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Decomposing the net efficiency of Active Labor Market Programs

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Abstract: Each state intervention in the labor market must be evaluated at the end in terms of efficiency. It is especially important during periods when the resources allocated for this purpose are limited. The most commonway to verify it, is to estimate the gross efficiency. The gross efficiency is the percentage of unemployed who moved to employment following the end of the program. Gross efficiency indicators contain a number of apparent effects that distort the effect of intervention. Therefore we estimate net efficiency indicators, which reflects the actual effect of state intervention in the labor market. The aim of this paper is to estimate the net efficiency indicator of active labor market programs using the Oaxaca-Blinder decomposition. Analysis will be carried out using data sets of unemployed participating and not participating in active labor market programs.

Introduction

Labor Market Policy is aimed at solving structural problems of labor market and improving the efficiency of its functioning. Labor Market Policy is based on specialized instruments that adjust the structure of supply of work to the structure of demand for work. It has microeconomic character. Labor Market Policy is a state intervention in the labor market in case of imbalance on the labor market and it doesn't create new places of work. In the process of achieving the objectives of the labor market policy one uses many instruments, which could be divided into active and passive ones.
Active Labor Market Programs are in general directed to prepare the unemployed to reenter into the process of work and should be used especially to those with highest risk of unemployment and living in the regions with most difficult labor market situation. The aims of active labor market policy are:

- elicitation of unemployed,
- decreasing the structural mismatching in the labor market,
- increasing the productivity of labor force and verification the willingness of the unemployed to work.

The group of active instruments is composed of:

- career counseling and placement services,
- job search assistance,
- trainings,
- rotation and job sharing,
- subsidised employment.

The group of passive instruments is composed of employment benefits and early retirement.

Each state intervention in the labor market must be evaluated at the end in terms of efficiency. Efficiency indicators are calculated in general for active labor market programs. In most cases gross efficiency indicators are calculated and are interpreted as a percent of unemployed who moved to employment following the end of the active labor market program. Gross efficiency indicators contain several apparent (external) effects for example deadweight loss which is defined as the hirings from the target group that would have occured also in the absence of the programme (Calmfors,1994).
External effects distort the real causal impact of active labor market program. This is the substantial reason explaining why one should estimate net efficiency indicators of the programs.

Several methods of estimation the net efficiency indicators are proposed. One of the most popular is the Propensity Score Matching method, which is based on counterfactual states theory. The main idea of this method is that for each participant it matches one or more non-participants with equal or similar probability of participating in the programme (Heckmann, Ichimura, Todd, 1997).

When we obtain a control group we can estimate casual state intervention effect on the labor market. Net casual effect is estimated with the formula (Caliendo, 2006):

$$\Delta^{MAT} = \frac{1}{N_1}\sum_{i\in I_1}\left[Y_i^1 - \sum_{j\in I_0} w_{ij} Y_j^0\right],$$

where:

Δ^{MAT} is the net effect of the state intervention,
$N_1$is the number of participants of the program,
$I_1$is the subset of*i*participants of the intervention,
$I_0$is the subset of*j*nonparticipants of the intervention,
w_{ij} is a weight for *j*-th unemployed in a control group, which is used to estimation a counterfactual effect for *i*-th participant.

For each participant a sum of weights w_{ij} of similar nonparticipants must be equal to 1.
An alternative for matching methods are model-based methods. One of them is Oaxaca-Blinder decomposition, which is based on econometric models.

The aim of this paper is to estimate the net efficiency indicator of active labor market programs using the Oaxaca-Blinder decomposition. The substantial part of analysis is the estimation of the impact of each characteristic of the unemployed on the net efficiency indicator.

