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The system of disability benefits in Russia

Estimation of targeting accuracy

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This paper investigates the accuracy of targeting in the system of disability benefits in Russia. It describes the principles of benefit provision and compares disability benefits to other sources of social security. Possible approaches to disability measurement are discussed, following by the analysis of disability determinants under different definitions of disabled population. The estimates of targeting accuracy are suggested based on the comparison of self-reported health conditions and status in the social security system. The impact of selected individual, household and infrastructure characteristics on the probability of belonging to the three different groups in the system — complying, abusing benefits and refusing from participation — is investigated.

Keywords. Russia, disability, social security, retirement.

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NON-TECHNICAL SUMMARY

This paper addresses the problem of targeting in the system of disability benefits in Russia. The interest to the topic is caused by the important role played by disability benefits in the national social security system. Over the last 15 years Russia has faced a visible growth of the number of individuals receiving disability pensions, which at the first sight may be seen as an evidence of deteriorating health conditions of the country population. However, some recent studies of disability development around the world suggest that there exists a relationship between the number registered recipients of disability benefits and other indicators, such as generosity of provided benefits in comparison with other available sources of incomes in the economy, unemployment level, or stringency of requirements to the applicants. At the same time, measurement of disabled population can not be seen as a trivial task: obtained estimates may vary significantly depending on the selected approach. Available estimates show that usage of government statistics on the recipients of disability benefits results in significant underestimation of disability comparing to the approaches based on the analysis of functional limitations.

It is therefore unclear whether observed growth of benefit recipients in Russia truly reflects the changes in the population health. If this is not the case, it would be interesting to find a better explanation for this trend: could the changes be caused by alterations in the legislation, availability of easy ways to benefit fraud, changing take-up rates, or simultaneous contribution of these reasons? Given all these problems, the central question of the research is to define how accurately the system allocates money to the targeted recipients, and whether individuals registered with the government agencies are the same as the ones experiencing restrictions in their regular functions and daily activities.

Conducted study of social security for disabled population in Russia and comparison of disability pensions to other types of social benefits has shown that the former have a number of significant advantages in terms of benefit amounts, eligibility, application procedures and maintenance of status in the system. Therefore, the main hypothesis of the paper states that the system does not provide sufficiently accurate targeting, and there exist numerous discrepancies between individual health condition and status within the system of state disability benefits. To test this hypothesis, the paper distinguishes between four groups of individuals. The first two groups comprise individuals fully complying with system requirements: healthy who do not receive disability benefits and benefit recipients in poor health. The other two groups are associated with inaccurate targeting in the system: they include relatively healthy recipients of disability pensions in and individuals with bad health who are not registered with the system.

Estimation of targeting accuracy conducted based on the data of the Russian Longitudinal Monitoring Survey (RLMS) has shown that the rate of discrepancies in the system may amount to 13%, and 2.4% in this number are the cases of benefit fraud. This means that more than 50% of individuals receiving disability benefits in terms of health conditions can not be differentiated from the rest of

adult population. The accuracy of targeting varies with age groups: the most accurate targeting is provided for younger groups, the difference between healthy and disabled gradually disappears with age, and after the statutory retirement age old-age and disability pension can be considered as a voluntary trade-off. Based on the identified relationship between disability and retirement, we can say that disability benefits play a distorting role and substitute for early retirement. Introduction of means-tested system at least for the part of benefits that is not funded on insurance principles, as well as introduction of policies that encourage people with disabilities to work and to stop paying benefits once some level of income is achieved might correct this problem.

It also has been shown that non-participation is associated with lower levels of education. This outcome implies the need to simplify existing application procedures and to improve the flows of information in the system for the benefit of less educated individuals. Emphasis on disability policies that are aimed at provision of accommodation for disabled to work, development of infrastructure, rehabilitation measures (including psychological adjustment) rather than just monetary benefits can also be beneficial for this group. These measures would provide disabled population with more options to get sufficient income and would reduce the psychological and social burden of being disabled. As a result, the rate of applications for disability benefits would fall, the remaining amount would allow to increase payments to the fewer severely disabled individuals.

1. INTRODUCTION

The problem of disability benefits is important for policy making in Russia for several reasons. First, national disability rates have grown significantly since the beginning of social security reforms in the early 90s. In 2003 the number of disabled people increased by almost 30% in comparison with 1985, amounting to 4.4 million or about 3% of the country population. The disability incidence also increased from 6.15 to 8.25 individuals pro mille recognized as disabled respectively in 1991 and 2004 (*Socialnoe polojenie i uroven' jizni naselenia Rossii*, 2004). Because of the forecasted population ageing, it seems likely that the proportion of disability pensioners in the total population will continue to rise. Second, funding of disability benefits represent considerable budgetary concern, and even under ongoing reform of social security system disability pensions are to a large degree funded on a pay-as-you-go basis. Third, disability rates become increasingly important for developing insurance markets, as understanding of disability risks is essential for design and pricing of insurance products. Finally, both state and private insurers need to know the extent to which today's high disability rates reflect true ill-health, as opposed to seeking for additional income.

The last argument draws attention to the issue which is central for this paper: relationship between desire people have to apply for social benefits and various factors defining personal and social context, such as availability of income sources, social and psychological profiles of individuals facing social security system, or stringency of system requirements to successful applicants. Different combinations of these factors may result in benefit fraud in one case, or in voluntary refuse from application for benefits by someone with disability in another. Cases like these create a challenge to any system of disability benefits that is expected to provide accurate targeting and efficient prevention of fraud, but apparently both problems are not resolved within the current system in Russia.

This paper addresses the problem of mismatch between officially recognized disability status and actual health conditions of Russian population. The main objective is to evaluate the accuracy of disability benefits targeting, to investigate factors that determine individual behavior leading to the inconsistency between degree of actual health damage and status within social security system, and to elaborate policy recommendations to improve targeting in the system.

The research focuses on three groups of individuals that arise from comparison of actual health conditions and status in the system of disability benefits:

- *complying* — those whose health conditions correspond to the status in the system, either healthy or disabled;
- *not participating* — those who do not receive disability benefits in spite of poor health that allows to classify them as disabled;
- *abusing* — those in reasonably good health, yet registered with the system and receiving disability benefits.

Members of the last two groups correspond to the two types of targeting deficiencies in the system: benefit fraud and rejection of participation. It is suggested that in the majority of cases these deficiencies can be attributed to the deficiencies of social security system that does not impede deviant behavior among individuals. Investigation of individual behavior patterns would allow to identify the shortcomings of existing system and to elaborate suggestions for improvement of targeting. The main hypotheses of this research were formulated as follows:

- (1) The existing system of benefit allocation does not provide sufficiently accurate targeting.
- (2) Disabled population is a complex phenomenon affected by various economic, social and psychological factors. Numeric estimates of this population may differ significantly depending on the adopted definition, such as registration in the social security system, estimated health conditions or self-reported disability. Disability determinants also vary with selected approach.
- (3) The social security system can be regarded as considerable supplementary source of income in unfavorable economic conditions. This means that some people tend to seek disability status even when their actual state of health allows labor force participation. Therefore, low-income individuals having no support from other members of the household will be more likely to abuse the system. System abusers are also more likely to have unfavorable employment histories, such as long unemployment spells or lasting wage arrears.
- (4) Individuals are more likely to refuse from participation when higher transaction costs are associated with application to the social security agency. Hence, this type of behavior should be more distinctive to the residents of rural areas and settlements with lower degree of infrastructure development. Moreover, people with serious health problems may deliberately avoid application to the social security agencies that is associated with high transaction and moral costs, even when they do not have sufficient alternative sources of income. It is also more difficult for severely disabled people to go through administrative procedures, as a result adverse selection takes place.
- (5) Both abusing and refusing individuals are more likely to change their status in the disability system rather than those whose registered degree of disability is consistent with actual health conditions.

2. LITERATURE REVIEW

Research on disability relevant for this paper covers both theoretical models and empirical results, including Maki (1993), Kreider and Riphahn (2000), and Haveman *et al.* (1991). These studies mainly address the issues of relationship between availability and accessible amounts of disability benefits, measures of the health status, and labor participation rates for different groups of individuals. From this stream of research we do know that disability rates vary considerably over time, and that there is even more variation among the underlying causes of being disabled. In addition, there exist a causal relationship between search for disability benefits and the general economic conditions. During economic decline, many individuals at risk of losing employment or suffering income

decrease can be expected to seek disability support, even if the actual health condition might allow continuing labor force participation. Conversely, individuals may tend to return to labor force as conditions improve, especially if the recovery leads to a real, positive influence on health, either because of improved medical care or for psychological reasons.

A number of papers address the issue of mismatch and inaccurate targeting of social security payments to disabled population. Bound *et al.* (2004) discuss the importance of relationship between strictness of eligibility criteria in the system of disability benefits and two risks the systems are facing: the risk of having disabled people who do not receive benefits and the risk of awarding benefits to people who are able to work. Bound and Burkhauser (1999) provide a detailed overview of research that considered the impact of screening procedures on application rates and labor force participation, including the problem of moral hazard and work disincentives provided by social security benefits. Among existing screening models Parsons (1999) should be mentioned. To study targeting in the US disability insurance system, he develops a utility based model of self-screening in the process of eligibility determination. Empirical estimation of the model supports hypothesis of inverse relationship between the stringency of administrative procedures and the application rates.

