
Individual Time Preferences for Well-Being Allocation between Present and Future Generations

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Abstract

Despite the utopian nature of the socialist societies of the 20th century, the public legitimacy of temporarily sacrificing current prosperity for the sake of a better future remains a notable characteristic of a society's potential for modernization. This study focuses on measuring individual discount rates for the reallocation of two experimental types of non-market merit goods in favor of future generations—"saved lives" and "healthy and prosperous life-years".

In the case of "saved lives", the experimental situation inherits the logic of similar foreign research, while in the case of "healthy and prosperous life-years" the experimental situation departs from the theoretical foundations of similar foreign approaches, which use the category of "healthy and prosperous life-years" to solve problems in the field of healthcare economics. In our case, the experimental situation gives data about individual political and economic decisions of the price at which additional current well-being might be allocated for the sake of the future generations. In particular, it provides an analysis of intertemporal choice when respondents vote for one of two programs: the first, with a rentier effect, provides society with the above-mentioned goods immediately, but does not impact the well-being of future generations, while the second requires a rejection of additional prosperity in the present and postpones access to those goods for several decades, but eventually allows the society to receive the goods in larger amounts or for a longer period of time.

It is shown that the discount rates for "saved lives" in Russia are higher than for Europe and the US in similar experiments and amount to 20.4% and 11.8% for time periods of 25 and 50 years, respectively. Discount rates were calculated for "healthy and prosperous life-years" (6.1% and 3.9% for the same time periods). It is also shown that the share of respondents who prefer present-oriented programs (the distribution of benefits in favor of those living today)

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for Russia exceeds 75%. The main motives of this orientation towards the redistribution of benefits in favor of the present, rather than future generations, are identified, among which the main ones are the current standard of living, the limited forecast horizon, the principle of generational self-responsibility, the scientific and technological revolution factor, and the “time loop” factor.

Keywords: *individual time preferences, social discount rate, social choice, shadow price, subjective well-being, merit goods, life-years, generations, post-socialist societies*

Evaluating sacrifice for the sake of the future

When speaking about social changes with long-term results, a critical question arises whether the society is ready to wait for this result and, if so, at what price. The main measurable value in this case is the social discount rate, an indicator which is a key social characteristic when it comes to investing in long-term structural changes. The social discount rate demonstrates the price that members of society are ready to pay for renouncing current benefits in favor of the future ones (and in favor of future generations).

The idea of temporarily sacrificing current prosperity for the sake of a better future underlay the communist projects in the 20th century. At different stages of the development of these societies and in different proportions, the sacrifices included limitations in economic freedom, individual opportunities, or prosperity, demanding or intense labor conditions, scarce leisure opportunities, etc. The need to overcome difficulties and limitations, deemed as temporary, was justified by the era of common prosperity that would arrive thanks to those sacrifices. Social benefit was postponed by the ideology for a period that was, on the one hand, long enough to conceal the utopian nature of ideas, and, on the other hand, short enough to maintain some legitimacy of temporary hardships, when it came to day-to-day well-being. In 1961, for instance, the approximate time for building the material and technical foundation for communism in the USSR was considered to be twenty years.¹

Despite the utopian character of the communist project as such, using society's capacity for this type of development and its interpretation as a legitimate one reveals development trajectories that are not available to societies functioning with an evolutionary logic. This capacity comes in handy in modernization projects which are hindered by established institutions which have the opposite goals and thus represent “inefficient, stable norms”—a phenomenon defined as the “institutional trap” [Polterovich 2005, pp. 30, 32].

The ratio of expected future benefits from the project underway to the required current sacrifices, with respective social changes remaining legitimate in the public's mind, will be called, for the purposes of this study, the shadow price of such changes. The commercial discount rate, as a measure of the shadow price of such projects, is inapplicable since the problem of intertemporal social choice in this case is essentially different from a standard investment problem. First, there is the need to challenge established social institutions which are in conflict with the project's goals, which means

¹ The 22nd Congress of the Communist Party of the Soviet Union (October 17–31, 1961). Verbatim Report. State Publishing House for Political Literature, Moscow, 1962, vol. 1, pp. 168, 338.

a market approach fails. Second, the expected benefit often has a public, not a private, nature. Third, the forecast horizon is decades, so the benefits generated as a result of the project will be experienced by unborn future generations.

One of the ways to correct the commercial discount rate in such cases is to use the social rate of time preferences, with significantly smaller values. The lower the chances of living until the end of the discount period and the faster the pace of consumption growth [Kula 1984; Pearce, Groom, Hepburn, Koundouri 2003], the higher the social rate. The social rate has been calculated for Russia, in particular, for public sector projects [Kossova, Sheluntcova 2014; Kossova, Sheluntcova 2016].

However, commercial and social rates are not defined for an important class of goods—non-market merit goods—which have a social price, but no market price [Keeler, Cretin 1983; Lipscomb 1989]. These goods include, among other things, life, health, quality of life, happiness, which are all alternative methods of evaluating social prosperity. For example, the idea of using happiness as an alternative social prosperity indicator has resulted in a whole new field of research—theories of happiness [Bruni, Porta 2005; Easterlin 1974; Easterlin 2001].

Finally, there is another case when using classically defined discount rates is not correct. It has to do with social projects, the benefits from which have a probability distribution (for instance, a program allowing 1,000 lives to be saved, when it is 10,000 people that need to be saved). The social benefits from such projects will be discounted at a rate reflecting ideal social expectations, as decisions are made by members of society behind a “veil of ignorance”, a basic premise for fair social decisions [Rawls 1999].

The approach to measuring the discount rate for the intertemporal choice of non-market merit goods was developed in studies involving experimental situations. An approach was proposed and implemented to calculate the discount rate for human lives on the basis of experiments in which respondents chose between two hypothetical projects or programs with different time horizons [Horowitz, Carson 1990; Cropper, Aydede, Portney 1991; Cropper, Aydede, Portney 1992; Cropper, Aydede, Portney 1994]. One of them implied some lives saved or deaths prevented immediately and the other one suggested more lives would be saved or deaths prevented, but T years from now. The problem statement in these works represents a tested and convenient instrument for measuring the shadow price of renouncing current merit goods for the sake of the future ones.

Another approach is when the ideal types of goods re-distributed in time can be expanded by means of logical construction “life-years” (for example, happy, healthy, or prosperous life-years) as a good which can also be shared between generations. In general, statistical constructions involving the categories of “lives” and “life-years” are convenient instruments for measuring the efficacy of social programs [Sunstein 2004].

Research in this field significantly varies in terms of the stated problems. Some experimental studies are dedicated to framing effects, or, in other words, to establishing the relation between respondents’ answers and question design. According to a number of studies, this relation is very noticeable [Johannesson, Johansson 1997; Frederick 2003].

