



# “Evaluating performance of public sector projects in Russia: The choice of a social discount rate”

Tatiana Kossova<sup>a</sup>, Maria Sheluntcova<sup>b,\*</sup>

<sup>a</sup> Department of Applied Economics, National Research University Higher School of Economics, Russian Federation

<sup>b</sup> Department of Economics and Finance, National Research University Higher School of Economics, Russian Federation

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## Abstract

Public sector project management in Russia is inefficiently carried out. One reason for this is an absence of generally accepted procedures for evaluating the performance of projects. In the framework of evaluating performance, there is the issue of evaluating the rate for discounting the anticipated benefits and costs of public projects to the present moment. This paper contains a methodology for estimating the social discount rate for cost–benefit analysis in various economic industries in Russia. We apply two approaches – social rate of time preferences and social opportunity cost of capital – and propose a methodology for projects related to any industry. We present examples of estimating the social discount rate for healthcare, education, social services, and infrastructure projects. Our results are useful when both the government and private firms are able to solve the same social problems. The findings are applicable for any country with unequal development of various economic industries. © 2015 Elsevier Ltd. APM and IPMA. All rights reserved.

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## 1. Introduction

Public sector project management inefficiency is a serious problem for many countries, in particular for post-communist states and developing economies. In those countries, direct government investments and various types of government support for private investments form an essential part of national development programs. Project management in the public sector of economics has the long history of developing and improving methods that enable decision-makers to allocate budget resources in the most effective way possible. New public management (NPM) and public value management (PVM) have followed traditional public management. Approaches to public management have changed from the single performance objective of managing inputs and outputs to multiple objectives such as “service outputs, satisfac-

tion, outcomes, maintaining trust and legitimacy” (Smith, 2004, p. 77). Effective project management in the public sector should improve “the ability to achieve outcomes while providing traceability, transparency, and accountability” (Crawford and Helm, 2009, p. 73). The importance of project management is explained by the need for a guarantee of receiving value from budget expenditures.

Public sector project management differs from its private sector counterpart and hence faces additional challenges. The point to be considered in detail is the issue of providing transparency as one of the key elements of project governance. Government agencies are forced to demonstrate “accountability and transparency while effectively implementing policy and adapting to change” (Crawford and Helm, 2009, p. 73). “Public administration institutions are under pressure by stakeholders for performance and transparency” to make viable investment decisions (Pilkaitė and Chmieliauskas, 2015). For those countries where practices of project management in the public sector are still undergoing a process of formation, more transparency is required in the form

\* Corresponding author. Tel.: +7 916 7948630.

E-mail address: [sheluntcova@gmail.com](mailto:sheluntcova@gmail.com) (M. Sheluntcova).

of clarifying project evaluation procedures and providing clear information to the public.

Plenty of studies are devoted to various aspects of public project management, such as the strengths and weaknesses of the project management process and the governance of public investments. Authors argue that principles of project management, such as transparency, performance management, and efficiency should be broadly introduced at both the state and the local administrative levels (Vrečko, Žnidaršič and Kovač, 2015). Various authors have examined the adoption of project management practices in public organizations (Fitsilis and Chalatsis, 2014), the efficacy of performance management (Poister, Pasha and Edwards, 2013), and the impact of performance management on project success (De Carvalho, Patah and De Souza Bido, 2015). Cross-country and cross-industry comparisons of Argentina, Brazil and Chile enable authors to identify areas that play a key role in project performance. Despite the fact that the authors base their conclusions on the analysis of business units from the abovementioned countries, there is no doubt that the factors they identified are also important for public sector projects. These factors include project complexity, which interferes with project success, and industrial sector, as project risk varies across industries. One more factor that significantly influences project performance is national environment (De Carvalho, Patah and De Souza Bido, 2015).

It is worth noting that public sector project management is becoming more and more popular in developing countries like Pakistan (Kundi and Unab, 2014), Jordan (Abbasi and Al-Mharmah, 2000), Ethiopia (Shiferaw, Klakegg and Haavaldsen, 2012), and Ghana (Ofori, 2014). It is also noteworthy that the public management efficiency problem is of high interest for post-communist countries like Romania (Istrate, Marian and Ferencz, 2014), Latvia (Pūlmanis, 2013), and Kazakhstan (Amagoh, 2011; Monobayeva and Howard, 2015).

The crucial stage of the project management process is performance evaluation, as only viable social projects should be considered for implementation. The evaluation process should “run through the life cycle of a project rather than as a hurdle that needs to be cleared to ensure financial approval” (Irani, 2010). It is important that “governments should have formal and well publicized guidance on the technical aspects of project appraisal” (Dabla-Norris et al., 2012). However, methods and techniques to be applied in the public sector still require further development. Methods of evaluating the performance of private investments cannot be used in the public sector because public sector projects create social benefits that are not traded on the market. Examples of such benefits might include reducing morbidity and mortality from various causes, improving the quality of the environment and others. This problem is solved with the help of cost–benefit analysis, which enables decision-makers to estimate the present value of public sector projects in monetary units.

Implementation of cost–benefit analysis involves the important step of choosing a social discount rate (SDR). The social discount rate makes possible the comparison of social benefits and costs that might arise at different time points as a result of the realization of public projects. The value of this rate has a significant impact on the present value of a project. An

overestimated rate might lead to the rejection of a worthwhile project or shift preferences toward quick-impact projects. Conversely, an underestimated rate might cause acceptance of long-term projects with distant benefits to society or to substitution of private investments by government projects. It is important to note that the market rate is not appropriate for discounting the benefits and costs of public projects. Generally, public projects are carried out in sectors where market failures exist or there is no market for social benefits at all. In addition, social benefits and costs should be evaluated from the perspective of society as a whole and not that of an individual investor. Originally, social discount rate was considered as a parameter that indicated the preferences of society “for present versus future consumption, because investment is simply a means of using resources that could be consumed now in order to increase consumption later” (Schad and John, 2012, p. 129). Researchers and practitioners currently use positive rate for discounting future social effects arising from project implementation, as what is shown by Zhuang et al. (2007). However, the methodology for selecting a particular value of this rate remains nontransparent to many project initiators. Thus, valid arguments are required for the correct choice of SDR.

