.44	Buxton	16,512.25	9.59
Izgrev	41,340.58	12.12	Gevgeliyski	15,766.77	9.53
Lozenets	40,758.57	12.06	Dianabad	20,391.64	9.46
Moderno predgradie	21,396.80	12.03	Razsadnika	11,532.87	9.34
Lagera	32,394.00	11.99	Lyulin – centre	11,747.79	9.32
Karpuzitsa	24,636.39	11.91	Pavlovo	13,015.06	9.30
Hipodruma	27,553.25	11.88	Darvenitsa	14,280.03	9.26
Lyulin 10	21,386.09	11.86	Belite brezi	19,536.89	9.23
Orlandovtsi	15,065.55	11.75	Reduta	13,871.19	9.19
Mladost 4	25,135.97	11.73	Gorna banya	10,143.76	9.03
Druzhba 1	23,677.34	11.71	Musagenitsa	10,901.88	8.47
Manastirski livadi	36,967.20	11.67	Ovcha kupel 1	9890.91	8.39
Zona B-5	23,464.31	11.62	Zona B-18	12,176.85	8.38
Druzhba 2	23,495.94	11.62	Poduyane	11,175.50	8.28
Simeonovo	31,415.30	11.52	Studentski grad	5822.52	7.82
Oborishte	39,293.45	11.48	Vitosha	8794.82	7.75
Borovo	27,293.27	11.40	Banishora	10,659.89	7.55
Boyana	27,982.85	11.35	Mladost 1A	12,335.58	7.32

Residential areas	NPV, euro	IRR, %	Residential areas	NPV, euro	IRR, %
Ilinden	22,768.55	11.34	Strelbishte	12,593.06	7.26
Zaharna fabrika	17,266.37	11.24	Levski	5542.27	6.89
Suhata reka	16,694.98	11.20	Zona B-5-3	5350.40	6.80
Ovcha kupel 2	21,357.11	11.19	Dragalevtsi	8096.01	6.76
Krasna polyana 3	17,281.39	11.14	Obelya	5693.35	6.59
Centre	26,818.57	11.10	Vrabnitsa 2	3512.60	6.27
Fondovi zhlishta	19,122.76	11.05	Kremikovtsi	-348.36	3.83

It was determined that the result from the investment period depends mostly on the expected change of prices of two-room lodgings in the relevant residential area and not that much on the expected rent. According to the parameters set in the investment project, only Kremikovtsi shows negative result. The residential areas with norm of return calculated according to the static method based on expected income from rent, which is lowest in a long-term aspect, appear to have highest profitability.

It could be concluded that the investment in two-room lodging in Sofia in a 5-year outlook provides high return but its optimization requires precise selection of lodging's location.

Conclusions

Both types of investments in real estates provide various advantages, which gives the opportunity for optimal choice on the side of potential investors. They are as follows:

The advantage of an investment in the establishment of a poplar plantation is the necessity of less initial capital. The nominal amount of the investment expenses is relatively low and amounts to 17,209.24BGN. At the expense of this, the indices *NPV* and *IRR* are unsatisfactory. At prices of the poplar wood as of 2017, prolonged to the rotation with the

inflation rate for 2017, which is 2.8 %, it turns to be inefficient. At discount norm 0.06, *NPV* of the assessed investment in the poplar plantations is -4083.86 BGN, i.e. it is financially inefficient. At the same time *IRR* of the investment in the plantation is 0.0401 (4.01 %), which in fact is unsatisfactory norm of return in comparison with rate of return of market portfolio in Bulgaria. Besides, the expected final result is with 15 years perspective. This outlook, however, could be an opportunity for improving of the final economic results, if there are prerequisites for increasing of the demand of wood. In this sense, to our opinion, within the investment in poplar stands there are characteristics like foresight, ecology and innovation on the territory of the country and it deserves the attention of economic subjects.

The advantage of the investment in a two-room lodging is that if the location is well-selected, it provides high and stable return in spite of the dynamics of rents. For a 5-year outlook, for which realistic prognosis of change in prices could be done, the investment in a two-room lodging in Sofia could be profitable in all investigated residential areas with the exception of Kremikovtsi. It is financially efficient by discount rate – the achieved average annual return in 2018 for the relevant residential area. The *IRR* varies within the range from 15.26 % in Yavorov to 6.27 % in Vrabnitsa 2. However, it is necessary to invest considerably more fi-

nancial resources compared to the investment in fast-growing poplar stands. The minimal value of the necessary capital is 40,027 EUR for the purchase of a two-room lodging in Lyulin 5 with *IRR* 12.66 %. For the purchase of two-room lodging in Yavorov, where highest *IRR* would be expected to be achieved, would be needed average 117,467 EUR according to prices in 2018.

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