Another type of study focuses on the content of experiments and, in particular, on the relation between the discount rate and the proposed social situation. For example, time preferences were studied depending on a possible risk of no benefits in the future, on social inequality in receiving the benefits, and in the context of the life quality and expectancy dilemma [Gyrd-Hansen 2002]. Intertemporal choice was studied in terms of program costs and effects [Brouwer, van Exel 2004; Polinder, Meerding,

van Exel, Brouwer 2005]. In some works, time preferences were examined in terms of the targets of the effects to determine whether the benefits went to an individual or society as a whole [Lazaro, Barberan, Rubio 2001]. Among other topics studied are the balance of time preferences concerning monetary and non-monetary benefits [Lazaro, Barberan, Rubio 2001; Meerding, Bonsel, Brouwer, Stuijbergen, Essink-Bot 2010; Parouty, Le, Krooshof, Postma 2014]. The dependency of time preferences on age, disease type, or the severity of health conditions was also established [Ganiats et al. 2000; Stavem, Kristiansen, Olsen 2002]. Experimental discount rates were calculated for countries with different levels of socioeconomic development [Poulos, Whittington 2000]. Some results for different countries obtained from experiments with a similar design can be found in Table 1.

Table 1. Median rate of time preferences for well-being allocation in different countries

Country	Author(s)	Type of Good	r_{Me} , % ¹	T , years	d_A , % ²
USA	Cropper, Aydede, Portney (1992)	Lives	7.4 4.8	25 50	40-47
Sweden	Johannesson, Johansson (1997)	Lives	12.9 (13.77) 7.3 (7.58)	25 75	34 ³ 69 ³
Spain	Lazaro, Barberan, Rubio (2001)	Lives Life-years	18.1 (19.9) 13.9 (14.9)	11-15 11-15	n/a
Netherlands	Polinder, Meerding, van Exel, Brouwer (2005)	Life-years	15.0 (16.2) 9.3 (9.7)	20 40	n/a

Notes:

¹ The median values of rates re-estimated for exponential discounting case (the original values elicited in these research papers are given in parentheses).

² The percent of respondents, choosing present-oriented program A.

³ The value d refers to the case when the number of lives that can be saved in T years is 100 times higher than the number of lives that can be saved today.

A comparative analysis of the results obtained in different countries has certain limitations. These have to do, first, with the types of original models applied (types of the utility function and the discounting methods), secondly, with varying time delays for which discount rates are evaluated, and, thirdly, with the fact that studies were conducted at different times, sometimes with very large intervals between them.

This article represents results of the first similar study in Russia with specified design and experiment logic.

Modeling time preferences for the allocation of specific non-market merit goods between generations

The logic of the model and utility function first introduced in [Cropper, Aydede, Portney 1991; Cropper, Aydede, Portney 1992; Cropper, Aydede, Portney 1994] is taken

as a basis for the purposes of this study. The authors assume that individuals compare the utility of saving future lives with the utility of saving the lives of those living today. The main measurement value is the individual rate of time preferences, or the price of refusing to save current lives in favor of future ones. They used the following assumptions for a hypothetical situation on the allocation in time of saved lives:

- the utility function for saving lives is linear and depends on the subjective individual value of human life and the number of saved lives;
- the value of the human life of all simultaneously living people is the same;
- the difference in the subjective value of people's lives in different periods is determined only by the time factor;
- the time factor is calculated using exponential discounting.

This approach allows the design of a similar model for cases when the aim is to measure preferences for a broader range of goods and for specific kinds of non-market merit goods like happiness, quality of life, or health. The volume of such goods may be measured in terms of the time for which they are provided, that is, in the number of life-years improved due to these goods in the present or in the future (see Appendix A for details).

In order to more clearly understand the socioeconomic meaning of the discount rate r calculated in hypothetical situations of this type, the utility function proposed by Cropper, Aydede and Portney [1992, p. 470] can be extended. Let us assume an individual has a specific belief about the level of fairness initially available to the current generation and to the future generation, T years from now, in the form of the amounts of merit good V_0 and V_T respectively. An individual can correct the fairness level with the help of a hypothetical project (in this case, a project for saving lives and reallocating prosperous life-years) by choosing additional quantities ΔV_0 and ΔV_T of the merit good reallocated between generations.

The utility function for a good provided at a time $t = 0$ and in T years will be:

$$U_0 = a_0 \cdot (V_0 + \Delta V_0) \quad (1),$$

$$U_T = a_T \cdot (V_T + \Delta V_T) \quad (2),$$

where a_0 and a_T represent the subjective values of the current and future merit goods for individuals living today.

Then, the indifference condition ($U_0 = U_T$) yields:

$$\left(\frac{\frac{V_0}{\Delta V_0} + 1}{\frac{V_T}{\Delta V_T} + 1} \right) \cdot \frac{\Delta V_0}{\Delta V_T} = \frac{a_T}{a_0} \quad (3).$$

Tomorrow's goods are cheaper than today's ones, and the longer the period T for which they are delayed, the cheaper they are. This can be taken into account using exponential discounting. So that:

$$\frac{a_T}{a_0} = e^{-\hat{r}T} \quad (4),$$

where \hat{r} represents the cumulative (or societal) discount rate that shows the relative value of current and future human lives for individuals living today. It depends on (a) individuals' ideas about the initial amount of merit goods available now and T years from now and (b) individual willingness to change the distribution of such goods between generations.

By defining two additional values, r and δ , as:

$$e^{-rT} = \frac{\Delta V_0}{\Delta V_T} \quad (5),$$

and

$$e^{\delta T} = \left(\frac{\frac{V_0}{\Delta V_0} + 1}{\frac{V_T}{\Delta V_T} + 1} \right) \quad (6),$$

expression (3) can be written as:

$$r - \delta = \hat{r} \quad (7).$$

It is clear from (1)–(7) that \hat{r} is determined by two effects—the project effect (r) and the initial conditions effect (δ). Rate r , elicited from this hypothetical situation, is a key instrumental parameter used by an individual to correct the pre-existing level of relative intergenerational fairness determined by the goods ratio V_0/V_T . An individual decides if the current generation additionally gets ΔV_0 or the future generation T years from now additionally gets ΔV_T . The latent parameter δ indicates how the individual decision is compensated for by the initial level of fairness: $\delta > 0$ if people vote for a larger price for withgoing current prosperity ($\Delta V_0/\Delta V_T < V_0/V_T$), $\delta < 0$ if people choose a smaller price ($\Delta V_0/\Delta V_T > V_0/V_T$), and $\delta = 0$ if people vote for the status quo ($\Delta V_0/\Delta V_T = V_0/V_T$).

