

Attitudes to reform:

Could a cooperative health insurance scheme work in Russia?

Abstract

As for all health systems, in Russia, the demand for medical care is greater than its health system is able to guarantee the supply of. In this context, removing services from the state guaranteed package is an option that is receiving serious consideration. In this paper, we examine the attitudes of the Russian population to such a reform. Exploiting a widely-used methodology, we explore the population's willingness to pay for cooperative health insurance. Distinguishing between socioeconomic and demographic factors, health-related indicators and risk aversion we find, consistent with other literature, positive income and risk aversion effects. We interpret the former as evidence that the Russian population is not opposed to the idea of progressive redistribution, to pool the costs of health-related risks; and the latter as evidence that risk-averse individuals demand more insurance coverage. In exploring these results further, we show that cognitive bias is important: overestimating the benefits leads to the purchase of additional insurance, while underestimating lowers demand for insurance. Our overall conclusion is that the introduction of a supplementary cooperative health insurance scheme in Russia could increase the accessibility of healthcare, lower the tendency for informal payments, incentivize the personal maintenance of good health and create a new source of funding for public healthcare.

Keywords: cooperative health insurance, willingness to pay, risk aversion, solidarity, cognitive bias, Russia, health reform.

JEL Classification: I13, D81

1. Introduction

In the face of a stagnating economy, growing fiscal restrictions and increasing population demands, Russia – like other countries – is facing important questions concerning how best to finance its health care system. Under the current (1993) Russian Constitution, health care is provided free for all and minimum standards for each year are set through a Program of State Guarantees (PSG). However, there is growing evidence that this approach is faltering, that health care is not distributed either fairly or evenly and that there are both adverse selection and moral hazard effects in Russia's health economy. Health care expenditures are rising steadily and, with the government finding it difficult to finance care within the scheme, there are plans to introduce a new PSG with some health services to be removed from the 'free' list and placed within the voluntary health insurance sector.

Rather worryingly, despite the speed at which these plans are being implemented, there is little by way of empirical evidence exploring how such changes will be received by the population, or what type of co-financed schemes might perform well in the Russian context. Our research addresses this gap in three important ways: first, we elicit individual, willingness-to-pay (WTP) based preferences for a possible cooperative health insurance scheme among the Russian population; second, using data on the attitudes of respondents to risk, we explore the link between risk-aversion and the willingness to pay for such a scheme; and third, we explore the potential for cognitive bias to impact the findings of these types of attitudinal studies.

Our empirical results show that income has a permanent positive effect on the WTP for cooperative health insurance and that there is an appetite for progressive redistribution among the population. This is important since, unsurprisingly, less wealthy individuals (pensioners and rural residents) and the chronically ill express less support for this type of scheme in comparison with other groups. We also find strong evidence of a positive association between risk aversion and the WTP and show that understanding cognitive bias in the population is important for the design both of research and of policy.

In terms of policy, we conclude with the strong recommendation that the government should consider the introduction of a broad based cooperative health insurance scheme, since it will enhance the availability of medical care and meet the shortfall of funding in the sector without passing the entire burden on to the consumer. As well as reducing problems of moral hazard and adverse selection, cooperative health insurance will help to address the informal payments that are notoriously widespread in the Russian health sector.

The paper proceeds as follows. In section 2 we situate the ongoing Russian health care reforms within the relevant literature. Section 3, our methodological section, briefly reviews

the state of the art in various approaches, including contingent valuation, conjoint analysis and choice-based modelling approaches, to evaluating the population's willingness to pay and risk aversion. This section produces two testable hypotheses, which are explored empirically and presented in sections 4 and 5 respectively. The final section discusses and interprets our findings and provides policy implications.

2. Reforms in the Russian health care system

The Russian populations' entitlement to health care free at the point of delivery is enshrined in the 1993 Russian Constitution (Constitution 1993) and reiterated annually through Government Decrees, regulating the provision of healthcare with respect to the Constitution by agreeing the PSG each year. These standards 'define' the conditions and illnesses, which are treated at the expense of public funds, the sources of funding, and the average quantity and prices for different types of medical service. Medical care included in the PSG is financed from two major sources: the mandatory health insurance pool and the budget.

In reality, since it does not precisely define which (or how) services should be utilised for which conditions, the PSG leaves room for 'negotiation' among the stakeholders. This negotiation space, and the mismatch between the potential demand on the state's guarantees and the actual financial resources available gives rise to several systemic inefficiencies. First, since there is an excess of patients, doctors have some control over how and where they exercise their efforts. In particular, they are able to avoid 'problematic' patients (e.g. the elderly, patients with chronic illnesses etc) in favour of cherry picking 'easier' patients and so, without regulation, a version of adverse selection becomes embedded in the system. A second and related problem emerges in the form of moral hazard: on the one hand, doctors are able to induce-demand while, on the other hand, patients do not face a meaningful set of price signals to guide their consumption. Both the adverse selection problem and the moral hazard problem give rise to inequity and inefficiency. These problems are further exacerbated by Russia's geographic size, across which, health services are unevenly located. In most small towns and in rural areas the quality of services provided is very low, waiting lines are long and/or some types of care are not available (Ukhova and Kucheryavenko 2015).

In addition to the PSG, the population can 'top-up' through the purchase of voluntary health insurance. Voluntary health insurance (VHI) first appeared in Russia in 1991, in the immediate aftermath of the communist system, as the provision of health care became less centralized. For most Russians though, the cost of VHI is prohibitive and, by 2014, spending on VHI accounted for only 1.7% (3.5%) of total (private) spending, representing a little over

5% of all medical appointments (BusinessStat, 2016) which is largely located in Moscow and St. Petersburg and there is principally provided through large corporate entities purchasing health insurance for their employees. Nevertheless, the health insurance market is growing and the number of VHI contracts has increased from around 6.6 million in 2000 to almost 11.4 million in 2016 (Russian Bureau of Statistics, 2018).

