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The Wage Premium from Foreign Language Skills

Jacek Liwiński[∇]

Abstract[#]

The globalization of labour markets makes language skills one of the key competences required by employers nowadays. Our purpose is to estimate the wage premium from foreign language skills (FLS) earned by the Poles. We also want to find out whether this premium is affected by the fact of working in Poland or abroad. The Poles seem to be a good case study, because the Polish language is not used for international communication, while as much as 58% of Poles command at least one foreign language and 5% of Poles earn their income abroad. We use data from three waves (2012-2014) of the Human Capital Balance survey with a pooled sample of about 35,000 individuals. We estimate wage equation with the Heckman correction for selection to employment and we check for robustness with propensity score matching.

We find that the advanced command of a foreign language bring a 6% wage premium to individuals working in Poland and 22% to those working abroad. Interestingly, those working in Poland earn a much higher wage premium from proficiency in Spanish (29%), Italian (20%) or French (19%) than from proficiency in English (8%). But the English language is the only foreign language that brings a wage premium to Poles working abroad.

Keywords: foreign language skills; wage premium; wage equation

JEL Classification: I26, J24

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Introduction

The progressing globalization, accompanied by the growing international trade, foreign direct investments and international labour migrations, cause the demand for language competences grow and according to forecasts, this trend should continue in the future (Antonietti and Loi 2014; Ispording 2015). In the Central and East-European countries, including Poland, these changes intensified after the accession to the European Union. Suffice it to mention that a significant increase in the inflow of foreign direct investments to Poland has been observed since 2004, and ca. 900 000 Poles migrated to the UK and Ireland with the opening of EU labour markets in 2006. Under such circumstances, the command of foreign languages is becoming one of the key competences on the global labour market. Hence, it is not surprising that substantial public and private funds are allocated to language education. Learning two foreign languages at school is obligatory in Poland, similarly as in most European countries. Furthermore, there is a thriving sector of private language schools in Poland. In the European context, language skills are promoted by means of such initiatives like the Erasmus programme, which is financed from public funds, while requiring individual financial contribution too. Since language education involves expenses, it seems interesting from economic point of view, whether this type of education brings any benefits to individuals in the labour market, and the wage benefits in particular.

Our purpose is to estimate the wage premium from foreign language skills (FLS) which is obtained by Poles. Besides, we want to find out whether this wage premium is affected by the fact of being employed abroad rather than in Poland. The Poles seem to be a good case for this type of analysis, because the Polish language is not used for international communication, while as much as 58% of Poles declare to command at least one foreign language and 5% of Poles residing in Poland earn their income abroad.¹ We estimated an extended Mincer wage equation using OLS. The analysis was based on data from three waves (2012-2014) of the Human Capital Balance survey with a pooled sample of about 35,000 individuals.

We contribute to the literature on economic returns to foreign language skills in the following ways. Firstly, according to our best knowledge, this is the first paper which enables one to compare the wage premium from language skills, earned in one's home country and abroad. Secondly, this is one of a few studies enabling to identify the wage premium from proficiency in many different languages – not only English (Di Paolo and Tansel 2015; Williams 2011). Thirdly, our study is one of only a few for the Central and East-European countries (Toomet 2011; Fabo et al. 2017) and the first one for Poland. Fourthly, owing to the unique nature of the data used, we are controlling for a wide variety of respondents' skills in our wage equation, with the native language skills among them, thereby being able to reduce the bias caused by endogeneity of language education.

¹ Own analysis based on the Human Capital Balance survey data (2012-2014).

The paper is structured into five sections. In the first one, we present an overview of literature on the impact of language competences on wages. The second and the third sections present data and the method of analysis. The fourth section contains descriptive statistics of the sample and the fifth discusses the results of empirical analysis. The robustness analysis is presented in the sixth section, and at the end of the paper the most important findings are summarised.

