Influence of disability status on labor supply in Russia

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Motivation

Position of the disabled people in OECD countries:

- income level of the disabled is in average 15 percent lower than of nondisabled
- the employment rate of the disabled is about 40 percent, despite 70 percent of the able-bodied
- OECD countries spend around 2% of GDP on disability benefits

Position of the disabled people in Russia:

- in 2015 disability rate was around 9%
- number of disabled increased more than in three times in 25 years
- the disabled still remain socially unprotected group of population with low level of living, education and employment
- employment rate of the the disabled in 2015 - 11,9% of disabled, unemployment rate – 19,0%

Disability and the labor market position

- a disabled person is subject to public measures only if he or she has a disability status
- disability evaluation board assigns it as a result of special evaluation procedure
- disability is a result of physical and social barriers

1. disability benefits and non-monetary privileges destimulate employment of the disabled
2. disabled people are less competitive in the labor market
3. disability status serves a negative signal for employers, it leads to discrimination

Literature review

1. disability benefits and non-monetary privileges destimulate employment

- a positive relationship between disability benefits assignment and leaving the labor market (Harkness, 1993; Fenn and Vlachonikolis, 1986)
- an inverse relationship between the size of the disability benefits and the employment rate (Parsons, 1980, 1982; Bazzoli, 1985; Fenn, Vlachonikolis, 1986; Marie, Castello, 2010; Fevang et al, 2013).

2. reduced productivity of the disabled make them less competitive in the labour market

- disability onset leads to earlier exit from the labor market as well as to smaller probability of return to work (Bound et el., 1999; Disney et al, 2006).
- disability has a long-term effect on employment probability and working hours (Meyer, Mok, 2013)
- the effect of disability differs by age, the most severe effect is in the middle age (Pelkowski, Berger, 2004).
- the effect on employment for women is less adverse than for men (Pelkowski, Berger, 2004; Lindeboom et al, 2006; García-Gómez et al, 2010).

Literature review

3. disability status is a negative signal for employers in the situation of information assymetry about productivity and extra costs of employment of the disabled, it leads to discrimination

- Kidd et al (2000), Jones (2006) using Oaxaca-Blinder methodology found that observable characteristics explain only 25-50% of differences in the employment rate of the disabled and able-bodied, but the most part of unexplained difference goes to difference in unobservable characteristics. According to Jones, after introduction of antidiscrimination law the influence of discriminatiom decreased from 10 to 0%.

- Ravaud et al (1992) carried out an experiment and revealed that disability decreases the probability of employment 2-3 times.

It is necessary to separate influence of the disability status from other factors.

Disability studies in Russia

- Sociological surveys (Whitefield, et al (2009), Yarskaya-Smirnova and Naberushnikova (2004), Tarasenko (2004));
- Analysis of legislation with descriptive statistics (Klepikov and Shatalova (2009));
- Few works which analyze influence of poor health on employment and earnings (which also cover disabled people) (Kuzmich and Roshin (2007), Lyashok and Roshin (2012)).

- There is no empirical estimates of the disability impact on employment outcomes in Russian literature.

Key issues of the research

- **A purpose of the research:**

To access an effect of the disability status on the labor supply (employment and working hours) of the disabled people in Russia

- **Additional value of the research:**

- Empirical study of the disability status impact on the employment of the disabled people in Russia in 2004-2014 on the basis of RLMS-HSE data;
- Separation of the disability status effect from poor health effect

Dependent variables:

- employment probability
- working hours a week

Disability status – treatment variable

Disability definition and key difficulties in evaluation of disability effect

The question: “Will you tell me if you possess disability status, please?” is used to construct the main variable of being a “disabled person”.

The questions from a section "Health assessment" are used for identification of individuals who have similar to disabled health characteristics but do not have disability status (control group).