Notwithstanding this relatively narrow market share, several VHI plans are available. The majority concentrate on outpatient care, with a minority providing cover for inpatient care, and fewer still covering outpatient medicine and with dental care excluded entirely from the PSG. Indeed, in contrast to the original assumption that VHI would cover services excluded from the PSG, in the absence of a clear policy directive, VHI has actually focused on providing a supplementary form of cover through offering a means to access better medical technologies and facilities, enhanced choice, shorter waiting lists and better material conditions. As in some other European countries the socioeconomic status of VHI policy holders tends to be higher with policy holders typically earning more, working for large companies and living in big cities. This highlights the challenge of ensuring affordable access to VHI for the more marginalized social groups, including the elderly, those who are disabled or suffer from chronic conditions and poorer households (Sagan and Thomson 2016b). Moreover, not only are these vulnerable groups unable to afford VHI they are often excluded or even offered a higher price for the same insurance. Russian insurers are generally free to explicitly reject applications, or to implicitly discourage them through charging higher premiums for pre-existing conditions, by rating premiums on the basis of individual health risk, and by setting strict limits on the benefits.

This combination of healthcare financing has given rise to inequalities and inequities in the distribution of health care with some people over consuming ‘free’ medical services, while much of the population lacks access to basic care provision of sufficient quality. To overcome these drawbacks there are ongoing efforts exploring ways to make the PSG more effective by requiring it to cover the full costs of a more narrowly defined range of medical services and to do so with improved efficiency. To this end, a non-arbitrary threshold level of cost-effectiveness ratio for services that are fully covered will be determined by the budget constraint; and services that have a ratio below the threshold level will have to be (at least partially) financed by private sources.

While these reforms will increase the economic efficiency of the PSG and enhance its sustainability, they will also likely exacerbate some of the equity and access problems referred to above. To mitigate against these unavoidable effects the government is currently exploring several voluntary insurance schemes that can cover services not included in the renewed PSG.

One such scheme that meets this criterion is a ‘cooperative health insurance’ scheme through which an individual receives coverage for medical services not included in the PSG but with a fair cost-effectiveness ratio mirroring equivalent service principles. The basic idea is that when a person pays an insurance premium of X for a one-year contract, the government then contributes an equal sum that makes the insurance cooperative, doubles the total payment and increases total coverage.

A prime example of this type of cooperative health insurance is China’s ‘New Cooperative Medical System’ (NCMS), introduced in 2002. The NCMS is administered at a rural (county) level with contributions made from local governments’ budgets (Zhang et al. 2010). The program, which had become almost universal (in rural areas) by 2009, is seen as a successful mechanism for guaranteeing adequate medical care to individuals who had previously lacked access to care. Funding for the program covers 20-30% of total medical expenditure but is expected to rise, as demand for this insurance grows in China (Brown and Huff 2011).

3. Methodological approach

The central aim of this paper is to elicit population preferences for a cooperative health insurance system in Russia. There are 3 prevailing methodologies for preference elicitation in this context: choice modelling, conjoint analysis and contingent valuation. We comment on each one of these briefly before explaining why our preferred choice is contingent valuation.

In choice modelling individuals are presented with a set of alternatives (e.g. products or services) that have different attributes and are asked to choose one (Lancsar and Louviere 2008). In doing so, the individuals are assumed to have ‘revealed’ their preferences, either in an experimental setting (stated preference modeling) or in an actual consumer market scenario (revealed preference modeling). Conjoint analysis is also based on the concept of attributes: the respondents are again presented with a set of products with different features/attributes and are forced to rank or make trade-offs between products and product features, much as buyers are forced to do when shopping. In each question the combination of attributes changes. This allows for the indirect elicitation of attribute values, or ‘part-worths’, based on the ranking (Veinien 2007).

In contrast to choice-based approaches, conjoint analysis or ratings-based methods, the approach to value elicitation in the contingent valuation method is whole-product focused, in which respondents are asked to identify their maximum willingness to pay (WTP) for a given discrete improvement, a particular new product or new service. The typical format of the

contingent valuation question, and the one adopted in this research is: what is the maximum amount of money you are willing to pay, sacrifice or exchange to receive ‘a good’ (or to avoid ‘something undesired’)? We adopt the contingent valuation approach, in preference to choice modelling and conjoint analysis, principally because we do not seek to partition cooperative health insurance into distinctive attributes. Indeed, we are specifically only interested in the principal attribute of cooperative health insurance – its price – and did not want to complicate this by creating a more complex product in the mind of respondents.

The contingent valuation method, as with the alternatives, is not without drawbacks and can be undermined by, for example, starting point bias, sample selection bias, ‘warm-glow’ bias, and hypothetical bias. In designing our methodology, we therefore follow the recommendations of Arrow et al. (1993): to conduct interviews personally or over the phone; to format the question as one of WTP for a referendum; to provide respondents with the option of abstaining from voting; to remind respondents that their WTP for a referendum would reduce their remaining budget for other goods. The data used in this paper therefore satisfies these guidelines but we acknowledge that hypothetical bias may still be present, since there are no actual monetary consequences (Kerr 2001).