An important implication for evaluation of targeting accuracy can be derived from a drastically new view of disabled populations introduced by the Americans with Disabilities Act (1990), as discussed by Burkhauser and Daly (2002). This approach is challenging a traditional attitude according to which people with disabilities are not expected to work. In contrast, the new viewpoint argues that nonworking disabled population arises from lack of appropriate arrangements in the society that prevents these people from employment rather than intrinsic nature of disability. Under such approach, the role of disability benefits in general is significantly reduced, as a large share of disabled people come under jurisdiction of regular unemployment or welfare benefits when needed, just as others without any health problems do. The importance of targeting issue in this case is minimized, since the difference in social security treatment of disabled and healthy population is gradually eliminated.

Apart from the issue of targeting, an important behavioral aspect of disability benefits is relationship between generosity of payments and labor supply of recipients. Leonard (1979) finds that the growth of social security payments explained almost 50% of decline in labor force participation of US middle age males in the middle of the 20th century. We also know that the generosity of disability system can have a serious impact on the labor markets from Gruber (2000) who uses Canadian data and policy specifics to show that increasing amounts of benefits lead to significant declines of the labor participation rates and labor supply.

Estimation of national disabled population, description of disability policies and trends across different countries is considered in another group of studies. The two papers of particular interest for this project that expand the research of disability into transitional countries are Metts (2000) and Hoopendardner (2001). These are both policy-oriented papers that address the magnitude of disability problem across countries and existing policies. Unfortunately, lack of the systematic data does not allow the authors to elaborate further on the empirical model for disability in transition. How-

ever, both papers also recognize disability issue as a combination of social, personal and environmental aspects and provide an extensive statistical coverage of the problem, implemented policy analysis, and problematic issues for a range of countries.

The focus on Russia suggested for this paper is beneficial due to clear disability categorizations in the country's comprehensive social security system that reveals behavioral responses to shifts in the underlying environment. The data of ongoing RLMS survey of Russian households provides an opportunity to consider the dynamics of disability, enabling us to focus on the influence of factors other than health status on the individual likelihood of obtaining a state disability pension. Some results of disability risk estimation based on RLMS survey are presented by Becker and Merkuryeva (2003). They include the multinomial analysis of the determinants of disability risks in Russia, estimates of the probability of moving between disability statuses. This paper develops previous work, allowing to relate the results obtained for the determinants of transition probabilities between disability statuses, and to provide the ground for a systematic assessment of targeting.

3. SOCIAL SECURITY FOR DISABLED IN RUSSIA

3.1. The system of disability benefits

The main part of disability benefits in Russia is provided in the form of labor disability pensions through the Pension Fund of the Russian Federation. Apart from disability pensions which comprise the main part of social security for disabled people, there exists a complicated system of payments for industrial accident injuries and temporary loss of ability to work administered by two other non-budget funds — Social Security Fund and Compulsory Medical Insurance Funds. The system provides a whole range of payments for those who are not eligible for labor disability pension, such as disability pensions to civil servants, social pensions to disabled without employment record and disabled from childhood. Yet, recipients of labor disability pension comprise the majority of official disabled population (Fig. 1); therefore this group is primarily addressed in the research hereafter.

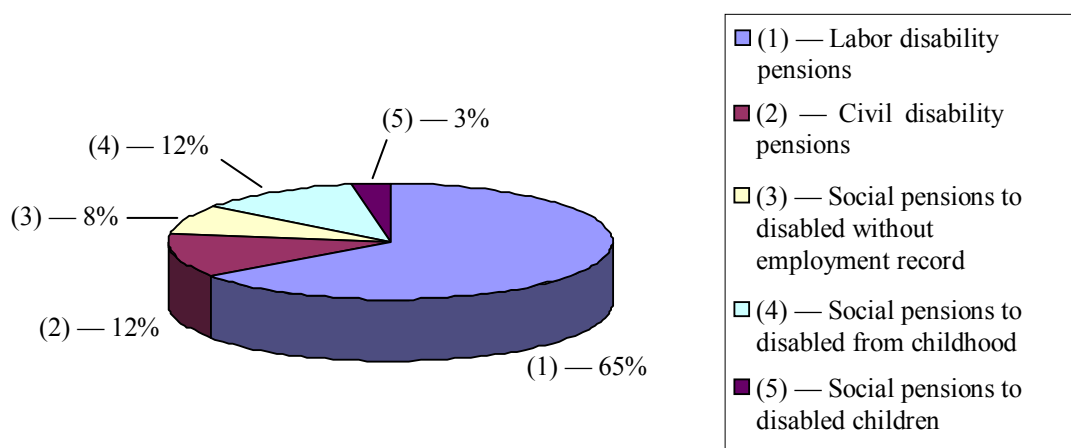


Fig. 1. Disability pensions in Russia: distribution of recipients. Source of data: NOBUS, 2003

The Law on Labor Pensions defines three categories of disability pension recipients depending on the degree of health damage, Category III corresponding to the most severe disability¹. A special commission of medical experts defines disability status based on the statement from applicant's medical institution. It is reconsidered every two years for the Category III, and annually for Categories I and II, except for those individuals who have reached official retirement age or have irreversible anatomical defects.

The amount of pension is determined from combined information on the category of disability and earnings history. Starting from 2002, labor disability pension consists of three parts replicating the old-age labor pensions: base (minimal amount equal for all recipients), insurance (linked to individual earnings and employment record), and funded (paid from individual accumulated reserve). The size of base disability pension is set at the level of old-age base pension for the recipients of category 2; recipients of the 3rd and 1st category receive respectively 200 and 50% of the base old-age pension.

The benefits were determined differently prior to 2002 reform. Although these changes did not shift significantly the balance between various social security benefits, they are important to discuss here, as significant part of available data refers to pre-reform period. Before 2002, the amount of disability pension was set at 75% of individual pensionable earnings for Categories II and III, and at 30% of earnings for the first category. In both systems, if information on earnings was not available, the recipient received a minimum disability pension, which is equal to the minimum old-age pension for those in Categories II and III, and 2/3 of the minimum old-age pension for the first category (base old-age pension after 2002). In any case, disability pension could not exceed the maximum amount of old-age pension. The amount of disability pension did not depend on the number of years worked in case of an on-the-job injury, or for individuals under 20 years old. In all other cases, a minimum employment qualification period was required, depending on the age. There are special cases when different calculation approaches are applied, including military, incomplete working period, and immigrants.

In addition to the general pension amount, up to January 2005 the system provided all disabled people with supplementary in-kind benefits. The most valuable and popular benefits included the rights to obtain free medicines, free transportation, and discounts on utilities payments; altogether these provisions nearly doubled real incomes of the disability pensioners (Maleva *et al.*, 1999).

3.2. Disability benefits in comparison with other sources of social security

It should be emphasized that the size of income gained in form of disability pension and accompanying in-kind benefits is an important addition to the recipient's budget. It is also quite important

¹ Categories of limitation to vital activity are introduced by the Federal Law on Social Security for Disabled People (Federalnyi zakon "O socialnoi zaschite invalidov v RF"). Based on the category of limitation, three groups of disability are identified to be granted by medical expertise, providing one-to-one match between the two notions. However, the numbering for disability groups is inverse (group 1 corresponds to the most severe disability). Although the term "groups" is used more often, in this work we refer to the "categories", mainly because labor disability pensions are assigned based on the categories rather than groups (Federalnyi zakon "O trudovyh pensiah v RF").

comparing to other benefits that can be received within social security system. Some information on the relative amounts of social security payments and minimal social guarantees provided in 2000 and 2003 is shown in Table 1.

Table 1. Monthly amounts of social security benefits and living standards in Russia

Indicator (rubles)	2000	2003
Minimal wage	83.5	450
Average wage	2225.3	5493.3
Minimal pensions:		
old-age	108.4	522.38
disability, cat. I	72.3	261.2
disability, cat. II	108.4	522.38
disability, cat. III	216.8	1044.8
Minimal retiree subsistence level	909	1605
Unemployment benefits (min/max)	242/1210	422/2112
Monthly allowance for children under 1.5 y.o.	167	500
Minimal scholarship for the students of state universities	167	200

Source: *Rossiyskiy statisticheskiy ejegodnik* (2001–2005).

As it is seen from the table, eligibility for the third category of disability payments can bring a significant gain compared with, for instance, regular old-age pension, even in terms of monetary benefits taken without consideration of in-kind supplements. This gap becomes even larger when the special privileges are taken into account. Moreover, for an individual who used to be employed in the informal sector or received shadow wage payment, disability pension may become a more reliable source of social security comparing to other types of payments that have stronger linkage to the earnings history. While the amounts of benefit seem to be quite attractive, actual probability of being caught with falsified benefit is perceived as extremely low. Disability of the 3rd category is assigned for 2 years, 2nd and 1st — for one year, after which medical reexamination is required. Therefore, registration of disability leads to automatic and safe receipt of benefits for another year or two. The penalty in case of cheat revelation theoretically can be rather severe: falsification might imply bribery of a medical expert, which is a criminal offence in Russia making both parties involved responsible. However, there are virtually no cases of this law enforcement in case of disability benefits, and consequently expected loss is negligibly low. The worst thing that can actually happen afterwards is rejection of status prolongation.

Probably the most natural alternative of disability benefits for an individual who faces problems in the labor market would be unemployment status. In general case recognition of disability status does not prevent an individual from receiving unemployment benefits, therefore there is no need for a choice between mutually exclusive options, and disability pension can be viewed as a complementary source of income in addition to unemployment benefits. As the amount of unemployment

benefits can not be determined without information on the earning history of a specific individual, Table 1 shows only minimum and maximum statutory amounts; exact relationship between allowable unemployment and disability payments can only be computed on case by case basis. Therefore, comparison between the amounts of disability and unemployment benefits requires more careful consideration that would take into account a number of factors, such as belonging to formal or informal sector, etc.