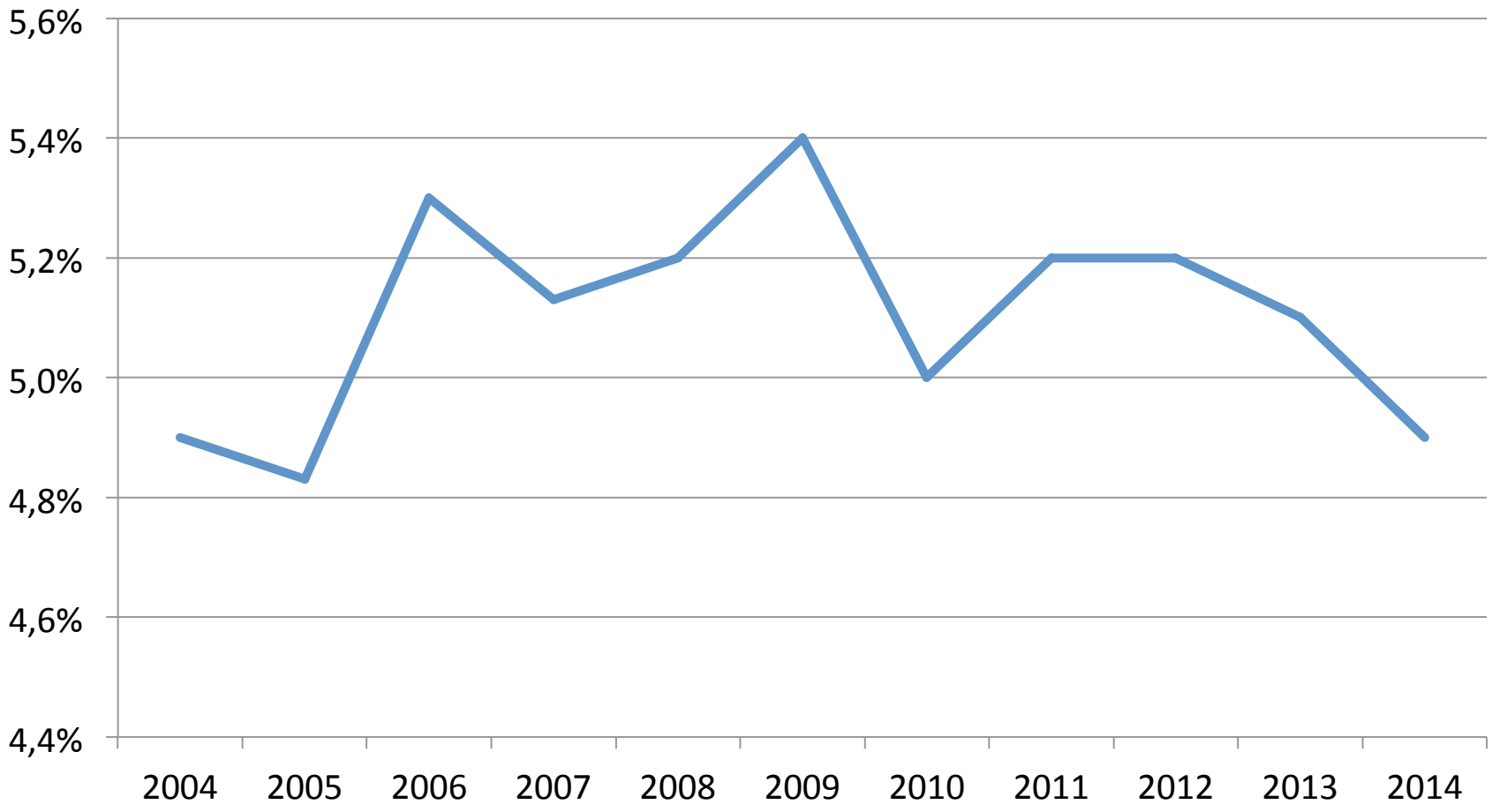
Sampling frame:

- Individuals 18 - 65 years old;
- Presence of data on the level of education, health assessment, labour status, family status, disability status;
- Disabled from childhood are excluded from the analysis

The main difficulties of the research:

1) measurement of real individual’s productivity
2) selection bias (individuals may manipulate disability status)
3) lack of common support (differences in characteristics of the disabled and nondisabled individuals)

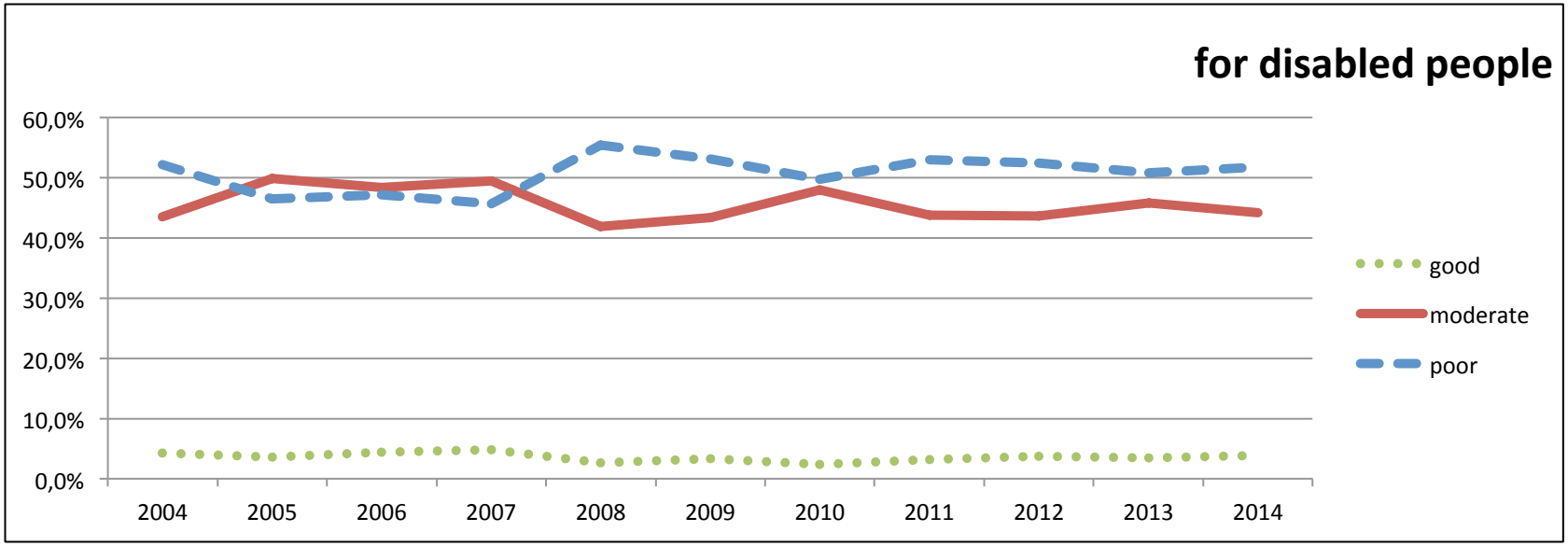
Share of the disabled in the age of 18-65 in RLMS-HSE,%