Closely related to an individual’s willingness to pay is their degree of risk aversion. Prior work has shown that individuals differ in their attitudes towards risk and their participation in gambles (Pratt 1964; Arrow 1971). Individuals that prefer having a sum of money (certainty equivalent) to an expected monetary value of a gamble are termed risk-averse. For any individual with a given utility function of wealth $U(W)$, there is a numerical measure of the degree of risk aversion called the Arrow-Pratt measure of absolute risk aversion (ARA):

$$ARA = \frac{-U'(W)}{U''(W)}, \text{ where}$$

$U(W)$ is a utility function and W represents individual wealth.

It is possible to calculate ARA from a respondent’s answer to a standard lottery question:

Imagine that N people participate in the lottery with a prize of Z rubles. What is the most you would be willing to pay for a ticket in this lottery?

If we denote Z as the price of the lottery, $\alpha=1/N$ the probability of winning the lottery, and λ the price of the lottery ticket (a proxy for the certainty equivalent of this gamble) then, following Hartog, Ferrer-i-Carbonell and Jonker (2002), a simple measure of ARA based on these three variables can be derived using a Taylor expansion, simplified as follows:

$$ARA = \frac{(\alpha Z - \lambda)}{\left(\frac{\lambda^2}{2} + \frac{\alpha Z^2}{2} - \alpha \lambda Z\right)}$$

Risk aversion influences the consumption of products, including health insurance, that are associated with risk. It has long been established (Friedman 1974) that the degree of risk aversion influences the choice among different health insurance plans and there is a large literature relating the transmission mechanism to personal characteristics. Bellante and Green (2004), Schmitz (2011), Kim and Lee (2012) and Gandelman and Hernandez-Murillo (2013) all demonstrated that the degree of risk aversion in health depends on personal characteristics such as gender, age, education and health status. Bellante and Green (2004) found evidence that risk aversion increases with age. Kim and Lee (2012) showed that risk aversion increases for older, married and more educated individuals, while Schmitz (2011) argued that individuals in poorer health are less willing to participate in gambles in general and particularly those associated with their health status. Gandelman and Hernandez-Murillo (2013) showed that happiness and health satisfaction are linked to risk aversion.

Turning now to how these approaches have been operationalised specifically within the WTP literature, Dong et al. (2005) and Mathiyazhagan (1998) found a positive relationship between income and WTP for health insurance generally, while Brown and Huff (2011) confirmed this positive relationship in the specific case of cooperative health insurance. Education typically has a significant positive effect on the WTP for health insurance and is considered as a proxy for familiarity with the health system (Zhang et al. 2006; Gustafsson-Wright et al. 2009; Almualm et al. 2013). Mataria et al. (2006) showed that those having a steady job report a higher WTP than other employment categories (unemployed, pensioners and students). Almualm et al. (2013) found evidence of a positive effect of chronic conditions on WTP for (mandatory) health insurance. Married respondents tend to report higher WTP compared to other marital status categories (Shafie and Hassali 2013), a result which carries across into cohorts of elderly respondents too (Bock et al., 2014). Adebayo et al. (2014) is typical in demonstrating that other significant factors influencing the WTP for health insurance include gender, age, and place of residence; specifically, living in rural areas remote from big conurbations negatively affects the WTP for health insurance (Asgary et al. 2004).

We also consider a further important insight from the multidisciplinary research spanning psychology (Holtgraves and Skeel 1992; Haselton et al. 2005), sociology (Beckert and Lutter 2013) and economics (Oechssler et al. 2009). This is that people tend to make errors in calculating their chances of winning the lottery - a phenomena that is known in the literature

as ‘cognitive bias’. Cognitive bias can result in either over- or underestimation of the chances of winning. This is important and, as an extension to our results, we study how cognitive bias may affect people’s risk aversion and their consequent choice of insurance plan in Russia.

Bringing this back into the Russian context we can therefore identify two empirically testable hypotheses: (i) WTP for cooperative health insurance will be significantly and positively related to income, education, and health status, as well as in predictable ways to a range of individual characteristics including, employment status, marital status and place of residence; (ii) risk aversion will be positively and significantly related to the price of cooperative health insurance - that is, more risk-averse individuals will choose more health insurance coverage.

4. Data and empirical approach

Our data is drawn from a bespoke social, economic and health survey conducted in April 2014 by the Levada-Center, an independent Russian polling agency established in 2003.¹ The survey is based on representative samples of the urban and rural population, aged 18 and over, and is drawn from the 8 Federal Russian districts (Central, South, North-West, Volga, North Caucasus, Siberia, Ural and Far East), according to a sample design based on the data from the 2002 Census, updated by Rosstat in 2009. Within each region, several strata of settlements are defined, taking into consideration: administrative status, population size, and their relation to autonomous republics inside Russia. All cities with more than 1 million inhabitants are incorporated within 5 settlement groupings distributed in proportion to the adult population resident in them. This gives rise to 130 Primary Sampling Units (PSU), comprising of 94 urban settlements and 36 rural settlements, spanning 45 subjects of the Russian Federation. The Secondary Sampling Units (SSU) are then selected in cities and rural areas according to random draws of electoral districts and rural settlements respectively. At the level of the SSU, households are selected according to the ‘random route’ method, with every 17th household (5th) in high-rise (individual) buildings being targeted (up to 3 times) and, within each household, respondents are selected according to the birthday method: the person who has the next birthday is selected for interview. When selected, sex-by-age and sex-by-education quotas are observed. If either quota has been filled, another person is selected for the interview. The 2014 April survey covers 1,602 individuals and provides us with a rich set of socio-economic

¹The survey was sponsored by the UCL School of Slavonic and East European Studies (UCL SSEES). The authors were directly involved in helping to formulate the attitudinal instruments within the survey.