Notably, the pre-existing conditions (for present and future generations) which influence individual decisions are not so much an objective reality, as individual's idea of it. Such beliefs can be predetermined by either culture or experience or can be the result of manipulated public opinion instilling respective values in all aspects of social life, as described in the hegemony concept of Gramsci [see, Katz 2006, p. 335].

These theoretical points reveal the socio-economic meaning of the discount rate in the redistribution in time of saved lives and prosperous life-years as the price of sacrificing

current well-being for the sake of a better future, taking into account the initial level of equity for present and future generations. The empirical part of the paper measures the probability of future-oriented individual choice and the value of the discount rate, and identifies the factors it depends on using a Russian sample.

Design of the hypothetical situation

For the purposes of this paper, time preferences regarding two types of goods were studied. The first type of goods are lives saved using high-tech medical care, where program A is effective immediately and allows 100 lives to be saved, while program B allows more lives to be saved, but 25 or 50 years from now.

The second type of goods are healthy and prosperous life-years. Their number may be increased for future generations (scenario B) 25 or 50 years from now, per member of society, on average, if the current generation undertakes to solve a backlog of social problems, rejecting an easier way that implies a rentier lifestyle backed by favorable market conditions.² Opting for the easy way (scenario A) guarantees 3 additional healthy and prosperous life-years on average per person today, but does not allow to improve the lives of future generations, who will be responsible for solving the postponed social problems.

When characterizing the quality of life-years as a good, the term “prosperous” was added, compared to other studies. This has two goals, first, to emphasize that ensuring healthy life-years does not entail critical financial expenses, and second, to give a broader interpretation of the good, not restricting it to just health. This was an attempt to take the notion of life-years out of the traditional health economics context and conduct the experimental study in a more political and economic vein. All the more so as the rentier effect and the choices it entails are very close to the dilemma of rent-based transition economies that the new Russia was trying to solve during the 2000s. Such a hypothetical construction allows a consideration of self-sacrifice for the sake of the nation as a specific moral public good with the evaluation of its shadow price.

For each good under consideration, it was suggested that respondents specify a minimum quantity of that good received by the society in the future that would make them willing to choose Program B instead of Program A, that is, to sacrifice the proposed immediate prosperity for the sake of the future. This approach makes it possible to calculate the minimum price of renouncement (the discount rate) and the maximum possible subjective price of future goods measured in terms of current goods.

In each case, respondents were also offered the response: “I will choose Scenario/ Program A in any case.”

Full description of experimental situations can be found in Appendix B.

² Such a construction of a hypothetical situation differs from the approach when a respondent redistributes in time the healthy life-years to a limited number of arbitrary (unknown) people [Polinder, Meeding, van Exel, Brouwer 2005, p. 794] or when respondent enjoys the healthy life-years personally today or in T years [Lazaro, Barberan, Rubio 2001, pp. 352–355].

Sampling

Calculations rely on data from a representative survey in Russia using experimental situations and are published for the first time. The survey was conducted in September 2016 on the basis of a representative Russian sample for the whole country and for federal districts in particular, taking into account the proportions of the population aged 18 and above, types of settlement, social and professional group quotas, and respondents' gender. The overall sample size was 1000 people. The survey was conducted using the personal interview method, with a formalized structure and closed and half-open questions.

The sample's main characteristics are: the average age of respondents is 44.3 years (standard deviation 16.1, median 42.0), average monthly per capita income is 17,596 RUR (standard deviation 9,938, median 15,000); male respondents account for 45.6%, respondents with completed higher education 32.8%, respondents living in big cities and regional centers 40%, respondents living in small towns and urban villages 32.3%, rural population 27.7%.

The price of sacrifice for the sake of future generations

As a result of the model's empirical testing, three main indicators have been singled out: the relation between the subjective value of a good provided in T years and the subjective value of the same good provided immediately (a_T / a_0), the discount rate (r), and the proportion of respondents choosing Program A (d_A), or those voting for the well-being of people living today.

Figures 1 and 2, corresponding to the two types of goods under consideration, contain respondents' answers on the minimum quantity of future benefits that would be sufficient to justify sacrificing current benefits as specified in the experiment.

The stepwise character of answer distribution should be noted. Technically, a distribution of this kind shows that respondents give answers, thinking in terms of price intervals, rounding off the values to cognitively convenient levels (100, 1,000, 5,000, 20,000, etc.), which is common in experiments like this. This type of answer is "decision heuristic" [Polinder, Meerding, van Exel, Brouwer 2005, p. 796].

It is clear that society is divided into many social groups distant from one another in terms of the discount rate. Society on the whole is extremely heterogeneous, comprising groups with considerable differences in the cost of sacrifices for the sake of the future. For example, in the saved lives experiment, the difference between the first and third quartiles of the distribution is 200 times (for $T = 25$) and 870 times (for $T = 50$). In the experiment for prosperous life-years, the respective difference is about 2 times for both time horizons.

The median number of future lives equivalent to saving 100 lives today is 10,000 people for a time delay of 25 years and 25,000 people for a time delay of 50 years. Accordingly, the value of life of one person in the future is estimated at $1/100$ and $1/250$ of the value of the life of a person living today (see values a_T / a_0 in *Table 2* for the category "saved lives"). The median amount of future prosperous life-years equivalent to 3 prosperous life-years today is 10 and 20 for the respective time delays. Depending on the time delay, 1 year of prosperity in the future is 3.3 or 6.7 times cheaper than 1 year of prosperity today (see values a_T / a_0 in *Table 2* for the category of "life-years").

