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THE DISCOUNT RATE IN THE ASSESSMENT OF EU-FUNDED INVESTMENT PROJECTS[3]

The article presents the effect of the financial discount rate on key financial indicators in the cost-benefit analysis used in the assessment of public investment projects – financial net present value, financial internal rate of return and financial gaps. It then estimates the Weighted Average Cost of Capital as an alternative approach for determining the discount rate. The model builds on the debt/equity ratio in the overall project investment portfolio and Capital Asset Pricing Model based on: (1) the return gained from investment in risk-free instruments; (2) the risk premium for the state (the so-called asymmetric state-related risk); (3) the business risk premium; (4) the project asymmetric risk premium. The model is then applied to an environmental investment project in Bulgaria.
Keywords: discount rate; weighted average cost of capital; cost-benefit analysis; public infrastructure financing; revenue-generating projects
JEL: H43; H54

Introduction

Bulgaria joined the European Union in January 2007, and the first experience with financing infrastructure projects from the Structural and Cohesion Funds coincided with the start of the 2007-2013 programming period. The managing authorities of the operational programs appraising and financing revenue-generating infrastructure projects – environment, transport and regional development, fully adopted and applied the requirements of the *EC Guide to Cost-Benefit Analysis of Investment Projects*, as this policy and approach continued in the 2014-2020 programming period.

In 2020, the European Commission published *Economic Appraisal Vademecum 2021-2027*, *General Principles and Sector Applications*. With this document, the Commission introduced a more flexible approach towards project appraisal in the 2021-2027 programming period compared to the previous ones. The discount rate is one of the affected project appraisal

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aspects, since with the *Vademecum* the EC does not define a reference discount rate but encourages the Member States to calculate their own country-specific and sector-specific discount rates. The option for using a different discount rate was available also before however, the Member States conveniently applied the reference discount rate proposed for the relevant programming period. For countries, such as Bulgaria, where public authorities and project developers have relied exclusively on the reference discount date in project appraisal, that lack of reference discount rate will certainly pose challenges. Therefore, the objective of the article is to present the results of a study on a methodology to calculate and justify a discount rate for the assessment of EU-funded projects in Bulgaria to be applied in the 2021-2027 programming period, and to assess the credibility and implications of the calculated discount rate values.

1. The Cost-Benefit Analysis – Evolution and Focus in Assessing Public Investment Projects in the EU

The EU grant financing of public infrastructure comes along with requirements and rules for project assessment to ensure that the EU public financial resources support public projects that are not attractive for private funding. In terms of public infrastructure projects' assessment, two major approaches are distinguished depending on the revenue generation capacity of the projects.

The non-revenue generating projects lead to the construction and improvement of infrastructure for the provision of "pure" (Samuelson, 1954, pp. 387-389) or "next to pure" public goods like street lighting, rehabilitation of streets and squares, creation and maintenance of green areas, parks and gardens. These public goods are characterized by non-rival consumption and non-feasible exclusion of potential consumers (Musgrave, Musgrave, 1989, p. 44). Hence, each member of society may benefit from these projects without any limitations in access and without paying any fees. As these projects improve social welfare, they are entirely financed by grants and the assessment is done mainly based on public needs assessment, overall costs and cost-effectiveness, and in many cases based on political decisions.

The revenue-generating projects include a large variety of projects in sectors like transport, energy, environment (water and waste management), industry, telecommunications, public health, education and culture, cultural and historical heritage and conservation, recreation, tourism and entertainment, research, development and innovation. In terms of public finance theory, these projects are characterized by rival consumption and feasible exclusion of public services' potential consumers (Musgrave, Musgrave, 1989, p. 44). These projects generate revenues from tickets, fees, prices, etc., paid by the final consumers. However, due to their public nature and significant contribution to social welfare, which curbs their revenue generation potential, they are not quite attractive to commercial banks, funds and private investors like purely commercial and marketable projects. That is why these projects are financed partially by public authority grants covering a share of the project costs, as the remaining funding is provided from the own resources of the project promoter, also including credits.