and demographic variables as well as a suite of questions to explore our research hypotheses. To ensure that the sample mirrors national statistics, the Levada Center weights the data by sex, age, education, region and settlement type.²

The survey instrument defines cooperative health insurance in the following way: *Let's assume that the Russian government introduces voluntary medical insurance with governmental co-financing: you make an annual payment of X for such insurance and the government makes an equal contribution. This doubles your payment. The insurance contract allows you to receive medical care in state and private clinics except for dental care and the treatment of self-inflicted injuries.*³ We make clear to respondents that enrolment into this insurance scheme is going to be on an individual basis, and then ask them (question 5) whether they would be willing to buy such insurance. If a respondent responds positively to question 5, he/she is then asked question 5A, which seeks to assess the monetary extent of his/her willingness-to-pay for cooperative health insurance.

In contingent valuation, the WTP question can have different formats. It can be phrased as an open-ended question, a closed ended accept/reject referendum, a bidding game or payment card/payment scale approach (Frew et al., 2003). In our study, we apply the later – payment card – mechanism to allow the respondents to adjust their answers appropriately in the context of the current prices for medical insurance and the perceptions of quality prevailing. The existing literature has demonstrated that both willingness-to-pay and demand for health care services depend on the perceived quality of the services offered (Chawla and Ellis 2000; Habbani et al. 2006).⁴ Our methodology for assessing willingness-to-pay, drawing on marketing research on product pricing, reflects this concern with quality (Van Westendorp 1976; Marbeau 1987). These approaches recognize that there are upper and lower limits of a product's price for every individual. While the upper limit is usually defined by the budget constraint; the lower limit is related to perceptions of product quality. In both methods, there are therefore questions which ask below which price a respondent would not buy the product because of quality concerns (Breidert et al. 2006). The instrument in our survey (question 5A) therefore asked respondents '*what minimum sum of money would you be WTP annually for*

² The statistical error of the survey does not exceed 3.4%.

³ It is worth noting that, in Russia, all VHI plans are similar. Basically, under VHI, all services in clinics and hospitals that work with a particular insurance company are available for a policy holder except dental care and treatment of self-inflicted injuries. If/once the cost of services exceeds the level of insurance coverage during a year, the insurance is terminated. Since all VHI plans are very similar, the situation when the choice of services included in the cooperative health insurance influences a person's choice of policy is very unlikely.

⁴ The fact that individuals might have different perceptions of quality is not of primary importance here since his/her unique perception is one of the subjective factors on which an individual bases his/her WTP.

cooperative health insurance provided that you are sure that you would receive services of good quality'. This question is accompanied by a series of choices on the payment card based on the average regional prices for medical insurance.

The average price for one-year of medical insurance coverage in 2014 was approximately 200 US dollars or 7,000 rubles. In the spirit of a cooperative health insurance scheme in which an individual pays 50% and the regional government pays another 50%, the median choice on the payment card was set at 3,500 rubles. By using cards as visual prompts, respondents to question 5A were invited to indicate amounts above or below the average regional price 'offer' (see Appendix 1). The maximum value of 9,000 rubles corresponds to 50% of the maximum price for medical insurance of 18,000 rubles or approximately 515 US dollars that was offered in 2014 in big cities of Russia. To address the possibility of starting point bias (or anchoring), which occurs when higher offer prices are correlated with higher WTP (Smith 2006), we included a card with a very low figure of 500 rubles (14 US dollars). The mean response of our respondents was 2,486 rubles (68 US dollars). The wording of the question also deliberately excluded the possibility of respondents giving a WTP value reflecting an expectation of poor quality health care.⁵

From our respondents, there were 329 (21%) who indicated a WTP for cooperative health insurance, of whom 304 provided numeric answers to question 5A. In view of: the relatively low levels of income in the population; the embedded tradition of healthcare free at the point of delivery; the prevailing law guaranteeing all Russian citizens access to essential medical services for free within the public health system; and the absence of familiarity with health insurance schemes, this represents a surprising core of potential support for the introduction of cooperative health insurance. We base our subsequent exploration on an analysis of this sub-sample.⁶

The risk aversion instrument (question 8) in our survey reads: *'Imagine that 10 people participate in a lottery with a prize of 30,000 rubles. What is the most you would be willing to pay for a ticket in this lottery?'* Possible answers include: giving a precise valuation; indicating definite non-participation; or simply responding with 'cannot answer'. Applying the approach outlined in section 3 above, question 8 implies values for Z and α of 30,000 and 0.1 respectively. Appendix 2, which presents the distribution of answers to question 8, shows that the proportion

⁵ A subsequent question (5D) asked respondents to provide an estimation of a lower price of insurance at which they would question the quality of services provided.

⁶ In our regressions, this sample is reduced further due to missing information for illness (N=299) and the information required to calculate the Arrow-Pratt measures (N=261).

of ‘I would not participate in the lottery’ answers is large in absolute number (56%) as well as relative to other studies (6-12% in Hartog et al. (2002); 38% in Guiso and Paiella (2008)). This likely reflects the lack of familiarity and/or trust of the Russian population with this kind of choice. To investigate the characteristics of the non-participant groups we run a series of regressions, finding that non-participants are older, less healthy and more likely to be female, while non-respondents are more likely to reside in small towns and villages and therefore are less likely to ‘understand’ insurance than non-participants.⁷ In calculating the value for λ , we follow the framework of Hartog et al. (2002) and treat answers ‘I would not participate in the lottery’ as expressing extreme risk aversion (implying $\lambda=0$) and the non-respondents are coded as missing. Appendix 3 details the consequent distribution of the ARA measure ($A-P$), calculated from the lottery question (Q8) for the sample with complete information.