Empirical papers attempt to provide values of SDR for such countries as the USA (Azar, 2007, 2009; Moore, Boardman and Vining, 2013), Germany (Schad and John, 2012), Italy (Percoco, 2008), Canada (Boardman, Moore and Vining, 2010), India (Kula, 2004), and Latin American countries (Lopez, 2008). Along with various empirical estimates, these papers present comparisons of social discount rates recommended by government authorities in different countries. For instance, a recent paper by Spackman (2013) systematizes federal government discount rates in ten OECD countries. Nonetheless, there is no single view on the choice of an approach to social discount rate evaluation. In addition, only a few studies consider determining the social discount rate in the context of a particular industry in which the government invests money. For instance, Paulden and Claxton (2012, p. 612) determine a social discount rate for health and argue that this rate depends on “growth in the cost-effectiveness threshold and the rate at which the higher authority can save or borrow between periods”. Government authorities in certain countries provide values for projects devoted to different industries. For example, the *Treasury Guidance in New Zealand (2015)* dictates using 5% p.a. for office and accommodation buildings, 7% p.a. for infrastructure, and 9% p.a. for telecommunications, IT, and the knowledge economy. Central guidance in Spain provides values of 6% for transport, 5% for environment, and 4% for water (Spackman, 2013). However, these guidelines do not describe the methodology that makes it possible to calculate the social discount rate for projects devoted to another industry or for another country.

The problem of imbalances in the development of various economic industries is present in many countries, including Russia. Thus, this paper aims to provide a methodology of estimating social discount rates for government projects related to different industries. Our findings can lead to improvements in the performance evaluation of public sector investments through the correct choice of a social discount rate. These

results might be useful for decision-makers in various countries.

## 2. The place of a social discount rate in public sector project management in Russia and other post-Soviet countries

Initiators of new projects and programs face the problem of selecting a social discount rate when investments are financed by the state or when other forms of government support are expected. In Russia, the government is the main investor in such sectors as education, healthcare, water supply, infrastructure, transport, and the electric power industry. This is explained by the high importance of infrastructure facilities for the economy. In addition, private investors are often not willing to take the risk of long-term investment in large-scale projects when the expected return on these investments might not be sufficient.

Investment in the public sector cannot be considered in isolation from the general economic situation in a country. Among the most important indicators characterizing the economy are gross domestic product and changes in gross investments (Fig. 1). The dynamics of these indicators in Russia for the period from 2000 to 2014 are given below. The source of the data is the [Federal State Statistics Service of Russia \(2015\)](#). The figures are in 2000 prices.

From 2000 to 2014, there was a general trend of growth of the indicators under consideration. However, the recent financial crisis of 2008 led to a noticeable decrease in both gross domestic product and gross investments in 2009. The latest data also demonstrate a worsening of the general economic situation in the country. This fact makes solving social problems in Russia more difficult.

An analysis of the federal budget for recent years shows that government expenditures in Russia has increased with a growth in the number of commitments being made by the government. At the same time, the amount of resources directed toward social policy on a national level has gradually reduced. The reduction of government expenditures on social policy indicates that the government must now fulfill its obligations to society by using fewer funds. This suggests a need for establishing priorities for social policy and, consequently, the need for a clear methodology for assessing the effectiveness of various initiatives. This could be a great challenge for public sector management.

It is also important to determine the character of the financing of government programs aimed to solve social problems and

improve the quality of life in the country. The data is provided on the website of the [Ministry of Finance of the Russian Federation \(2015\)](#) from 2009 to 2014. All figures are in 2009 prices, calculated with a GDP deflator.

Fig. 2 illustrates recent changes in total expenditures on federal programs approved by the government at the national level. The downward trend emphasizes the importance of effective allocation of limited budgetary resources. Fewer resources for the implementation of federal programs lead to a need for more rigorous project selection. The consequences of inefficient investment decisions are worse when budget constraints are stricter. This causes a necessity for more effective methods of evaluating the performance of public investments.

In order to increase the effectiveness of decision-making, governments can apply the best practices of project management and adopt methods from the private sector. One of the most promising forms of cooperation is public–private partnership—when a private firm solves problems of the public sector, such as building and maintaining infrastructure facilities and providing public services. In Russia, great attention is paid to this kind of investment. Attracting non-budgetary investments helps the government finance infrastructure projects and save budget resources in the short-term. This makes budget constraints less strict.

Competent government authorities are able to select projects for budget funding and further implementation as well as for provision of other forms of government support, including public–private partnership. Nevertheless, it remains essentially important to develop procedures to ensure the objectivity and effectiveness of decision-making. At the sub-national level, regional authorities in Russia implement various investment projects, which vary, based on the needs of a particular region and the amount of available funds. At present, the process of performance evaluation is very subjective. It can vary from one region to another. Subjectivity arises from the fact that there is no unified methodology of performance evaluation. Moreover, the methods and techniques being applied are not open to the public. Only data on expenditures on project implementation and output indicators for these projects are openly available. It is not clear how government agencies estimate the social effects and externalities of initiatives or how they compare budget costs with the anticipated social benefits. Thus, the principle of transparency is being violated.