In order to guarantee fair allocation of public resources in terms of grants to revenue-generating projects, the European Commission has developed a detailed project assessment methodology based on the cost-benefit analysis (CBA). In 1994, the EC published the first Guide to Cost-Benefit Analysis of Major Projects. The project assessment methodology has been constantly developed and improved based on the actual project implementation throughout the programming periods. As a result, five subsequent editions of the Guide have been published, respectively in 1997, 2002, 2008 and 2014, each one updating the methodology of the previous editions. The final edition bears the title Guide to Cost-Benefit Analysis of Investment Projects.

The economic theory recognizes a variety of analytical methods to assess and verify if projects achieve certain objectives in an effective and efficient way. These include cost-benefit analysis, cost-effectiveness analysis, least-cost analysis, multi-criteria analysis, etc. The European Commission has recognized cost-benefit analysis as a universal project assessment tool because it is based on an objective and verifiable method. The cost-benefit analysis enables the measuring in monetary terms of all the costs and benefits of a certain project for society no matter whether they are financial, economic or social. The cost-benefit analysis also allows sensitivity and risk assessment, which are also important for the overall project assessment.

According to the Guide, the cost-benefit analysis methodology for project assessment includes three large sections – financial analysis, economic analysis, sensitivity and risk analysis. The methodology for financial analysis of investment projects is based on three main pillars – assessment of the project's financial profitability; assessment of the financial gap, which determines the amount of the EU grant and the beneficiary's co-financing; and assessment of the project sustainability.

The methodology for economic analysis according to the Guide focuses on the assessment of the project's contribution to society's welfare. The key concepts here are: the application of shadow prices to indicate the social opportunity cost instead of market prices; consideration and monetarization of project-related externalities and benefits like increase/reduction of air pollution, greenhouse gas emissions, noise, soil and water contamination, ecosystem degradation, landscape deterioration, population healthcare status, etc.

The sensitivity analysis identifies critical variables that may impact the project's financial and economic performance and analyses scenarios of combinations of these variables. The risk analysis is qualitative and quantitative. The former arranges the possible risks in the matrix by analyzing the possible negative effects, the probability of occurrence and the severity of impact and proposes mitigation and/or prevention measures for the main project risks. Quantitative risk analysis is required when the residual risk after the proposed mitigation and/or prevention measures remains medium to high and involves statistical probability analysis.

The cost-benefit analysis methodology presented in the European Commission's Guides is very detailed and elaborate, as for each aspect of the analyses precise indicators, assumptions and formats of the calculation tables are required. In 2006 the European Commission published Council Regulation (EC) No 1083/2006 of 11 July 2006 laying down general

provisions on the European structural and cohesion funds. The Regulation provided a definition for a major project as one whose total cost exceeds EUR 25 million in the case of the environment and EUR 50 million in other fields. In 2013 the European Commission published Regulation (EU) No 1303/2013 of 17 December 2013 which defined the major project as one whose total eligible costs exceed EUR 50 million and in the case of projects promoting sustainable transport – exceeding EUR 75 million. In cases of major projects, the member-states were explicitly required by these regulations to perform a full cost-benefit analysis, including a risk assessment.

Non-major investment projects (below EUR 50 million) were not explicitly required to provide full cost-benefit analysis when applying to obtain EU grant funding from the member-state operational programs and it was up to the national authorities to decide to what extent to stick to the provisions of the Guide.

Thus in the 2014-2020 programming period, the focus of the assessment of non-major projects which constituted the majority of the EU-funded investment projects was shifted towards financial, sensitivity and risk analysis, as the economic analysis was already not obligatory and financial analysis became of key importance for project assessment.

2. Discount Rate in Financial Analysis – According to the Guide to Cost-Benefit Analysis of Investment Projects

The core indicators in financial analysis are the financial net present value, the financial internal rate of return and the financial gap, which are calculated by using the following formulas:

Financial net present value (FNPV). This is a financial indicator based on discounting of net cash flows by applying the following formula:

$$FNPV = \sum_{t=0}^{T} \frac{X_t}{(1+i)^t} = X_0 + \frac{X_1}{(1+i)} + \frac{X_2}{(1+i)^2} + \ldots + \frac{X_T}{(1+i)^T} \quad (1)$$

where:

T is the project reference period;

X – the amount of the net cash flow for the respective year;

i – the discount rate.