Methodology of the research

To estimate net efficiency indicators we will use the method called Oaxaca-Blinder decomposition and its modification. For a linear regression, the standard Oaxaca-Blinder decomposition is the difference between two groups in the average value of the dependent variable *Y* can be written as (Oaxaca, 1973; Blinder, 1973):

$\bar{Y}_A - \bar{Y}_B = [\bar{X}_A\beta_A - \bar{X}_B\beta_A] + [\bar{X}_B\beta_A - \bar{X}_B\beta_B]$,

where:

$\bar{Y}_A$ is the mean outcome for the group of participants of active labor market programs,
$\bar{Y}_B$ is the mean outcome for the group of nonparticipants of active labor market programs,
β_A is the vector of coefficients in the model of outcome for the group of participants of active labor market programs,
β_B is the vector of coefficients in the model of outcome for the group of nonparticipants of active labor market programs,
$\bar{X}_A$ is the vector of mean values of characteristics of the group of participants of labor market programs,
$\bar{X}_B$ is the vector of mean values of characteristics of the group of nonparticipants of labor market programs.

The decomposition for a nonlinear case $Y = F(X\hat{\beta})$ can be shown as: $\bar{Y}_A - \bar{Y}_B = \left[\overline{F(X_A\beta_A)} - \overline{F(X_B\beta_A)}\right] + \left[\overline{F(X_B\beta_A)} - \overline{F(X_B\beta_B)}\right]$,

where:

$\overline{F(.)}$ represents the mean value of the theoretical values from nonlinear or linear model.

The first part of the decomposition$\left[\overline{F(X_A\beta_A)} - \overline{F(X_B\beta_A)}\right]$ represents the differences in characteristics and the second one $\left[\overline{F(X_B\beta_A)} - \overline{F(X_B\beta_B)}\right]$ denotes the differences in coefficients.

The most important thing is to find the contribution of each variable to the total difference. If the function *F* is linear, obtaining detailed decomposition equation is trivial. But in case of nonlinear *F* function, the key problem is how to estimate the contribution of particular variables to the characteristics and coefficient effects. The solution of this problem is to use two types of approximation. First type of approximation evaluates the value of the function by using mean characteristics. The second type of approximation is based on first order Taylor expansion which linearizes the characteristics and coefficients effects around $\bar{X}_A\beta_A$ and $\bar{X}_B\beta_B$, respectively (Yun, 2003). The decomposition with weights takes the form (Yun, 2003):

$$\bar{Y}_A - \bar{Y}_B = \sum_{i=1}^{k} W_{\Delta X}^{i} \left[\overline{F(X_A\beta_A)} - \overline{F(X_B\beta_A)}\right] + \sum_{i=1}^{k} W_{\Delta\beta}^{i} \left[\overline{F(X_B\beta_A)} - \overline{F(X_B\beta_B)}\right]$$

where:

$W_{\Delta X}^{i} = \frac{(\bar{X}_A^i - \bar{X}_B^i)\beta_A^i}{(\bar{X}_A - \bar{X}_B)\beta_A}$ weights concerning characteristics of unemployed,

$W_{\Delta\beta}^{i} = \frac{\bar{X}_B^i(\beta_A^i - \beta_B^i)}{\bar{X}_B(\beta_A - \beta_B)}$ weights concerning coefficients,

$\sum_{i=1}^{k} W_{\Delta X}^{i} = 1$,

$\sum_{i=1}^{k} W_{\Delta\beta}^{i} = 1$.

Above decomposition may be considered as a general decomposition accounting for differences in the first moment. The only requirement is that the function *F* must be once differentiable. In many practical applications as a *F* function, a probit and logit model is used (Even, Macpherson, 1990; Nielsen, 1998; Yun, 2000). A described methodology of nonlinear decomposition technique will let us to estimate the net efficiency indicators for active labor market programs and identify causes of differences in moving to employment between groups of unemployed participants (group *A*) and non-participants (group *B*) of active labor market programs.