1. Review of literature

The literature refers to four reasons why the proficiency in foreign languages should influence earnings. Firstly, language skills can have a positive impact on productivity, since they enhance the effectiveness of communication at work. This includes both internal communication – with peers or managers – and external communication – with clients or suppliers (Ku and Zussman 2010). Secondly, learning a foreign language, and then using it, can translate into improved cognitive skills and, consequently, a greater productivity at work. Adesope et al. (2010) shows that bilinguals have a cognitive advantage over monolinguals in the so called executive functions involving mental flexibility, inhibitory control, attention control, and task switching as well as creativity, flexibility, and originality in problem solving (Di Paolo and Tansel 2015). Hence, the above two channels of the impact on wages correspond with the human capital theory, as they perceive the increments of skills to be the source of higher earnings. The third explanation refers to the signalling theory (Spence 1973). Based on it one can argue that the command of a foreign language may be a signal of greater abilities and cognitive skills, thereby suggesting higher potential productivity. And fourthly, the command of a foreign language may open doors to more prestigious professions that are also likely to be better remunerated (Quella and Rendon 2012). This is confirmed by Chiswick and Miller (2010) who find that workers obtain a premium if their language skills match linguistic requirements in the workplace. Moreover, Aldashev et al. (2009) suggest that the positive effect of language proficiency among immigrants in Germany is completely driven by occupational selection, as the wage premium disappears once the endogenous selection into economic sector and occupation is controlled for.

There are three strands of studies on the wage premium from language skills. The first and the most popular one covers the wage premium earned by immigrants in the host country (see Dustmann (1994), Dustmann and van Soest (2001 and 2002), Stöhr (2015) for Germany; Berman et al. (2003), Lang and Siniver (2009) for Israel; Ispording (2013) for Spain; Leslie and Lindley (2001), Shields and Price (2002), Dustmann and Fabbri (2003) for the UK; Bleakley and Chin (2004) for the US). It is well established in this literature that immigrants with the host country language skills obtain a positive wage premium

The second strand refers to the wage premium from bilingualism obtained by natives in multilingual labour markets (see Shapiro and Stelcner (1997), Albouy (2008) for Canada; Henley and Jones (2005) for Wales; Grin and Sfreddo (1998), Cattaneo and Winkelmann (2005) for Switzerland; Rendon, (2007), Di Paolo (2011), Di Paolo and Raymond (2012) for Catalonia in Spain). The results obtained usually show that proficiency in a second language is remunerated in the labour market.

The third strand, to which our paper is most closely related, focuses on the wage premium from the command of foreign languages earned by the natives. Most of these papers are for developed countries (see Grin (2001) for Switzerland; Fry and Lowell (2003), Saiz and Zoido (2005) for the US; Lang and Siniver (2009) for Israel; Ginsburgh and Prieto-Rodriguez (2011), Williams (2011) for a comparative analysis of several Western European countries; Stöhr (2015) for Germany). Furthermore, the focus of many studies is on developing countries (see Levinsohn (2007) and Casale and Posel (2011) for South Africa; Azam et al. (2013) for India; Di Paolo and Tansel (2015) for Turkey; Guo and Sun (2014), Wang et al. (2017) for China). So far, not much research in this strand has been done for the Central and Eastern European countries (CEEC) (see Toomet (2011) for Latvia and Estonia; Fabo et al. (2017) for Czechia, Slovakia and Hungary). Besides, most studies concentrate on the command of English, with only a few analysing premiums from other languages (see Ginsburgh and Prieto-Rodriguez (2011), Williams (2011), Di Paolo and Tansel (2015)). The literature in this stand find a positive wage premium from the command of English, while in some countries – from other foreign languages too.

According to our best knowledge there are no studies for the CEEC on the wage premium from proficiency in any other foreign languages than English. Moreover, none of the existing studies compares wage premiums obtained in the home country and abroad. Our research is intended to fill these gaps in the literature.

2. Data

The analysis is based on the Human Capital Balance survey for the period of 2012-2014.² The survey is a unique source of unit data about human capital resources of Poles and it also provides information about the situation of individuals in the labour market. The sample is representative for the working age population, i.e. women aged 18-59 and men aged 18-64, residing in Poland. The sample consists of ca. 17600 individuals in each yearly wave of the survey.