The demographic and socioeconomic characteristics in our data mirror those used in other studies of individual preferences in health care (e.g. Mathiyazhagan 1998; Kerssens and Groenewegen 2005; Zhang et al. 2006; Brown and Huff 2011; Baji et al. 2013). Appendix 4 presents definitions and summary statistics for the variables and sample used in our main analysis: gender, age, three levels of education, place of residence, employment status, marital status, and income classification,⁸ self-assessed health and an indicator of chronic illness.⁹ Females (52%) outnumber males, the average age is 42 years and the majority of individuals (61%) belong to the third income group (‘we have enough money to buy food and clothes but not durable goods’). Almost three-quarters of our sample are employed and 69% are married, with 60% having attained secondary education and 32% having attained higher education. Thirty-two percent of individuals report having a chronic illness. Ten percent live in Moscow or St. Petersburg and another 20% reside in regional capitals. These figures are qualitatively similar to those found in the general population, though are of a slightly higher socioeconomic status. This is to be expected given that the potential participants in cooperative health insurance are likely to be younger, better educated and with higher incomes.

We now return to the two hypotheses set out at the end of section 3. We test, in turn, the determinants of the WTP for cooperative health insurance, with and without accounting for risk

⁷ Results are available from the authors upon request.

⁸ Respondents were asked to choose between six responses reflecting their subjective income status.

⁹ Choice of cooperative health insurance could in practice be influenced by having/not having voluntary health insurance (VHI). Question 7 asked about reasons for not being willing to participate in the cooperative health insurance scheme. It was an open-ended question and only 5 out of 326 individuals with VHI (1.5%) stated that VHI was a reason for not wanting to participate in the new proposed scheme. Given such a low proportion (1.5%) we did not specifically control for VHI as a possible factor influencing choice of the new scheme.

aversion, by running three types of regressions in each case. We first run a straightforward OLS regression, based on the premise that the dependent variable, drawn from Q5A (above) is effectively continuous.¹⁰ To allow for the likelihood that the WTP responses fall in broad categories reflecting an ordinal hierarchy of WTP we then converted the dependent variable into 3 categories ('less than 1,000'; 'between 1,000 and 1,700; and 'over 1,700') and run an ordered logit model. The first category contained 19.08% of responses, the middle category – 38.8% and the third category – 42.11%. Finally, allowing for the possibility that these categories have additional characteristics that make ordering impossible, we run a multinomial logit model.

We contend that the multinomial logit model best captures the empirical reality of the Russian health insurance market. Indeed, the risk profile that corresponds to each category of insurance is an example of the sort of characteristic that makes ordering unlikely. For example, for a person with a lower initial stock of health, insurance contracts with lower prices may be inaccessible because the insurance provider would be reluctant to sell it. Alternatively, some people may prefer contracts with low coverage because of a strong sense of high self-assessed health. In this case, the price of the insurance is not the only characteristic according to which the contract can be ordered.

5. Results

Turning first to the results without controlling for risk aversion, we observe a significant and positive effect of income on the WTP for cooperative health insurance across all 3 equations. As higher premiums usually mean more insurance coverage, we infer that richer citizens are more likely to pay for more medical services, including for services beyond those included in the PSG. Even controlling for income, we find some evidence in the OLS and ordered logit regressions, that education has a positive impact on WTP, consistent with the thesis that education is a proxy for the ability to comprehend health insurance. Among the demographic variables, we find the expected non-linear relationship with age, so that individuals demand more health insurance as they age but do so at a decreasing rate. Accordingly, in our multinomial specification and OLS we find strong evidence that pensioners are WTP significantly less for cooperative insurance. In the OLS and ordinal estimates, single respondents, who tend to worry less about their health in comparison with those who have families and children (Brown and Huff 2011) are willing to pay less for insurance. As expected,

¹⁰ The 'cannot answer' choice in Q5A is coded as missing and the 'over 9000' (13 observations) choice is changed to the arbitrary selected figure of 10,000 in order to substitute a qualitative answer with a numeric value.

those in small towns and villages, where knowledge of and familiarity with health insurance is lower, are also less WTP for health insurance. Finally, contrary to the expectation of our first hypothesis, we find weak evidence (only in the ordered estimate) of a negative effect of the presence of a chronic condition. One possible explanation for this effect is the existing supplementary coverage through special programs that target specific chronic conditions. For example, individuals with an ‘invalid status’ can access regular medical checkups and be in receipt of free drugs. This additional coverage therefore results in lower demand for voluntary health insurance programs.

(TABLE 1 ABOUT HERE)

In table 2, we present the results inclusive of the additional risk aversion proxy. There are minor changes in comparison with the results presented in table 1 and described above. Specifically, the age and secondary education variables become non-significant in the ordered regression while the effect of lower WTP for single respondents is reinforced via its significant coefficient in the multinomial regression. With this minor qualitative distinction in mind, we turn our attention to risk aversion, which we find to be positively associated with WTP, but only in the multinomial specification. One possible explanation for the non-significance in the first 2 models stems from the ordering of the dependent variable. This ordering is performed with regard to insurance coverage, so that the more expensive insurance will necessarily include a greater number of medical services. This being so, when choosing the amount of ‘ordered’ coverage an individual bases their choices on his or her potential demand for this or that medical service in the upcoming period. We know that socioeconomic, demographic and health-related factors are the primary drivers of expected demand for services and not risk aversion *per se* and this might explain why risk aversion is not significant in these models.