Reducing subjectivity and increasing transparency will become possible when procedures of project selection are formalized. This

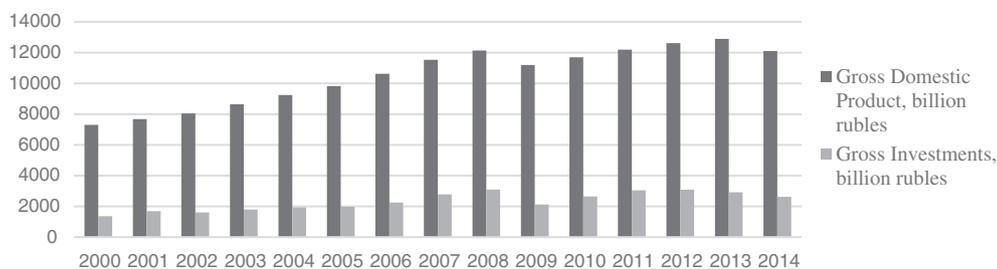


Fig. 1. The dynamics of gross domestic product and gross investments.

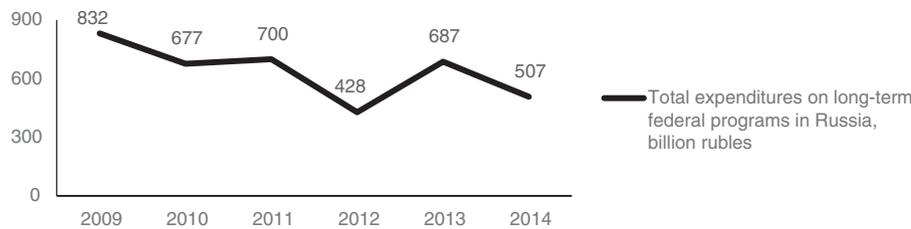


Fig. 2. The dynamics of government expenditures on long-term programs.

process is based on the analysis of the specific set of indicators characterizing project performance from the perspective of the selection criteria. In this case, the presence of a large number of investment projects proposed for implementation is required as well as a formalized preliminary evaluation of these projects with a cost–benefit analysis.

We note that cost–benefit analysis is applicable for assessment not only of public sector projects, but also of private projects. This is possible when the implementation of a private project produces externalities in addition to achieving the main commercial goal. For instance, installation of new equipment at a plant might reduce emissions of harmful substances into the environment. This social effect should be taken into account in project evaluation with the help of the methodology of cost–benefit analysis.

Practical application of cost–benefit analysis is complicated by the need to choose a rate for discounting the anticipated costs and benefits of public projects, which is known as the SDR. It should be noted that the initiator of the project faces the need to choose the discount rate at the initial stages of the project cycle. While methods of estimating market discount rates are well known, the method of selecting an SDR is not so obvious. There is an absence of clear estimation methods available to project initiators in Russia. Furthermore, there are no recommended values for SDR given by special authorities. Most probably, agencies do not discount the future benefits and costs of public projects at all. This might cause poor performance of public sector project management because of non-optimal project selection.

Similar problems exist in other post-Soviet countries. In order to demonstrate the importance of social discount rate estimation for post-Soviet states, we consider experience of Belarus and Kazakhstan. These countries are active reformers of public sector project management. In the framework of project management, we focus on performance evaluation. In Kazakhstan, government ministries provide target indicators and budget expenses for each government program or investment project. It is worth noting that the [Ministry of National Economy of the Republic of Kazakhstan \(2015\)](#) publishes on its website the methodology of economic expertise of investment projects financed by the budget. According to this methodology, it is necessary to conduct not only economic assessment of a project, but also social evaluation. In other words, decision-makers should examine the impact of public sector projects on society. Nevertheless, methods of quantitative estimation are not described in Kazakhstan.

To illustrate the implementation of public sector projects in Belarus, we consider official information given on the websites of government ministries. Budget investments are carried out in various industries. For instance, the [Ministry of Transport and Communications in Belarus \(2015\)](#) provides information about the construction of an aircraft repair plant on the territory of the national airport “Minsk.” This project is financed by the budget. It is stated that a discount rate of 21.5% is used to estimate the net present value of this project. However, no explanation is provided as to how this value is derived. Other ministries simply provide a list of investment projects being carried out at the present moment and related expenditures.

Examples of other post-Soviet countries show that more transparency should be introduced into the process of performance evaluation in the public sector. Despite the fact that the procedures of project management are described on the government web sources, specific methodologies are not provided to the public. Availability of clear methods for estimating social discount rates could help improve the quality of selecting projects for budget financing or providing other forms of government support. We argue that it is necessary to publish recommended values for social discount rate in the official state methodologies in Russia as well as in other post-Soviet states. Publication of rates would help increase the efficiency of decision-making at both the federal and the regional levels.

### 3. Review of studies on social discount rate estimation

There are two main approaches to social discount rate evaluation: social rate of time preferences (SRTP) proposed by [Ramsey \(1928\)](#), and the social opportunity cost of capital (SOC) introduced by [Baumol \(1968\)](#) and [Sandmo and Dreze \(1971\)](#). The large body of theoretical and empirical literature gives definitions and necessary explanations concerning the methodology of estimating these rates. The concept of SRTP (or CRI—consumption rate of interest) is based on maximizing society’s utility from consumption. This is the marginal rate of substitution of consumption, or “the rate of fall in the social value of consumption by the public, as opposed to public sector income” ([Pearce and Ulph, 1995](#), p. 2). SOC is identified as the real rate of return in the private sector on a marginal project with similar risk ([Lopez, 2008](#); [Pearce and Ulph, 1995](#)). While estimating the rate of return, all the social benefits and costs of a particular project should be considered. Investing in a public project “means that the resources devoted to the project will be unavailable for private investment” ([Lopez, 2008](#), p. 2), and the project is worth implementing if it creates social benefits larger

than “the loss resulting from the removal of resources from the private sector” (Lopez, 2008, p. 2). The core issue with the SOC approach is to determine the formula for evaluation, as there is no consensus on this point among economists.