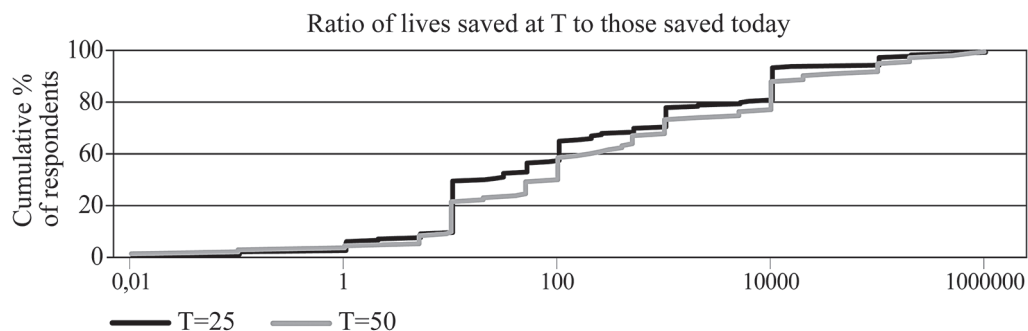


Figure 1. Distribution of time preference responses, the case of saved lives

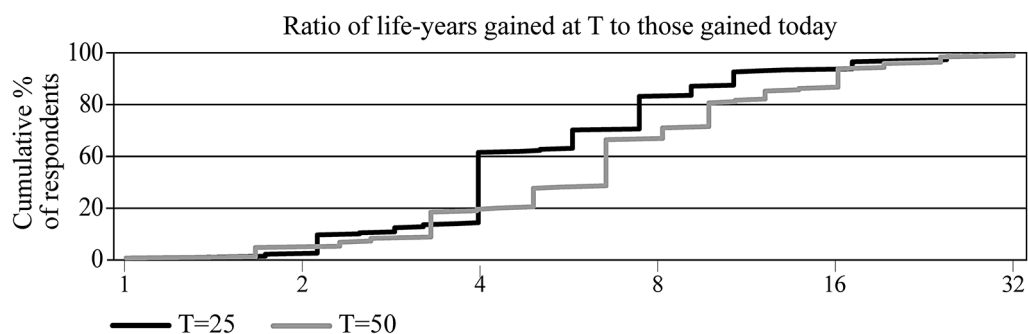


Figure 2. Distribution of time preference responses, the case of healthy & prosperous life-years

Table 2. Individuals' social time preferences for saving lives and allocating healthy & prosperous life-years

		Saved Lives				Healthy and Prosperous Life-years			
		a_T / a_0	r	d_A^a	N	a_T / a_0	r	d_A^a	N
$T=25$	Mean	0.096	0.204 ^b	82.0	882	0.267	0.061	76.8	859
	(st. dev.)	(0.226)	(0.127)			(0.168)	(0.027)		
	25%	0.0005	0.092			0.150	0.048		
	50%	0.010	0.184			0.300	0.048		
$T=50$	Mean	0.053	0.118 ^b	88.3	860	0.187	0.039	81.1	824
	(st. dev.)	(0.149)	(0.065)			(0.150)	(0.014)		
	25%	0.0001	0.049			0.100	0.030		
	50%	0.004	0.108			0.150	0.038		
	75%	0.087	0.184			0.223	0.046		

Notes:

^a d_A is the percentage of respondents (%) choosing Program A in each case.^b Some respondents deleted (if saved lives < 100 people or > 10 million people). Mean/st. dev./median for all respondents are respectively: 0.204/0.142/0.184 for $T=25$ and 0.118/0.076/0.110 for $T=50$.

According to these data, the discount rate calculation yields the following results. In the saved lives experimental situation, the discount rate for time delays of 25 and 50 years was 20.4% (median 18.4%) and 11.8% (median 10.8%) respectively. In the experiment on redistribution of healthy and prosperous life-years, the result was considerably smaller: 6.1% (median 4.8%) and 3.9% (median 3.8%) respectively (*Table 2*).³

Comparing these data with other countries is possible only for the saved lives experimental situation which is similar in all studies. The category of “life-years” in research is used in different contexts. Discount rates elicited from the Russian sample for saved lives are notably higher than in similar research in other countries (compare with data in *Table 1*): almost 2.5 times higher than in the US in the early 1990s, 1.4–1.5 times higher than in Sweden in the late 1990s, but comparable to results in Spain in the early 2000s.

For “healthy and prosperous life-years”, the discount rates in Russia are, on the contrary, low. However, when interpreting this result, one has to take into account that the theoretically possible rate range in the experiment for prosperous life-years reallocation is limited by the maximum life expectancy.⁴ For example, giving up 3 additional years of current well-being for the sake of providing 100 years of prosperity to those who will live in 25 years corresponds to the rate of 14%, whereas a similar trade-off in favor of those who will live in 50 years corresponds to the rate of 7%.

The results demonstrate a decrease in discount rates depending on the time delay in receiving goods. This, however, does not mean that individuals living today are more altruistic towards future generations. On the contrary, the relative value of more distant generations is considerably lower: the lives of people in 50 years will cost, on average, 1.79 times less than the lives of people in 25 years (0.096/0.053). A similar result of about 1.43 times (0.267/0.187) can be seen for healthy and prosperous life-years.

The factors of future-oriented choice

Table 3 contains the results of a binary logit model which predicts the choice of the future-oriented program/scenario B (dependent variable $y_i = 1$) instead of the present-oriented program/scenario A ($y_i = 0$) depending on the i -th respondent's seven social status variables (gender, age, the number of children, education, monthly income per family member, location, and place of primary socialization) and three value-based characteristics. Value system 1 is revealed in a projected situation: individuals vote for people to receive the money in an experimental situation implying a choice between spending additional state funds on national safety and sovereignty or directing that money to citizens (for solving their own problems). Value system 2 is also revealed in a projected situation: individuals vote for saving lives in an experimental situation implying a choice between spending additional state funds on national safety and sovereignty or directing that money to life-saving programs (for cases of serious diseases, tragic accidents, environmental and natural disasters, etc.). It should be noted that

³ All rate values have statistically significant differences relative to one another. Significance level of Kolmogorov-Smirnov Z statistics is in all cases $p < 0.0001$.

⁴ The present and future healthy and prosperous life-years are provided per capita. It reflects the basic idea of the experiment that the program is aimed at changes at the national level, not just isolated improvements.

Systems 1 and 2 are fundamentally different. In the first case, the recipient of the benefit (in the form of money) is clearly specified, being individuals themselves and other members of society in the same social situation. Therefore, here the motive has an egoistic or utilitarian nature. In the second case, the respondent is guided by an altruistic motive as the recipient of the benefit (in the form of a saved life) is not specified individually and it could be any member of society. Value system 3, which can be defined as a practical mindset aimed at helping other people, is revealed by means of asking respondents about participation in charity or volunteer activities.

For the first category of characteristics, the level of monthly income per family member is the only important factor. The higher the income, the higher the chances of choosing future-oriented program/scenario B.