Data used for the analysis

Data used to conduct the analysis contain information about the unemployed in Toruń City. Analysis was conducted for two periods of time: year 2009 and year 2010. Datasets contained variables describing unemployed:

- *Y* – binary variable taking value 1 if an unemployed person turned employed and 0 in other case,
- *SEX* – binary variable taking value 1 for men and 0 for women,
- *ENG* – binary variable taking value 1 for unemployed with fluent or medium knowledge of English,
- *UN_BEN* – binary variable taking value 1 if an unemployed person received an unemployment benefit,
- *CHILD*0 – binary variable taking value 1 if an unemployed person had no children,
- *CHILD*1 – binary variable taking value 1 if an unemployed person had one child,
- *CHILD*2 – binary variable taking value 1 if an unemployed person had two or more children (this is a base variable for the group of variables describing number of children),
- *EDUC*0 – binary variable taking value 1 for unemployed with incomplete primary or primary or lower secondary education,
- *EDUC*1 – binary variable taking value 1 for unemployed with basic vocational education,
- *EDUC*2 – binary variable taking value 1 for unemployed with general secondary education (this is a base variable for the group of variables describing education),
- *EDUC*3 – binary variable taking value 1 for unemployed with post-secondary and vocational secondary education,
- *EDUC*4 – binary variable taking value 1 for unemployed with tertiary education,
- OCCUP0 – binary variable taking value 1 if an unemployed person had no occupation,
- *OCCUP*1_2 – binary variable taking value 1 if an unemployed person had occupation that belongs to the first (Managers) or second (Professionals) large group of occupations from the *Classification of occupations and specialities* (this is a base variable for the group of variables describing occupation),
- *OCCUP*3 – binary variable taking value 1 if an unemployed person had occupation belonging to the third large group of occupations – Technicians and associate professionals,
- *OCCUP4* – binary variable taking value 1 if an unemployed person had occupation belonging to the fourth large group of occupations – Clerical support workers,

- *OCCUP*5 – binary variable taking value 1 if an unemployed person had occupation belonging to the fifth large group of occupations – Service and sales workers,
- *OCCUP*6 – binary variable taking value 1 if an unemployed person had occupation belonging to the sixth large group of occupations – Skilled agricultural, forestry and fishery workers,
- *OCCUP*7 – binary variable taking value 1 if an unemployed person had occupation belonging to the seventh large group of occupations – Craft and related trade workers,
- *OCCUP*8 – binary variable taking value 1 if an unemployed person had occupation belonging to the eighth large group of occupations – Plant and machines operators and assemblers,
- *OCCUP*9 – binary variable taking value 1 if an unemployed person had occupation belonging to the ninth large group of occupations – Elementary occupations,
- *MARITAL*1 – binary variable taking value 1 if an unemployed person was married,
- *MARITAL*2 – binary variable taking value 1 if an unemployed person was single,
- *MARITAL*3 – binary variable taking value 1 if an unemployed person had other marital status (this is a base variable for the group of variables describing marital status),
- *AGE* – continuous variable describing age of the unemployed,
- *SENIORITY* – continuous variable describing seniority of the unemployed,
- *PART* – binary variable taking the value equal to 1 if an unemployed person belonged to the group of participants of active labor market programs.

A variable *PART* takes the value equal to 1 for all unemployed who took part in such active programs like: grants for starting business, trainings, intervention works, internships, public works and socially useful works.

Results of the analysis

On the base of datasets we estimated net efficiency indicators for specified active labor market programs. As a *F* function we used three types of probability model:

- linear: $P(Y = 1) = X\beta$,
- logit: $P(Y = 1) = \frac{e^{X\beta}}{1+e^{X\beta}}$,
- probit: $P(Y = 1) = \int_{-\infty}^{X\beta} \frac{1}{2\pi} e^{-\frac{t^2}{2}} dt$.

Results of the estimation of net efficiency indicators and wages describing the impact of each characteristic of unemployed to the value of indicator.

