

# Managing the economic and financial efficiency of an investment financed through local bonds

ISSN 1857-9973

UDC 332.1.055.2]:336.763.3:352}:303.725.3(497.731)

**Elena Veselinova<sup>1</sup>, Marija Gogova Samonikov<sup>2</sup>**

<sup>1</sup>*Goce Delcev University, Faculty of Economics, Krste Misirkov St., 10-A, Republic of Macedonia, e-mail: elena.veselinova@ugd.edu.mk*

<sup>2</sup>*Goce Delcev University, Faculty of Economics, Krste Misirkov St., 10-A, Republic of Macedonia, e-mail: marija.gogova@ugd.edu.mk*

## Abstract

The intention of the authors of this paper is to prove the efficient use of funds acquired from a local bond by investing in a self-sustaining project that generates returns - a rehabilitation center that will exploit the Kezovica thermal spring in the Municipality of Stip. The economic-financial efficiency of the investment financed through the issue of local bonds is shown through investment criteria that prove the profitability and liquidity of such an investment. In this way, the justification for the issue of local bonds as an alternative way of financing and supporting local economic development is achieved.

The purpose of this paper is to evaluate the return on investment potential, that is, the efficiency and profitability of a project that significantly contributes towards the increase of value of local output as a component of national economic growth, and even more, taking into account the increased current demands for socially responsible behavior, how it demonstrates value for a wide range of stakeholders in the long run. The results of the research, projected in the form of conventional investment criteria, combined with a short financial ratio analysis, confirm that the efficient use of municipal bonds as an alternative way of financing local economic development can be achieved by investing in a long-term sustainable and profitable project such as is the analyzed example of the rehabilitation center.

## Key words

Self-sustaining project, local bonds, investment criteria, profitability, rehabilitation center

## 1. Introduction

A complete issue of municipal bonds in the Republic of N. Macedonia has not happened yet. The Municipality of Aerodrom in Skopje and the Municipality of Strumica have come the farthest with the attempt to create an emission.[1] However, these attempts did not come to fruition. The municipality of Stip, again, showed serious intentions by starting the emission procedure in 2022, and the central government is on the move to close the process.[2] Representatives from other municipalities have attended trainings, seminars and practices that would lead to professional improvement of the municipal bond issuance process and its realization.[3] Within the framework of the central government from 2005 onwards, the issue of government bonds in the Republic of N. Macedonia is a frequent practice. But until today, there is no interest among the municipalities in issuing municipal bonds, there is even a sense

of fear from additional borrowing. Such opinions can be taken as justified if one accepts the fact that the burden of payment will certainly fall on the municipality, and the burden of potential payment difficulties will fall on the person(s) responsible for its realization (according to the mentality of the countries from former Yugoslavia).[4] That's why the process of issuing a municipal bond in N. Macedonia should be studied in detail, analyzed and linked to revenue-generating projects.

Bond financing has the potential to be particularly desirable given the current economic climate where global savings rates are high, access to conventional financing vehicles for sizeable projects is restricted, while demand for development is firmly on the rise. [5] Local bonds, which may be used to finance an entire project or as part of a financing package, bear a number of risks relating to the preparation, construction, and operational phases of the project, requiring specialized skills in order to present an attractive investment. Local bonds may be used at project commencement (greenfield stage) or may be issued to take out the initial financing, typically after the operational phase begins (brownfield stage). [6] The usage of local bonds to finance projects is not a new phenomenon; they have been used for financing projects in the US, Canada and Asia for more than 25 years. Despite the fact that project bond financing has always played a minimal role in project finance globally, its importance is increasing. From a sector perspective, a very large majority of all projects financed through local bonds go to infrastructure, oil, gas and power. [7]

The municipal bond should serve as an alternative, better way of financing municipalities. In order to avoid the credit risk when issuing municipal bonds, it is necessary that the funds are used efficiently, and that the effectiveness comes from their allocation and management. This process can significantly contribute to the development of the municipality, especially if cheaper prices are realized. The current conditions in the Republic of N. Macedonia are such that a decentralized revival is inevitably needed. Aspirations for such a revival have been noted by the central government. But everything should not be left to the central government, especially considering the industrial development of this country.