Yet, there are a number of system specific features allowing for certain comparisons. The first serious difference between the two types of benefits is eligibility and potential duration of payments. Amount of unemployment benefits is determined based on the information on average individual earnings within three months preceding the loss of employment, while disability status does not require being employed directly before application for benefits and therefore is more accessible for individuals with broken earnings records. Standard duration of unemployment status corresponds to the minimal duration of disability status between two medical reexaminations (12 months). However, maximum period of unemployment benefits payment can not exceed 24 out of any uninterrupted 36 months, while disability status can be prolonged without any limits, and in some cases even without reexamination.

Another considerable difference is in the scale of allowable benefits. The wage to benefit ratio for unemployment benefits is set at regressive scale constituting 75% in the first 3 months of unemployment period, 60% in the following 4 months, and only 45% afterwards in the first year of payments; the second 12 months period provides merely the minimum payment equal to 30% of the regional minimal subsistence level (Federalnyi zakon "O zaniatosti naselenia v RF"). In all periods there are upper and lower limits of benefit amounts. Until recently introduced 2005 amendments to legislation that probably are not relevant for this paper², the maximum was set at the level of regional minimal subsistence level, the minimum after 6 months of benefit receipt at 30% of regional minimal subsistence level (but not less than 100 rubles monthly). The figures shown in Table 1 reveal that there is only 5 times difference between maximum and minimum amounts of unemployment benefits. This means that there is a severe binding constraint on the maximum size of unemployment benefits: it can never be higher than a relatively small statutory amount (2880 rubles, or around 100 USD in 2006), and within 7 months of unemployment it goes down to 1296 rubles (45 USD) at the very best case. As the values of disability benefits do not decrease over time, this aspect of the system can be viewed as another advantage of disability over unemployment status.

Finally, the status of disabled does not necessitate any additional activities or communications with the government structures to be taken within a period between two medical examinations, which is at least one year. Meanwhile, being registered as unemployed with the state agency normally requires regular visits to the local office, a lot of paper work, passing job interviews or participation in various training programs, *etc.* Incompliance with any of these requirements leads to the termination of status and benefits, making positions of unemployed more vulnerable and unstable.

² Starting from 2005, the federal government is annually setting minimum and maximum limits for unemployment benefits.

3.3. Disability benefits as a part of household income

In addition to the size of minimal social guarantees it is interesting to consider the actual contribution of the main social security payments into individual and household budgets (Table 2). Although according to the obtained estimates average size of disability pension is lower than the amount of old-age pension, the minimal values show that there are certain advantages of disability pensions for low income recipients. It should be kept in mind that eligibility requirements to old-age pension recipients (age and length of employment record) are much more restrictive in terms of falsification opportunities than those to the recipients of disability pensions (health conditions determined by potentially corrupt medical institution). The same is true in case of other social benefits that can be relatively hard to access. Consequently, disability pensions become a comparatively accessible and significant in size type of support. Therefore, as in the case with minimal statutory set amounts, we are facing relative attractiveness of disability pensions in the overall system. In general, disability pensions amount to 86% of individual income of the recipients (more precisely, 71 to 92% depending on the disability category), although their contribution to the combined income of all household members is lower than those of other pension types.

Table 2. The contribution of pensions and social allowances into household budgets

Indicator (RUR)	Average	Min	Share of individual income	Share of household income
Pensions:				
old-age	1691	200	0.89	0.26
disability (I category)	1084	460	0.71	0.13
disability (II category)	1396	500	0.92	0.17
disability (III category)	1603	500	0.87	0.17
loss of provider	974	345	0.90	0.43
social pensions	1051	180	0.91	0.31
Allowances:				
to the citizens who suffered from radiation	142	20	0.21	0.02
to children under 1,5 y.o.	539	50	0.66	0.06
to children under 16 (18) y.o.	91	4	0.92	0.03
to disabled children	680	50	0.76	0.07
Unemployment benefits	2154	144	0.96	0.33
Scholarship in state universities	236	26	0.85	0.03

Source of data: NOBUS, 2003

In-kind benefits that until recently were fully available to the disabled individuals can also be evaluated in terms of overall contribution to the household income. The most popular are the discounts for utilities (over 80% of eligible respondents used them within 3 months preceding to the survey) and telephone payments, subsidized public transport and medicine provision (Fig. 2). Less

popular but still important are property tax discounts, free medical services, purchases of private vehicles, *etc.* — the usage rates do not exceed 10% of eligible respondents, however, these are still very high rates given the durable nature of the benefits.

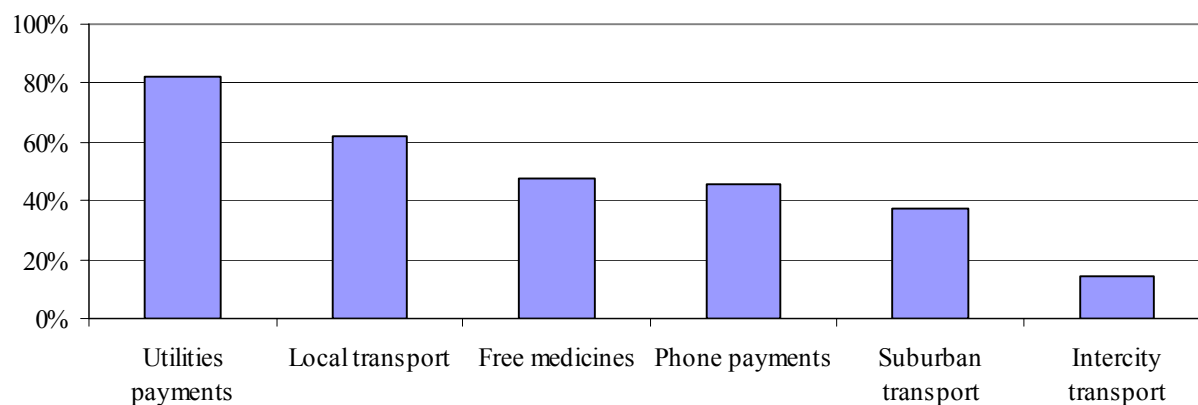


Fig. 2. Usage of selected in-kind benefits provided to the recipients of disability pensions (% to the number of eligible respondents).

Source of data: NOBUS, 2003

4. ESTIMATION OF TARGETING ACCURACY

4.1. Data and identification of disabled population

The paper uses the data of Russia Longitudinal Monitoring Survey (RLMS) to evaluate the accuracy of targeting in the disability benefits system and identify the factors that determine discrepancies between official and actual health statuses of the individual respondents. There are few ways to identify disabled individuals from RLMS dataset. The difficulties encountered in the estimation of disabled population are discussed by Ravaud *et al.* (2002) who suggest application of five different approaches to define disabled population from the data of INSEE survey: administrative registration, self-reporting of individuals, restriction of activity, functional limitations and need of assistance. The authors recognize disability as a complicated social phenomenon that can not be measured exactly, influenced among all by social, cultural and economic factors. Depending on the approach, the estimates of disability prevalence vary from 21.1 to 5.2% of adult sample, the lowest being official recognition of disability status. For RLMS data three measurement approaches based on administrative registration, self-reporting and restriction of activity can be implemented. The following survey questions are used in this work to identify different types of disabled population:

- *administrative registration*: respondent reported receiving state pension for disability (question 74-2 of adult questionnaire);
- *self-reporting*: respondent classified her primary occupation at the time of survey as "unable to work for health reasons, disabled" (question 90 of adult questionnaire);

- *restriction of activity*: a set of questions in the health section of adult questionnaire on individual ability to perform certain daily activities. This is a composite indicator discussed below in more details.

The last approach is crucial for the purpose of this research, as it allows to estimate actual health conditions as opposed to the fact of disability benefits assignment. Potential problem of this research is the accuracy of available data on the health status of the respondents. As the only way to assess health conditions is through self-reporting, there is a possibility that benefit abusers would provide biased information on their health conditions. In order to minimize the extent to which those individuals who already falsified their disability status would attempt to provide incorrect information in course of data collection, it is suggested to use indirect approach to the evaluation of physical conditions.

RLMS provides three pieces of data on individual health status using different types of questions: first, direct questions on self-evaluation of health, second, questions designed to collect information on specific chronic illnesses and serious diseases experienced within the recent time period, and, third, questions on individual ability to perform certain basic functions required in everyday life.

Generally the nature of the survey suggests that information on health evaluation should not be considered by the respondents as the most sensitive. In particular, RLMS covers a number of issues that might be more natural to conceal, such as information on employment, income and taxes, informal payments for medical services or attitudes to the current political system. Among all these issues that might be really kept to oneself, it seems rather unlikely that a respondent would be able to follow a link between the questions on disability status and health conditions that are located in completely different sections of the questionnaire, and provide consistently falsified answers.

However, the design of disability benefit system suggests that the first two measures used in RLMS (self-reported health and medical record) would be the most likely to incorporate falsified information, as the disability status is most frequently granted in relationship with some serious illness. The underlying measures of physical functions, which do not appear directly in course of medical examination for benefit applicants, provide comparable information on the degree of health damage and cause less suspicion from the respondent. Therefore, this information can be used to generate implicit indicators of individual ability to function normally in everyday life and therefore increase reliability of the data. A crosscheck between different types of questions (*e.g.*, illness vs physical functions) can also be used to explore the data accuracy.

The construction of composite indicator measuring *restriction of activity* is based on five basic vital functions defined in accordance with social security regulations: self-service, mobility, orientation, communications, and behavior control. RLMS contains certain pieces of information on most of the functions with the answers ranked on 5-point scale from "absolutely not difficult" to "impossible". The correspondence between available survey data and required functions is shown in Table 3. Many of the available indicators are interrelated, and most are focused on the two primary functions — self-service and mobility. Although it is sometimes difficult to classify certain questions, in general they provide sufficient information, especially for identification of the most severe group of

disabled. Availability of multiple questions can be regarded as another source of data reliability. Further in this section the number of indicators available from RLMS for a vital function $i \in 1:5$ is denoted as k_i , and an individual answer score regarding the indicator $j \in 1:k_i$ for a vital function $i \in 1:5$ as A_{ij} .