For this study it is important that the survey contained questions about FLS. Respondents were asked to list all languages they knew and to assess the level of command for the three languages they knew best (using a six-grade scale) in four

² The Human Capital Balance (BKL) survey was conducted in the years 2010-2014 by the Polish Agency for Enterprise Development (PARP) in co-operation with the Jagiellonian University.

linguistic competences: reading, writing, speaking and listening comprehension. Although, the measure was a subjective one, it seems that owing to the relatively broad rating scale, the variation of language skills between individuals can be properly identified.

The database used has one additional advantage, namely the fact that it contains information about twelve other skills of respondents, including:

- searching and analysing information, as well as drawing conclusions,
- operating, installing and repairing technical equipment,
- performing calculations,
- operating a computer and using the Internet,
- artistic and creative abilities,
- physical fitness,
- self-organisation of work and showing initiative,
- networking,
- arranging and performing office tasks,
- managerial skills and organising other people's work,
- availability,
- fluency in spoken and written Polish.

The respondents were asked to assess their skills in the above-listed areas, using a five-grade scale. Hence, we have a map of respondents' skills at our disposal. Certainly, the assessments are subjective and the list of skills is not an exhaustive one. Nevertheless, there are many enough of the skills assessed, they are different enough and the rating scales are broad enough to assume that respondents' abilities and skills are reflected quite well. Importantly, the last skill on the list can be regarded as a measure of linguistic predispositions.

The sample is limited to individuals who were self-employed or employed on a contract within 12 months before the survey and who reported their average earnings from that period. Furthermore, in order to use the Heckman correction, the unemployed and economically inactive respondents were included in the sample. Eventually, the sample consisted of 35,579 respondents, of which 14,145 were employed.

3. Method

The potential bias of the wage premium estimator, resulting from endogeneity of language skills, is the basic methodological problem encountered when analysing

benefits from linguistic proficiency. If the individuals studying foreign languages are on average more able, skilled or motivated, we may expect that the OLS estimate of the wage premium will be overestimated as we do not control for unobservable abilities and skills. The wage premium estimated in this way will reflect not only benefits from language skills, but also those from other skills and abilities, that were useful when studying foreign languages and are useful at work too.

In order to reduce this bias, we used the unique property of the Human Capital Balance survey database, that is the information on respondents' twelve skills. Considering that development of skills – both linguistic and non-linguistic – is determined by abilities and motivation, the inclusion of the map of respondent's skills to the wage equation should reduce the endogeneity bias to a certain degree.

Based on the overview of literature, the following wage equation was estimated:

$$\ln(w_i) = (FLS_i \times WA_i)\beta_1 + S_i\beta_2 + X_i\beta_3 + \varepsilon_i \quad (1)$$

where: the dependent variable $\ln(w_i)$ represents the natural logarithm of hourly net earnings³, FLS_i is a vector of variables representing the level of foreign language skills, WA_i represents working abroad within 12 months before the survey, S_i covers the map of respondents' skills, and vector X_i – other factors that may have an impact on earnings.

Vector FLS_i consists of three binary variables representing the following levels of language skills: elementary, intermediate and advanced. In order to create these variables, we computed the average level of language skills (fls_i) as an arithmetic mean of the assessments of the four skills: reading, writing, speaking and listening comprehension. Each of them was rated by the respondents from 1 to 6, therefore each individual's average level of language competence fits in this interval too. Then, the following three levels of language skills were defined:

- elementary, if $fls_i \in <1;2>$,
- intermediate, if $fls_i \in (2;4>$,
- advanced, if $fls_i \in (4;6>$.

The map of skills (S_i) covers twelve skills listed in the previous chapter. The model includes a separate variable for each skill, taking values from 1 to 5. Furthermore, the model includes also other control variables (X_i) that represent respondents' features (gender, age, education level, participation in training), as well as characteristics of the local labour market (class of the place of residence, region, year of survey). All independent variables are listed in Table A1 in Appendix.