The bond as an instrument would currently fare well in the markets due to the level of interest rates. The municipalities' interest in issuing such an instrument should be positive, because this is a process that the municipality can conduct according to its needs. The loans are arranged by the banks, the municipal bond issue can be arranged in accordance with the needs of the municipality (terms, interest, etc.). Financial markets in countries in transition do not have a spectrum of instruments, as is the case in developed countries. This market needs to be developed and the municipal bonds would be an interesting novelty, which should be competitively positioned in order to be successful.[8]

However, due to the development of the municipalities and the current situation in the countries in transition, the fact that these instruments must be linked to a revenue-generating project ought to be taken into account. Such a connection will enable the security of payments, thereby gaining the public's interest and confidence in investing. As with all instruments, the existence of risks must also be noted with municipal bonds. Credit, interest and maturity risk are aspects that accompany all instruments. Therefore, when issuing a municipal bond, it should be taken into account that such risks do not prevail over the profit interest.

The investment of the cash flow generated from the initial sale of the local bonds could be realized as a reconstruction of a rehabilitation center, as well as a spa center that will exploit the natural source of thermal water - Kezovica - a key project in Eastern Macedonia, which would have the performances necessary for a successful usage of local bonds as an alternative source of financing. According to unofficial data, this spring is considered the second most healing spring in Europe. In the national framework, there are several more complexes that are used for treatment and rehabilitation, such as Negorski spa, and several entrepreneurial initiatives of small private investors within this sector. However, the specific

characteristics of the water from the Kežovica spring are a key competitive advantage that cannot be imitated. In this sense, this is about financing a project that has the potential to generate income more dynamically and intensively than all other competitors on the market. The feasibility study shows that the project not only meets the minimum criteria for acceptability for implementation, but also significantly exceeds them.

## 2. Research Hypotheses, Design and Methodology

The rehabilitation and physical therapy center, which has been using the Kezovica thermal spring until now, functions within the Clinical Hospital in Stip and is a regional treatment center in its domain. However, the installed capacity of the center, both physically and in terms of human capital, is not sufficient to meet the needs of consumers of this type of service. It is necessary to expand and improve the quality of this center. Municipal bonds that can be used to finance this type of project, which will generate income that minimizes the riskiness of the bond, as well as ensuring the payment of interest and principal.

In order to verify the economic and financial efficiency for investing in this or a similar project, the authors set the following basic hypotheses:

H0: The investment in the project - center for rehabilitation and physical therapy has economic and financial efficiency.

H1: Local bonds can be used as an alternative source of finance for a sustainable revenue-generating project.

The economic-financial efficiency of the project is analyzed in detail further in the paper. The profitability of this investment is tested through conventional investment criteria, some of which are not based on the time preference of money: the payback period and the rate of return, as well as those based on the concept of discounting: net present value, profitability index and internal rate of return. [9],[10]

Based on this, the following additional hypotheses are set, the testing and confirmation of which verifies the accuracy of the basic hypotheses stated above in the paper:

H2: The expected payback period of the project is shorter than the normal, that is, the average payback period.

H3: The expected rate of return is higher than the average rate of return.

H4: The net present value is positive, that is, the profitability index is higher than 1.

H5: The internal rate of return is higher than the established reference value.

## 3. Empirical Results

Below, Table 1 summarizes the projections for the total fixed assets and the required working capital.