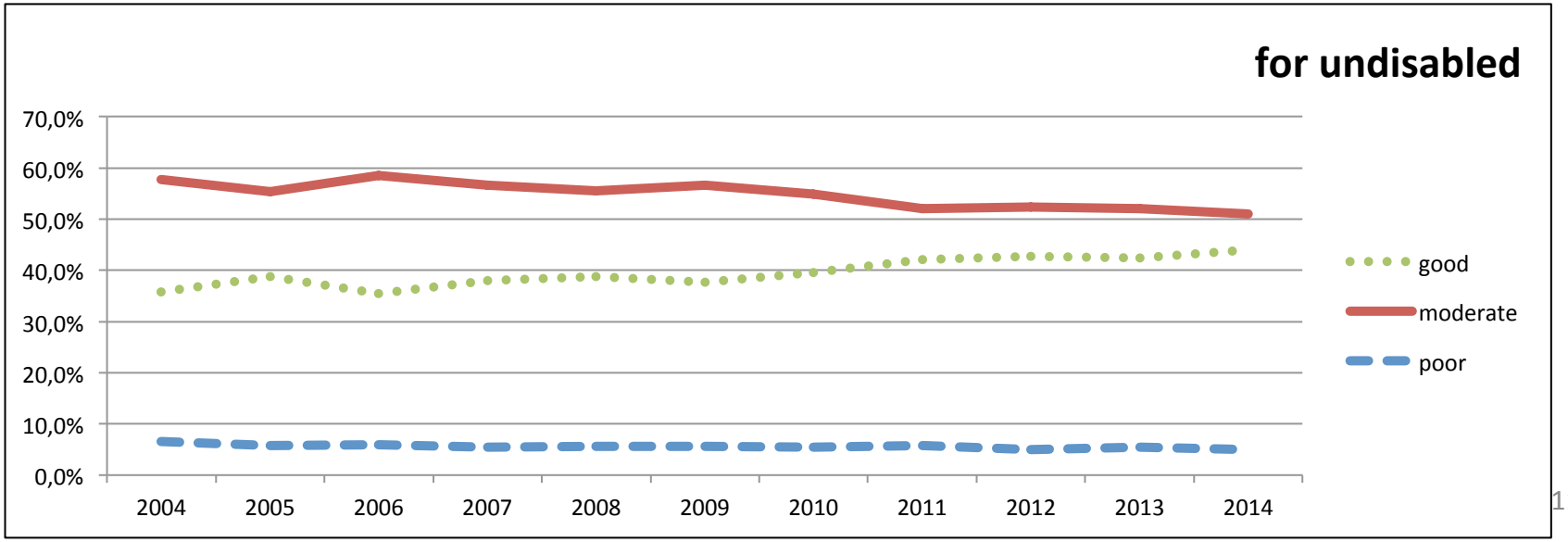


Social-demographic characteristics of the individuals

	2004		2014	
	Disabled	Undisabled	Disabled	Undisabled
Female,%	50,9	56,1	54,1	55,9
Age, years	51,5	38,5	54,5	40,3
Share of individuals in pension age, %	35,0	11,3	53,4	16,1
Household size, person	2,9	3,5	2,9	3,6
Has children under 18 years old, %	18,3	45,1	11,7	41,2
Education, %				
Under secondary	19,8	11,9	18,6	11,8
Secondary	45	39,5	38,3	36
Vocational	21,2	28,9	26,4	24,5
Higher	14,5	19,8	16,8	27,7
Has a chronical desease	91,5	43,0	94,0	52,0
Lay in a hospital during the last 3 months	19,1	3,8	14,6	3,7
Per capita income, rubles	3706	3910	6089	6261
Number of observations	377	7226	567	10592

Health assessment by groups, %





Propensity score matching (PSM) methodology

Advantages:

- helps to mitigate the "lack of common support" problem. Matching method allows to estimate differences between people who are identical with respect to observable characteristics but differ in their disability status (treatment).
- decreases risks of inappropriate specification of the model. Matching is a semiparametric method: no assumptions are made on the functional relationship (Imbens, 2004; Ениколопов, 2009; Caliendo and Kopeinig, 2011).

Limitations:

- does not solve the problem of non-random selection, but reduces its influence, if unobservable characteristics correlate with observable

Average treatment effect on treated (ATT)

Average treatment effect was estimated for the disabled

$\tau_{ATT} = E(\tau|D=1) = E[Y(1)|D=1] - E[Y(0)|D=1]$

where τ_{ATT} – average treatment effect on treated (D=1, if an individual has a disability status, D=0 – otherwise), Y- outcome (employment probability or length of a working week).