Table 3. Social factors of choosing future-oriented programs, logit model^a

	Saved Lives		Healthy and Prosperous Life-years	
	<i>T=25</i>	<i>T=50</i>	<i>T=25</i>	<i>T=50</i>
Independent variables ^b	Average marginal effects (Std. Err.)			
Male	0.022 (0.027)	0.013 (0.024)	- 0.048 (0.030)	- 0.042 (0.029)
Age, years	- 0.000 (0.001)	- 0.001 (0.001)	- 0.001 (0.001)	- 0.001 (0.001)
Children ≥ 2	- 0.027 (0.029)	- 0.005 (0.025)	0.018 (0.033)	0.042 (0.033)
Higher Education	0.003 (0.031)	- 0.011 (0.026)	0.028 (0.035)	0.009 (0.033)
<i>Ln</i> (monthly income per family member, in 10 ³ RUB)	0.063 (0.029)*	0.047 (0.022)*	0.067 (0.031)*	0.077 (0.029)**
Metropolitan areas and regional centers	0.048 (0.035)	0.022 (0.027)	- 0.001 (0.038)	0.025 (0.037)
Place of Socialization ^c in Metropolitan areas and regional centers	- 0.042 (0.032)	- 0.039 (0.025)	- 0.036 (0.038)	- 0.042 (0.034)
System of values – 1	- 0.034 (0.033)	- 0.049 (0.027) ⁺	- 0.077 (0.037)*	- 0.061 (0.036) ⁺
System of values – 2	0.063 (0.034) ⁺	0.063 (0.029)*	0.115 (0.039)***	0.094 (0.037)**
System of values – 3	0.068 (0.033)*	0.081 (0.030)**	0.057 (0.036)	0.049 (0.035)
Wald χ^2 (10)	21.89*	23.49**	23.80**	25.66***
-2 Log Likelihood	730.630	543.089	812.050	694.945
χ^2 Hosmer-Lemeshow (10)	6.67 (p=0.572)	10.96 (p=0.204)	4.65 (p=0.794)	10.52 (p=0.230)
N ^d	805(143)	782(92)	780(178)	747(140)

Notes:

^a Dependent variable: 1—future-oriented program (B), 0—present-oriented program (A).

^b Robust standard error appears in parentheses. Significance level: *p<0.10, **p<0.05, ***p<0.01, ****p<0.005, †p<0.001.

^c Type of location where the respondent went to school. “Metropolitan Areas and Regional Centers” includes Moscow and Saint-Petersburg and capitals of regions.

^d The number of future-oriented respondents appears in parentheses.

Unlike the characteristics of social status, the impact of value-based factors is steadier and statistically more significant. Interestingly, the effect of value systems 1 and 2 is opposite: value system 1 decreases, while value system 2 increases the chances of future-oriented scenario B. On the whole, future-oriented scenario B is more often chosen by respondents involved in charity or volunteer activities and those demonstrating a humanistic mindset.

Factors determining the discount rate

Table 1C in Appendix C contains the evaluation results for factors determining the discount rate. A set of independent variables characterizes the social status of the i -th respondent (gender, age, the number of children, education, monthly income per family member, place of primary socialization). An ordinal logit regression model was applied. The discount rate value r , which is the minimum rate for switching from Program A to program B was split in each case into four intervals with ranks $s = 1, 2, 3, 4$, and the highest values were assigned the highest rank of 4 (see notes to Table 1C, Appendix C).

According to the results, the factor system is different for the two types of goods under consideration. Factors for the good of “life-years” are the most distinct: the price of foregoing current goods for the sake of future ones is higher for younger respondents who went through primary socialization in metropolitan areas and regional centers. The probability that the value of the discount rate falls into intervals 1 and 2 is higher for older respondents and lower for those respondents who went through primary socialization in metropolitan areas and regional centers. Conversely, the probability that the value of the discount rate falls into intervals 3 and 4 has the opposite value for the same groups of respondents. Factor effect is identical for the time horizons of 25 and 50 years (Figure 3, e–h).⁵

Fundamentally different is the situation for the good of “saved lives”. For a time-delay of 25 years, monthly income per family member, the number of children in a family, and place of primary socialization are the main determinants. All of them contribute to a lower discount rate value. The probability that the value of the discount rate falls into intervals 3 and 4 is lower for respondents with high income, having more than two children, and being primarily socialized in big cities.⁶ However, it is interesting that the last three factors are significant only for the period $T=25$ years, i.e. for the period of either the old age of the respondents, or the peak of their children’s life-cycle. And for the time-delay of 50 years, only gender is important: men are more prone to renounce current benefits for the sake of the long-term future. See plots of calculated average marginal effects in Figure 3, a–d.

⁵ Average marginal effects shown in the plots mean the average difference in the probability of choosing a given discount rate’s rank due to a one-unit increase in the underlying scale of the corresponding independent variable (e.g., a change from female (0) to male (1), or a one-year age difference, etc.)

⁶ It seems that the opposite effect of the factor of socialization in big cities for the case of “saved lives” and “prosperous life-years” is caused by the context of the hypothetical situation for saving lives. It states that the basis of the program to save future lives is the development of hi-tech healthcare. So, respondents expect the program to have the greatest impact in Metropolitan areas and regional centers.