**Table 1**      **Projected fixed assets and working capital of the project**

	In den.	In euros
Preparatory works	1.230.000,00	20.000,00
Construction works	64.575.000,00	1.050.000,00
Reconstruction of an existing facility for physical therapy and rehabilitation	9.225.000,00	150.000,00
Construction of a new sports and recreation facility	12.300.000,00	200.000,00
Construction and furnishing of a space for accommodation of patients	19.065.000,00	310.000,00
Construction and furnishing of space for accommodation of users of spa services	17.835.000,00	290.000,00
Reconstruction of swimming pools	6.150.000,00	100.000,00
Equipment	<b>17.804.250,00</b>	<b>289.500,00</b>
Equipment for laser therapy	1.076.250,00	17.500,00
Magnetic therapy equipment	461.250,00	7.500,00
Electrotherapy equipment	1.230.000,00	20.000,00
Equipment for aqua therapy	707.250,00	11.500,00
Equipment for light therapy	184.500,00	3.000,00
Equipment for paraffin therapy	1.537.500,00	25.000,00
Spine extensiomat	922.500,00	15.000,00
CPM - Continuous Passive Motion Machines	4.920.000,00	80.000,00
Massagers	615.000,00	10.000,00
Fitness equipment and other physical therapy equipment	6.150.000,00	100.000,00
Other	2.152.500,00	35.000,00
Engineering and project management	1.230.000,00	20.000,00
Development of projects	922.500,00	15.000,00
Planned total fixed assets	<b>85.761.750,00</b>	<b>1.394.500,00</b>
Planned working capital	<b>6.217.5890</b>	<b>101.0990</b>
Total required financial resources	<b>91.979.338,50</b>	<b>1.495.599,00</b>

Source: authors calculations from a feasibility study

### 3.1 Basic assumptions for market, organizational and financial aspects

*Organizational aspects* - The management team would include one chief executive officer and five directors of separate departments. Additionally, 5-7 people would be needed for administrative support. The annual amount of funds intended for salaries for the administrative staff is about 6,000,000 den (€100,000).

*Market analysis.* Procurement market - All components of material and human resources will be hired from the domestic market. An exceptionally large part of the equipment will be procured from foreign markets. Sales market - The services that will be offered by this center will be intended primarily for users in R. Macedonia, but due to the specific key resource – healing thermal water, which provides a competitive advantage in a wider scope, it is expected that there will be interest in the services of the center from users from neighboring countries, as well as from countries in Europe.

*The environmental risk of the project* - The realization of this investment does not cause environmental pollution, the project is sustainable and fits into the trends of responsibility and sustainability in the long term.

*Financial construction* - The project will be financed by the issue of local bonds in the amount of € 2,000,000 euros in Denar counter value.

### **3.2 Financial projections and analyses**

In addition, the financial projections for the project are presented in tabular presentations including the projected income statement, sales revenues, projected costs, the projected cash flow report for profitability assessment, followed by the calculation of the investment criteria that confirm the economic-financial efficiency of the project.

**Table 2 Projected income statement**

In euros	n+1	n+2	n+3	n+4	n+5	n+6	n+7	n+8	n+9	n+10
Sales and other revenues – in the country	2.645.691	2.780.894	2.923.154	3.072.854	3.230.398	3.404.903	3.569.886	3.743.117	3.925.011	4.115.999
<b>Total revenues</b>	<b>2.645.691</b>	<b>2.780.894</b>	<b>2.923.154</b>	<b>3.072.854</b>	<b>3.230.398</b>	<b>3.404.903</b>	<b>3.569.886</b>	<b>3.743.117</b>	<b>3.925.011</b>	<b>4.115.999</b>
Raw materials in the county	624.390	686.341	754.540	829.622	912.286	829.622	1.103.529	1.003.305	1.335.437	1.469.292
From abroad	156.098	171.585	188.635	207.405	228.072	207.405	275.882	250.826	333.859	367.323
Total costs for raw materials	771.000	771.000	809.550	850.028	892.529	937.155	1.084.874	1.139.118	1.139.118	1.196.074
Other costs	203.000	201.600	200.308	204.128	208.064	212.120	216.302	220.613	225.058	218.643
Total costs	<b>1.754.488</b>	<b>1.830.527</b>	<b>1.953.033</b>	<b>2.091.183</b>	<b>2.240.951</b>	<b>2.186.303</b>	<b>2.680.588</b>	<b>2.613.863</b>	<b>3.033.473</b>	<b>3.251.332</b>
Depreciation	31.500	31.500	31.500	31.500	31.500	31.500	31.500	31.500	31.500	31.500
<b>Total operative costs</b>	<b>1.785.988</b>	<b>1.862.027</b>	<b>1.984.533</b>	<b>2.122.683</b>	<b>2.272.451</b>	<b>2.217.803</b>	<b>2.712.088</b>	<b>2.645.363</b>	<b>3.064.973</b>	<b>3.282.832</b>
EBIT	859.703	918.867	938.621	950.171	957.947	1.187.100	857.798	1.097.755	860.038	833.167
Tax (10%)	(85.970)	(91.887)	(93.862)	(95.017)	(95.795)	(118.710)	(85.780)	(109.775)	(86.004)	(83.317)
<b>Net income</b>	<b>773.733</b>	<b>826.981</b>	<b>844.759</b>	<b>855.154</b>	<b>862.152</b>	<b>1.068.390</b>	<b>772.018</b>	<b>987.979</b>	<b>774.035</b>	<b>749.850</b>