³ The earnings are expressed in 2014 prices.

In order to eliminate outliers, we deleted 0.2% of the upper and lower extreme values from the distribution of the hourly net earnings. The linear regression model was estimated using OLS with heteroscedasticity-robust standard errors.

4. Descriptive statistics

The descriptive statistics of the sample presented in Table 1 show that as much as 57% respondents have at least elementary knowledge of one foreign language. Respondents most often declare the command of English (37%), Russian (20%) and German (19%). Spanish, Italian and French are very rare - as little as 0.7%, 0.9% and 1.9% individuals in the sample, respectively, know these languages.

[TABLE 1 ABOUT HERE]

28% of respondents who declared command of a foreign language rated their language skills as advanced, 61% - as intermediate and 11% - as elementary. The advanced level is declared by a relatively high proportion of respondents with a command of English (35%) and Italian (31%), and a relatively low proportion of those with a command of French (15%), Russian (16%) and German (18%).

[TABLE 2 ABOUT HERE]

5. Results

The estimations of the wage equation are presented in Table 3. Estimation (1) is unconditional in the sense that hourly earnings are regressed on the foreign language skills (FLS) only. Both advanced and intermediate command of a foreign language are positively correlated with earnings. Yet, these correlations are getting lower as successive explanatory variables are included in the model (specifications 2 and 3). In particular, after the other respondents' skills (S_i) are included in the model the wage premium from advanced FLS falls from 13% to 10% and the premium from intermediate FLS – from 7% to 5%. This decrease can be interpreted as resulting from a reduction of the bias owing to the inclusion of the map of skills, which reflects respondents' abilities and motivations. This shows that abilities and motivation have an impact on both linguistic proficiency and earnings.

When we interact FLS with working abroad we find that the wage premium from FLS is three times higher for individuals working abroad than for those working in Poland. Respondents with the advanced command of a foreign language earn a 6% wage premium in Poland and 22% abroad, while those with intermediate language skills obtain 3% and 20%, respectively (specification 6).

What is interesting, the inclusion of the set of other respondents' skills (S_i) to the model has a different effect on the wage premium from FLS obtained by individuals working in Poland and those working abroad. The premium of the former group

decreases, while that of the latter group increases (specifications 2 and 3). This shows that FLS are positively correlated with abilities, in general. This is what one could expect as high abilities and motivation are likely to enhance the process of learning foreign languages. But at the same time it seems surprising that FLS are negatively correlated with abilities of individuals working abroad. This may be evidence that language skills are an important asset of individuals with low abilities, as it pushes them to work abroad.

[TABLE 3 ABOUT HERE]

Knowing that language skills translate into wage benefits, it is worth finding out, which languages are most beneficial. Table 4 shows estimations of the model with separate specifications for different foreign languages. The results show that the respondents employed in Poland obtain a wage premium from the advanced command of almost any of the languages covered by the analysis. The premium is particularly high from the advanced knowledge of Spanish (29%), Italian (20%) and French (19%). The premium from the advanced command of English and German is much lower (8% and 5%, respectively). Such a substantial difference may be due to the fact that the command of the first three languages referred to above is very rare among Poles (these languages are declared by 0.4%, 0.8% and 1.7% of the respondents, respectively), while the last two are much more common (34% and 16% respectively). Interestingly, the command of Russian does not bring any wage benefits at all. This outcome may be depressing especially to individuals who studied in Poland before the economic transition, as learning Russian had been mandatory in Polish schools and universities until 1990.

[TABLE 4 ABOUT HERE]

Another interesting finding is that English is the only foreign language the command of which has a positive impact on wages earned abroad. Individuals with the advanced command of this language earn 16.5% more when working abroad and 7.5% more, when working in Poland. Furthermore, English is the only foreign language bringing a wage premium while working in Poland, even if the command is intermediate (4.4%).