Assumptions:

1. Selection on observables (conditional independence assumption)

$Y0, Y1 \perp D|X$ (2)

where $\perp$ means independence, X- observable characteristics.

2. Individuals with similar characteristics are treated with the same probability

$0<P(D=1|X)<1$

Methodology

Stage I. On the basis of a probit model a propensity score index is calculated – a probability of that a person attains a disability status.

Stage II. A control group is formed on the basis of propensity score estimation. Every individual in a treatment group is paired with a similar observation (by propensity score index) in a control group.

Stage III. A treatment effect is calculated as a difference in a factual outcome and imputation.

- Nearest neighbor matching with replacement

identifies the closest observation from the control group. The method provides an effective evaluation. 'Replacement' implies usage of the same observation from the control group as a pair more than once, it helps to decrease bias.

- Stratification method

all the observations in the control group are devided into M-number of stratas, every strata contains observations with close propensity scores. Then average effects are evaluated for every strata, then an average effect for the whole group as a weighted average of effects for stratas.

Choice of covariates

Criterion of choice**:**

Covariate is included in the model if it influences disability status attainment and employment probability simultaneously.

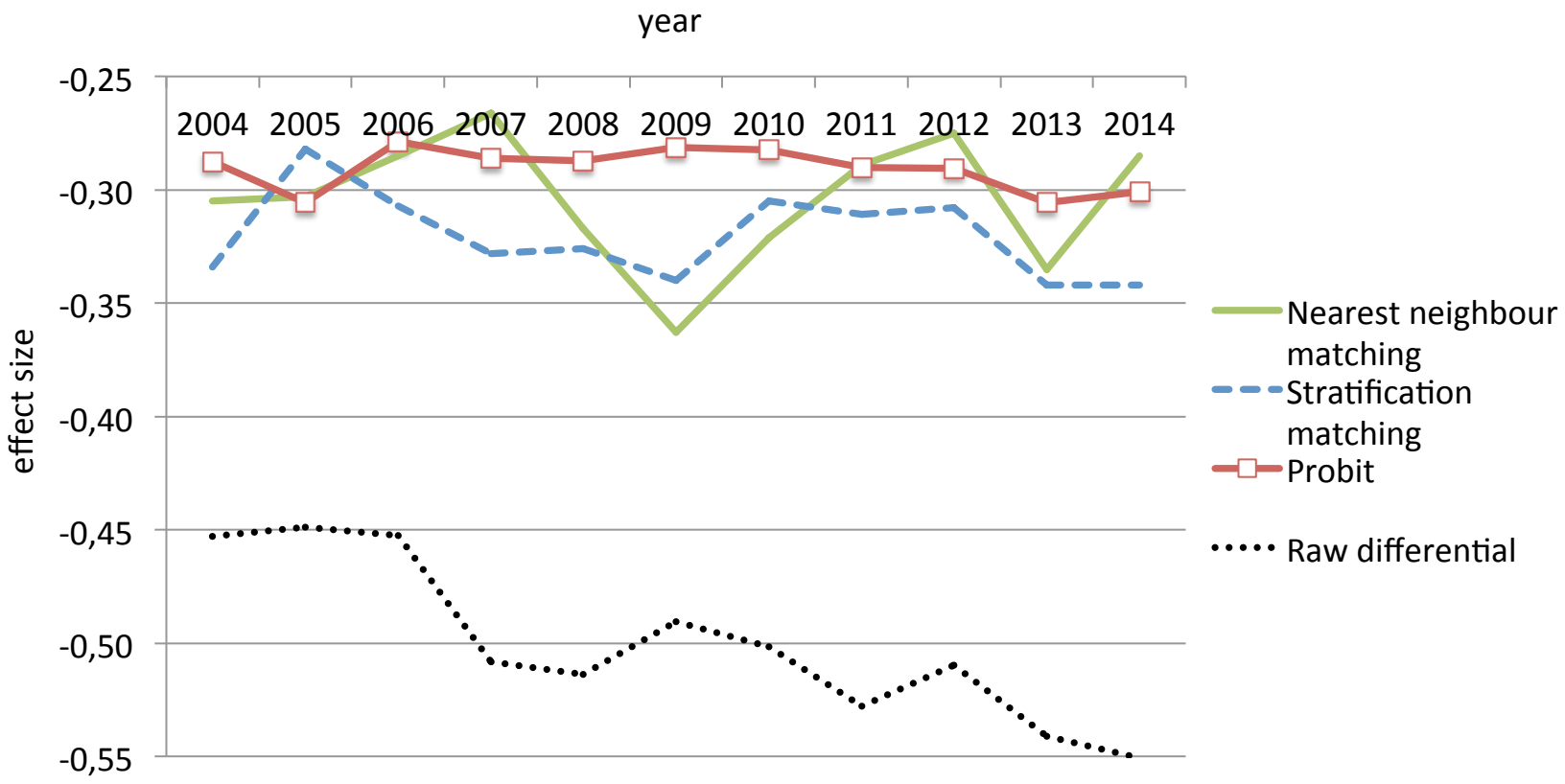
Covariates:

- health characteristics (self-assessment; frequency of doctor visits, the fact of staying in a hospital during the last three months; possession of chronical deseases);
- demographic and social-economic characteristics (gender, age, age squared, education level, marital status, pension age - dummy variable);
- household characteristics (size, logarithm of the non-labor income exclusive of disability benefits);
- characteristics of a living place (dummy variables: living in urban area, living in capitals regions).