(TABLE 2 ABOUT HERE)

The assumptions underpinning the multinomial approach are different. In effect, we introduce risk profiles corresponding to each category of insurance (making ordering impossible) and this captures the more compelling logic that individuals actually take into account their stock of health, self-assessed health and possible health risks when valuing each category of insurance. Insurance contracts are more expensive when they account for a greater number of risks. In this way, more risk-averse individuals insure against a greater number of risks when buying expensive insurance. The significant and positive effect of *A-P* within the less-restrictive multinomial framework therefore provides support for our second hypothesis that more risk-averse individuals tend to choose more insurance coverage. As explained earlier, this is in line with prior studies (e.g. Hartog et al. 2002; Schmitz 2011).

Cognitive bias in contingent valuation

To explore the robustness of the positive and significant effect of the risk aversion proxy, in this section, we allow for cognitive bias in the calculation of the Arrow-Pratt measure. Cognitive bias is the ‘pattern of deviation in judgement, whereby inferences about people and situations may be drawn in an illogical fashion’ (Haselton 2005). In our context, cognitive bias can result in over or underestimation of the chances of ‘winning’. For example, overestimation can occur because of *representative bias*, a tendency of people to judge the randomness of an outcome as a function of its irregularity and local representativeness (Kahneman and Tversky 1972). For a lottery player who had lost several times previously, expectations of winning in the next round would correspondingly increase.

Let us assume that respondents of our survey overestimate their chances of winning when they respond to question 8 by incorrectly calculating the probability of winning as $1/6$ instead of $(1/10)$. In practice, we can pick any number less than $(1/10)$ to introduce overestimation of chances or an ‘optimistic’ cognitive bias. For these individuals, the expected value of the lottery would be $30,000 \times (1/6) = 5,000$. Using this information, we can recalculate the Arrow-Pratt measure, defining an ‘optimistic’ Arrow-Pratt measure as $A-P_{5000}$. Similarly, assuming a probability of $(1/30)$ instead of $(1/10)$, we can define a ‘pessimistic’ absolute Arrow-Pratt measure as $A-P_{1000}$. This renders a third testable hypothesis: (iii) the presence of cognitive bias (both optimistic and pessimistic) will have a significant effect on the willingness to pay for cooperative health insurance and will produce different outcomes compared to the case of no cognitive bias.¹¹

(TABLE 3 ABOUT HERE)

Referring to table 3, we find evidence, consistent with hypothesis 3, that cognitive bias does matter. The effect of the ‘optimistic’ Arrow-Pratt measure on the WTP for the cooperative health insurance is the same as the effect of the original Arrow-Pratt measure: more risk-averse respondents choose more coverage. However, the coefficient for the $A-P_{5000}$ in category 3 is significantly higher than the coefficient of $A-P$ for the same category. It means that the relative probability of choosing more expensive coverage for category 3 relative to category 2 ($WTP \in [1000; 1700]$) is higher when people tend to overestimate their chances of winning the lottery. Correspondingly, the effect of the ‘pessimistic’ Arrow-Pratt measure, $A-P_{1000}$, is smaller than for $A-P$ indicating that, as we would expect, the demand for expensive coverage is lower when

¹¹ To preserve space we only assess the impact of cognitive bias on the multinomial regression (from table 2) but the results (available on request) based on the other two specifications are not qualitatively affected.

the chances of winning are underestimated. In neither case is the significance or sign of the other variables affected.

6. Discussion and Conclusions

Healthcare provision in Russia faces great challenges. The demand for medical care is sure to outstrip the capacity for the state to guarantee its supply. Removing some services from the guaranteed package is an option that is receiving serious consideration. In this paper, using attitudinal population survey data, we examine the plausibility and likely success of initiatives to introduce a cooperative health insurance program alongside the core state package, guaranteed through mandatory health insurance. We make 4 main claims.

First, our data suggest that there would be limited but substantive interest in such a policy. Over a fifth of our respondents indicated that they would be willing to pay for additional insurance of this type. Among these people we confirm that those in higher income groups are willing to pay more for this type of insurance. This is encouraging in that it suggests that the financial contributions of more affluent citizens represent a potentially stable source of funding to sustain a cooperative health insurance scheme. It would appear therefore that Russia has the requisite residue of social solidarity to underscore a progressive redistribution mechanism within the health economy (James and Savedoff 2010). That is, the share of the income that wealthier respondents are WTP for cooperative insurance can be partly redistributed to subsidize the insurance premiums of the less well off. Consistent with this headline socio-economic claim, we also find that individuals with secondary and higher education, the middle-aged, those in good health and from big cities are more likely to support cooperative health insurance. In related research, Gerry et al. (2017) find that only the chronically ill and low-income group respondents indicated a willingness to join a drug insurance scheme being proposed and piloted in Russia. This highlights the importance of policy design, since tapping into the population's willingness to pool risks is not straightforward. In contrast to cooperative health insurance, which offers the possibility of accessing a wide-range of medical services with enhanced speed and quality, the drug insurance scheme offers simply the option of purchasing drugs with a discount. This proposition is not attractive to affluent respondents who prefer to cover these specific costs, should they occur, out-of-pocket and they don't perceive that they will need help in accessing quality drugs.

Secondly, and as importantly, we show that the chronically ill, pensioners, single respondents and those residing in small towns and rural villages are likely to be significantly less WTP for cooperative health insurance. Enticing some of these groups in to cooperative

health plans, through information campaigns, special service provision or tax discounts will therefore be an important policy task for the government. Equally, accepting that there is a part of the population that is likely to find it difficult or impossible to participate is an important reminder of the need for social assistance protection for the most disadvantaged.