6. Robustness checks

We have tested the robustness of our results in three ways. Firstly, we estimated the baseline model separately for individuals working in Poland and those working abroad. Secondly, we applied the Heckman correction for selection to employment, and finally we used the propensity score matching (PSM) as an alternative method of estimation.

Our first robustness check was to estimate separate wage equations for individuals working in Poland and those working abroad, while our baseline model was estimated for the pooled sample and FLS were interacted with working abroad. Table 5 shows that the wage premium from intermediate and advanced command of foreign languages is positive for both individuals working in Poland and those who work abroad, which is consistent with the baseline results.

[TABLE 5 ABOUT HERE]

Secondly, as our baseline OLS estimates may be biased due to selection to employment, we applied the correction procedure proposed by Heckman (1979). We used two variables as exclusion restrictions: "woman" interacted with "having a child aged 0-1 years", and "marital status".⁴ The variables to be used as exclusion restrictions should be correlated with the probability of being employed, but not with the outcome variable. We find that both instruments are, as expected, negatively correlated with the probability of being employed and they are not significant, when included in the wage regression. Besides, the instruments may be regarded as strong since the value of chi2 in the Wald test of independence of equations is above 10, which is the threshold recommended by Staiger and Stock (1997), and the main and selection equations are independent at 0.01%. Table 6 shows that after applying the Heckman correction the results are basically the same as the baseline results.

[TABLE 6 ABOUT HERE]

Thirdly, we used the PSM as an alternative method of estimation. In our case the basic idea of the PSM method is to match the individuals with FLS (treatment group) with those who have a similar propensity to command a foreign language, but they actually do not command any (control group). We estimated this propensity based on the observable characteristics of individuals which were included in the wage regression. The wage premium from language skills was estimated as the difference between the mean wage levels in the treatment and control group.

To identify the propensity to command a foreign language for each individual in the sample we estimated the following probit model:

$$FL_{kmi} = Z_{kmi}\gamma_{km} + v_{kmi} \quad (2)$$

where: the dependent variable (FL_{kmi}) is equal to 1 if the respondent i , employed in the labour market m commands any foreign language at the level k , and 0 if he or she commands no foreign language at all. The model was estimated for three levels of FLS separately, that is for $k=\{elementary; intermediate; advanced\}$, and for two labour markets, that is for $m=\{Poland; abroad\}$. Z_i includes individual characteristics of respondents, while v_i is the random error. As a starting point we used the variables listed in Table A1 in Appendix (except for foreign language skills and working abroad)

⁴ The variable representing marital status takes three values: 1 - for married couples or partners; 2 - for the divorced or widowed, and 3 - for individuals who has never been married.

as explanatory variables, and then we reduced the model by removing, step by step, the variables insignificant at 10%.

In order to achieve as good quality of matching as possible we applied the following matching procedure for each level of FLS and for those working in Poland and abroad separately. First, we tried the nearest neighbour (NN) matching with 1 to 6 neighbours and looked for the number of neighbours, which gives the lowest Rubin's B statistics, provided that Rubin's R is between 0.5 and 2.⁵ In the second step we tried adding a caliper to NN matching. We tried four calipers: 0.001, 0.01, 0.05, and 0.1. As a result of this step, we chose the method providing the best quality of matching in terms of low Rubin's B statistics. The last step in the matching procedure was to apply the exact (1:1) matching based on the survey year and, in case of individuals working in Poland, on the region (voivodeship). After matching the ATT was estimated as the difference between the mean log of hourly wage rate in the treatment and control group. Standard errors were bootstrapped by performing 500 replications.

The PSM estimates presented in Table 7 are very similar in qualitative terms to the OLS estimates (in Table 5). Individuals working abroad enjoy a high positive wage premium from intermediate and advanced command of a foreign language (26-31%), while those working in Poland obtain a much lower wage premium from advanced foreign language skills (6%). The only qualitative difference between the OLS and PSM estimates is that the former show that intermediate FLS bring a small positive wage premium in Poland, while the latter show no wage premium from these skills in Poland.