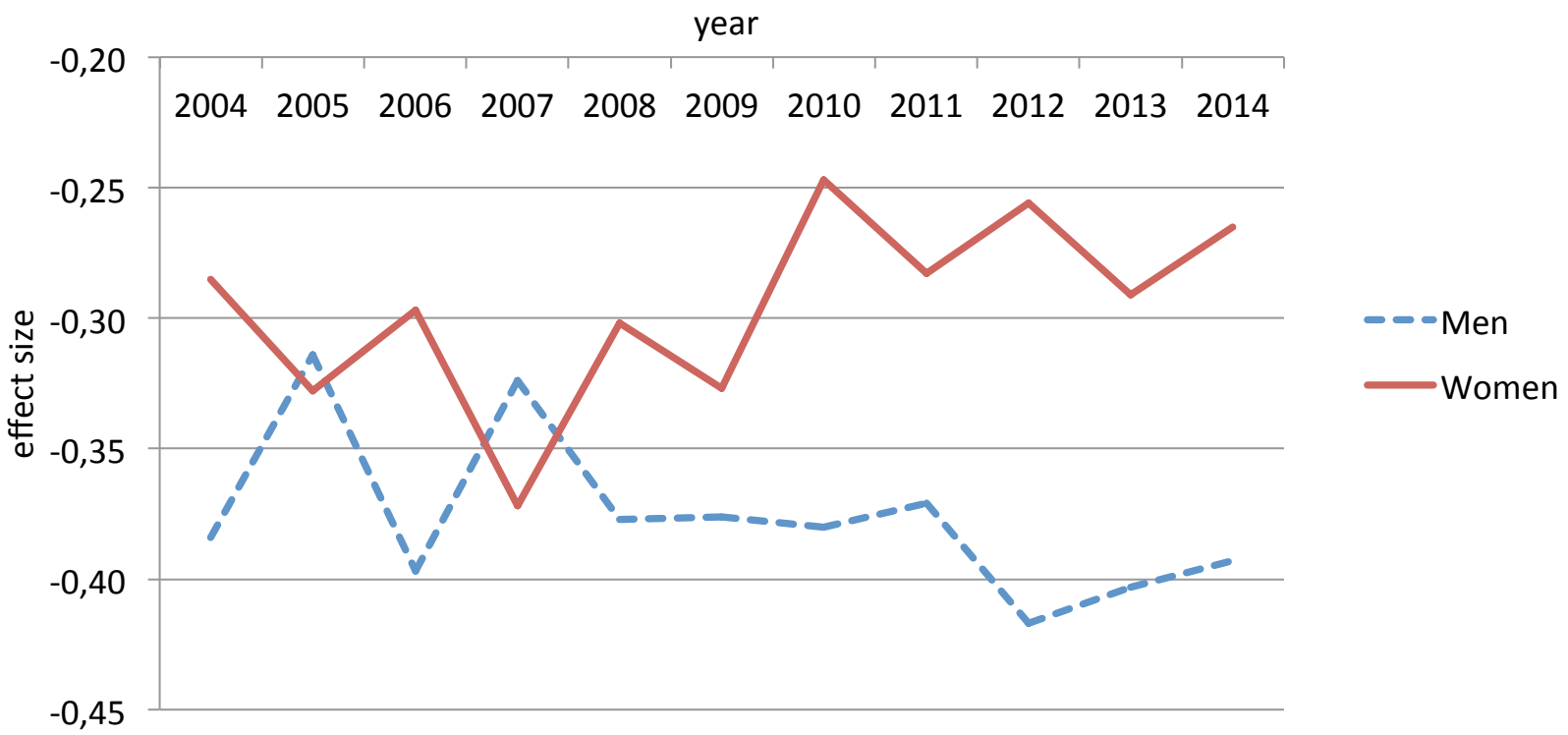
Matching method estimates of disability status influence on the employment probability

Year	Treatment group size	Control group size	ATT	Standard errors	t-statistics
Nearest neighbor matching					
2004	377	276	–0.31	0.05	–6.60
2005	357	253	–0.30	0.05	–6.27
2006	481	331	–0.29	0.04	–7.12
2007	451	321	–0.27	0.04	–6.26
2008	458	308	–0.32	0.04	–6.31
2009	474	330	–0.36	0.04	–8.66
2010	688	495	–0.32	0.03	–11.66
2011	722	527	–0.29	0.03	–9.05
2012	741	535	–0.30	0.03	–9.70
2013	701	525	–0.34	0.03	–13.66
2014	567	425	–0.31	0.04	–7.90
Stratification matching					
2004	377	5249	–0.33	0.03	–10.29
2005	357	6337	–0.28	0.03	–8.30
2006	481	7053	–0.31	0.03	–11.31
2007	438	4929	–0.33	0.03	–10.57
2008	458	6611	–0.33	0.03	–10.54
2009	474	5739	–0.34	0.04	–10.30
2010	688	10816	–0.31	0.02	–14.08
2011	722	10501	–0.31	0.02	–14.09
2012	741	8366	–0.32	0.02	–15.58
2013	701	9376	–0.34	0.02	–20.89
2014	567	8262	–0.33	0.02	–20.15