The measures of vital functions available from RLMS can be linked to the criteria used by the Offices of Medical and Social Expertise to assign certain categories of disability in accordance with the current legislation (Joint Decree of the Ministry of Labor and Ministry of Health, 29 January 1997, N 1/30). First, the legislation defines three degrees of distortion for each mentioned vital function (1 — partial distortion, 2 — ability to perform function with an aid of specific equipment or other people, 3 — complete loss of function). Second, each category of disability is defined according to the individual ability to perform specific functions.

Table 3. RLMS questions used to evaluate restriction to activity

Vital function	Survey questions
Self-service	Ability to take a shower, eat, put on clothes, brush hair, use bathroom, cooking
Mobility	Ability to run/walk 1 km/200 m, walk upstairs, carry weight, kneel, walk across room, sit for 2 hrs, stand up after sitting, stand up from a bed
Orientation	Ability to use the public transport, shopping
Communications	Eyesight, hearing, ability to use the phone
Behavior control	Ability to manage money

In terms of RLMS answer codes for the questions on individual ability to perform specific tasks, the answers "impossible" and "very difficult, but possible" can represent the sufficiently high degree of vital function distortion to identify disabled population. In this case, two alternative measures can be suggested to attribute individuals to disabled population based on self-reported health status. A "weak" measure (W) would simply take the maximum distortion value for a complete set of the vital functions as an indicator (*i.e.*, complete loss of ability to perform just one of the tasks will be enough for an individual to be classified as disabled). A weak measure can be determined both for the separate vital function and for a complete set of vital functions. In the first case this measure is computed as

$$W_i = \max_{j \in 1:k_i} A_{ij}, \quad i \in 1:5. \quad (1)$$

An overall measure for the five vital functions can be obtained as

$$W = \max_{i \in 1:5} W_i = \max_{i,j} A_{ij}. \quad (2)$$

This measure might intensify the degree of disability comparing to the actual state of affairs, as even severe distortion of merely one function might either be caused by misreporting or turn to be insufficient for proper classification of an individual who is absolutely healthy in all other respects. Therefore, alternative "strong" measure (S) can be based on an average for a set of indicators for

each function, allowing for more comprehensive account of the distortions, and also giving an opportunity to rank the extent of distortion:

$$S_i = \frac{\sum_{j=1}^{k_i} A_{ij}}{k_i}, \quad i \in 1:5, \quad (3)$$

$$S = \frac{\sum_{i=1}^5 S_i}{5} = \frac{\sum_{i,j} A_{ij}}{5k_i}. \quad (4)$$

For each individual both measures will give estimated health-based status in the system (healthy or disabled) that can be matched to the fact of disability pension receipt to identify possible mismatches. This results will further be used to evaluate the accuracy of benefit targeting.

4.2. Estimation of disabled population and labor market histories

In this work Round 11 of RLMS with adult sample size of 10 499 individuals was used for empirical estimation. The choice of this survey round referring to the year 2002 is explained with the fact that this was the most recent round containing appropriate information on health conditions and allowing for another period of observations to follow transitions from disability status in the subsequent period (starting from round 12, different structure of health section was introduced, therefore information from 2003 and later could only be used for reference).

As discussed in section 4.1, there are three possible ways to identify disabled individuals in RLMS. First, all those receiving disability benefits can be classified as actually disabled. Second, one of options provided to answer a survey question on the main occupation sounds as "Unable to work for health reasons, disabled" — this option can be used to identify individuals in bad health who for some reason do not receive a disability pension. Although this measure of self-reporting may be imperfect, as the question is not formulated directly enough to emphasize importance of physical or mental restrictions and include too many answer options that may be overlapping, we try to use it to provide some basis for comparison. Third, direct information on health conditions can be used to estimate physical ability. Discussion below is based on the comparison of disabled populations obtainable with the first and the second methods.

The number of individuals who report receiving state disability pension is around 4.3% of adult sample. However, less than one third of these individuals (1.3% of the surveyed respondents) considered being unable to work for health reasons (disabled) as their primary occupation at the moment of interview. Respectively, individuals reporting disability as the main occupation are much less numerous — 1.7% of the sample. Almost all of them receive either disability pension (in 75% of cases), or an old-age pension (9%). As the individuals beyond the statutory retirement age are eligible for any single type of pensions at their own choice (*e.g.*, old-age, disability, pensions for civil servants, *etc.*), these cases might reflect the situations when benefits for old-age are higher than for disability. There are some 17% of self-reported disabled individuals who do not receive any

kind of pension despite stating that they can not work for health reasons. None of these individuals is employed, registered with state unemployment agency or obtaining additional qualification, suggesting that these are individuals refusing form participation in social security system being actually unable to participate in the labor activities for health reasons. This group, representing around 0.3% of adult sample, can be used as a benchmark for the estimates of non-participating individuals.

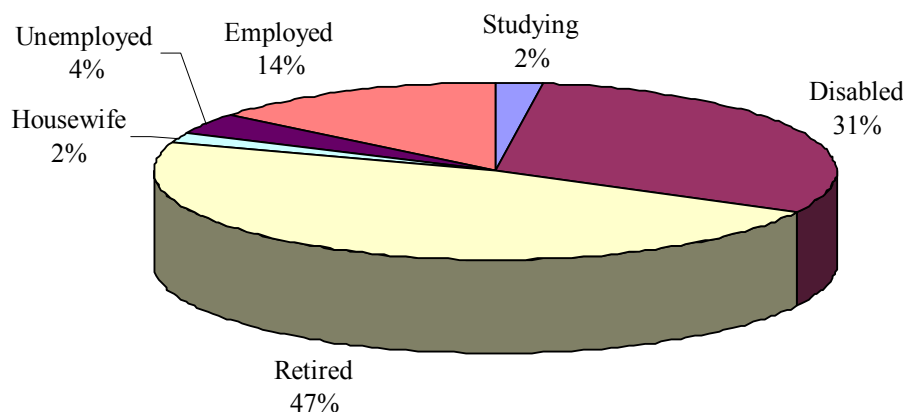


Fig. 3. Recipients of disability pensions by primary occupation, RLMS 2002

The number of those who receive disability pension but do not consider being disabled as the primary occupation is very high amounting to about 70% of the benefit recipients. The distribution of these individuals is given in Fig. 3. Most of these individuals (47% of disability pension recipients) classify themselves as retired and not working, another large group is involved in various kinds of employment (14%). This fact, on the one hand, suggests that recipients of disability benefits are in relatively good shape and are ready to participate in various activities. On the other hand, it might support the hypothesis of benefit abuse.

Another interesting feature of disability pension recipients is the patterns leading in and out of the disability status in the system. The results of this analysis are summarized in Table 4 that shows the history of individuals who received disability pensions in 2002 in terms of their primary occupations at different stages of the survey. The majority of recipients tend to stick to the system once they manage to access it: over 50% of 2002 pension recipients used to be in the system in previous year, and the vast majority (over 70%) does not quit within the next two years. Another huge group comprising at some stages up to 20% of 2002 benefit recipients are retired individuals. In fact, disabled and retired might be difficult to distinguish, and the status might represent the result of voluntary rational choice. In other words, over 50% of the movers (those who change disability status between the two periods) come from the category of retired individuals. In all periods up to 2% classify themselves as disabled by primary occupation but do not receive benefits, either being dismissed from the system or unsuccessful in application or refusing from interactions with the system. The prospective of employment seems to be very sensitive to the experience of disability pension receipt: while almost 11% of the recipients used to work two years before obtaining the status, only 4% returned to work two years after stopping being registered with the system. Meanwhile, the

highest rates of unemployment are observed 2 years before obtaining disability status, suggesting a gradual transition from being in the labor force to disability.

Table 4. Primary occupation of 2002 disability pension recipients at different survey dates (% to the number of disability pension recipients)

Primary occupation	Year			
	2000 ($t-2$)	2001 ($t-1$)	2003 ($t+1$)	2004 ($t+2$)
Disabled (received disability pension)	0.59	0.73	0.81	0.72
Disabled (self-reported, did not receive disability pension)	0.02	0.02	0.01	0.02
Studying	0.01	0.01	0.00	0.00
Retired	0.21	0.15	0.14	0.19
Maternity/child leave	0.00	0.00	0.00	0.00
Housewife	0.00	0.01	0.00	0.01
Unemployed	0.04	0.02	0.01	0.02
Employed	0.11	0.06	0.02	0.04
Other	0.01	0.01	0.00	0.00

The relative risks of becoming disabled differ significantly in terms of the status in the labor market in the previous period. The overall probabilities of becoming disabled (both in terms of self-reporting disabled as primary occupation or getting eligibility for disability pension) within the following year for representatives of different groups are given in Table 5.