Table 1. The averages used in calculation the net efficiency indicators

Variable	Year 2009		Year 2010	
	$\bar{X}_A$	$\bar{X}_B$	$\bar{X}_A$	$\bar{X}_B$
SEX	0.4360	0.5157	0.4485	0.5215
ENG	0.5256	0.3513	0.5485	0.3540
UN_BEN	0.1431	0.2748	0.1336	0.2346
*CHILD*0	0.7380	0.6569	0.7112	0.6470
*CHILD*1	0.1197	0.1750	0.1533	0.1803
*EDUC*0	0.1724	0.2789	0.1548	0.2887
*EDUC*1	0.1423	0.2458	0.1676	0.2420
*EDUC*3	0.2289	0.2239	0.2533	0.2216
*EDUC*4	0.3283	0.1485	0.2859	0.1460
*OCCUP*0	0.1333	0.1297	0.1395	0.1329
*OCCUP*3	0.1627	0.1389	0.1572	0.1303
*OCCUP*4	0.0512	0.0600	0.0710	0.0636
*OCCUP*5	0.1145	0.1702	0.1557	0.1815
*OCCUP*6	0.0045	0.0055	0.0034	0.0058
*OCCUP*7	0.1190	0.2125	0.1395	0.2156
*OCCUP*8	0.0602	0.0670	0.0483	0.0692
*OCCUP*9	0.0648	0.0875	0.0596	0.0931
*MARITAL*1	0.3155	0.4297	0.3539	0.4303

MARITAL2	0.5354	0.3932	0.4781	0.3980
SENIORITY	6.0750	9.0750	6.6345	9.0191
AGE	32.5904	35.8143	33.1247	36.0506

Source: own calculations.

On the base of averages one can state that in the year 2010: the share of men in both groups increased, the share of unemployed with knowledge of English in both groups increased, the share of unemployed receiving unemployment benefit in both groups decreased, the share of unemployed with no children decreased and the share of unemployed with one child in both groups increased. The share of unemployed with tertiary education decreased in both groups. The share of unemployed with incomplete primary or primary or lower secondary education decreased for the group of participants and increased for the group of nonparticipants of active labor market programs. The shares of unemployed with post-secondary and vocational and with basic vocational education increased for the group of participants and decreased for the group of nonparticipants. Due to occupation the highest increase of a share was for unemployed with occupations belonging to the fifth large group of occupations. This situation concerned participants and nonparticipants. The share of married unemployed increased in both groups. The share of single unemployed decreased only for the group of participants. The average seniority increased only for the group of participants. The average age increased in both groups.

Table 2. Results of the estimation of linear model and net efficiency indicator for the year 2009

Variable	β_A	β_B	Difference in characteristic (%)	Difference in coefficient (%)
Intercept	1.1130	0.6578	0.00	226.66
SEX	-0.0126	-0.0200	0.50	1.92
ENG	0.0219	0.0417	1.90	-3.46
UN_BEN	0.0826	0.1899	-5.42	-14.70
*CHILD*0	-0.0187	-0.0034	-0.75	-5.00
*CHILD*1	-0.0641	-0.0171	1.77	-4.10
*EDUC*0	-0.1410	-0.0891	7.48	-7.20
*EDUC*1	-0.0613	-0.0154	3.16	-5.62
*EDUC*3	-0.0178	0.0861	-0.04	-11.58
*EDUC*4	0.0554	0.1582	4.97	-7.60
*OCCUP*0	-0.1646	-0.0790	-0.29	-5.53
*OCCUP*3	-0.0560	-0.0334	-0.66	-1.56
*OCCUP*4	-0.0307	-0.0154	0.13	-0.46
*OCCUP*5	-0.1250	-0.0084	3.47	-9.88
*OCCUP*6	0.0702	0.0371	-0.04	0.09
*OCCUP*7	-0.0941	-0.0028	4.39	-9.67
*OCCUP*8	-0.0834	0.0394	0.28	-4.10
*OCCUP*9	-0.1010	0.0124	1.14	-4.94
*MARITAL*1	0.0677	0.0415	-3.85	5.61
*MARITAL*2	-0.0092	-0.0080	-0.65	-0.22
SENIORITY	0.0092	0.0110	-13.74	-8.30
AGE	-0.0144	-0.0112	23.11	-57.23
NET EFFICIENCY	0.2008		26.86	73.14

Source: own calculations.