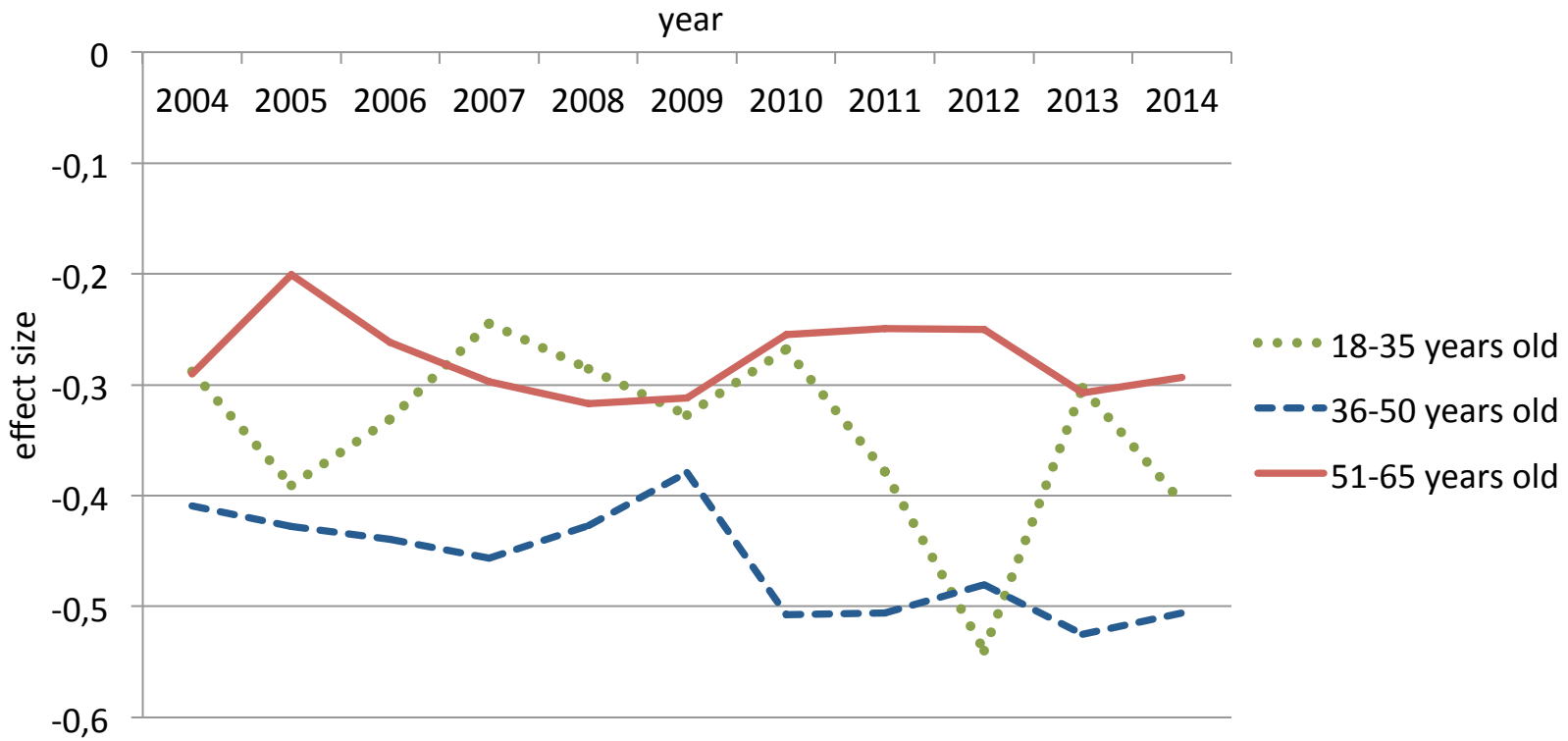
The estimates of disability status on the employment probability in 2004-2014, %



The estimates of disability status on the employment probability for men and women in 2004-2014, %



The estimates of disability status on the employment probability for different age groups in 2004-2014, %