The financial net present value is calculated for: (1) the total project investment costs – financial net present value of the investment (FNPV/C). This indicator shows how attractive for investors the analyzed project is. If it demonstrates negative FNPV/C then the project is not attractive for investors and needs public authorities' support in the form of grants; and (2) the national public contribution in the project costs – financial net present value of the capital (FNPV/K). This indicator shows how the project is influenced by the EU grants as

the FNPV/K increases as a result of the grant funding however again they should remain negative.

Financial internal rate of return (FIRR). This financial indicator shows the discount rate at which FIRR/C becomes equal to 0. It is calculated based on the following formula:

$$FIRR = \sum_{t=0}^{T} \frac{X_t}{(1+i)^t} = 0 \quad (2)$$

where:

T is the project reference period;

X – the amount of the net cash flow for the respective year;

i – the discount rate.

Similar to the FNPV, FIRR is also calculated for (1) the total project investment costs – financial internal rate of return of the investment (FIRR/C); and (2) the national public contribution in the project costs - financial internal rate of return of the capital (FIRR/K).

Financial gap. This financial indicator shows the percentage of the total project costs that cannot be covered by the project net revenues generated throughout the project reference period. This percentage converted in monetary terms forms the actual amount of the EU grant. The financial gap is calculated based on the following formula:

$$\text{Financial Gap (\%)} = \frac{Discounted\ investments - Discounted\ net\ revenues}{Discounted\ investments} * 100 \quad (3)$$

As seen from the formulas for calculation of the key indicators, discounting turns out to be a fundamental concept underlying project financial analysis required by the EC Guide. Discounting is the method for determining the present value of cash flows generated in a given year in the future, i.e. how much tomorrow's monetary unit is worth today. This concept originated in the 1800s and was first summarized by John Burr Williams (Williams, 1938, pp. 55-74). Nowadays it is widely used in the financial assessment of projects and financial markets.

The discount rate (factor, coefficient, norm, etc.) lies in the core of the concept as it is used in the coefficient by which the cash flow in the relevant year is multiplied in order to be calculated its present value.

$$\frac{1}{(1+i)^t} \quad (4)$$

The EC Guide provides two options for the discount rate to be applied by the project proposers:

- use a benchmark/reference discount rate proposed by the European Commission for the relevant programming period;

- use a different discount rate "justified on the grounds of international macroeconomic trends and conjunctures, the Member State's specific macroeconomic conditions and the nature of the investor and/or the sector concerned" (European Commission, 2014, p. 42).

The first two editions of the Guide to CBA published in 1992 and 1997 did not explicitly recommend a reference discount rate though they used a 5% discount rate in real terms when providing examples for the calculation of the project financial indicators. The next editions of the Guide however recommended specific values for the given programming periods, which are presented in Table 1.

Table 1. Reference financial discount rates recommended by the EC

Programming period (years)	% in real terms
2000-2006	6
2007-2013	5
2014-2020	4

Source: Guides to Cost Benefit Analysis for Investment Projects for programming periods 2000-2006, 2007-2013, 2014-2020, European Commission.

The reference discount rate proposed by the European Commission is considered as a benchmark:

- to discount the project's net cash flows in order to calculate the FNPV/C and FNPV/K, i.e. if both indicators' values turn to be positive after applying the benchmark rate, then the project is considered attractive for investors and the proposers should look for market financing but not EU grants
- to assess the projects' profitability, i.e. if the project's FIRR/C and FIRR/K values turn to be above the benchmark, then the project is determined as not eligible for grant financing with EU funds and private financing should be considered.
- to calculate the financial gap and further on the final amount of the EU grant. The higher the financial discount rate the higher the financial gap and thence the EU grant is. As seen from Table 1, the declining trends of reference financial discount rates indicate the attitude of the EC to reduce the overall amount of grants.