Social rate of time preferences enables one to estimate the present value of future consumption in accordance with its desirability for society (Lopez, 2008). The method for evaluating SRTP is based on the Ramsey formula (Ramsey, 1928). SRTP equals “the representative individual’s time preference plus the product of the absolute value of the elasticity of marginal utility of consumption and the growth rate of consumption” (Schad and John, 2012, p. 128). Recent empirical papers suggest using the following formula, which is equivalent to the initial form (Evans and Kula, 2011):

$$\text{SRTP} = (1 + g)^{\mu} * (1 + \rho) - 1 \quad (1)$$

$\rho$  is the rate of time preferences. It reflects society’s impatience for utility from consumption. Recent estimates are around 1%–2%, which are 1.5% for the UK (Treasury Guidance, 2011), 1% for Cyprus (Evans and Kula, 2011), and 1% for the US (Moore, Boardman and Vining, 2013).  $g$  is the rate of growth of per capita consumption. The base value of “ $g$ ” is around 2% per year (Baum, 2009), or even lower (Moore, Boardman and Vining, 2013).  $\mu$  is the parameter of the social utility function. It is common to use this function with constant elasticity of substitution. The details are laid out in a large number of studies, including the papers of Pearce and Ulph (1995), Boadway (2000), and others. Most estimates of the parameter “ $\mu$ ” for developed countries are near unity. The issue of how to estimate this parameter is controversial. Methods for estimating “ $\mu$ ” include the personal taxation model, consumption for food model, and the savings behavior model. They are completely described in the recent papers of Lopez (2008), Percoco (2008), Evans and Kula (2011), and Moore, Boardman and Vining (2013).

“The SOC argument is that government should discount at the rate of return obtained on private sector” for similar investment (Spackman, 2013, p. 201). According to Liu (2003), implementation of the SOC faces the problem of no general formula for evaluating this rate. In the case of using “the social opportunity cost of borrowed funds, the SOC rate will be unique and common to all projects” (Burgess, 2013, p. 17). This means that benefits and costs of all public sector projects are discounted “at the rate of return foregone in the private sector when the government borrows to finance the project” (Burgess, 2013, p. 9). However, current practice in countries such as Russia shows that government borrowing rarely finances public sector projects.

Another approach to evaluating social discount rates comes from the inequality of SRTP and SOC. This is the shadow price of capital (SPC) approach, which requires converting all investment flows into consumption equivalents, and then discounting both consumption and investment flows at the SRTP rate. A shadow price of capital is “the value of forgone investment in terms of the equivalent amount of consumption” (Moore et al., 2003, p. 5). SPC is equal to the present value of effects produced by initial

investment of one monetary unit (Lyon, 1990; Moore et al., 2013; Zhuang et al., 2007):

$$\text{SPC} = \frac{i - si}{\text{SRTP} + f - si} \quad (2)$$

where

- $i$  the rate of return on private capital;
- $f$  the fraction of annual depreciation in the capital stock;
- $s$  the fraction of the return that is reinvested. Consequently,  $(1 - s)$  is the fraction of return that is consumed;
- SRTP the social rate of time preferences.

Another way to estimate the shadow price of capital is described in the paper of Pearce and Ulph (1995). In the case of infinite streams of return on a project, SPC equals the ratio of SOC to SRTP. SPC is the social value of investment relative to consumption, and the formula for calculating a social opportunity cost of capital is the following:

$$\text{SOC} = \text{SPC} * \text{SRTP} = \frac{i - si}{\text{SRTP} + f - si} * \text{SRTP} \quad (3)$$

Recent papers give estimates of SPC that are 1.26 for Canada (Boardman, Moore and Vining, 2010), and 2.2 for the US (Moore, Boardman and Vining, 2013). We note here that SPC should be equal to unity or higher than unity. Otherwise, an investment unit is converted into a consumption equivalent, which is less than unity, and this seems to be an inappropriate investment. However, formula (2) might lead to a value of SPC below unity (Small, 1998), and, consequently, to a value of SOC lower than SRTP. One possible explanation is the absence of competition for resources between public projects and private initiatives. In this case, we propose to use SRTP in estimations, as there are no competing projects in the private sector due to a lower rate of return on investment. Conversely, the presence of competition between public and private projects requires estimating the SOC in such a way that prevents the rejection of private initiatives due to low rate of return.

Indicators for a particular industry instead of values for the whole country enable one to calculate the social opportunity cost of capital for projects devoted to different industries. In addition, it might be reasonable to estimate a social discount rate for sub-industries in order to evade undue aggregation, as industries comprise various activities including unprofitable ones as well as commercial services. For instance, hospital activities provide a substantially lower return on investment in comparison with dental practice. However, both activities are included in healthcare, and using the same social discount rate in calculations might lead to wrong investment decisions. Overall, careful consideration of each particular project is necessary.

#### 4. Estimating social discount rate for projects belonging to various industries in Russia

In this section, we estimate social discount rate for public sector projects belonging to several different industries. We start

by estimating the social discount rate for the whole country with the SRTP approach. The necessary statistics from 2000 to 2012 are accessible on the web sites of the Federal State Statistics Service of Russia and the [Central Bank of Russia \(2015\)](#). We apply formula (1) and find that the rate of time preference ( $\rho$ ) equals 1.48%, the parameter ( $\mu$ ) of utility function equals 0.2, and the rate of growth of per capita consumption ( $g$ ) equals 9%. The elasticity of marginal utility of consumption ( $\mu$ ) is estimated by the savings behavior approach introduced by [Stern \(1977\)](#). All statistical indicators are calculated as averages for the given period. Complete information on estimating the SRTP for Russia is given in the paper of [Kossova and Sheluntcova \(2014\)](#).