Estimated net efficiency indicator calculated for the year 2009 on the base of linear regression equals to 0.2008. This value represents the real effect of participation in active labor market programs and one can state that participants more often received a job in comparison with nonparticipants. Only 26.86% of the net efficiency indicator is explained by differences in characteristics of unemployed, the rest 73.14% is an unexplained part of the indicator. The biggest positive impact of differences in characteristics on the indicator had age, lack of education or tertiary education, occupation belonging to the seventh large group of occupations. The biggest negative impact of differences in characteristics on the indicator had receiving employment benefit, being married and seniority. The impact of differences in coefficients had in general negative influence on the efficiency indicator of the active

labor market programs. The biggest impact had receiving unemployment benefit, possessing post-secondary or vocational secondary education, having occupation belonging to fifth or seventh large group of occupations and seniority.

Table 3. Results of the estimation of logit model and net efficiency indicator for the year 2009

Variable	β_A	β_B	Difference in characteristic (%)	Difference in coefficient (%)
Intercept	2.8787	1.0652	0.00	194,34
SEX	-0.0717	-0.0900	0.62	1,01
ENG	0.0969	0.1827	1.83	-3,23
UN_BEN	0.3730	0.8009	-5.32	-12,60
*CHILD*0	-0.0874	-0.0540	-0.77	-2,35
*CHILD*1	-0.3134	-0.0962	1.88	-4,07
*EDUC*0	-0.6080	-0.4759	7.01	-3,95
*EDUC*1	-0.2615	-0.1113	2.93	-3,96
*EDUC*3	-0.0802	0.3466	-0.04	-10,24
*EDUC*4	0.2793	0.6702	5.44	-6,22
*OCCUP*0	-0.8171	-0.4408	-0.31	-5,23
*OCCUP*3	-0.3105	-0.1500	-0.80	-2,39
*OCCUP*4	-0.1952	-0.0743	0.19	-0,78
*OCCUP*5	-0.6347	-0.0431	3.83	-10,79
*OCCUP*6	0.2561	0.1890	-0.03	0,04
*OCCUP*7	-0.4908	-0.0134	4.97	-10,87
*OCCUP*8	-0.4389	0.1829	0.32	-4,46
*OCCUP*9	-0.4998	0.0819	1.23	-5,46
*MARITAL*1	0.3290	0.2085	-4.07	5,55
*MARITAL*2	-0.0653	-0.0248	-1.01	-1,71
SENIORITY	0.0437	0.0605	-14.19	-16,36
AGE	-0.0674	-0.0613	23.54	-23,51
NET EFFICIENCY	0.2008		27.25	72.75

Source: own calculations.

Estimated net efficiency indicator calculated on the base of the logit model equals to the indicator calculated on the base of linear model. Differences in characteristics and coefficients are different but have similar tendencies. Share of the explained part is bigger than in the case of linear model and equals to 27.25%. Unexplained part is still large and equals to 72.75%.

Table 4. Results of the estimation of probit model and net efficiency indicator for the year 2009

Variable	β_A	β_B	Difference in characteristic (%)	Difference in coefficient (%)
Intercept	1.7375	0.5973	0.00	201.88
SEX	-0.0452	-0.0576	0.64	1.13
ENG	0.0546	0.1155	1.70	-3.79
UN_BEN	0.2292	0.4967	-5.40	-13.01
*CHILD*0	-0.0558	-0.0290	-0.81	-3.12
*CHILD*1	-0.1976	-0.0558	1.95	-4.39
*EDUC*0	-0.3699	-0.2821	7.04	-4.33
*EDUC*1	-0.1551	-0.0619	2.87	-4.05
*EDUC*3	-0.0449	0.2167	-0.04	-10.37
*EDUC*4	0.1752	0.4120	5.63	-6.23
*OCCUP*0	-0.4835	-0.2567	-0.31	-5.21
*OCCUP*3	-0.1773	-0.0926	-0.75	-2.08
*OCCUP*4	-0.1216	-0.0448	0.19	-0.82
*OCCUP*5	-0.3759	-0.0261	3.74	-10.54
*OCCUP*6	0.1691	0.1041	-0.03	0.06
*OCCUP*7	-0.2921	-0.0078	4.88	-10.70
*OCCUP*8	-0.2581	0.1111	0.31	-4.38

*OCCUP*9	-0.3014	0.0467	1.23	-5.39
*MARITAL*1	0.1933	0.1293	-3.94	4.87
*MARITAL*2	-0.0249	-0.0155	-0.63	-0.65
SENIORITY	0.0268	0.0353	-14.38	-13.52
AGE	-0.0410	-0.0358	23.59	-32.83
NET EFFICIENCY	0.2003		27.47	72.53

Source: own calculations.