The authors' review of revenue-generating infrastructure projects (waste and water management, transport, etc.) funded by the operational programs in Bulgaria indicates that the cost-benefit analysis for all projects in the 2007-2013 and 2014-2020 programming periods have applied the reference financial discount rate, recommended as a benchmark by the EC, and no project proposer has used the opportunity to justify a different financial discount rate. The national authorities also did not publish any specific guidelines to justify any overall country rate for Bulgaria or sector-specific rate.

With the Economic Appraisal Vademecum 2021-2027, General Principles and Sector Applications, published in 2020, the Commission introduced a more flexible approach towards project appraisal compared to the previous programming periods. The cost-benefit analysis again remains mandatory only for major projects, as for other projects tools such as

cost-effectiveness analysis and multi-criteria analysis in addition to CBA are proposed for voluntary use, based on sector and/or project type and scale.

In addition to this flexibility, the Vademecum also states that if "a financial analysis with a calculation of performance indicators is carried out, Member States are free to assess their own country- and/or sector-specific financial discount rate(s)". No reference discount rate is explicitly recommended for the 2021-2027 programming period.

In this new context, the calculation of a justified financial discount rate becomes a significant challenge for project proposers in the programming period 2021-2027 as far as this rate is used not only in cost-benefit analysis but also in other methods like the 'levelized cost' concept which is often the core of cost-effectiveness analysis.

3. Discount Rate in Financial Analysis – Going Beyond the Guide to Cost-Benefit Analysis of Investment Projects

As the national authorities and the project proposers in Bulgaria will have to justify project discount rates in the 2021-2027 programming period, this section will present a feasible approach for the calculation of the financial discount rate.

A commonly used approach for determining the discount rate is to estimate the ***Weighted Average Cost of Capital (WACC)***. The EC Guide refers to WACC as an option for the calculation of a discount rate in case the project promoters do not wish to apply the reference discount rate for the relevant period. The Guide also refers to country-specific and sector-specific WACC, however, it does not provide an elaborate methodology for the WACC calculation.

From an entrepreneur's point of view, WACC is the actual cost of capital needed for financing a particular project (Frank, Shen, 2016, pp. 300-315). This implies that a project-specific discount rate should be calculated taking into account the cost of capital that the project proposer will alternatively have to allocate from his own resources (equity) or borrow from funding institutions (debt) instead of using grants.

As WACC refers to a project and its sources of financing the authors have chosen to apply the methodology for an environmental investment project in Bulgaria, as far as environmental infrastructure (water and waste management) financing represented a significant share of the project financing in the 2007-2013 and 2014-2020 programming periods in the country. The sample project, on which the approach will be tested, will have the following parameters: (1) project reference period of 30 years (3 years construction period and 27 years of operation period), as required by the EC Guide 2014-2020; and (2) average investment costs amounting to EUR 10 million. This value is based on the actual average project costs for the 2007-2013 and 2014-2020 programming periods – 7.3 million Euro for a waste project and 11 million Euro for a water project.

The funding institutions providing debt financing seek a smaller return on their funds considering the fact that they are ahead on private investors (equity holders) on the payment "queue" (the payment of interests and principals related to credits is paid ahead of profit

calculation and dividend payment). The entities that allocate equity into projects receive returns in the form of dividends (in case of sufficient and positive value cash flows) as well as in the form of eventual growth in the price of their shares on the stock market, which depends on the business cycle.

WACC depends on the debt/equity ratio in the overall project investment portfolio. Debt/equity ratios of 50/50; 60/40; 70/30 and 80/20 are thus reviewed for the sample EUR 10 million environmental projects.

WACC is determined by applying the approach that the cost of capital for one entity is the average weighted value of the equity costs and the debt financing costs. This is illustrated by the following formula:

$$WACC = \frac{E}{(D+E)} * \mathrm{Re} + \frac{D}{(D+E)} * Rd * (1 - Tc) \quad (5)$$

where:

D is the amount of debt financing;

E – the amount of equity financing;

Re – the amount of aimed return on equity;

Rd – the cost of debt;

Tc – the corporate tax rate.