Source: authors calculations

n – period (year) of investment  
n+1 – first year of operational period

**Table 3 Projected cash flow statement for profitability evaluation**

In euros	n	n+1	n+2	n+3	n+4	n+5	n+6	n+7	n+8	n+9	n+10
Investments in fixed assets	- 1.394.50 0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Investments in working capital	-101.099	-31.400	-96.006	-99.618	-104.239	-151.920	-70.479	-153.865	-71.876	-121.638	0
Domestic revenue	0,0	2.645.69 1	2.780.894	2.923.154	3.072.854	3.230.397	3.404.902	3.569.885	3.743.117	3.925.011	4.115.999
Revenue from abroad	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Total revenues	0,0	2.645.69 1	2.780.894	2.923.154	3.072.854	3.230.397	3.404.902	3.569.885	3.743.117	3.925.011	4.115.999
Domestic market costs		1.598.39 0	1.697.491	1.804.875	1.926.278	2.057.505	2.025.755	2.353.044	2.308.792	2.699.613	2.884.009
Foreign market costs		156.097	171.585	188.635	207.405	228.071	250.826	275.882	303.473	333.859	367.323
Total operating costs		1.754.48 7	1.869.076	1.993.510	2.133.684	2.285.577	2.276.581	2.628.927	2.612.266	3.033.472	3.251.332
Net cash flow in operating period		891.203	911.817	929.643	939.169	944.820	1.128.321	940.958	1.130.851	891.538	864.666
Net cash flow in exploitation period	- 1.495.59 9	859.803	815.811	830.025	834.930	800.038	1.050.704	795.747	1.050.320	769.900	864.666

Source: authors' calculations

### 3.3 Analysis of investment criteria – testing of basic and auxiliary hypotheses

To calculate the payback period, the authors use both the static and the dynamic approach for the payback period calculation, in parallel. [11],[12]

According to the static approach, the representative annual net cash flow is calculated as a simple arithmetic mean of the projected net cash flows for each year of the project's operational period. So,

$$T = I_i / NCF_{avg}$$

Where, T – payback period

$I_i$  – projected initial investment

$NCF_{avg}$  – projected average annual net cash flow

Therefore, the payback period for the project would be

$$T = 1,495,599.00 / 867,194.90 = 1.72 \text{ years}$$

Hence, if the usual, i.e. the expected payback period of the investment should be shorter than half of the time interval of the economic life of the project, in this case it is about 5 years -  $T_{max}$  (the operational period is projected at 10 years - corresponds to the duration of the local bond), then, according to the criterion  $T \leq T_{max}$ , the hypothesis H2 is accepted based on the static approach for calculating the investment payback period.

However, since the static approach, despite the accuracy and the clear signal it sends over the initial economic efficiency of the project, has limitations that cannot be ignored, which refer to the weakness in the selection of a representative annual net cash flow, that is, the neglect of fluctuations from the average annual net cash flow, it needs to be combined with the so-called dynamic approach based on the cumulative projected net cash flows from the operational period of the project.

Using this approach, the calculation of the investment payback period includes:

$$T = T_i + (I_i - \sum NCF_i) / NCF_{i+1}$$

Where, T – investment payback period

$T_i$  – year in which the initial investment is not yet covered by the cumulative projected annual net cash flows

$I_i$  – projected initial investment

$NCF_i$  – projected annual net cash flow

$$\text{In this case, } T = 1 + (1,495,599.00 - 891,203.30) / 911,817.50 = 1.78 \text{ years.}$$

Another addition, in order to eliminate the shortcomings in the approach to the calculation of this criterion, is the calculation of the investment payback period based on the cumulative discounted net cash flows, while in the dynamic approach, the nominal values of the projected annual net cash flows are replaced with discounted value.