Results received from the probit model are similar to linear model and logit model-based. Net efficiency indicator is slightly smaller than in previous cases and equals to 0.2003. Share of explained part is bigger than in cases of linear and logit model and equals to 27.47%.

Table 5. Results of the estimation of linear model and net efficiency indicator for the year 2010

Variable	β_A	β_B	Difference in characteristic (%)	Difference in coefficient (%)
Intercept	0.8598	0.5367	0.00	176.24
SEX	0.0225	0.0026	-0.90	5.67
ENG	0.0059	0.0260	0.62	-3.88
UN_BEN	0.1280	0.1585	-7.05	-3.90
*CHILD*0	0.0836	0.0148	2.92	24.26
*CHILD*1	0.0631	-0.0006	-0.93	6.27
*EDUC*0	-0.0453	-0.0982	3.31	8.34
*EDUC*1	-0.0519	-0.0369	2.10	-1.97
*EDUC*3	0.0046	0.0585	0.08	-6.52
*EDUC*4	0.1352	0.1752	10.32	-3.19
*OCCUP*0	-0.1053	-0.0338	-0.38	-5.19
*OCCUP*3	-0.0201	0.0198	-0.30	-2.84
*OCCUP*4	0.0142	0.0106	0.06	0.12
*OCCUP*5	-0.0366	0.0446	0.51	-8.05
*OCCUP*6	0.0289	0.0727	-0.04	-0.14
*OCCUP*7	-0.0194	0.0542	0.80	-8.65
*OCCUP*8	-0.0264	0.0647	0.30	-3.44
*OCCUP*9	-0.0733	0.0662	1.34	-7.08
*MARITAL*1	0.0574	0.0399	-2.40	4.13
*MARITAL*2	-0.0123	-0.0106	-0.54	-0.37
SENIORITY	0.0115	0.0102	-14.98	6.40
AGE	-0.0144	-0.0096	22.99	-94.08
NET EFFICIENCY	0.1833		17.86	82.14

Source: own calculations.

Estimated net efficiency indicator calculated for the year 2010 based on the linear regression is smaller than the indicator for the year 2009 and equals to 0.1833. moreover one can state that the share of explained part of the indicator significantly decreased and for the investigated year equals to 17.86%. The biggest positive impact of differences in characteristics on the indicator had age, lack of education or tertiary education, occupation belonging to the ninth large group of occupations. The biggest negative impact of differences in characteristics on the indicator had receiving unemployment benefit, being married and seniority. The biggest negative impact of differences in coefficients had receiving unemployment benefit, possessing post-secondary or vocational secondary education, having occupation belonging to fifth or seventh large group of occupations and in particular age.

Table 6. Results of the estimation of logit model and net efficiency indicator for the year 2010

Variable	β_A	β_B	Difference in characteristic (%)	Difference in coefficient (%)
Intercept	1.6170	0.4909	0.00	135.37
SEX	0.1006	0.0171	-0.94	5.23
ENG	0.0228	0.1174	0.57	-4.03
UN_BEN	0.5751	0.6575	-7.42	-2.32