[TABLE 7 ABOUT HERE]

7. Conclusions

The analysis presented above shows that, in general, FLS bring wage benefits to Poles. Yet, these benefits are strongly differentiated, depending on the language and on whether one is employed in Poland or abroad. In Poland, a high wage premium can be obtained from the advanced command of Spanish, Italian and French (29%, 20% and 19%, respectively), which is most probably due to the fact that the supply of individuals fluent in these languages is low. There are relatively many individuals fluent in English or German in Poland and presumably, this is why the wage premium is rather low in these cases (8% and 5%, respectively). Fluency in Russian, on the other hand, is not rewarded at all on the Polish labour market – due to the lack of demand, most probably. As far as employment abroad is concerned, only proficiency in English brings wage benefits (16%).

⁵ Rubin's B is the absolute standardized difference of the means of the linear index of the propensity score in the treated and (matched) non-treated group. Rubin's R is the ratio of treated to (matched) non-treated variances of the propensity score index. Rubin (2001) recommends that B be less than 25 and that R be between 0.5 and 2 for the samples to be considered sufficiently balanced.

These findings can be explained based on the human capital theory. They indicate a strong positive correlation between FLS and earnings, even after a set of variables representing twelve other skills is included to the model in order to control for abilities and motivation, at least to some extent. These skills include also fluency in spoken and written Polish, which can be regarded as a measure of predisposition to learning foreign languages. It seems therefore that the command of foreign languages, irrespective of abilities and motivation, increases productivity, thereby translating into higher earnings.

Finally, the results of the analysis justify public and private investments in development of language competences. The progressing globalisation and the resultant growth of demand for language competences suggest that investments in learning foreign languages will translate into wage benefits in the future too. In this context, the special role of English is worth stressing. It is the only one of the languages covered by the analysis that, if really mastered, brings wage benefits both in Poland and abroad. Therefore, proficiency in English seems to be one of the key competences on the contemporary labour market.

Obviously, our results are subject to some limitations. Firstly, the level of FLS was not measured but it was declared by respondents, so it may suffer from misreporting. Secondly, the wage premium from FLS may still be biased due to unobservable heterogeneity as neither OLS nor PSM estimation allows to eliminate this kind of bias entirely.

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Annex of tables and graphs

Table 1. Descriptive statistics of the sample by basic variables

Variable	N	Mean	Std. Dev.	Min	Max
Hourly net earnings	14110	13.96	10.21	0.89	153.67
Woman	35579	0.502	0.500	0	1
Age	35579	38.9	14.0	18	64
Education: lower secondary or below	35579	0.215	0.411	0	1
Education: basic vocational	35579	0.296	0.456	0	1
Education: secondary	35579	0.355	0.479	0	1
Education: tertiary	35579	0.134	0.341	0	1
Working abroad	35579	0.044	0.204	0	1
Foreign language: any	35579	0.571	0.495	0	1
Foreign language: English	35579	0.367	0.482	0	1
Foreign language: French	35579	0.019	0.138	0	1
Foreign language: German	35579	0.188	0.391	0	1
Foreign language: Russian	35579	0.203	0.402	0	1
Foreign language: Italian	35579	0.009	0.096	0	1
Foreign language: Spanish	35579	0.007	0.084	0	1
Foreign language: other	35579	0.016	0.127	0	1

Source: Author's own analyses based on the Human Capital Balance survey data.

Table 2. Sample distribution by the level of a foreign language skills

Foreign language	N	Elementary	Intermediate	Advanced
Any	20308	0.110	0.609	0.281
English	13008	0.083	0.565	0.352
French	681	0.220	0.628	0.151
German	6645	0.156	0.661	0.183
Russian	7196	0.169	0.670	0.161
Italian	328	0.122	0.570	0.308
Spanish	250	0.188	0.580	0.232
Other	576	0.116	0.530	0.354

Source: Author's own analyses based on the Human Capital Balance survey data.