The final value of the SRTP is 3.2% p.a. in real terms for Russia. It is close to 3.5% for Canada ([Boardman, Moore and Vining, 2010](#)), 3.5% for the UK ([Treasury Guidance, 2011](#)), 3% for Germany ([Schad and John, 2012](#)), and 3.5% for the US ([Moore, Boardman and Vining, 2013](#)). However, it is substantially lower than the 7% recommended for Slovenia, 10% for Serbia ([Ministry of Infrastructure, 2010](#)), and 5.06% estimated for Turkey ([Halicioglu and Karatas, 2011](#)). Still, there is a tendency to decrease values of SRTP and SOC in many countries. For instance, social discount rates have been lowered by governments in the UK (from 6% to 3.5%), France (from 8% to 4%), and Germany (from 4% to 3%) over the last 10 years ([Moore, Boardman and Vining, 2013](#)).

Next, we estimate the SOC for Russia using formula (3). This requires statistics on the return on capital, the depreciation rate, and the reinvestment rate by different industries. These indicators are available on the web site of [First Independent Rating Agency "Fira" \(2015\)](#) by subscription. Similar to SRTP, all parameters included in SOC are calculated as averages for the given period. [Table 1](#) presents values for all parameters and results for a social discount rate.

The results of our estimation provide two values of a social discount rate in real terms: 3.2% for SRTP and 3.9% for SOC. We note that these values are appropriate only for discounting social benefits and costs in the medium-term. For the long-term forecast of a social discount rate, longer time series data are required. Comparing the derived value of the SOC with recent values for other countries, we note that [Burgess and Zerbe \(2011\)](#) determine a range of 6%–8% for USA, and [Moore, Boardman and Vining \(2013\)](#) estimate the USA's SOC at 5%. However, the aforementioned papers use different methods to estimate SOC.

Taking into account the derived value of the SRTP, we can estimate social discount rates for several different industries in Russia. We consider the social sphere and infrastructure, namely, healthcare, education, social services, and roads construction. Traditionally, these industries have belonged to the public sector,

where the role of the state is crucial. In Russia, the share of budget investments in the total volume of investments in these sectors is higher than 50%. Data availability is another important criterion of choosing an industry for analysis.

Social policy in Russia covers all these fields and includes various projects such as disease prevention, retraining programs, improvement of a road network, and others. Often, projects implemented by the national government and sub-national authorities are part of large-scale government programs approved at the federal level. As for the aforementioned industries, some examples of federal programs are "Development of Education for the Period of 2013–2020," "Development of the Transport System of Russia for 2010–2020," and "Accessible Environment" for 2011–2015. An example of a subprogram is the "Development of Vocational Education," which is carried out under the auspices of the program for the development of education as a whole.

[Fig. 3](#) illustrates irreducible budget expenditures on the abovementioned programs for the coming years. The data is derived from the website of the Ministry of Finance, in current prices.

It is important that the expected results of all programs are expressed in terms of target values of different indicators. There is no openly available information about cost–benefit analysis or other methods for determining the viability of programs.

Regional projects are not limited to initiatives of the federal government. Sub-national authorities might carry out their own investments if they have sufficient funds. We note that formula (3) enables one to make calculations for any other industry. In addition to estimating the social discount rate for the aforementioned industries, we demonstrate calculations for sub-industries within some of them.

[Table 2](#) presents the estimation results. Just as when we estimated the SOC for the whole country, we consider the average values of all indicators included in the social discount rate. The names of sectors in Russian Classification of Objects of Administrative Division are as follows. Hospital activities are "general and specialized hospital activities," social services are "provision of social services," and roads construction is "construction of bridges, highways, tunnels and subways."

For industries that are mainly public, the social opportunity cost of capital is relatively low. Here, the number of projects implemented by private firms is small, and competition between the public and private sectors is very low. [Table 2](#) presents examples for hospital activities and vocational education. Examples of projects conducted in these industries of the Russian economy include improving the efficiency of health service delivery, applying innovative methods to medical treatment and diagnostics, and increasing the availability of vocational

Table 1  
Estimating a social opportunity cost of capital for Russia.

Rate of return on private capital ( $i$ )	Fraction of the return that is reinvested ( $s$ )	Fraction of an annual depreciation in the capital stock ( $f$ )	Social rate of time preferences (SRTP)	Social opportunity cost of capital (SOC)
0.098	0.072	0.05	3.2%	3.9%

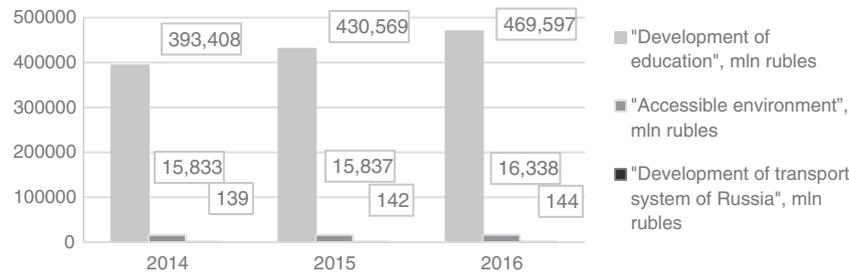


Fig. 3. Anticipated budget expenditures on several federal programs, million rubles.

education programs. For these sub-industries, the SRTP and SOC are close to each other. However, SOC rates for both education as a whole and health care are higher than for the selected sub-industries within them. This confirms the necessity of going into more detail and reflects the fact that each sector includes commercial activities that increase the average rate of return on capital for the industry.

Social services are one of the most important areas where correct estimation of social benefits and costs is necessary. These include, for instance, projects related to the growing problem of the aging of the population. The government implements initiatives that are devoted to improving the quality of life of the elderly. These might include visiting the elderly at home, day care for adults with disabilities, etc. Here, private agencies as well as state agencies might provide related services.

Overall, the rate of return on private capital has the most significant influence on the social opportunity cost of capital. For industries with a great number of private firms, a higher rate of return on capital leads to a relatively high value of SOC. Table 2 presents the example of roads construction. Constructing and improving the highway system is one of the government's priorities, as there are problems with traffic jams, access to remote and distant areas, and the quality of the road surface. In this industry, public and private organizations compete for resources, and hence, the SOC is the appropriate rate for evaluating performance.