The return that the equity owners aim at $\boldsymbol{R_e}$, can be determined by applying the ***Capital Asset Pricing Model – CAPM***. CAPM is a standard theoretical framework for evaluating the target return on equity. According to this model $\boldsymbol{R_e}$ is calculated based on the following formula:

$$\boldsymbol{R_e} = Rf + \beta i * (market\ risk\ premium) \quad (6)$$

where:

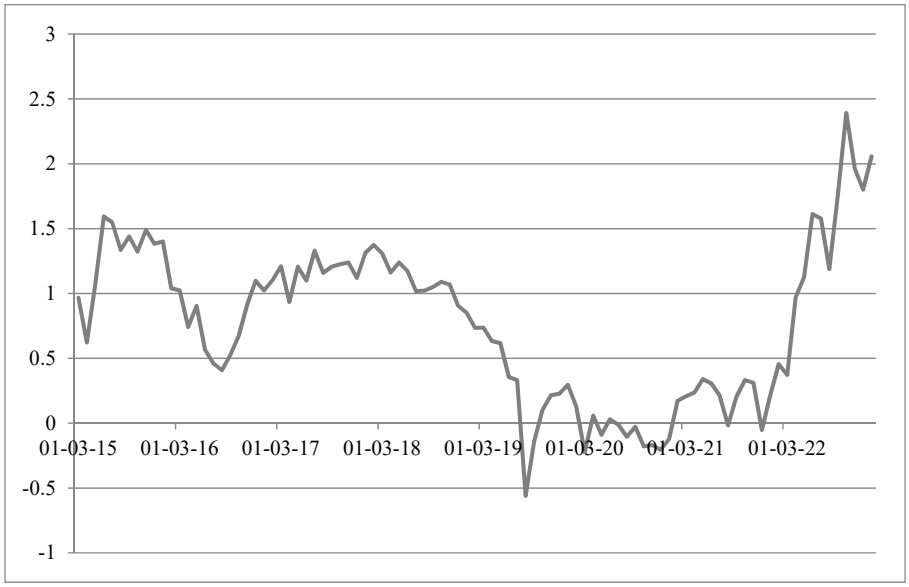
Rf is the return on investment in risk-free instruments;

βi – the so-called beta coefficient which measures the market volatility.

The **market risk premium** is calculated as a sum of the risk premium for the state (the so-called asymmetric state-related risk); the business risk premium; and the project asymmetric risk premium.

*Return on investment in risk-free instruments (*Rf). The regulatory and competition protection authorities usually consider state bonds as the most appropriate equivalent to risk-free instruments. For European projects, the yield on 30-year German state bonds denominated in EUR can be presumed as the rate of return of risk-free instruments. The fact that the reference period for large infrastructure projects is usually 20-30 years is another argument to support the selection of this financial instrument. The dynamics of return on investment in these bonds is presented in Figure 1.

Figure 1. Dynamics of yield on 30-year German state bonds in the period 2015-2023, %



Source: Bloomberg.

The dynamics of the yield on 30-year German state bonds in the period 2015-2023 indicates a series of significant fluctuations starting from 1.594% in July 2015 and plunging to negative values in the second half of 2019 and particularly in 2020 due to the Covid-19 pandemic. However, the market stabilized in 2021 and started to grow rapidly again in 2022. As far as expectations show that the market will continue to be stable, the average yield rate for 2022 of 1,285% could be used as an assumption for the *return gained from investment in risk-free instruments*.

The risk premium for the state (asymmetric state-related risk). In practice, the investors always claim additional returns related to the country where the project will be implemented. The usual measure of this risk is the difference between the yield of similar instruments in the relevant country and a selected low-risk country.