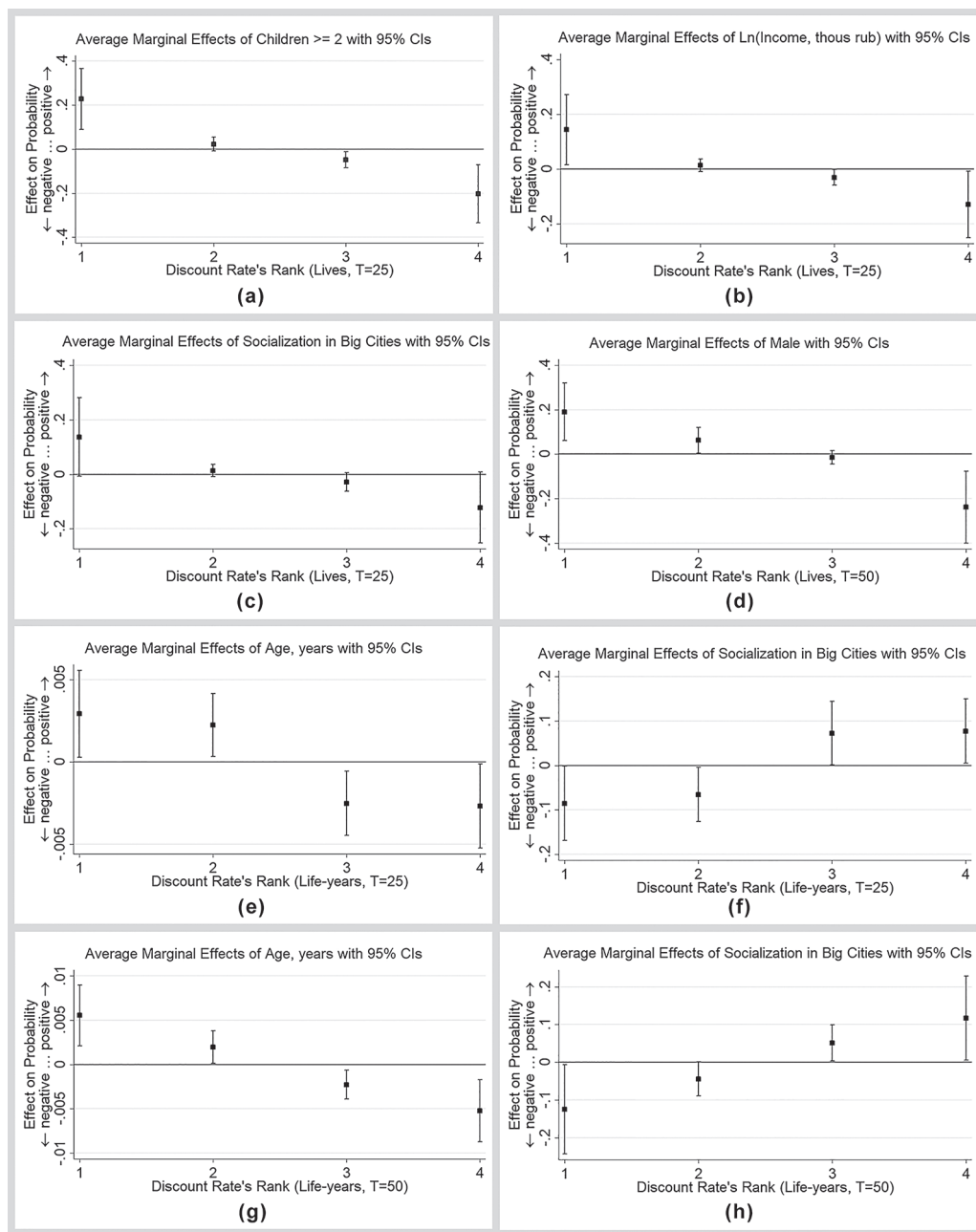


Figure 3 (a-h). Average marginal effects for the factors of the discount rate, ordinal logit regression, significant factors only

Motives for being present-oriented

The share of respondents that chose Program/Scenario A in any case was significant, reaching 80% and above. This is one of the highest indicators as compared to Europe and the US. However, it should be noted that this indicator is significant in practically all earlier studies of this type, although it does not reach values like those in Russia, reaching only 34 to 69% (*Table 1*). The share of present-oriented respondents is, on average, lower for the good of life-years.

To reveal the possible motives for choosing Program/Scenario A on the qualitative level, an additional internet survey was conducted. Alongside the formalized experimental situations, it included open-ended questions that allowed those respondents who voted for Program/Scenario A in each case to give a detailed explanation of their choice. Overall, 100 people participated,⁷ and more than half of them chose Program/Scenario A, explaining their motives (*Table 4*).

Table 4. Motives for choosing program A, voting for the well-being of those living today^a

Motives for choosing Program A ^b	Saved Lives		Healthy and Prosperous Life-years	
	T=25	T=50	T=25	T=50
We need to save and improve lives of those who need it now	15	15	19	17
I don't know what will happen in so many years	10	12	5	12
The delayed program will be disrupted or not implemented at all	8	9	5	5
The lives of future generations will be naturally improved by progress; more progressive programs will appear in the future	6	9	2	2
If the program is realized today, the future will be better anyway; I don't believe in a better 'tomorrow' without a better 'today'	4	5	6	6
I won't see results; I don't want to improve the lives of those I don't know; Future generations can take care of themselves	5	6	7	7
I prefer my own prosperity; Let me keep my modest well-being	-	-	4	5
Delayed programs like the construction of socialism are a utopia that we have seen before	-	-	3	1
N	48	56	51	55

Notes:

^a The number of respondents with the corresponding motive is indicated for each experimental situation

^b Typical phrases of the responses are given in each case

⁷ The proportion of the residents of big metropolitan areas (Moscow, Saint Petersburg) was 72%. The average age of respondents was 34. The share of male respondents was 30% of the sampling.

The prevailing motives of voting for programs ensuring the well-being of present (not future) generations include:

- a focus on improving the lives of those who are in need now;
- a lack of belief that long-term programs will be realized at all or without serious errors;
- a personal inability to make predictions for such a long period;
- a belief that technological progress will improve the lives of future generations by default;
- an attitude that future generations can (or ought to) be responsible for their own lives and prosperity;
- the factor of a “time loop” reflecting the idea that if life is improved today, the future will be better in any case.

Interestingly, the belief that future generations would have higher life chances due to technological progress is not the main reason to opt out of the future-oriented choice as is the case in a US sample [*Cropper, Aydede, Portney* 1994, p. 250].

In the experimental situation of reallocating “healthy & prosperous life years”, there emerge two additional motives. The first one is close to the idea that each generation must be responsible for itself, but with an additional emphasis on the prevalence of personal interests over the interests of strangers who will live in the future. The second one is related to the memory of the utopian character of socialist societies in the 20th century. This motive is expressed in the attitude of “delayed programs like the construction of socialism are a utopia that we have seen before”.

Conclusion

Using a representative sample, the present study, for the first time in Russia, delivers estimates of the discount rates for intertemporal choice of non-market merit goods simulated using experimental categories “saved lives” and “healthy and prosperous life-years”. Discount rates are estimated for periods of 25 and 50 years. Such hypothetical situations make it possible to estimate the shadow price of modernization projects as a quantitative measure of their public legitimacy, if such projects offer results in the future and demand some sacrifices in the present (by means of renouncing certain goods).

According to the results of the study, most respondents are strictly present-oriented. Only 19–23% of the respondents are willing to discuss the price of renouncing current benefits, even with a minimum amount guaranteed today (in the experiment, it is 100 saved lives and 3 years of a prosperous life). But even this population group demonstrates high heterogeneity across assumed price values, ranging from several (“prosperous life-years”) to hundreds (“saved lives”) of times. The rentier effect for the case of “healthy and prosperous life-years” (opting for an immediate and easily achievable result) is less common for older respondents who went through primary socialization in small towns. In present-day Russia, they are the social base of national projects for long-term social transformations. For the case of “saved lives” the factors of a large family and high income reduce the rentier effect, but only for 25 years, that is,

for the period of the respondents' own old age and/or for the period of peak life activity of their children. They are not significant for the period of 50 years.

More than 75% of respondents prefer present-oriented programs and social development scenarios. This choice means that current benefits are recognized as infinitely valuable, even if they are provided in smaller quantities. Interestingly, the differences between present-oriented and future-oriented respondents are mainly determined by personal beliefs, rather than their social group structure based on objective characteristics. The key factor driving choices in favor of future generations is the overall humanistic mindset of the respondents. Along with value-based factors, only the level of per capita income contributes to higher chances of a future-oriented choice.

When analyzing the motives for foregoing choice in favor of future generations, there are two types of pre-existing knowledge guiding respondents. The first is related to the general modern-day social discourse, with its *carpe diem* attitude and faith in progress which will automatically improve the lives of future generations. The second represents the social response to negative macro-social experiences from Russia's recent past. It manifests itself in a lack of belief in the realization of any long-term programs without catastrophic blunders, and an aversion to the utopian nature of socialist societies, with their focus on self-sacrifice for the sake of a hypothetical (improved) future.