Table 5. Relative risks of becoming disabled by primary occupation

Primary occupation in previous year	Year			
	2003	2002	2001	2000
Retired	0.039	0.027	0.027	0.021
Unemployed	0.020	0.027	0.027	0.021
Housewife	0.014	0.003	0.016	0.008
Employed	0.008	0.011	0.009	0.009
Maternity/child leave	0.006	0.007	0.000	0.000
Studying	0.003	0.003	0.003	0.004
Other	0.005	0.018	0.007	0.009

Similar to the previously discussed case with the history of primary occupation of disabled individuals, retirees represent the most vulnerable group and have the highest rates of disability risks. This result is natural if we take into consideration that this is the oldest age group of surveyed individuals. It is more interesting to note that the next group by risk magnitude is unemployed respon-

dents; in fact, for most of the periods the risks of becoming disabled is almost equal for retired and unemployed individuals. If we consider the category of unemployed jointly with the next one — housewives, who under some conditions can cover the same status in the labor market as unemployment — this group becomes even riskier than the retirees. This outcome suggests that individuals without regular employment are more likely to apply for disability benefits, although causality can work differently for those who lost job due to ill health or any other reasons not related to the medical conditions. The most secure groups are represented by the students and women on maternity leave or taking care of the young children who presumably comprise younger groups of population and enjoy relatively good state of health.

4.3. Estimation of inconsistencies

According to the approach described in Section 4.1, two measures of health conditions were constructed for each of the five vital functions for both strong and weak criterion. Table 6 shows sample average values obtained for the two criteria. According to the suggested approach, health conditions are slightly better when measured on the weak criterion, as poor results on one dimension are not offset by otherwise good state of health. Self-reported health is on average around one point worse (which makes a difference of almost 30%) for the recipients of disability pension and disabled by main occupation comparing to the remaining part of the sample. However, the differences are not as pronounced as it could be expected, suggesting the presence of deviating individuals in both groups.

Table 6. Estimated health conditions by vital functions

Function	Weak criterion (maximum value in the group of questions)			Strong criterion (average value in the group of questions)		
	Recipients of disability pensions	Disabled by primary occupation	Rest of the sample	Recipients of disability pensions	Disabled by primary occupation	Rest of the sample
Self-service	2.51	2.52	1.61	1.75	1.81	1.26
Mobility	3.50	3.53	2.02	2.57	2.54	1.52
Orientation	2.87	2.73	1.83	2.68	2.54	1.70
Communications	3.35	3.12	2.71	2.62	2.52	2.22
Behavior control	1.84	1.72	1.28	1.84	1.72	1.28
Overall criteria result	4.03	4.03	2.92	2.35	2.40	1.70

The character of disability usually varies a lot depending on different social and demographic groups of the population, in particular with age and gender. To investigate how these patterns are

reflected by suggested criteria Table 7 provides the values of criteria differentiated by gender and three age groups: 40 and below, 41 through the statutory retirement age (55 for women and 60 for men) and after reaching the statutory retirement age. The results of Table 7 show gradual deterioration of health with aging: the values of criteria are increasing with age for all groups under consideration, supporting consistency of the measures. It is seen that the relative differences between presumably healthy and disabled individuals are maximized for the first age group (reaching 40% for men below 41 disabled by primary occupation on weak criterion), while after retirement disabled become more comparable with those who are not (for example, only 10% difference for retired women receiving disability pensions). Suggestion that can be made from these results is that targeting works much better in young ages, while for older people distribution of benefits is not that directly linked to the health conditions.

Table 7. Estimated health conditions by age and gender

Age / gender group		Weak criterion (maximum value in the group of questions)			Strong criterion (average value in the group of questions)		
		Recipients of disability pensions	Disabled by primary occupation	Rest of the sample	Recipients of disability pensions	Disabled by primary occupation	Rest of the sample
Men	40 and below	3.07	3.51	2.10	1.93	2.27	1.45
	41–54(59)	3.85	4.03	2.86	2.28	2.29	1.71
	55(60) and above	4.56	4.50	3.83	2.51	2.66	1.70
Women	40 and below	3.38	3.32	2.45	1.99	2.00	1.60
	41–54(59)	4.06	4.34	3.20	2.57	2.69	2.00
	55(60) and above	4.61	4.82	4.14	2.57	2.75	1.94
Overall criteria result		4.03	4.03	2.92	2.35	2.40	1.70

Estimation of inconsistencies relies among other factors upon specified thresholds used to distinguish between healthy and disabled individuals. Here the values 5 corresponding to the complete loss of ability to perform one of the vital functions was selected as the most reasonable for weak criterion. Fig. 4 shows how the mismatch levels change depending on the selected threshold levels. It is seen from the graph that application of strong criterion at 2.2 threshold value would provide results relatively close to those obtained with the value 5 set for weak criterion; therefore, the value 2.2 is used for strong criterion in further discussion. The patterns shown in Fig. 4 also resemble reaction of individuals to the social security policy: when a government increases threshold value required for an individual to enter the system of benefits, the expected number of abusers rises, and the abstinence simultaneously reduce. Regardless of the criterion or selected thresholds, it is seen from the graph that the actual health differences are not perfectly captured by the policy of benefit allocation.

Inconsistencies between self-reported health conditions and status within the system of disability benefits computed for the entire sample are given in Table 8. Mainly due to the dominating healthy group, the majority of the respondents (altogether 86% of the sample) behave consistently in terms of health conditions and usage of disability pensions. Yet, according to both criteria 2% of the sample are benefit recipients whose health is not that bad in comparison with the rest of population, while 11% of surveyed respondents do not receive disability benefits despite of having worse actual health conditions than some of the recipients. In terms of potential system abuse (or maybe just inefficiency of benefit allocation) these figures mean that health conditions of around half of the disability benefits recipients are not any worse than some of those who refuse from participation in the system. Altogether, mismatches amount to over 13% of the sample.

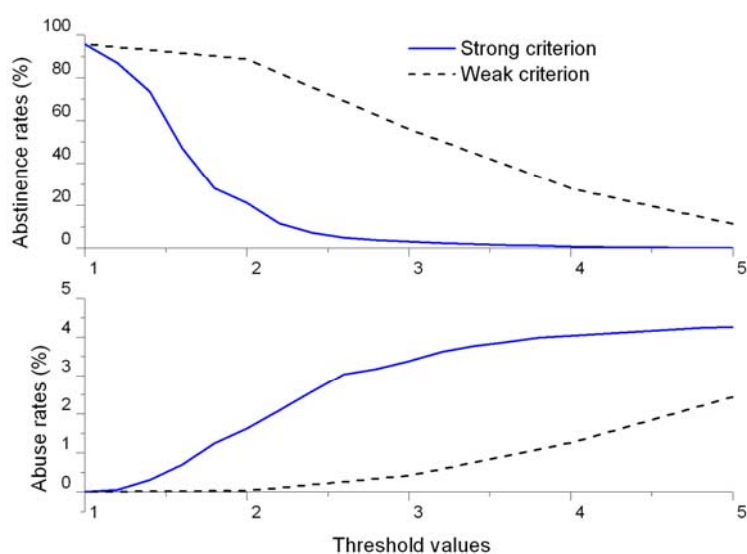


Fig. 4. Estimated abstinence and abuse rates for different criteria threshold values

Table 8. Inconsistencies in benefit allocation (% to the adult sample, composite results on all criteria)

		Weak criterion		Strong criterion	
		Self-reported health conditions		Self-reported health conditions	
		Healthy	Disabled	Healthy	Disabled
Status in the system	Healthy	84.4	11.3	84.1	11.7
	Disabled	2.4	1.8	2.1	2.2

Further consideration of inconsistencies computed for different age and gender groups provide additional results (Table 9). The boundaries between healthy and disabled gradually disappear with age: the share of consistently disabled people amounts to 97–98% in the youngest age group but later drops significantly (up to 40 points decrease). This decrease is followed by simultaneous shift to other groups: in particular, the number of refusing individuals grows reflecting general deterioration of health with age. The most remarkable case is represented by women after retirement age: the

shares of consistently healthy and refusing take very close values on weak criterion, resulting most likely from voluntary choice between various sources of social security support at comparable health status. More interesting, the distribution of disability pension recipients also changes with age. When still relatively young, the number of abusers exceeds the number of consistently disabled; it is usually after retirement that the relationship in most cases reverses. When applying weak criterion, a remarkable increase in abusing rates is found for both genders in pre-retirement age: this is where maximum abuse rates are found.

Table 9. Inconsistencies in benefit allocation by age/gender groups

Age/gender group		Consistently healthy	Refusing	Abusing	Consistently disabled
<i>Weak criterion</i>					
Men	age 40–	97.02	0.70	1.86	0.41
	age40–55(60)	89.12	2.95	5.59	2.33
	age55(60)+	64.10	25.71	3.23	6.96
Women	age 40–	96.56	1.66	1.55	0.22
	age40–55(60)	88.14	7.21	2.93	1.71
	age55(60)+	53.54	41.43	1.59	3.44
<i>Strong criterion</i>					
Men	age 40–	96.23	1.49	1.57	0.70
	age40–55(60)	82.67	9.40	3.57	4.35
	age55(60)+	77.52	12.30	5.22	4.97
Women	age 40–	92.83	5.40	1.18	0.59
	age40–55(60)	68.21	27.14	1.29	3.36
	age55(60)+	71.59	23.39	2.38	2.65

These findings suggest that some factors other than merely health conditions determine individual status in the system of disability benefits. Appendix A1 provides descriptive statistics for selected variables on representatives of the four groups that to be used in empirical part of the paper. All variables are discussed in more details in the next section of the paper.

5. REGRESSION ANALYSIS

5.1. Model specification

The next step is to seek some explanation for identified inconsistencies through investigation of the factors that influence the probability of an individual in better health to search for disability benefits, or the probability of the one suffering limitations in the daily activities due to the poor health to refrain from application for the social assistance. Two types of models were estimated with the following purposes:

- logit models to estimate the impact of personal and social characteristics on the probability of an individual to belong to a specific type of disabled population — recipients of state disability pensions, self-reported disability, or state of health measured on weak and strong criteria;
- multinomial logit model to estimate the impact of personal and social characteristics on the probability of belonging to different groups in terms of compliance or inconsistencies between the status in the disability system and health conditions.