*CHILD*0	0.3540	0.0495	2.90	23.69
*CHILD*1	0.2717	-0.0105	-0.94	6.11
*EDUC*0	-0.1999	-0.5158	3.42	10.96
*EDUC*1	-0.2276	-0.2037	2.16	-0.69
*EDUC*3	0.0156	0.2255	0.06	-5.59
*EDUC*4	0.6103	0.7261	10.91	-2.03
*OCCUP*0	-0.4609	-0.2636	-0.39	-3.15
*OCCUP*3	-0.0924	0.0771	-0.32	-2.65
*OCCUP*4	0.0609	0.0276	0.06	0.25
*OCCUP*5	-0.1637	0.1804	0.54	-7.51
*OCCUP*6	0.1195	0.3252	-0.04	-0.14
*OCCUP*7	-0.0813	0.2283	0.79	-8.02
*OCCUP*8	-0.1249	0.2821	0.33	-3.39
*OCCUP*9	-0.3381	0.2983	1.45	-7.12
*MARITAL*1	0.2647	0.1945	-2.59	3.63
*MARITAL*2	-0.0578	-0.0415	-0.59	-0.78
SENIORITY	0.0527	0.0552	-16.07	-2.71
AGE	-0.0650	-0.0527	24.29	-53.31
NET EFFICIENCY	0.1833		18.21	81.79

Source: own calculations.

Results obtained from the logit model are similar for the year 2009 to the results received from the linear probability model. The net efficiency indicator equals to 0.1833 and a share of explained part is greater in comparison to linear model-based results and equals to 18.21%.

Table 7. Results of the estimation of probit model and net efficiency indicator for the year 2010

Variable	β_A	β_B	Difference in characteristic (%)	Difference in coefficient (%)
Intercept	0.9882	0.2498	0.00	145.52
SEX	0.0644	0.0065	-0.97	5.95
ENG	0.0187	0.0734	0.75	-3.82
UN_BEN	0.3506	0.4084	-7.32	-2.67
*CHILD*0	0.2153	0.0335	2.86	23.18
*CHILD*1	0.1661	-0.0058	-0.93	6.11
*EDUC*0	-0.1202	-0.3073	3.33	10.65
*EDUC*1	-0.1344	-0.1212	2.07	-0.63
*EDUC*3	0.0103	0.1403	0.07	-5.67
*EDUC*4	0.3741	0.4496	10.82	-2.17
*OCCUP*0	-0.2787	-0.1445	-0.38	-3.51
*OCCUP*3	-0.0537	0.0503	-0.30	-2.67
*OCCUP*4	0.0424	0.0199	0.06	0.28
*OCCUP*5	-0.0969	0.1151	0.52	-7.58
*OCCUP*6	0.0767	0.1960	-0.04	-0.14
*OCCUP*7	-0.0526	0.1433	0.83	-8.32
*OCCUP*8	-0.0757	0.1742	0.33	-3.41
*OCCUP*9	-0.2052	0.1832	1.42	-7.13
*MARITAL*1	0.1597	0.1214	-2.52	3.25
*MARITAL*2	-0.0358	-0.0248	-0.59	-0.86
SENIORITY	0.0322	0.0324	-15.89	-0.29
AGE	-0.0398	-0.0308	24.09	-64.25
NET EFFICIENCY	0.1834		18.19	81.81

Source: own calculations

Results received from the probit model are, like for the year 2009, similar to linear model and logit model-based. Net efficiency indicator is slightly higher than in previous cases and equals to 0.2003. Share of the explained part is higher than in case of linear model-based calculation and smaller then in logit model-based calculation and equals 18.19%. The impact of each difference in characteristic and

coefficients is in general similar except for seniority. The impact of differences in coefficients on seniority varies due to econometric probability model used. In case of linear model the impact is positive and equals 6.40% but for logit and probit model the impact is negative and equals 2.71% and 0.90%, respectively.

Conclusions

As a result of carried out analysis we obtained estimates of net efficiency indicators of active labor market programs. The decomposition allowed to estimate impact of each characteristic of the unemployed to the value of the indicator. Moreover the analysis showed that a type of the probability model doesn't influence significantly the estimates of the net efficiency indicator. Moreover percentage differences in characteristics and coefficients have similar tendencies.

Possible direction of future research is to estimate net efficiency indicator with various methods and compare them. One can use model-based parametric methods and for example kernel-based nonparametric methods or matching-based methods.

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