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APPENDIXES

Appendix A. Some theoretical assumptions

For the case of “healthy and prosperous live-years”, a utility function for receiving the number of years equal to T_1 in the present or T_2 in the future (i.e., in T years from now) can be introduced:

$$U_0 = \int_0^{T_1} a_0 \cdot e^{-\theta t} dt \quad (1'),$$

$$U_T = \int_0^{T_2} a_T \cdot e^{-\theta t} dt \quad (2'),$$

$$a_T = a_0 \cdot e^{-r \cdot T} \quad (3'),$$

where a_0 and a_T represent the subjective value of the current and future prosperous life-years for individuals living today; r is the rate at which the future benefits from the prosperous life-years will be discounted, assuming that the prosperity period starts in T years and will continue for T_2 years; and θ is a parameter denoting that every following year of prosperity may change its value for an individual.

Formulas (1')–(3') easily define the condition of choosing future prosperity at the expense of current well-being:

$$U_0 < U_T \Rightarrow \begin{cases} \frac{1 - e^{-\theta T_1}}{1 - e^{-\theta T_2}} < e^{-rT}, & \text{if } \theta \neq 0 \\ \frac{T_1}{T_2} < e^{-rT}, & \text{if } \theta = 0 \end{cases} \quad (4').$$

The difference between r and θ lies in the fact that θ represents the discount factor within a period when prosperity has already been achieved by an individual (it is a measure of year-to-year saturation with prosperity), while r is the discount factor within a period of waiting for future prosperity, assuming that in the next T years, the individual will have to live without it. This is another aspect of the question of how and why the discount rate may change over time, compared to the approach that assumes the discount rate may not be the same for different time delays T [e.g., *Cropper, Aydede, Portney* 1994, pp. 247–248]. It is clear that if $\theta = 0$ or is sufficiently small, this condition will be identical to the condition for saving future lives, with the amounts of lives saved replaced by the amounts of years T_1 and T_2 .⁸

⁸ Indeed, using the L'Hôpital's rule, it is easy to calculate that for small values of θ : $\lim_{\theta \rightarrow 0} \frac{1 - e^{-\theta T_1}}{1 - e^{-\theta T_2}} = \frac{T_1}{T_2}$.

The case of θ tending to zero enables the calculation of the upper bound of the discount rate. There are three arguments in favor of considering this case as the main one. First, such specific kinds of non-market merit goods as health, happiness, or quality of life are not supposed to be discountable if they are already given. The happiness or health of a future time cannot be provided in the current year if the individual is already happy and healthy. Second, multigenerational logic implies that even if more distant periods of available prosperity gradually lose value for an individual due to age, they will be enjoyed by next generations (his children, grandchildren) and, therefore, may remain as important for an individual as more immediate time periods of prosperity. Third, more distant periods of available prosperity may be considered both less and more valuable with equal probability, due to distance in time in the first case and a growing deficit of health and prosperity on account of aging in the second case.

Appendix B. Design of the Hypothetical Situations

Question 1. In this study, the design of the experiment for choosing life-saving programs was the following. Respondents were given a question:

Every year, a considerable number of people die in the world because they are not able to get hi-tech healthcare. You can vote for one of the two programs that bear equal expenses and will contribute to solving this problem in Russia. Program A will make it possible to save and bring to full life 100 people today. Program B will make it possible to save the lives of a larger number of people, but 25 years from now. How many lives does Program B have to save, so that you would vote for it?

Suggested answers:

1 – I'll vote for Program B if it saves the lives of no less than [give a number ____] people 25 years from now.

2 – I'll choose Program A in any case.

Question 2. The question about allocating the “healthy and prosperous life-years” over time was phrased in the following way:

You are offered to choose one of the two scenarios of life for modern Russian society. Scenario A will increase the number of healthy and prosperous years in the lives of people today by 3 on average, but it will not impact the lives of the next generations. Scenario B will not contribute to the well-being of people today, but it will bring more healthy and prosperous years to the lives of people 25 years from now. How many healthy and prosperous years on average should be added in Scenario B for you to choose it?

Suggested answers:

1 - I'll choose Scenario B if it allows an increase in the number of healthy and prosperous years at least by [give a number ____] years 25 years from now.

2 - I'll choose Scenario A in any case.

Being phrased this way, the questions allowed the calculation of the minimum rate at which the society is willing to sacrifice current well-being for the sake of the future.

Both questions were asked for the time frame of 25 and 50 years.

In order to understand the necessary context of question 2, respondents were offered to read the following paragraph prior to answering:

When answering the question, think about this. Every generation has its own number of healthy and prosperous years that in many respects depends on the situation in the country. The willingness of previous generations to solve complicated social problems and all the ensuing troubles, as a rule, helps create conditions for a more prosperous life of future generations. Are you ready to sacrifice some of the healthy and prosperous years of your generation so that future generations could get a larger number of such years?

Appendix C. Ordinal Logit Model

Table 1C. Social and demographic factors of discount rates value, ordinal logit model^a

Cutpoints for ranks $r = c_1 \dots c_3$	Saved Lives		Healthy and Prosperous Life-years	
	$T=25$	$T=50$	$T=25$	$T=50$
c_1	- 3.244 (1.133)	- 3.072 (1.528)	- 1.673 (1.045)	- 2.000 (1.002)
c_2	- 2.355 (1.134)	- 2.022 (1.513)	0.129 (1.043)	- 0.240 (1.000)
c_3	- 1.453 (1.130)	- 1.152 (1.519)	1.936 (1.065)	0.888 (1.026)
Independent variables ^b	β – Coefficients (Std. Err.)			
Male	- 0.502 (0.323)	- 1.157 (0.454)**	0.064 (0.288)	- 0.446 (0.318)
Age, years	0.011 (0.010)	0.025 (0.016)	- 0.022 (0.010)*	- 0.035 (0.011)***
Children ≥ 2	- 1.108 (0.367)***	- 0.775 (0.503)	- 0.146 (0.318)	- 0.057 (0.332)
Higher Education	- 0.235 (0.342)	- 0.289 (0.445)	- 0.057 (0.315)	- 0.251 (0.384)
$\ln(\text{monthly income per family member, in } 10^3 \text{ RUB})$	- 0.702 (0.331)*	- 0.642 (0.488)	0.321 (0.331)	0.332 (0.326)
Socialization ^c in Metropolitan areas and regional centers	- 0.665 (0.369)+	- 0.243 (0.488)	0.647 (0.310)*	0.782 (0.372)*
Wald χ^2 (6) Log Likelihood	17.56** - 179.998	11.25+ - 116.206	16.83** - 225.258	22.80† - 178.693
N	139	91	178	140

Notes:

^a The unobserved dependent variable (R_i) reflects the price of renouncing current goods in favor of future generations acceptable for the i -th individual, such that (see, e.g., [Winship, Mare 1984, pp. 513–515] discount rate's rank $r_i = s$ if $c_{s-1} < R_i \leq c_s$:

Lives:

$s = 1$, if $100 \leq N_2 \leq 1\,000$,

$s = 2$, if $1\,000 < N_2 \leq 10\,000$,

$s = 3$, if $10\,000 < N_2 \leq 500\,000$,

$s = 4$, if $500\,000 \leq N_2 \leq 100\,000\,000$.