One more point to be mentioned is the evaluation of projects aimed at creating social effects in several different industries. When it is difficult to separate the benefits and costs in accordance with the industry to which they belong, we assume that a social discount rate estimated for the whole country should be applied for discounting the costs and benefits of such a project.

## 5. Conclusion

One of the most controversial points in evaluating performance in the public sector is the choice of a social discount rate. It is important to provide more transparency to the methodology of estimating discount rates for cost–benefit analysis. In this paper, we address this issue by considering the choice of social discount rates for estimating public sector projects in different industries.

Currently, the most prominent discussion in the scholarly literature is related to the choice of an appropriate method for determining the social discount rate. For instance, Moore et al. (2013) recommend applying the SRTP approach. At the same time, Burgess and Zerbe (2011, p. 2) consider the SOC approach as “superior to other suggested approaches”, and Burgess (2013) continues to examine this preferred approach in the next paper. The analysis of existing approaches is very important not only from an academic point of view, but also from the perspective of practical application. Presently, there is growing interest in evaluating public investment projects among practitioners and decision-makers, especially in emerging economies. In our paper, we adapt approaches to social discount rate evaluation for practical application, taking into account the peculiarities of Russian statistics and the Russian economy. We base our research on the accomplishments of other authors (with necessary adjustments), namely, Evans and Kula (2011) and Schad and John (2012) for the SRTP approach, and Moore et al. (2013), Spackman (2013), and Burgess (2013) for the SOC approach. Implementation of the existing approaches requires selecting specific indicators of Russian statistics for estimating social discount rates as well as dealing with the lack of data and disparities in the development

Table 2  
Social discount rate for different industries in Russia.

	Rate of return on private capital ( $i$ )	Fraction of the return that is reinvested ( $s$ )	Fraction of an annual depreciation in the capital stock ( $f$ )	SRTP, %	SOC, %
Russia as a whole	0.098	0.072	0.05	3.2	3.9
1 Health care	0.104	0.129	0.049	3.2	4.3
1.1 Hospital activities	0.09	0.1	0.047	3.2	3.7
2 Education	0.13	0.207	0.057	3.2	5.4
2.1 Vocational education	0.094	0.205	0.055	3.2	3.5
3 Social services	0.099	0.183	0.048	3.2	4.2
4 Roads construction	0.16	0.105	0.09	3.2	4.4

of various industries. Recent debates over the social discount rate also concern the question of why different government agencies of the same country use different discount rates (Hansson et al., 2015). Hansson et al. raise this issue as a basis for determining the values of these rates and draw attention to a necessity for coordination between these agencies. Hence, there is a need for a unified methodology that could be applied by various agencies in relation to various industries.

We argue that both the social rate of time preferences and the social opportunity cost of capital should be estimated. We have found that the SRTP for Russia equals 3.2%, and the SOC equals 3.9% in real terms. Decision-makers should use the SOC in situations when a government initiative has competing projects in the private sector. These derived values for the social discount rate are a useful tool for social policy affecting different industries of the Russian economy. The values of the social discount rate for Russia are close to the values given in the official guidelines on cost–benefit analysis in European countries. The benchmark for the European Union is 3% for member states and 5% for major projects in cohesion countries for the period of 2014–2020 (Guide to Cost–Benefit Analysis of Investment Projects, 2014). The Green Book for the United Kingdom provides the value of 3.5% for the SRTP (Treasury Guidance, 2011). The Canadian Cost–Benefit Analysis Guide gives a value of 3% for the SRTP (Canadian Cost–Benefit Analysis Guide, 2007).

In our paper, we propose a procedure of a social discount rate evaluation that is useful for evaluating various government initiatives in many different industries. Our methodology of estimating social discount rates for different industries might be relevant for other countries with imbalances in economic development. Despite the fact that the results of our study are helpful mainly for the public sector, they are also useful for evaluating private projects that create benefits and costs not only for private firms but also for society at large. In particular, they are useful for projects being implemented as public–private partnerships. In order to estimate the net present value of such private projects correctly, a social discount rate should be applied to discounting social costs and benefits. Overall, our findings equip practitioners and decision-makers with a methodology for evaluating the performance of investment projects and social policy.

Some limitations of the study include the length of the period used for calculating the values of the necessary indicators. Calculations for Russia are limited to the year of 2000. Earlier data are either unavailable or cannot be used for the forecast due to strong fluctuations in the Russian economy in the 1990s. Thus, the social discount rate values we have derived are appropriate in the short and medium-terms. When new statistics appear, it will be reasonable to revise the value of the social discount rate. This will enable decision-makers to reconsider the evaluation of investment projects and, if necessary, make corrections. It is worth noting that in a recent paper for the United States, Cropper et al. (2014) also recommend revisiting the rate at regular intervals.

Future research might be devoted to estimating the social discount rate for projects related to different industries with

long-term planning horizon. The problem of determining the social discount rate in the long term is another point for debates among economists. This is largely presented in the paper of Hansen (2006), Evans (2008), Caney (2014), and others. Considering the case of Russia, we draw attention to the fact that long time series data is not available for emerging economies, as opposed to developed countries. The lack of statistical data causes difficulties in long-term forecasting, as we are less able to rely on a retrospective analysis.

### Conflict of interest

There is no conflict of interest.