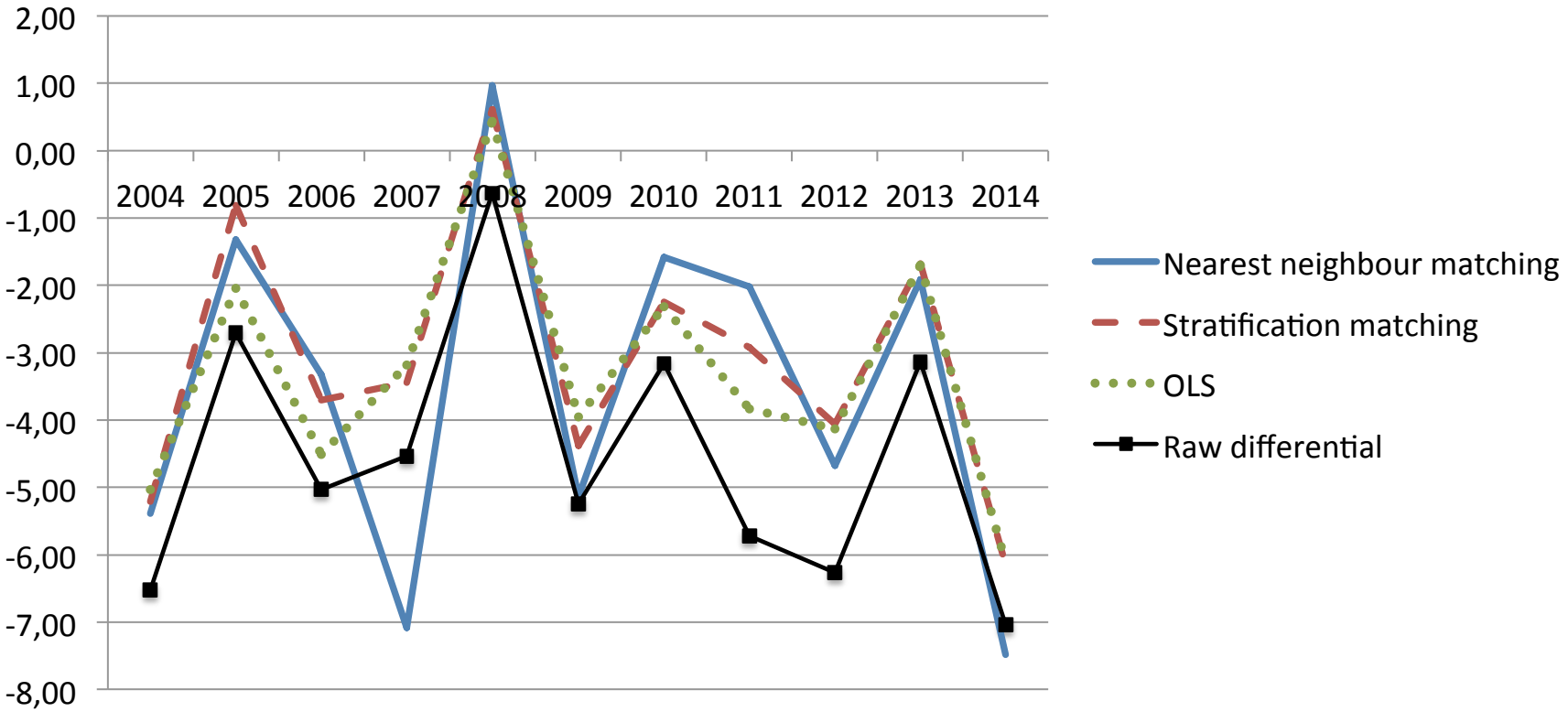
Main results: employment probability

- disability status has a significant separate effect on labour supply of the disabled
- disability status is associated with a 27-36 percent decrease in employment probability (according to matching methods evaluation)
- the effect is stable and significant over time
- the results of probit model estimation of average treatment effects (ATE) are close to estimaties of matching method
- both evaluations are lower than raw differential of employment rates

Matching method estimates of the influence of disability status on the working hours a week

Year	Treatment group size	Control group size	ATT	Standard errors	t-statistics
Nearest neighbor matching					
2004	100	91	–5.39	3.29	–1.64
2005	99	88	–1.32	2.63	–0.50
2006	141	121	–3.33	2.51	–1.33
2007	111	92	–7.08	2.57	–2.76
2008	112	98	0.96	2.26	0.43
2009	128	109	–5.14	2.41	–2.13
2010	161	147	–1.58	2.12	–0.75
2011	166	152	–2.02	1.98	–1.02
2012	153	140	–4.67	2.04	–2.29
2013	133	125	–1.91	2.15	–0.95
2014	102	93	–7.48	2.54	–2.95
Stratification matching					
2004	98	4021	–5.21	1.89	–3.14
2005	96	3146	–0.81	1.73	–0.47
2006	136	4426	–3.70	1.43	–2.57
2007	104	3938	–3.45	1.82	–1.89
2008	109	5413	0.61	1.91	0.32
2009	125	4606	–4.37	1.72	–2.54
2010	160	7589	–2.25	1.23	–1.83
2011	162	5400	–2.93	1.22	–2.40
2012	148	5939	–4.06	1.52	–2.67
2013	131	4371	–1.68	1.32	–1.28
2014	101	4964	–6.14	1.46	–4.20

The estimates of disability status on working hours a week in 2004-2014, hours



Main results: working hours a week

- a consistent impact of disability status on hours worked was not found;
- the effect flactuates within the limits [-7,5;1] hours per week according to matching methods evaluation;
- this effect also includes influence of legislation, according to which persons with the first and the second disability groups have a right to work 35 hours a week;
- the nearest neaghbour matching estimates are significant in 2004, 2007, 2009, 2012, 2014 years, stratification mathing estimates also in 2006, 2011 years;
- the matching method estimates are close to OLS ones;

Conclusion

We expected that probit and OLS models estimates will exceed matching method estimates in absolute magnitude. Two explainations of the fact that probit and OLS results are close to matching estimates:

- there may be unobservable differences which are not considered in our specification;
- measurement errors may influence the results, especially different perception of health self-assessment scale by the disabled and able-bodied.