Life-years:

$s = 1$, if $3 \leq T_2 < 10$ (≤ 10)

$s = 2$, if $T_2 = 10$ ($10 < T_2 < 20$)

$s = 3$, if 10 ($20 < T_2 < 30$) (40),

$s = 4$, if 30 ($40 \leq T_2 \leq 100$).

Boundaries of the intervals for delay $T = 50$ appear in parentheses if they differ from those for delay $T = 25$.

^b Robust standard error appears in parentheses. Significance level: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.005$, † $p < 0.001$.

^c The type of settlement where the respondent went to school. The "Metropolitan Areas and Regional Centers" includes Moscow and Saint-Petersburg and capitals of federal regions.

Индивидуальные межвременные предпочтения по перераспределению благополучия между сегодняшними и будущими поколениями

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Аннотация

Несмотря на утопический характер коммунистических обществ XX века, степень легитимности в общественном сознании, идеи временного отказа от текущего благополучия в пользу будущих поколений являются одними из основных характеристик модернизационного потенциала современного общества. Данное исследование посвящено измерению общественной (теневой) цены благополучия будущих поколений на основе вычисления ставки дисконтирования в задаче о перераспределении индивидами во времени двух видов экспериментальных риторных благ – «спасённых человеческих жизней» и «здоровых и благополучных лет жизни».

Если в случае «спасённых человеческих жизней» экспериментальная ситуация находит логику аналогичных зарубежных исследований, то в случае «здоровых и благополучных лет жизни» экспериментальная ситуация выведена за теоретические рамки аналогичных зарубежных подходов, которые, как правило, используют более узкое понятие «здоровые годы жизни» в контексте задач, которые решает экономика здравоохранения. В нашем случае экспериментальная ситуация переведена в плоскость политико-экономических решений индивидов, касающихся цены передачи будущим поколениям дополнительного благополучия, которое можно получить самим, живя, не заботясь о благополучии будущих поколений. В частности, анализируется межвременной выбор, осуществляемый респондентами при голосовании за одну из двух программ: первая программа – эффект рантье – позволяет немедленно получить указанные выше блага в ограниченном количестве или на ограниченный срок, но без улучшения благополучия будущих поколений, вторая программа предполагает отказ от дополнительного благополучия сегодня, откладывая доступ общества к соответствующим благам на несколько десятилетий, но с последующим их получением в большем количестве или на более долгий срок.

Показано, что ставки дисконтирования для блага «спасённые человеческие жизни» в России выше, чем в Европе и США в аналогичных экспериментах, и составляют 20,4 и 11,8% для временных периодов 25 и 50 лет, соответственно. Рассчитаны ставки дисконтирования для экспериментального блага «благополучные годы жизни» (6,1 и 3,9% для тех же временных периодов). Лишь небольшая часть населения (не более 19–23%) готова обсуждать вопрос цены отказа от сегодняшних благ даже при минимальном их количестве, гарантированном сегодня (в предложенных экспериментальных ситуациях – это 100 спасённых жизней и 3 года благополучной жизни). При этом в указанном узком слое общества

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крайне высока гетерогенность по допускаемым значениям цены отказа — от нескольких раз (для блага «благополучные годы жизни») до сотен раз (для блага «спасенные жизни»).

Для блага «благополучные годы жизни» эффект рантье (предпочтение немедленного легко достигаемого результата) в меньшей степени выражен для респондентов старших возрастов, чья первичная социализация прошла в малых городах. Именно они являются социальной базой национальных проектов долгосрочных социальных изменений, базирующихся на идее отложенного благополучия. Эти факторы одинаково работают при обеих альтернативах, то есть в случаях, когда «благополучные годы жизни» откладываются на 25 и 50 лет. Для блага «спасенные человеческие жизни» эффект рантье выражен меньше для респондентов с высоким доходом, первичной социализацией в крупных городах и мегаполисах и на момент опроса имеющих двух или более детей. Однако указанные обстоятельства работают только для периода в 25 лет, то есть для периода собственной старости респондента и/или периода, на который приходится пик жизненной активности детей респондента; для периода в 50 лет данные факторы уже не значимы. Для этого временного горизонта выявлена значимость только гендерного фактора: отказываться от спасения сегодняшних жизней в пользу спасения будущих более склонны мужчины.

Наконец, важным выводом работы является предельно высокая доля тех, кто отказывается от выбора в пользу будущих поколений. Примерно 75–80% респондентов предпочитают выбор программ развития, ориентированных на настоящее (на сегодняшнее благополучие). Такой выбор буквально означает признание бесконечной ценности ($r = \infty$) сегодняшних благ, даже если они предоставляются в достаточно малом количестве. Интересно, что различия между респондентами, ориентированными на будущее, с одной стороны, и ориентированными на настоящее, с другой, главным образом определяются мировоззренческим фактором, нежели существующей структурой социальных групп, выделенных по объективным признакам. Ключевым обстоятельством, стимулирующим выбор в пользу будущих поколений, является общая гуманистическая установка сознания респондентов. Наряду с ценностными факторами вероятность выбора в пользу будущих поколений повышает уровень душевого дохода.

При анализе мотивов отказа от выбора в пользу будущих поколений обращает на себя внимание роль двух типов априорного знания, которым руководствуются респонденты. Один тип знания отталкивается от общего социального дискурса современных обществ с их ценностью сегодняшнего дня и верой в прогресс, автоматически улучшающий жизненные шансы тех, кто будет жить после нас. Второй является общественной реакцией на негативный макросоциальный опыт из недавнего прошлого страны и выражается в неверии в реализацию каких-либо долгосрочных программ без катастрофических промахов со стороны государства, а также в определенной мере идиосинкратическом восприятии идей коммунистических обществ о необходимости (важности) самопожертвования ради гипотетического (улучшенного) будущего.

Ключевые слова: индивидуальные межвременные предпочтения, социальная ставка дисконтирования, социальный выбор, теневая цены, субъективное благополучие, мериторные блага, годы жизни, поколения, постсоциалистические общества

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