Three versions of *logit model* differ only in dependent variable y denoting belonging of an individual to one of the three types of disabled population, otherwise the models take the following form:

$$P(y = 1 | \mathbf{x}) = G(\beta_0 + \mathbf{x}\boldsymbol{\beta}), \quad (5)$$

where G is logistic function, $\boldsymbol{\beta}$ — vector of estimated parameters. Vector of explanatory variables \mathbf{x} includes a set of individual, household and settlement characteristics that are discussed below.

The first set of suggested individual characteristics that are expected to influence the probability to belong to disabled population is rather typical for this type of studies: it includes dummies for age groups (same as used in Section 4.3, senior group used as omitted category), gender, marital status and education level (the highest grade completed at school and dummy variable for higher education).

The level of income is presumably a relevant variable; however, since current personal income is expected to be endogenous, historical levels of income in the previous year and back in 1990 are used to estimate the level of pre-application income for individuals who are currently classified as disabled. In addition, dummies corresponding to self-reported primary occupation in the previous period of the survey (disabled, unemployed, retired and not working for other reasons) with omitted category "employed" are introduced to control for development of individual status in the labor market.

Two variables are included to account for health conditions of individuals in the sample. The first one is a dummy variable taking non-zero values for individuals who reported suffering from any chronic disease, including in particular diseases of heart, lung, liver and kidney, gastrointestinal disease, spinal problems, stumps or other chronic illness. An additional health related variable is smoking. Similarly to the personal income, smoking in the current period is presumably endogenous, therefore having an experience of smoking ever in the respondent's life is taken into account as a proxy for this factor.

The next set of variables covers characteristics of a household. The size of the household is measured by the number of people in it, meaning the number of people living together and having common income and expenditures, as well as children younger than 18 who are studying away from the household. The number of dependents is estimated by the number of respondent's own or officially adopted children under age 16. Household assets are approximated by the estimated market value of currently occupied residence, and the current level of income is taken into consideration as total per capita income of other household members, excluding personal income of any given respondent.

The characteristics of population center where a household resides are described by the following set of variables. First of all, settlement size is measured by the variable *popul* — estimated population as reported by local authorities. In addition, two dummies are used to control for settlement type: regional administrative center (*settype1*) or other city (*settype2*), omitted category includes rural settlements.

Multinomial logit model (Greene, 2003) was used to investigate the factors affecting behavior of complying, abusing and refusing groups of individuals in the system of state disability benefits. The choice between available options is considered as unordered multinomial response. Dependent variable y takes four values corresponding to a set of mutually exclusive choices between statuses in the system: 0 — consistently healthy, 1 — refusing, 2 — abusing, 3 — consistently disabled. The base category is being consistently healthy.

A vector of conditioning variables $x \in 1 \times K$, $K = 23$ (the first element of x being equal to 1) includes the same personal demographic, occupational, household and population center characteristics as logit models. Dummy controlling for chronic diseases was omitted from this model as it is highly correlated with other variables that were used in the construction of dependent variable when estimating the actual state of individual health.

Two new variables were included into this model to evaluate the impact of available infrastructure and established interactions with the system of health care. First, accessibility of medical aid in the area was measured by the average time required for the members of the household to travel to the medical institution when they had to see health worker last time. When these measures were not available from the current survey round, a proxy — same variable available from the most recent round of survey — was used to reduce the number of missing observations. Since RLMS does not follow mobility of the respondents beyond the limits of the current population center, we assume that the distances remained valid over 5 years time period. Second, potential willingness to abuse the system was supposed to be correlated with establishes practice of interactions with the medical personnel. Therefore, another variable that was introduced to capture disposition of a respondent to corrupt behavior leading to the system abuse was experience of paying for received medical help with informal gifts or money given directly to the personnel of medical institution avoiding cashier.

Response probabilities in multinomial logit model are defined as

$$\Pr(y_i = j | x_i) = P_j = \frac{\exp(x_i \beta_j)}{1 + \sum_{k=1}^3 \exp(x_i \beta_k)}, j \in 1:3. \quad (6)$$

Descriptive statistics for full sample and specific behavior patterns is shown in Appendix A1. The following discussion of sample mean values is mainly based on the comparison of aggregate means and groups defined with help of the weak criterion; conclusions on the differences arising when using strong criterion can be made directly from the table of means. Out of 10,066 adults aged over 16 available in the sample, 7,194 are consistently healthy, 2,433 refuse from participation, 127 abuse the system, and 312 are consistently disabled.

Males constitute 43% of the total sample. Comparing to the aggregate sample average, the lowest share of men is found among refusing respondents (24%), while the highest is seen among abusers (57%). Average sample age is 44 years, due to the exclusion of individuals under than 16 years old. Refusing and consistently disabled individuals are noticeably older than those in the two groups with better health conditions. Married people represent 62% of the sample, with the highest share of marriages in consistently healthy group. Remarkably, the share of divorced and never married individuals is the highest among those individuals who were classified as system abusers, being about twice as high as among consistently disabled people. Healthy complying individuals are on average more educated than representatives of other groups (they are the only group to have over 9 years of schooling and above 80% of the group members with higher education), and they are more likely to have young children. Health conditions across groups in general correspond to the expectations: the majority of people with chronic diseases, anatomical deficiencies or self-reported disabilities are found outside consistently healthy group.

To understand the situation with current income, all individual income excluding the amount of disability pension is shown for different groups. In 2002, this value amounted to 2200 rubles, with roughly 10% increase comparing to the previous year. Consistently healthy group gains the highest personal incomes, and positions of other groups have deteriorated comparing to the previous period. Average per capita income of other household members is lower — only 1352 rubles; maximum income is also registered in the households of consistently healthy individuals, but the difference across groups is much lower. In terms of other household features, population in poor health (consistently disabled and refusing) live in smaller and less wealthy households. Representatives of different groups also demonstrate systematic distinctions in the lagged labor market status, complying with discussion on transition between different options that was provided in Section 4.2.

Abusing individuals are less frequently residing in regional administrative centers, concentrating more in the cities with fewer population and rural settlements, while descriptive statistics does not show a lot of specific differences among other groups. Consistently disabled individuals visibly surpass population average in terms of the settlement size: this is the only group to be found on average in a city with more than 1.5 million people, in 49% a regional center.

Estimated transaction costs of seeing a health worker (average time required to travel to a medical institution) are lower for complying groups (both healthy and disabled), and the highest value is registered for the group of refusing, supporting hypothesis on the inverse relationship between accessibility of the system and willingness to participate. On the opposite, the rates of informal payment for medical services are 30% higher for non-complying groups (both refusing and abusing), in line with hypothesis on willingness to pay trying to enter the system when eligibility is not obvious.

5.2. Estimation results

Tables in Appendix A2 and A3 provide elasticities at mean values from maximum likelihood estimation of the models (Appendix A2 for logit and Appendix A3 for multinomial logit models). Estimation of logit models shows that regardless of adopted definition disability risk has a long mem-

ory: regardless of taken definition of disability, it is consistently higher for individuals who used to be disabled or retired in the previous period. Unlike expected, unemployment in the previous period does not influence significantly the current ability of individual, even when difference is made between unemployment and non-participation. Disability is also closely related to health conditions: in all cases it is more likely for individuals suffering from chronic diseases, although smoking experience seems to be irrelevant.

The impact of income level is not pronounced: income history dating back to 1990 is insignificant in all models (possible due to recollection error), as is the household wealth. Income of other household members only has a positive slightly significant impact for the recipients of state disability benefits, not allowing to link application benefits to poverty at the level of household. Yet, at individual level lag of personal income reduces the probability of self-reporting disability and disability measured by health conditions on weak criterion.

Other household features — both size of the household and having under age children — reduce the likelihood of health-related disability (both factors are significant from weak criterion, children dummy — for strong as well). Self-reported and weak health related disability rates increase with the size of the population center, while the type of settlement is not necessarily important. The probability of health-related disabilities (both criteria) is lower in urban settlements that do not play the leading administrative role comparing to rural areas.

The impact of demographic variables differs significantly from what might be expected from intuitive understanding of disability. The central problem occurs with age coefficients. Natural deterioration of health conditions with age suggests that the model coefficients should be negative to account for increased risk of disability among older people. However, the only case when this intuitive suggestion finds empirical support is the model for health-related disability (weak criterion). In all other models age coefficients are highly significant, yet positive, with the highest absolute values for middle-aged group. Potential explanation that can be provided for the first two models — those using receipt of disability benefits and self-reporting as dependent variables — can be searched for directly in the way the left hand side of the models was specified. In both cases we can suspect that whatever we measure as a dependent variable reflects not that much health-related disability, but individual status in the system. As older people have more options to choose from when answering these questions (different types of retirement, non-participation, *etc.*), the rates of physical disability as such may be reduced for this group, while younger people may be found in the group both because of health conditions and system abuse. The latter question will be examined in more details when multinomial logit models are discussed. Another option available for clarification of age issue could be to estimate separate models for different age groups, however it is not implemented here due to the limited number of complete observations among young people.

The impact of gender is also different depending on the specification of dependent variable: state disability pensions are more likely to be granted to men, while health-related approaches show that women are more likely to lose regular ability because of health reasons. Higher education turned out to be irrelevant, and years of schooling influence negatively the risk of health-related disability

for both criteria. Marital status, when significant (in all cases but self-reporting) reduces the likelihood of disability.

To summarize the discussion of logit models estimation, it is seen that the results are substantially different and in some cases even contradictory depending on the definition of disabled population. These findings suggest that disability officially recognized by assignment of state pension may reflect a variety of issues in addition to the state of health alone. An attempt to distinguish between different types of disabled population within this broader category is made by estimation of multinomial logit model based on comparison between official recognition and reported state of health.