Consequently, at a discount rate of 10% (which exceeds the current competitive coupon rate of a potential local bond in inflation conditions and which would be the only source of finance for the project), the investment payback period would be adjusted as follows:

$$T = 2 + (1,495,599.00 - (781,639.25 + 674,224.64)) / 623,610.48 = 2.06 \text{ years}$$

The rounded analysis of the investment payback period, calculated in the separate variants, based on the criterion  $T \leq T_{max}$ , confirms the correctness of the hypothesis H2: The expected investment payback period of the project is shorter than the normal, that is, the average investment payback period.

To test the next additional hypothesis, the authors use the second investment criterion that is not based on the time value of money – the rate of return calculated on the basis of initial investments. Considering this,

$$RR = NP_{avg} / li$$

RR – rate of return

li – initial investment

$NP_{avg}$  – average annual net profit

Or, specifically,  $RR = 842,858.91 / 1,495,599.00 = 0.5636 = 56.36\%$

To test H3, the criterion  $RR \geq RR_{min}$  is used, whereby the minimum reference expected rate of return could be compared with the average cost of capital from multiple sources of financing - WACC or, in this specific case only with the cost of bonds as the main source of finance for this project. The expected RR result of 56.36% significantly exceeds  $RR_{min}$ , thus confirming the accuracy of H3: The expected rate of return of the project is higher than the average rate of return.

The following two auxiliary hypotheses, which verify the basic two hypotheses, are analyzed through conventional investment criteria based on the concept of time value of money. [13] First, H4 refers to determining the expected net present value of the project as a clear indicator to support the investment decision. So, the expected NPV of the project should be a positive value, that is, it should be higher than the reference value for  $NPV_{min}$ .

According to the projected net cash flows of the project, in this case

$$NPV = \sum (NP_i / (1+r)^i) = € 2,451,438.37$$

NPV – net present value of the project

$NP_i$  – projected annual net cash flow

r – discount rate

i – duration of economic life of the project

Although the projected NPV of the project in the amount of € 2,451,438.37 confirms H4, however, in order to remove the disadvantages of absolute values [14], in this analysis the authors also include the relative net present value, that is, the profitability index. As it follows,

$$PI_g = \sum (NP_j / (1+r)^j) / li = 2.64 > 1$$

$$PI_n = NPV / li = 1.64 > 0$$

$PI_g$  – gross profitability index

$PI_n$  – net profitability index

NPV – net present value of the project

$NP_j$  – projected annual net cash flow

li – initial investment

r – discount rate

j – duration of operational life of the project

Based on the criterion  $PI_g > 1$  and  $PI_n > 0$ , the hypothesis H4: The net present value is positive, i.e. the profitability index in the gross variant is higher than 1, and the relative net present value (PI net) is higher than 0, is accepted.

Finally, the marginal efficiency of the investment, calculated through the internal rate of return of the project [15] -  $IRR = 56\%$  would be significantly higher than the interest rate of the local bond, as well as the discount rate used to actualize the net cash flows, i.e.  $IRR \geq IRR_{min}$  and therefore H5: The internal rate of return is higher than the established reference value, is accepted.

In summary, Table 4 shows the calculated values of the investment criteria that verify the economic-financial efficiency of the investment in this or a similar project, affirm the investment decision and, consequently, confirm the basic hypotheses in the paper:

H0: The investment in the project - center for rehabilitation and physical therapy has economic-financial efficiency.

H1: Local bonds can be used as an alternative source of finance for a sustainable revenue-generating project.

**Table 4 Projected value of investment criteria**

Investment criteria	Projected value
T	1.72 years – static 1.78 years – dynamic 2.06 years – discounted
RR	56,36%
NPV	€ 2.451.438,37
PI	2,64 gross 1,64 net
IRR	56%

Source: authors' calculations

## 4. Conclusion

Based on Table 4, which shows the projected values of the investment criteria, the soundness of the investment decision to invest in such a project is clearly confirmed, that is, the justification of using local bonds as an alternative source for financing sustainable income-generating projects is indicated. The economic-financial efficiency of the investment is proven through investment criteria that prove the profitability and liquidity of such an investment. This paper is based on the authors' primary research which is part of a larger feasibility study. The same can be extended by inserting techniques for testing the variability of returns, such as scenario analysis or simulation, which can further determine the significance of such or similar projects and develop alternative ways of financing them. So far, there are still no examples of full implementation of such or similar projects on Macedonian soil, but the authors, through benchmark analyses, as well as through this research, confirm their relevance and significance for local economic development.