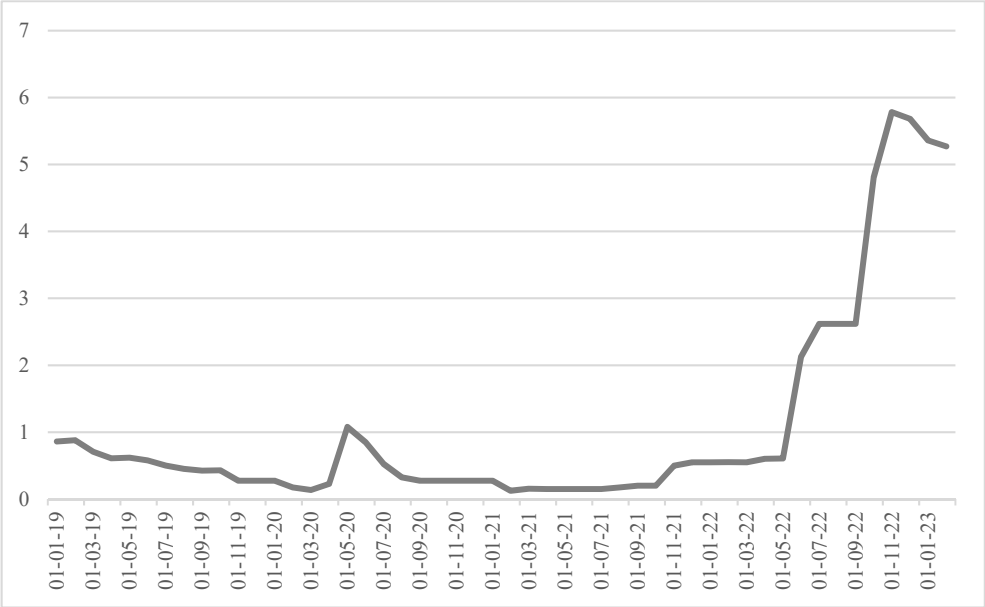
This poses several methodological issues related to the calculation of the asymmetric state-related risk for Bulgaria:

- The Bulgarian Government does not issue 30-year state bonds, so there is no instrument with a similar maturity to use for the gap calculation.
- The 20-year state bonds are the instrument with the longest maturity in Bulgaria, however, they are not frequently issued by the Government. For example, the most recent issue of such bonds was in 2019, while for instruments with shorter maturity several auctions per year are being performed. In the period 2019-2022, the 20-year bonds form 6.62% of the

overall state debt assumed through state bonds. Therefore, the 20-year state bonds are not frequently traded and no detailed yield statistics is available.

- For the purposes of the present study, the yield of the 10-year state bonds should be used in order to calculate the asymmetric state-related risk. These are the bonds with the next longest maturity period. The Ministry of Finance's auction data indicates that these bonds are issued several times a year and in the period 2019-2022, these bonds formed 30,3% of the overall state debt assumed through state bonds. These bonds are frequently traded and detailed statistics on their yield are available.

Figure 2. Dynamics of yield on 10-year Bulgarian state bonds in the period 2019-2023, %

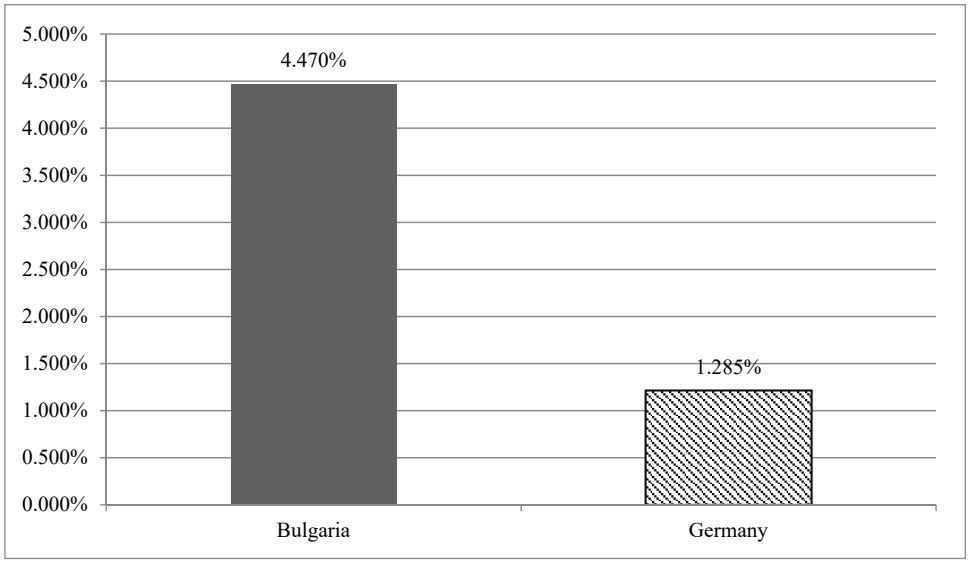


Source: World Government Bonds.