Estimation results are summarized in form of elasticities in Appendix A3. Similar to the models estimating overall probability of disability, the only factor that consistently differentiates healthy individuals from those somehow attributed to disabled population (either based on health conditions, or benefit assignment) is individual status in the previous period: experience of disability or being in retirement increases the likelihood of true or officially recognized disability in the current period. In addition, unlike expected, being registered as unemployed in the previous round of the survey actually decreases the likelihood of system abuse. Therefore, based on obtained estimation results we don't have any reasons to suggest that the system of disability benefits is widely regarded as an option of income extraction by individuals unsuccessful in search of regular employment. Apart from unemployment status, the economic well-being plays an important role only for consistently disabled individuals. Consistent disability is inversely related to the lag of personal non-pension income, as is abstinence (though at least at twice lower magnitude and only for weak approach). However, there is some positive compensating relationship between consistent disability and per capita income of other people in the household.

Abstinence is unexpectedly lower for the members of small households, not reflecting higher need for assistance among individuals living alone or with fewer people that can contribute to the household budgets. All groups linked to the problem of disability have fewer children than consistently healthy ones, which might be a reflection of causality problem in case of refusing and consistently disabled. Consistently disabled are also less likely to be married, probably for the same reason.

Refusing individuals in the weak model are younger, while all other groups are in general older than consistently healthy. Men are more frequent among consistently disabled and abusing, while women tend to refuse. Education is lower among refusing group, indicating potential problems with dissemination of accessible information on available benefits among less educated groups of population.

Time variable capturing travel distance to the medical centers does not have significant impact in any case. However, abstinence rates increase with population but are lower for non-administrative urban centers, suggesting that both overpopulated areas and urban settlements with lack of infrastructure can be problematic for successful applications. Corruption variable has a positive influence for most of the groups; yet this finding may be associated with higher rates of visits to the medical institutions by people with real or simulated health problems.

6. CONCLUSIONS

This paper was aimed at the investigation of targeting in the system of disability benefits in Russia. Three approaches were suggested to identify disabled population from RLMS survey: recipients of state disability benefits, self-reported disabled and disabled based on health-related measurements. Two methods were introduced to estimate health of the respondents from survey data, referred to as weak and strong approaches. Accuracy of targeting was evaluated based on comparison of individual status in the system of disability benefits and health conditions. Four possible states were identified from these comparisons: complying healthy and disabled, refusing and abusing.

Apparently, the social security system currently fails to provide the benefits to the target group of population, instead covering numerous individuals with scarce benefits. The situation might improve from the introduction of more strict entry barriers and increase of the real amount of benefits obtained; however, such policy would require a deep understanding of the underlying processes of individual decision making and behavioral responses.

Descriptive analysis of the data revealed significant inconsistencies in the targeting of disability benefits. It has basically shown that there were no significant differences in the health status of the recipients of disability pensions and those who do not apply for social security benefits. Two sets of models were estimated to analyze the factors (especially those not related to the health) that define individual status in the system and decisions of incompletion and refusing.

Estimation results have shown that the status in disability system is very sensitive to the health conditions and is characterized with a long memory: the fact of being disabled or retired in the previous period plays the most important role in the current system participation. Investigation of the system of disability benefits in Russia and empirical study of disability benefits targeting have supported an existence of trade-off between disability and retirement. It was initially suggested that a similar trade-off may exist between disability and unemployment, however empirical estimation has shown that unemployment does not contribute to falsified disability, and even inverse situation may take place.

Based on the identified relationship between disability and retirement, we can say that disability benefits play a distorting role and substitute for early retirement. Introduction of means-tested system at least for the part of benefits that is not funded on insurance principles, as well as introduction of policies that encourage people with disabilities to work and to stop paying benefits once some level of income is achieved might correct this problem.

It has been shown that non-participation is associated with lower levels of education. This outcome implies the need to simplify existing application procedures and to improve the flows of information in the system for the benefit of less educated individuals. Emphasis on disability policies that are aimed at provision of accommodation for disabled to work, development of infrastructure, rehabilitation measures (including psychological adjustment) rather than just monetary benefits can also be beneficial for this group. These measures would provide disabled population with more options to get sufficient income and would reduce the psychological and social burden of being disabled. As a result, the rate of applications for disability benefits would fall, the remaining amount would allow to increase payments to the fewer severely disabled individuals.

APPENDICES

A1. Definition of variables and mean values

Variable	Description / Encoding	All sample	Weak criterion				Strong criterion			
			Consistently healthy	Refusing	Abusing	Consistently disabled	Consistently healthy	Refusing	Abusing	Consistently disabled
<i>Individual properties</i>										
<i>Age</i>	Age: continuous (years)	43.8	36.8	62.8	42.3	58.3	41.2	57.9	51.0	56.3
<i>Age1</i>	Age dummy: 1 = between 16 and 40	0.47	0.61	0.07	0.45	0.12	0.53	0.14	0.30	0.14
<i>Age2</i>	Age dummy: 1 = between 41 and statutory retirement age (55 females, 60 males)	0.27	0.28	0.21	0.42	0.37	0.24	0.41	0.30	0.46
<i>Age3</i>	Age dummy: 1 = after statutory retirement age	0.27	0.11	0.72	0.13	0.51	0.23	0.45	0.40	0.40
<i>Gender</i>	Gender dummy: 1 = male	0.43	0.48	0.24	0.57	0.52	0.45	0.21	0.57	0.50
<i>Married</i>	Marital status: 1 — married (registered or unregistered marriage)	0.62	0.66	0.52	0.53	0.58	0.64	0.53	0.58	0.54
<i>Divorced</i>	Marital status: 1 — divorced	0.08	0.07	0.08	0.14	0.09	0.08	0.07	0.07	0.13
<i>Widow</i>	Marital status: 1 — widow(er)	0.13	0.05	0.36	0.07	0.23	0.09	0.34	0.15	0.21
<i>Nevmar</i>	Marital status: 1 — never married	0.17	0.22	0.04	0.26	0.10	0.19	0.06	0.19	0.10
<i>Grdlev</i>	Highest grade level achieved as school	9.11	9.57	7.83	8.99	8.39	9.30	7.96	8.80	8.33
<i>Highsc</i>	Higher education dummy	0.73	0.81	0.52	0.70	0.60	0.76	0.58	0.68	0.58
<i>Occupation and income history</i>										
<i>Income</i>	Current personal income (excluding disability pension), 2002	2200.3	2746.9	920.6	797.8	305.3	2402.4	1438.7	608.5	288.4
<i>Inc90</i>	Estimated salary in 1990 (rub.)	293	302	268	323	288	294	279	267	328
<i>Income_l</i>	Lag of personal income (excluding disability pension), 2001	1984.2	2230.6	1533.6	727.2	601.4	2096.5	1702.4	750.4	532.2
<i>occup_lag1</i>	Occupation lag (2001): worked	0.50	0.61	0.25	0.29	0.15	0.54	0.39	0.24	0.14
<i>occup_lag2</i>	Occupation lag (2001): studied	0.09	0.12	0.01	0.08	0.01	0.10	0.02	0.06	0.01
<i>occup_lag3</i>	Occupation lag (2001): disabled	0.02	0.00	0.01	0.30	0.30	0.00	0.01	0.25	0.36

Variable	Description / Encoding	All sample	Weak criterion				Strong criterion			
			Consistently healthy	Refusing	Abusing	Consistently disabled	Consistently healthy	Refusing	Abusing	Consistently disabled
<i>occup_lag4</i>	Occupation lag (2001): unemployed	0.09	0.11	0.04	0.10	0.02	0.09	0.07	0.06	0.03
<i>occup_lag5</i>	Occupation lag (2001): retired	0.25	0.09	0.67	0.19	0.49	0.21	0.47	0.37	0.43
<i>occup_lag6</i>	Occupation lag (2001): did not work for other reasons	0.05	0.07	0.03	0.04	0.02	0.06	0.05	0.02	0.03
<i>Health</i>										
<i>Reaschron</i>	Dummy: 1 = suffers from at least 1 chronic disease	0.49	0.37	0.78	0.73	0.90	0.43	0.77	0.81	0.89
<i>Reasanat</i>	Dummy: 1 = anatomic defects, leg/arm absent	0.01	0.01	0.01	0.01	0.04	0.01	0.01	0.02	0.04
<i>Selfrep</i>	Main occupation — unable to work, disabled	0.02	0.00	0.01	0.31	0.30	0.00	0.02	0.25	0.36
<i>Smoked</i>	Dummy: 1 = has ever smoked	0.47	0.53	0.27	0.60	0.45	0.49	0.31	0.51	0.47
<i>Household properties</i>										
<i>Num</i>	Number of household members	3.33	3.54	2.73	3.53	2.90	3.39	2.97	3.16	3.01
<i>Mvalue</i>	Estimated market value of occupied residence (thousand rub.)	310	319	287	257	271	314	292	274	259
<i>Hhincpc</i>	Per capita income of other household members	1351.7	1465.5	1057.5	1144.1	1183.6	1387.7	1172.6	1186.3	1158.4
<i>Child</i>	Number of own children under 16 y.o.	0.41	0.53	0.11	0.32	0.11	0.46	0.20	0.20	0.14
<i>Settlement properties</i>										
<i>Popul</i>	Settlement population (thousand)	1,388	1,310	1,577	1,034	1,859	1,393	1,265	1,785	1,463
<i>Settype1</i>	Regional center	0.44	0.43	0.44	0.35	0.49	0.44	0.43	0.43	0.48
<i>Settype2</i>	City	0.24	0.25	0.22	0.27	0.20	0.25	0.21	0.23	0.21
<i>Settype3</i>	Village	0.32	0.32	0.34	0.38	0.31	0.31	0.36	0.34	0.31
<i>Healthcare system</i>										
<i>Trvtime</i>	Estimated time required to visit a doctor	68.92	66.93	96.33	92.06	68.88	65.31	89.95	96.67	68.92
<i>Corrup</i>	Dummy: 1 = has paid for obtained medical services directly to the personnel	0.06	0.06	0.09	0.09	0.06	0.08	0.06	0.12	0.06
<i>Number of observations</i>		10,066	7,194	2,433	127	312	8,413	1,214	215	224