Table 3. OLS estimations of the wage equation

Model specification	(1)	(2)	(3)	(4)	(5)	(6)
Elementary FLS	-0.025	-0.040**	-0.038**	-0.024	-0.044***	-0.042***
Intermediate FLS	0.136***	0.072***	0.052***	0.122***	0.052***	0.031***
Advanced FLS	0.276***	0.137***	0.100***	0.254***	0.099***	0.061***
Elementary FLS & working abroad				-0.090	0.003	0.012
Intermediate FLS & working abroad				0.115**	0.171***	0.198***
Advanced FLS & working abroad				0.095	0.211***	0.220***
Working abroad				0.191***	0.147***	0.129***
Other skills (S_i)			yes			yes
Other control variables (X_i)		yes	yes		yes	yes
Number of observations	14,145	14,145	14,145	14,145	14,145	14,145
R2	0.040	0.192	0.212	0.054	0.208	0.228

Notes: ***/**/* stand for 1%, 5% and 10% significance respectively.

Source: Author's own analyses based on the Human Capital Balance survey data.

Table 4. OLS estimations of the wage equation by languages

Model specification	English	French	German	Russian	Italian	Spanish	Other
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Elementary FLS	-0.062***	-0.030	-0.033	-0.033	-0.167	-0.220***	-0.046
Intermediate FLS	0.044***	0.071	0.020	0.000	-0.047	0.017	0.039
Advanced FLS	0.075***	0.187***	0.052*	-0.027	0.199**	0.289**	-0.097
Elementary FLS & working abroad	0.205	0.174	0.017	-0.029	-0.962**	0.298***	-0.198*
Intermediate FLS & working abroad	0.001	0.231	0.060	-0.060	-0.286*	0.055	0.292***
Advanced FLS & working abroad	0.165***	-0.070	0.109	-0.248**	-0.341*	-0.059	0.237
Working abroad	0.245***	0.286***	0.257***	0.306***	0.300***	0.287***	0.273***
Other skills (S_i)	yes	yes	yes	yes	yes	Yes	yes
Other control variables (X_i)	yes	yes	yes	yes	yes	Yes	yes
Number of observations	14,145	14,145	14,145	14,145	14,145	14,145	14,145
R2	0.227	0.224	0.225	0.224	0.225	0.224	0.225

Notes: ***/**/* stand for 1%, 5% and 10% significance respectively.

Source: Author's own analyses based on the Human Capital Balance survey data.

Table 5. OLS estimations of the wage equation

Model specification	Working in Poland			Working abroad		
	(1)	(2)	(3)	(4)	(5)	(6)
Elementary FLS	-0.024	-0.044***	-0.042***	-0.114	-0.072	-0.070
Intermediate FLS	0.122***	0.052***	0.030***	0.237***	0.219***	0.231***
Advanced FLS	0.254***	0.096***	0.058***	0.349***	0.294***	0.274***
Other skills (S_i)			yes			yes
Other control variables (X_i)		yes	yes		yes	yes
Number of observations	13,387	13,387	13,387	758	758	758
R2	0.034	0.204	0.225	0.063	0.180	0.227

Notes: ***/**/* stand for 1%, 5% and 10% significance respectively.

Source: Author's own analyses based on the Human Capital Balance survey data.

Table 6. Heckit estimations of the wage equation

Model specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Elementary FLS	-0.019	-0.024	-0.040**	-0.037**	-0.017	-0.025	-0.044***	-0.041***
Intermediate FLS	0.143***	0.103***	0.069***	0.052***	0.129***	0.088***	0.049***	0.031***
Advanced FLS	0.292***	0.232***	0.138***	0.105***	0.269***	0.202***	0.099***	0.066***
Elementary FLS & working abroad					-0.103	-0.031	0.001	0.010
Intermediate FLS & working abroad					0.108**	0.143***	0.172***	0.199***
Advanced FLS & working abroad					0.098	0.174***	0.215***	0.224***
Working abroad					0.190***	0.143***	0.147***	0.129***
Skills (S_i)				yes				yes
Other variables representing human capital (HC_i)			yes	yes			yes	yes
Local labour market characteristics (X_i)		yes	yes	yes		yes	yes	yes
Number of observations	35,579	35,579	35,579	35,579	35,579	35,579	35,579	35,579
chi2	251.0	614.9	16.18	10.72	240.9	610.1	16.10	11.18
Prob > chi2	0	0	0.0001	0.0011	0	0	0.0001	0.0008

Notes: The selection equation includes three variables: woman having a child aged 0-3 years, marital status, number of persons in the household; ***/**/* stand for 1%, 5% and 10% significance respectively.