We interpret the effect as a complex result of discrimination by employers and cost-benefit analysis of the disabled.

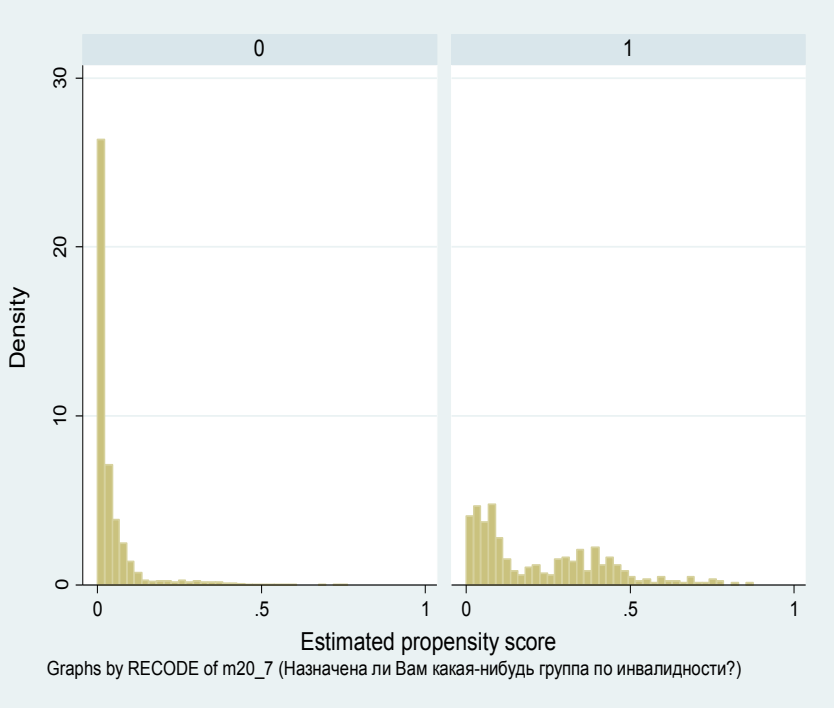
Our findings suggest that economic and institutional factors related to disability status influence the labor market entrance and to a lesser extent working hours.

Thank you for attention!

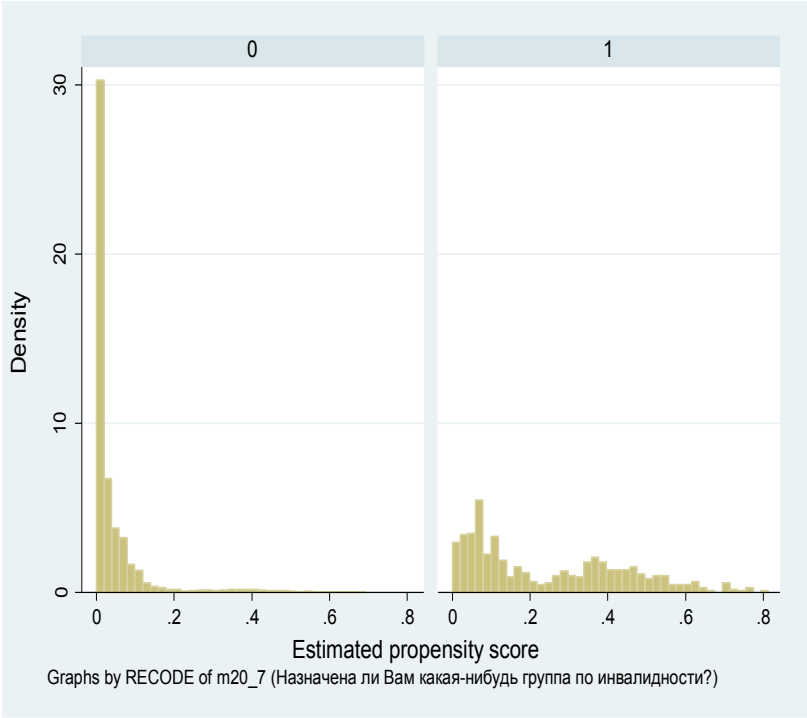
Probit and OLS estimates of the disability influence on outcomes

	Employment (probit model)		Employment (probit model)	
	Coef.	St. Err.	Coef.	St. Err.
2004	–0.29***	0.02	–5.03***	1.66
2005	–0.31***	0.02	–2.04	1.60
2006	–0.28***	0.02	–4.51***	1.43
2007	–0.29***	0.02	–3.18**	1.47
2008	–0.29***	0.02	0.43	1.39
2009	–0.28***	0.02	–3.95***	1.40
2010	–0.28***	0.02	–2.31*	1.24
2011	–0.29***	0.02	–3.84***	1.19
2012	–0.29***	0.01	–4.13***	1.22
2013	–0.31***	0.02	–1.70	1.28
2014	–0.30***	0.02	–6.10***	1.45

Propensity score distribution in 2004 and 2014



2004 – Disabled are in the right



2014 – Disabled are in the right