A2. Determinants of belonging to disabled population: elasticities after logit estimation

Explanatory variables	Dependent variable (category of disabled population = 1)							
	Recipients of disability pension		Self-reported disabled		Disabled by weak criterion		Disabled by strong criterion	
<i>Individual properties</i>								
age1	0.3048	***	0.4902	**	-0.2698	***	0.2079	***
age2	0.8240	***	1.4304	***	-0.2154	***	0.9450	***
Gender	0.5520	***	-0.1288		-0.1596	***	-0.3938	***
Married	-0.4370	**	0.4373		-0.1958	**	-0.2392	**
Grdlev	0.1984		-0.4321		-1.1528	***	-1.5034	***
Highsc	0.3276		0.0472		-0.1289		0.1760	
<i>Occupation and income history</i>								
inc90	-0.0692		-0.0779		0.0031		0.0100	
incomeind_1	-0.1774		-0.9473	**	-0.2767	***	-0.1036	
occup_lag3 (disabled)	0.0888	***	0.0947	***	0.0348	***	0.0388	***
occup_lag4 (unemployed)	0.0162		0.0207		0.0061		0.0096	
occup_lag5 (retired)	0.5167	***	0.3975	***	0.1729	***	0.2198	***
occup_lag6 (not working for other reasons)	0.0201		0.0816	*	0.0156		0.0151	
<i>Health</i>								
Reaschron	1.0067	***	0.7850	***	0.5236	***	0.5840	***
Smoked	-0.0705		0.2534		-0.0738		0.0702	
<i>Household properties</i>								
Num	0.2721		-0.0072		-0.2369	**	0.0652	
Child	-0.0807		-0.0307		-0.1504	***	-0.1377	***
Mvalue	-0.1165		-0.1939		0.0065		-0.0073	
Hhinothpc	0.1213	*	0.0531		0.0350		0.0392	
<i>Settlement properties</i>								
Popul	-0.0061		0.1410	***	0.0663	***	-0.0245	
settype1	-0.0105		-0.1114		-0.0579		-0.0138	
settype2	0.0083		0.0145		-0.0693	**	-0.1067	***
<i>Number of observations</i>	2631		2631		2631		2631	
Pseudo R2	0.3065		0.4448		0.3053		0.1764	
Wald Chi2	201.87		174.58		600.65		310.78	
Prob>chi ² (22)	0.000		0.000		0.000		0.000	

Note: *** / ** / * — estimate statistically significant at 1 / 5 / 10% level.

**A3. Determinants of individual behavior in the system of state disability benefits:
elasticities after multinomial logit estimation**

Explanatory variables	Inconsistencies (weak criterion)			Inconsistencies (strong criterion)		
	Refusing	Abusing	Consistently disabled	Refusing	Abusing	Consistently disabled
<i>Individual properties</i>						
age1	-0.3434 ***	0.4735 *	0.0900	0.1302 **	0.1315	0.3119 *
age2	-0.3521 ***	1.2545 ***	0.6070 ***	0.8170 ***	0.5428 **	1.3101 ***
gender	-0.2716 ***	0.5396	0.5799 ***	-0.4719 ***	0.9811 ***	0.0687
married	-0.0729	-0.0529	-0.6143 **	-0.1689	-0.4097	-0.5626 **
grdlev	-0.8184 **	0.9168	-0.6113	-1.3128 **	1.2249	-1.0496
highsc	-0.2932 ***	-0.4118	0.5145	0.0909	0.0622	0.5153
<i>Occupation and income history</i>						
inc90	0.0550	0.0986	-0.1776	-0.0245	-0.3265	0.1019
incomeind_1	-0.2593 ***	-0.1180	-0.5911 **	-0.0650	-0.2207	-0.6044 **
occup_lag3 (disabled)	0.0295 **	0.1032 ***	0.1196 ***	0.0373 ***	0.1012 ***	0.1243 ***
occup_lag4 (unemployed)	0.0109	-0.9146 ***	0.0317	0.0096	0.0388	0.0110
occup_lag5 (retired)	0.1490 ***	0.3227 **	0.5597 ***	0.1733 ***	0.4019 ***	0.6045 ***
occup_lag6 (not working for other reasons)	0.0225	0.0520	-0.0492	0.0186	0.0314	-0.0383
<i>Health care</i>						
trvtime	-0.0426	0.0349	0.0529	-0.0212	-0.0144	0.0817
corrup	0.0271 *	0.0717 *	0.0740 **	0.0445 ***	0.0234	0.0987 ***
smoked	-0.0163	0.0282	-0.1791	0.0208	-0.2765	0.1982
<i>Household properties</i>						
num	-0.4027 ***	0.4032	0.0570	-0.1568	0.2150	0.2004
child	-0.1584 ***	-0.3701 **	-0.1459	-0.1294 **	-0.2220 *	-0.2859 **
mvalue	0.0588	0.0260	-0.1252	-0.0502	-0.2121	0.0387
hhinot~c	0.0104	-0.0422	0.1280 *	0.0068	0.0502	0.1330 *
<i>Settlement properties</i>						
popul	0.0627 **	-0.0315	0.0060	0.0123	0.0089	-0.0489
settype1	-0.0775	-0.0883	0.1116	-0.0117	0.0545	0.0886
settype2	-0.0615 *	0.0887	0.0291	-0.0760 *	0.1076	-0.0129
Number of observations	2094			2094		
Pseudo R2	0.2885			0.1909		
Wald Chi2	19918.46			447.41		
Prob>chi2(22)	0.0000			0.0000		

REFERENCES

- Becker, C. and I. Merkur'yeva (2003) Disability transition risk: estimates from Russian panel data with modifications for Kazakhstan, Population Program – Institute of Behavioral Science, *University of Colorado at Boulder Working Papers*, 03-4.
- Bound, J., J.B. Cullen, A. Nichols, and L. Schmidt (2004) The welfare implications of increasing disability insurance benefit generosity, *Journal of Public Economics* **88**, 2487–2514.
- Bound, J. and R.V. Burkhauser (1999) Economic analysis of transfer programs targeted on people with disabilities, in: O. Ashenfelter and D. Card, eds., *Handbook of labor economics*, Vol. 3 (North-Holland, Amsterdam) 3417–3528.
- Burchardt, T. (2000) The dynamics of being disabled, *CASE Papers*, 36.
- Burkhauser, R.V. and M.C. Daly (2002) Policy watch: U.S. disability policy in a changing environment, *The Journal of Economic Perspectives* **16**, 213–224.
- Federalnyi zakon № 181-FZ ot 24 noiabria 1995 g. *O socialnoi zaschite invalidov v RF*.
- Federalnyi zakon № 173-FZ ot 17 dekabria 2001 g. *O trudovyh pensiah v RF*.
- Federalnyi zakon № 1032-1 ot 19 apreliia 1991 g. *O zaniatosti naselenia v RF*.
- Greene, W. (2003) *Econometric analysis* (Pearson Education, Inc, New Jersey).
- Gruber, J. (2000) Disability insurance benefits and labor supply, *The Journal of Political Economy* **108**, 1162–1183.
- Haveman, R., P. de Jong, and B. Wolfe (1991) Disability transfers and the work decision of older men, *Quarterly Journal of Economics* **106** (3), 939–950.
- Hoopengardner, T. (2001) Disability and work in Poland, *World Bank SP Discussion Papers*, 0101.
- Kreider, B. and R.T. Riphahn (2000) Explaining applications to the U.S. disability system: a semiparametric approach, *Journal of Human Resources* **35** (1), 82–115.
- Leonard, J.S. (1979) The social security disability program and labor force participation, *NBER Working Papers*, 392.
- Maki, D.R. (1993) The economic implications of disability insurance in Canada, *Journal of Labor Economics* **11**, 148–169.
- Maleva, T.M., S.A. Vasin, O.Yu. Golodec, and S.V. Besfamilnaya (1999) *Invalidy v Rossii: prichiny i dinamika invalidnosti, protivorechiya i perspektivy socialnoy politiki* (M.: Buro ekonomicheskogo analiza, ROSSPEN).
- Metts, R.L. (2000) Disability issues, trends and recommendations for the World Bank, *World Bank Social Protection Discussion Papers*, 0007.
- Parsons, D.O. (1991) Self-screening in targeted public transfer programs, *The Journal of Political Economy* **99**, 859–876.
- Postanovlenie Mintruda RF i Minzdrava RF N 1/30 ot 29 ianvaria 1997 g. *Ob utverjdenii Klassifikavii i vremennyh kriteriev, ispolzuemyh pri osuschestvlenii medico-socialnoi ekspertizy*.
- Ravaud, J.-F., A. Letourmy, I. Ville, and Z. Andreyev (2002) Identifying the population with disability: the approach of an INSEE survey on daily life and health, *Population (English edition)* **57**, 529–552.
- Rossiyskiy statisticheskiy ejegodnik (stat. sb., 2001–2005)* (M.: Rosstat).
- Socialnoe polozhenie i uroven' jizni naselenia Rossii (stat. sb., 2004)* (M.: Rosstat).