Source: Author's own analyses based on the Human Capital Survey data.

Table 7. PSM estimates of the wage premium from language skills

	Working in Poland			Working abroad		
	Foreign language skills (baseline category: no foreign language skills):					
	elementary	intermediate	advanced	elementary	intermediate	advanced
ATT	-0.0720***	0.0143	0.0568**	-0.0266	0.3062***	0.2612***
Standard error	0.0233	0.0149	0.0277	0.1398	0.0617	0.0995
Neighbours	2	3	3	3	3	1
Caliper	-	0.05	0.01	0.05	0.05	0.01
1:1 matching variables	survey year, region	survey year, region	survey year, region	survey year	survey year	survey year
B statistics (matched)	15.9	9.3	16.0	8.1	25.3	40.4
R statistics (matched)	0.88	0.99	0.92	1.12	1.39	1.07
No. of obs.: untreated	5,670	5,670	5,670	174	174	174
No. of obs.: treated on support	854	4,818	926	35	323	96
No. of obs.: treated off support	0	88	1,024	6	11	113

Notes: ***/**/* stand for 1%, 5% and 10% significance respectively.

Source: Author's own analyses based on the Human Capital Balance survey data.

Appendix

Table A1. Independent variables in the wage equation

<i>Independent variable</i>	<i>Value classes</i>
Foreign language skills (<i>FLS_i</i>)	1 – elementary; 2 – intermediate; 3 – advanced; 0* – none
Working abroad	1 – working abroad within the last 12 months; 0* – otherwise
<i>Other skills (S_i)</i>	
Searching and analysing information, as well as drawing conclusions	continuous variable
Operating, installing and repairing technical equipment	continuous variable
Performing calculations	continuous variable
Operating a computer and using the Internet	continuous variable
Artistic and creative abilities	continuous variable
Physical fitness	continuous variable
Self-organisation of work and showing initiative	continuous variable
Networking	continuous variable
Arranging and performing office tasks	continuous variable
Managerial skills and organising other people's work	continuous variable
Availability	continuous variable
Fluency in spoken and written Polish	continuous variable
<i>Other control variables (X_i)</i>	
Woman	1 – woman; 0* – man
Age	continuous variable
Age squared	continuous variable
Education	1* - lower secondary or below; 2 - basic vocational; 3 - secondary; 4 - tertiary.
Training	1 - participation in training within the last 12 months; 0* - no training within the last 12 months.
Place of residence class	1* – rural; 2 – town < 10,000 inhabitants; 3 – town 10,000 -19,999 inhabitants; 4 – town 20,000 -49,999 inhabitants; 5 – town 50,000 -99,999 inhabitants; 6 – town 100,000 -199,999 inhabitants; 7 – town 200,000 - 499,999 inhabitants; 8 – town ≥ 500,000 inhabitants; 9 – Warsaw.

Region (voivodeship)	1* – Dolnośląskie; 2 – Kujawsko-pomorskie; 3 – Lubelskie; 4 – Lubuskie; 5 – Łódzkie; 6 – Małopolskie; 7 – Mazowieckie; 8 – Opolskie; 9 – Podkarpackie; 10 – Podlaskie; 11 – Pomorskie; 12 – Śląskie; 13 – Świętokrzyskie; 14 – Warmińsko-mazurskie; 15 – Wielkopolskie; 16 – Zachodniopomorskie
Survey year	Dummy variables (2012-2014)

Note: asterisks indicate the base category.

Source: authors' own elaboration.