These two findings imply that the process of reassigning health services from the core package to the cooperative VHI should both be gradual, particularly during the early stages of reform, and should be oriented towards quality, for example, through the provision of higher spec implants or original drugs. The improved quality could be decisive in attracting the affluent parts of the population who are more willing to pay for additional insurance and would not harm those who cannot afford it.

Similarly, this would allow the core package to be incrementally reduced by carefully targeting the removal of services more likely to be taken up by the affluent (e.g. implants) or for which basic, cheaper, alternatives exist. However, as explained earlier, many Russians have constrained access to health care services and so the reform of VHI should extend the opportunity and incentive for enhanced coverage without exacerbating access problems for those who will not be able to purchase VHI. The gradual and cautious approach we call for will not only facilitate, in conjunction with the type of public health initiative referred to above, but will also allow a lead in period to work towards the eventual setting of an efficiency-oriented [threshold level of cost-effectiveness ratio for services to be retained in the PSG](#).

Consistent with other literature, our third main claim is that risk aversion shapes the demand for health insurance: more risk-averse individuals try to minimize the probability of the occurrence of risk by buying more insurance. Risk aversion is not observed by the insurer but in this case information asymmetry does not lead to adverse selection; it is a source of the opposite, ‘advantageous selection’ (Schmitz 2011) that results in a high share of low risk individuals in the health insurance risk pool.

Finally, cognitive bias alters the scale of the positive effect of risk aversion on WTP. According to psychologists, such as Griffiths (2012), overestimating the chances of lottery success occurs much more frequently than underestimation for reasons such as wishful thinking or representative bias. This means that in practice total financial inflows from positively biased risk-averse individuals in to insurance systems are almost always higher than under the assumption of no bias.

References

Adebayo, E.F., Ataguba, J.E., Uthman, O.A., Okwundu, C.I., Lamont, K.I., & Wiysonge, C.S.

- (2014). Factors that affect the uptake of community-based health insurance in low-income and middle-income countries: a systemic protocol. *BMJ Open*, doi:10.1136/bmjopen-2013-004167
- Almualm, Y., Alkaff, S.E., Aljunid, S., & Alsagoff, S.S. (2013). Factors influencing support for National Health Insurance among patients attending specialist clinics in Malaysia. *Global Journal of Health Science*, 5(5), 1–10.
- Arrow, K.J. (1971). *Essays in the theory of risk-bearing*. Amsterdam: North-Holland.
- Arrow, K., Solow, R., Portney, P., Leamer, E., Radner, R., & Schuman, H. (1993). Report of the NOAA panel on contingent valuation. *Federal Register*, 58, 4601–4614.
- Asgary, A., Willis, K., Taghvaei, A.A., & Rafeian M. (2004) Estimating rural households' willingness to pay for health insurance. *European Journal of Health Economics*, 5(3), 209–215.
- Baji, P., Pavlova, M., Gulasci, L., Farkas, M., & Groot, W. (2014). The link between past informal payments and willingness of Hungarian population to pay formal fees for health care services: results from a contingent valuation study. *European Journal of Health Economics*, 15(8), 853–867.
- Beckert, J., & Lutter, M. (2013). Why the poor play the lottery? Sociological approaches to explaining class-based lottery play. *Sociology*, 47(6), 1152–1170.
- Bellante, D., & Green, C.A. (2004). Risk aversion among elderly. *Review of Financial Economics*, 13(3), 269–281.
- Bock, J.-O., Heider, D., Matschinger, H., Brenner, H., Saum, K.-U., Haefeli, W. E., & König H-H. (2014). Willingness to pay for health insurance among the elderly. *European Journal of Health Economics*, doi: 10.1007/s10198-014-0663-8
- Breidert, C., Hahsler, M., & Reutterer, T. (2006). A review of methods for measuring willingness-to-pay. *Innovative Marketing*, 2(4), 8–32.
- Brown P., & Huff, T. (2011). Willingness to pay in China's New Cooperative Medical System. *Contemporary Economic Policy*, 29(1), 88–100.
- BusinesStat. (2016). 2011-2015 , 2016-2020 (Tech. Rep.). BusinesStat. Retrieved from <http://businessstat.ru/russia/services/health/medicine>
- Chawla, M., & Ellis, R.P. (2000). The impact of financing and quality changes on health care demand in Niger. *Health Policy*, 15(1), 76–84.
- Constitution of the Russian Federation. (1993). Available at: <http://www.constitution.ru>. Accessed 15 July 2015.
- Dong, H., Kouyate, B., Cairns, J., & Sauerborn, R. (2005). Inequality in willingness-to-pay for