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### References

- Abbasi, G.Y., Al-Mhamah, H.A., 2000. Project management practice by the public sector in a developing country. *Int. J. Proj. Manag.* 18, 105–109.
- Amagoh, F., 2011. New public management and health reform in Kazakhstan. *Int. J. Public Adm.* 34 (9), 567–578.
- Azar, S.A., 2007. Measuring the US social discount rate. *Appl. Financ. Econ. Lett.* 3 (1), 63–66.
- Azar, S.A., 2009. A social discount rate for the US. *Int. Res. J. Financ. Econ.* 25, 203–208.
- Baum, S.D., 2009. Description, prescription and the choice of discount rates. *Ecol. Econ.* 69, 197–205.
- Baumol, W., 1968. On the social rate of discount. *Am. Econ. Rev.* 58, 788–802.
- Boadway, R., 2000. The Economic Evaluation of Projects. Queen's University, Kingston, Canada (Available at: [http://qed.econ.queensu.ca/pub/faculty/flatters/courses/rwb\\_ben-cost\\_rev.pdf](http://qed.econ.queensu.ca/pub/faculty/flatters/courses/rwb_ben-cost_rev.pdf) [Accessed on 25 July 2015]).
- Boardman, A.E., Moore, M.A., Vining, A.R., 2010. The social discount rate for Canada based on future growth in consumption. *Can. Public Policy* 36 (3), 325–343.
- Burgess, D.F., 2013. Reconciling alternative views about the appropriate social discount rate. *J. Public Econ.* 97, 9–17.
- Burgess, D.F., Zerbe, R.O., 2011. Appropriate discounting for benefit–cost analysis. *J. Benefit Cost Anal.* 2 (2) (20 pp).
- Canadian Cost-Benefit Analysis Guide, Regulatory Proposals, 2007. Treasury Board of Canada, Secretariat. (Available at: <http://www.tbs-sct.gc.ca/trap-parfa/analys/analys-eng.pdf> [Accessed on September 24, 2015]).
- Caney, S., 2014. Climate change, intergenerational equity and the social discount rate. *Polit. Philos. Econ.* 13 (4), 320–342.
- Central Bank of Russia, 2015. Interest Rates. [http://www.cbr.ru/statistics/default.aspx?Prtd=int\\_rat&ch=PAR\\_61839#CheckedItem](http://www.cbr.ru/statistics/default.aspx?Prtd=int_rat&ch=PAR_61839#CheckedItem) (Accessed on September 21, 2015).
- Crawford, L.H., Helm, J., 2009. Government and governance: the value of project management in the public sector. *Proj. Manag. J.* 40 (1), 73–87.
- Cropper, M.L., Freeman, M.C., Groom, B., Pizer, W.A., 2014. Declining discount rates. *Am. Econ. Rev. Pap. Proc.* 104 (5), 538–543.
- Dabla-Norris, E., Brumby, J., Kyobe, A., Mills, Z., Papageorgiou, C., 2012. Investing in public investment: an index of public investment efficiency. *J. Econ. Growth* 17, 235–266.
- De Carvalho, M.M., Patah, L.A., De Souza Bido, D., 2015. Project management and its effects on project success: cross-country and cross-industry comparisons. *Int. J. Proj. Manag.* 33 (7), 1509–1522 (2015).
- Evans, D., 2008. Social project appraisal and discounting for the very long term. *Econ. Iss.* 13 (1), 61–70.