While from the beginning of 2019 until mid-2022 the dynamics of yield on 10-year Bulgarian state bonds remained relatively low at stable levels below 1%, after May 2022, it started to grow rapidly and at the beginning of 2023, it reached almost 6%. These fluctuations make it questionable which average value to assume as a 10-year state bond yield. The average yield for the entire 2022 is 2.42%, while the average yield for the second half of 2022 has grown almost twice to 4.02%. The short-term forecasts indicate a 4.47% yield by March 2024 which is even higher than the historical averages and this value will be assumed in the calculation of the asymmetric state-related risk.

Figure 3 presents the comparison of average yields of 30-year German state bonds and 10-year Bulgarian state bonds.

Figure 3. Yield on 30-year German state bonds and 10-year in Bulgarian state bonds, %



Source: Bloomberg, World Government Bonds.

Understandably, the yield of 10-year state bonds in Bulgaria is higher than the low-risk 30-year German state bonds. The 3.185% difference will be further on considered as a *risk premium for the state* (in the case of Bulgaria).

Business risk premium. This premium is the additional return over the yield from risk-free instruments, which the investors seek in order to invest in a certain sector, and is also called equity risk premium (*ERP). The* Bulgarian capital market is not well developed and liquid and so no official statistics about the yield on the corporate stock in general as well as by specific sectors is available. Therefore, assumptions for the value of ERP should be made based on foreign publications. According to a study by the Norwegian Bank for Investment Management (Norges Bank Investment Management. 2016), the average ERP for Europe is 5.8%. According to a study by professor Damodaran (Damodaran. A. 2022), ERP for Bulgaria in 2022 is 4.86%. The ERP values in both publications are determined based on historic data as ERP=4.86% will be applied for the purposes of the present study as far as it directly refers to the case of Bulgaria.

Project asymmetric risk premium. This is the risk related to the implementation of large investment projects with construction works. The risk usually materializes in public procurement problems leading to an extension of the construction period (as compared to the forecasted period of construction), excessive costs, problems with the quality of performance, etc. The integration of the project investment component in the so-called EPC contract (Engineering, procurement and construction) with a fixed price and turnkey build clauses significantly reduces the possibility for the materialization of these risks. The usual premium for asymmetric risk for environmental infrastructure projects is about 0.5-1%, which will be applied in the present sample project.

β coefficient. It measures market volatility or in other words, this is the systematic risk of a security or portfolio compared to the market as a whole. Investments/portfolios with β coefficient exceeding 1 are considered as more volatile. As pointed out above, the Bulgarian stock market is not well developed so no data and publications for overall or sector-specific β coefficient are available. Again, assumptions based on external publications should be made with the clear awareness that these assumptions are conditional and may be inaccurate. Publications for the β coefficient in different are available: 0.87 is the average coefficient calculated based on a study of European energy companies (Economic analysis for the Paks II nuclear power project); 0.74 is the average coefficient applied in a study for calculation of WACC for Dutch water companies (Harris, Figurelli, Guatri, Nezzo, 2021). As the present approach will be based on the environmental project including the water sector, the authors have considered the β coefficient for the Dutch water companies as more appropriate for the purpose.

Based on the assumptions for the four parameters of $\mathbf{R_e}$, the coefficient is calculated at 1.285+0.74*(3.185+4.86%+1%) = 7.978%.

The cost of debt (***Rd***) is determined by calculating the internal rate of return (IRR) of the debt financial flow for the particular sample project. This flow includes all debt parameters: initial fee; funds utilized every year; commitment fees for the amounts that have not been utilized; principal repayments and interest repayments. The credit assumptions are based on typical credits for implementation of similar projects: 20-year credit including 3 years for credit utilization and 17 years of credit repayment; 3% interest rate on an annual basis and credit-related fees.