- community-based health insurance. *Health policy*, 72(2), 149–156.
- Friedman, B. (1974). Risk aversion and the consumer choice of health insurance option. *Review of Economics and Statistics*, 56, 209–214.
- Frew, E.J., Whynes, D.K, & Wolstenholme, J.L. (2003). Eliciting willingness to pay: comparing closed-ended with open-ended formats and payment scale formats. *Medical Decision Making*, Mar-Apr, 150–159.
- Gandelman, N., & Hernandez-Murillo, R. (2013). What do happiness and health satisfaction data tell us about relative risk aversion? *Journal of Economic Psychology*, 39, 301–312.
- Gerry C., Kaneva M. & L. Zasimova (2017). Reforming voluntary drug insurance in Russian healthcare: does social solidarity matter? *Health Policy*, Vol.121(11), 1177-1185.
- Gustafsson-Wright, E., Asfaw, A., & van der Gaag, J. (2009). Willingness to pay for health insurance: an analysis of the potential market for new low-cost health insurance products in Namibia. *Social Science and Medicine*, 69(9), 1351–1359.
- Guiso L., & Paiella, M. (2008). Risk aversion, wealth and background risk. *Journal of European Association*, 6(6), 1109–1150.
- Griffiths, M. (2012). Everyone is a winner? The role of cognitive bias in lottery playing. Available at: <https://drmarkgriffiths.wordpress.com/2012/02/03/everyones-a-winner-the-role-of-cognitive-biases-in-lottery-playing/>. Accessed 11 June 2015.
- Habbani, K., Groot, W., & Jelovac, I. (2006). Household health-seeking behavior in Khartoum, Sudan: The willingness-to-pay for public health services if these services are of good quality. *Health Policy*, 75(2), 140–158.
- Hartog, J., Ferrer-i-Carbonell, A., Jonker, N. (2002). On a simple measure of individual risk aversion. *Kyklos*, 55(1), 3–26.
- Haselton, M.G., Nettle, D., & Andrews, P.W. (2005). The evolution of cognitive bias. In D.M. Buss (Ed.), *The handbook of evolutionary psychology* (pp. 724–746). Hoboken: John Wiley & Sons Inc.
- Holtgraves.T., & Skeel, J. (1992). Cognitive bias in playing the lottery: estimating the odds and choosing the numbers. *Journal of Applied Social Psychology*, 22(12), 934–952.
- James, C., & Savedoff, W. (2010). Risk pooling and redistribution in health care: an empirical analysis of attitudes toward solidarity. World Health Report. Geneva: World Health Organization.
- Kahneman, D. & Tversky, A. (1972). Subjective probability: a judgment of representativeness. *Cognitive Psychology*, 3, 430–454.

- Kerr G. (2001). Contingent valuation elicitation effects: revising the payment card. Paper presented to Australian Agricultural and Resource Economics Society, Adelaide, 23-25 January. Available at: <http://ageconsearch.umn.edu/bitstream/125686/2/Kerr1.pdf>. Accessed 10 October 2015.
- Kerssens, J., & Groenewegen, P. (2005). Consumer preferences in social health insurance. *European Journal of Health Economics*, 6(1), 8–15.
- Kim, Y.-I., & Lee, J. (2012). Estimating risk aversion using individual level survey data. *Korean Economic Review*, 28(2), 221–239.
- Lancsar, E., & Louviere, J. (2008). Conducting discrete choice experiments to inform Healthcare decision making. A user's guide. *Pharmaeconomics*, 26(8), 661–667.
- Marbeau, Y. (1987). What value pricing research today? *Journal of the Market Research Society*, 29(2), 153–182.
- Mataria, A., Giacaman, R., Khatib, R., & Moatti J.-P. (2006). Impoverishment and patients' "willingness" and "ability" to pay for improving the quality of health care in Palestine: an assessment using the contingent valuation method. *Health Policy*, 75(3), 312–328.
- Mathiyazhagan, K. 1998. Willingness to pay for rural health insurance through community participation in India. *International Journal of Health Planning and Management*, 13(1), 47–67.
- Oechssler, J., Roider, A., & Schmitz, P.W. (2009). Cognitive abilities and cognitive biases. *Journal of Economic Behavior and Organization*, 72(1), 147–152.
- Pratt, J.W. (1964). Risk aversion in the small and in the large. *Econometrica*, 32(1/2), 122–136.
- Russian Bureau Of Statistics. (2018) <https://www.fedstat.ru/indicator/31143> Last accessed on July 20, 2018.
- Sagan, A., & Thompson, S. (2016a). Voluntary health insurance in Europe: country experience. Copenhagen: World Health Organization.
- Sagan, A., & Thompson, S. (2016b). Voluntary health insurance in Europe: role and regulation. Copenhagen: World Health Organization.
- Schmitz, H. (2011). Direct evidence of risk aversion as a source of advantageous selection in health insurance. *Economic Letters*, 113(2), 180–182.
- Shafie, A.A., & Hassali, M.A. (2013). Willingness to pay for voluntary community-based health insurance: findings from an exploratory study in the state of Penang, Malaysia. *Social Science and Medicine*, 96, 272–276.
- Smith, R. (2006). It's not just what you do, it's the way that you do it: the effect of different

- payment card formats and survey administration on willingness to pay for health gain. *Health Economics*, 15(3), 281–293.
- Ukhova, D. & Kucheryavenko, O. (2015). Inequality and access to healthcare in Russia. URL: <http://www.globalhealthcheck.org/?p=1745> .Accessed 24 April 2017.
- Van Westendorp, P.H. (1976). NSS-Price sensitivity meter: a new approach to study consumer perception of prices. Venice ESOMAR Congress, Amsterdam: European Marketing Research Society, 139–167.
- Veinsten, K. (2007). Willingness to pay for eco-labelled wood furniture: choice-based conjoint analysis versus open-ended contingent valuation. *Journal of Forest Economics*, 13, 29–48.
- Zhang, L., Cheng, X., Liu, X., Zhu, K., Tang, S., Bogg, L., Dobberschuetz, K., & Tolhurst, R. (2010). Balancing the funds in New Cooperative Medical Scheme in rural China: determinants and influencing factors in two provinces. *International Journal of Health Planning and Management*, 25(2), 96–118.
- Zhang, L., Wang, H., Wang, L., & Hsiao, W. (2006). Social capital and farmer's willingness-to-join a newly established community-based health insurance in rural China. *Health Policy*, 76(2), 233–242.