- Evans, D.J., Kula, E., 2011. Social discount rates and welfare weights for public investment decisions under budgetary restrictions: the case of Cyprus. *Fisc. Stud.* 32 (1), 73–107.
- Federal State Statistics Service of Russia, 2015. [www.gks.ru](http://www.gks.ru) (Accessed on September 21, 2015).
- First Independent Rating Agency “Fira”, 2015. <http://www.pro.fira.ru> (Accessed June 20, 2015).
- Fitsilis, P., Chalatsis, T., 2014. Adoption of project management practices in public organizations. *iBusiness* 6, 131–142. <http://dx.doi.org/10.4236/ib.2014.63014>.
- Guide to Cost-Benefit Analysis of Investment Projects, 2015. Economic appraisal tool for cohesion policy 2014–2020/European Commission. Directorate-General for Regional and Urban Policy (Available at: [http://ec.europa.eu/regional\\_policy/sources/docgener/studies/pdf/cba\\_guide.pdf](http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/cba_guide.pdf) [Accessed on September 24, 2015]).
- Halicicoglu, F., Karatas, C., 2011. A social discount rate for Turkey. MPRA Paper 32925 (Available at: [http://mpira.ub.uni-muenchen.de/32925/1/MPRA\\_paper\\_32925.pdf](http://mpira.ub.uni-muenchen.de/32925/1/MPRA_paper_32925.pdf) [Accessed on 25 July 2015]).
- Hansen, A.C., 2006. Do declining discount rates lead to time inconsistent economic advice? *Ecol. Econ.* 60, 138–144.
- Hansson, S.O., Lilieqvist, K., Björnberg, K.E., Johansson, M.E., 2015. Time horizons and discount rates in Swedish environmental policy: who decides and on what grounds? *Futures* <http://dx.doi.org/10.1016/j.futures.2015.02.007>.
- Irani, Z., 2010. Investment evaluation within project management: an information systems perspective. *J. Oper. Res. Soc.* 61, 917–928.
- Istrate, L., Marian, L., Ferencz, I.S., 2014. The use of a project management application in managing investments in a public administration institution. *Proc. Econ. Financ.* 15, 1732–1739.
- Kossova, T., Sheluntcova, M., 2014. A social discount rate for appraisal of regional investments: evidence from Russia. *Int. J. Public Adm.* 37 (14), 1024–1029.
- Kula, E., 2004. Estimation of a social rate of interest for India. *J. Agric. Econ.* 55 (1), 91–99.
- Kundi, M.F.A., Unab, W., 2014. Review of project management (PM) practices in public infrastructure development organizations of Pakistan. *J. Strateg. Perform. Manag.* 2 (4), 144–158.
- Liu, L., 2003. A marginal cost of funds approach to multi-period public project evaluation: implications for the social discount rate. *J. Public Econ.* 87, 1707–1718.
- Lopez, H., 2008. The social discount rate: estimates for nine Latin American countries. The World Bank, Policy Research Working Paper 4639 (17 pp. Available at: <https://openknowledge.worldbank.org/bitstream/handle/10986/6659/wps4639.pdf?sequence=1> [Accessed on November 14, 2015]).
- Lyon, R.M., 1990. Federal discount rate policy, the shadow price of capital, and challenges for reforms. *J. Environ. Econ. Manag.* 18, 29–50.
- Ministry of Finance of the Russian Federation, 2015. Expenditures on Federal Programs. <http://info.minfin.ru/fcp.php> (Accessed on September 21, 2015).
- Ministry of Infrastructure, 2010. Manual Cost Benefit Analysis, Republic of Serbia. [http://www.putevi-srbije.rs/strategijapdf/Manual\\_Cost\\_Benefit\\_Analysis.pdf](http://www.putevi-srbije.rs/strategijapdf/Manual_Cost_Benefit_Analysis.pdf) (Accessed on 25 July 2015).
- Ministry of National Economy of the Republic of Kazakhstan, 2015. The Methodology of the Economic Expertise of Budget Investment Projects. <http://economy.gov.kz/economyabout/262/5742/> (Accessed on July 09, 2015).
- Ministry of Transport, Communications in Belarus, 2015. Construction of the Aircraft Plant on the Territory of the National Airport “Minsk”. [http://www.mintrans.gov.by/rus/invest\\_proekt/avia\\_remezavod/](http://www.mintrans.gov.by/rus/invest_proekt/avia_remezavod/) Accessed on July 09, 2015.
- Monobayeva, A., Howard, C., 2015. Are post-Soviet republics ready for the new public management? The case of educational modernization in Kazakhstan. *Int. J. Public Sect. Manag.* 28 (2), 150–164.
- Moore, M., Boardman, A., Vining, A., Weimer, D., Greenberg, D., 2003. Just give me a number! Practical values for the social discount rate. *J. Policy Anal. Manag.* 23 (4), 789–812.
- Moore, M., Boardman, A., Vining, A., 2013. More appropriate discounting: the rate of social time preference and the value of the social discount rate. *J. Benefit Cost Anal.* 4 (1), 1–16.
- Ofori, D., 2014. An exploratory study of project management competency in Ghana. *J. Afr. Bus.* 15 (3), 197–210. <http://dx.doi.org/10.1080/15228916.2014.956644>.
- Paulden, M., Claxton, K., 2012. Budget allocation and the revealed social rate of time preference for health. *Health Econ.* 21, 612–618.
- Pearce, D.W., Ulph, D.D., 1995. A social discount rate for the United Kingdom. CSERGE Working Paper 95-01. Centre for Social and Economic Research on the Global Environment, University of East Anglia, UK.
- Percoco, M., 2008. A social discount rate for Italy. *Appl. Econ. Lett.* 15, 73–77.
- Pilkaitė, A., Chmieliauskas, A., 2015. Changes in public sector management: establishment of project management offices—a comparative case study of Lithuania and Denmark. *Public Policy Adm.* 14 (2), 291–306.
- Poister, T.H., Pasha, O.Q., Edwards, L.H., 2013. Does performance management lead to better outcomes? Evidence from the U.S. public transit industry. *Public Adm. Rev.* 73 (4), 625–636.
- Pūlmanis, E., 2013. Public sector project management efficiency problems, case of Latvia. *Reg. Form. Dev. Stud.* 3 (11), 177–188.
- Ramsey, F.P., 1928. A mathematical theory of saving. *Econ. J.* 38 (152), 543–559.
- Sandmo, A., Dreze, J.H., 1971. Discount rates for public investment in closed and open economies. *Econ. New Ser.* 38 (152), 395–412.
- Schad, M., John, J., 2012. Towards a social discount rate for the economic evaluation of health technologies in Germany: an exploratory analysis. *Eur. J. Health Econ.* 13 (2), 127–144.
- Shiferaw, A.T., Klakegg, O.J., Haavaldsen, T., 2012. Governance of public investment projects in Ethiopia. *Proj. Manag. J.* 43 (4), 52–69.
- Small, K.A., 1998. Project evaluation. Chapter 5 for transportation policy and economics. Working Paper 379. The University of California Transportation Center (37 pp. Available at: <http://www.uctc.net/research/papers/379.pdf> [Accessed on November 14, 2015]).
- Smith, R.F.I., 2004. Focusing on public value: something new and something old. *Aust. J. Public Adm.* 63 (4), 68–79.
- Spackman, M., 2013. Government time discounting and required rates of return: UK history and current issues. *Econ. Aff.* 33 (2), 190–206.
- Stern, N., 1977. The marginal valuation of income. In: Artis, M., Nobay, A. (Eds.), *Studies in Modern Economic Analysis*. Blackwell, Oxford, pp. 209–257.
- Treasury Guidance, 2011. The Green Book. Appraisal and Evaluation in Central Government, London (Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/220541/green\\_book\\_complete.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf) [Accessed on 25 July 2015]).
- Treasury Guidance in New Zealand, 2015. Public Sector Discount Rates for Cost-Benefit Analysis Available at: <http://www.treasury.govt.nz/publications/guidance/planning/costbenefitanalysis> (Accessed on July 24, 2015).
- Vrečko, I., Žnidaršič, A., Kovač, J., 2015. Project management as a tool for fostering cooperation between municipalities in Slovenia. *J. Local Self Gov.* 13 (3), 321–350 (Lex localis).
- Zhuang, J., Liang, Z., Lin, T., De Guzman, F., 2007. Theory and practice in the choice of social discount rate for cost-benefit analysis: a survey. ERD Working Paper No. 94 (Available at: <http://www.adb.org/sites/default/files/pub/2007/WP094.pdf> [Accessed on July 24, 2015]).