The annual amounts of credit instalments, principal and interest repayments are calculated and allocated in the relevant year of the credit reference period. These form the credit net cash flow. Based on this flow the IRR (***Rd***) is calculated.

As pointed out above, different debt/equity ratios are possible for the implementation of the sample environmental project which is why 50/50; 60/40; 70/30 and 80/20 ratios are analyzed as WACC is calculated for each of them. The results are presented in Table 2.

Table 2. Calculation of WACC for a sample environmental project with different debt/equity ratios

	Debt/Equity ratio			
	50/50	60/40	70/30	80/20
Project investment (Euro)	10 000 000	10 000 000	10 000 000	10 000 000
Debt (Euro)	5 000 000	6 000 000	7 000 000	8 000 000
Equity (Euro)	5 000 000	4 000 000	3 000 000	2 000 000
Return on equity (Re) (%)	7.978	7.978	7.978	7.978
Return from investment in risk-free instruments (%)	1.285	1.285	1.285	1.285
Risk premium for the state (%)	3.185	3.185	3.185	3.185
Business risk premium (%)	4.86	4.86	4.86	4.86
Project asymmetric risk premium (%)	1	1	1	1
Beta coefficient	0.74	0.74	0.74	0.74
Rd (%)	4.06	4.06	4.06	4.06
Tc (%)	10	10	10	10
WACC (%)	5.82	5.38	4.95	4.52

Source: own calculations.

Conclusions

- WACC values vary depending on the debt/equity assumptions for the certain project and the sector in which it will be implemented as far as the $\mathbf{R_e}$ coefficient depends highly on sector specifics.
- WACC values are higher in scenarios with higher equity shares due to the higher return on equity sought by the investors. Respectively, WACC values are lower in scenarios with higher debt shares because using debt is usually cheaper compared to using equity.
- Despite the variations in the calculated WACC values for the different scenarios, they are around the 4-5% range of reference financial discount rate recommended by the Guide for cost-benefit analysis of investment projects for the 2007-2013 and 2014-2020 programming periods. These closer results are highly supportive of the selected methodology for the calculation of the discount rate although many of the assumptions made were highly conditional and uncertain.
- It is fully acknowledged that the discount rate is not the only variable that highly influences the financial analysis and assessment of investment projects. The time component in terms of the project reference period (number of years) also influences the project's net present value and rate of return. However, large investment projects have usually longer periods of construction and operation, and the time component is more or less fixed. Therefore if any of the WACC values calculated in the 4.52-5.82% range has been selected as a reference financial discount rate for the 2014-2020 programming period, this would mean that:
  - the analyzed projects will have smaller net present values, i.e. more projects will be unattractive for private investors and thence eligible for grant financing;
  - the internal rate of return of more projects will be below the reference level, i.e. they will be eligible for grant financing;
  - higher reference discount rate, if other things are equal, leads to higher financial gap values and respectively greater amounts of grant funding and less beneficiary co-financing.

For three consequent programming periods, the European Commission has been proposing lower and lower reference values for the financial discount rate. This is in line with the overall policy for reducing grant financing and increasing the share of financial instruments as funding sources because of their positive impact on the beneficiaries' financial discipline and on public spending in the context of constantly emerging needs for the reallocation of budget resources. On the threshold of the 2021-2027 programming period, the European Commission adopted a rather flexible approach to shift to the member-state national authorities the choice of project assessment methodology and the related issues like discount rate, etc. Therefore, the choice of assessment methodology should be done with great care and attention because it can support the implementation of policies favouring higher levels of grant or debt financing of public infrastructure projects, in other words, the discount rate can be used as an instrument to gear public policies. However, is this appropriate for Bulgaria? The implemented approach showed that due to the lack of official statistics and

studies, a lot of assumptions based on external sources need to be made, thus questioning the credibility of the results. Therefore, it is advisable for the Bulgarian authorities to continue applying the reference discount rate from the 2014-2020 period at least for the 2021-2027 programming period.

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