## References

- 1 Gogova Samonikov, Marija and Veselinova, Elena and Gruevski, Ilija and Fotov, Risto and Binovski, Risto (2017), "Municipal Bonds in Developing Countries. Case Study: Municipality of Stip, Republic of Macedonia." *Management Dynamics in the Knowledge Economy*, 5 (2). pp. 155-174.
- 2 <https://time.mk/c/791ccc15e0/opstina-stip-preku-obvrznici-ke-se-zadolzi-so-4-milioni-evra-ke-se-otplakaat-slednite-sedum-godini.html>, last visited 4 Oct 2023
- 3 Fotov, Risto and Gogova Samonikov, Marija and Veselinova, Elena and Gruevski, Ilija (2017), Општинските обврзници како алтернативен извор за финансирање и ефикасно менаџирање со прибрани средства за локален економски развој со посебен осврт на општина Штип. Универзитет „Гоце Делчев“ - Штип.
- 4 Gogova Samonikov, Marija and Fotov, Risto and Gruevski, Ilija and Veselinova, Elena (2015) SWOT analysis of the emission of municipal bonds in the Republic of Macedonia (comparative with the Republic of Croatia). *Academics World 10-th International Conference*, Istanbul, Turkey. pp. 23-26.
- 5 Norman Hutchison, Graham Squires, Alastair Adair, Jim Berry, Daniel Lo, Stanley McGreal, Sam Organ, (2016), "Financing infrastructure development: time to unshackle the bonds?", *Journal of Property Investment & Finance*, Vol. 34 Iss 3 pp. 208 – 224
- 6 Asian Development Bank (2019), Good practices for developing a local currency bond market - Lessons from the ASEAN+3 Asian Bond Markets Initiative, p.137
- 7 Vassallo, Jose Manuel & Rangel, Thais & Baeza, M<sup>a</sup> de los Angeles & Bueno Cadena, Paola. (2016). The Europe 2020 Project Bond Initiative: an alternative to finance infrastructure in Europe. *Technological and Economic Development of Economy*. 24.
- 8 Gogova Samonikov, Marija and Veselinova, Elena and Fotov, Risto and Gruevski, Ilija (2016) Readiness of municipalities in the developing countries for issue of municipal bonds through the analysis of their budget accounts (overview of the municipality of Stip - R.Macedonia). *International Journal of Management and Applied Science (IJMAS)*, 2 (8). pp. 44-47.
- 9 Uwe Götze, Deryl Northcott, Peter Schuster, (2010) *Investment Appraisal - Methods and Models*, Springer Berlin, Heidelberg
- 10 Dayananda Don, Richard Irons, Steve Harrison, John Herbohn and Patrick Rowland Frontmatter (2008), *Capital Budgeting: Financial Appraisal of Investment Projects*, Cambridge University Press
- 11 Bhandari, Shyam. (1989). *Discounted Payback Period – Some Extensions*, Bradley University, Peoria, Illinois
- 12 Boardman, Calvin & Reinhart, Walter & Celec, Stephen. (2006). The Role of the Payback Period in the Theory and Application of Duration to Capital Budgeting. *Journal of Business Finance & Accounting*. 9. 511 - 522.
- 13 Dai, Haotian & Li, Ningfan & Wang, Yuhan & Zhao, Xinrui, (2022) The Analysis of Three Main Investment Criteria: NPV IRR and Payback Period.
- 14 Chang, KP. (2023). *Internal Rate of Return, Profitability Index and Payback Period Methods*. In: *Corporate Finance: A Systematic Approach*. Springer Texts in Business and Economics. Springer, Singapore.
- 15 Rugg, R.T., Marshall, H.E. (1990). *Internal Rate-of-Return (IRR)*. In: *Building Economics: Theory and Practice*. Springer, Boston, MA.