Non-cognitive skills matter, beauty not that much: Evidence from hiring technicians*

*Jiří Balcar***

Abstract

Despite an extensive empirical body proving the importance of non-cognitive skills and beauty for labour market success, little is known about their role under special conditions and on different segments of a labour market. This article focuses on their effects on employment of Czech technicians, whose long-term lack indicates a labour market structural distortion. Individual data on technical high-school graduates from a large industrial agglomeration in the Czech Republic show that a) emotional lability negatively affects the probability of employment, especially in the case of graduates with low self-confidence (using Freiburg Personality Inventory for capturing psychological traits), b) efficiency, cooperation and leadership skills have a significant positive effect on employment in the case of active and persuasive individuals (using Soft Competencies Colour Association Diagnostics for capturing soft skills). The relative importance of cognitive and non-cognitive skills suggests that non-cognitive skills represent a very important employment determinant even on structurally deformed labour market of technicians. Surprisingly, also facial beauty was found to be relevant to some degree. Results show that beautiful technicians do not experience any advantage in hiring, whereas the ugly ones face an employment penalty. They also suggest that some specific face proportions (related to beauty) increase the probability of employment.

Keywords: non-cognitive skills; soft skills; psychological traits; beauty; hiring; technician
JEL Codes: J23, J24, J64

Introduction

Many European countries suffer from a long-term lack of workers with technical education, which can limit their development (European Commission 2018 and 2016; Cedefop 2015). The Czech Republic is no exception (see European Commission 2014 for comparing bottleneck vacancies in European countries); it shares similar causes and impacts of this unfavourable situation with other countries. Czech employers often solve the lack of technicians by using recruitment agencies and head-hunters, billboard advertisement campaigns or even running their own schools in order to hire at least a few qualified welders or CNC operators. The education system solves this problem only partially as there are low numbers of technical high-school graduates. This is the result of two factors: a) current high-school graduates were born in the period of significant decrease of childbirths (the number of newly born children decreased by -30.3 % between years 1990 and 2000), b) the drop in new enrolments was more pronounced at technical schools as technical studies are seen as more difficult and less presti-

* Received: 15.10.19, accepted: 5.5.20, 1 revision.

** *Jiří Balcar*, Ph.D., Associate Professor, VSB – Technical University of Ostrava. Email: jiri.balcar@vsb.cz. Research Interests: A role of psychological traits and non-cognitive skills for labour market success, gender equality and pollution-driven migration.

gious than humanities. However, the decreasing number of children led also to a drop in quality of education as schools have begun to compete for new enrolments by creating 'easier study conditions' ensuring both entrance and continuation in study for maximum number of students (schools were financed mainly according to the number of students until 2019).[1] The scope of the structural distortion of the Czech labour market can be illustrated also by the coexistence of a significant lack of technicians on the labour market and their 36.6 % share in unemployment of high-school graduates (MPSV 2014). All these facts make the Czech Republic a suitable case for examining employment determinants under the conditions of a structurally deformed labour market.

It can be assumed that formal qualification is the most important or even the only condition for hiring technicians. However, evidence from the Czech Republic and other countries (see next section) confirms considerable importance of non-cognitive skills for labour market success as well. Therefore, the aim of this article is to contribute to the discussion on importance of non-cognitive skills for hiring under the conditions of a structurally deformed labour market characterized by a significant and long-term lack of technically-educated workers. Focusing on this understudied topic is one of the contributions of this article. Another one is connected with an approximation of non-cognitive skills, the measurement of which represents a serious problem (as noted also by Heckman and Rubinstein 2001). The article focuses on different sets of non-cognitive skills measured using different methods, i.e. self-assessment, questionnaire-based psychological test and colour-association-based psychological diagnostics, covering different aspects of heterogeneous category of 'non-cognitive skills' (see e.g. Heckman et al. 2006; Heckman and Rubinstein 2001 for definition of this term). Moreover, it can be noted that it represents the first use of the soft skills diagnostics based on colour-association method in research. The third contribution is connected with exploring the effect of beauty, approximated by both objective measurement of physical facial traits (see Pallett et al. 2010) and its subjective perception (see Biddle/Hammermesh 1994 and 1998), as one of not commonly examined factors of hiring on technicians' labour market. The last contribution mentioned here is using longitudinal data on a representative sample of 243

1 The decrease of quality of students, reported by both employers and schools, can be illustrated by a comparison of shares of current high-school graduates (dataset used in this paper; age up to 21 years) and Czech employees with technical education (25–54 years of age, N=650, data gathered in Q4/2011; see Pytliková et al. 2012 for details on data), who had best grades from math (2 best grades at 5-point scale) at the end of primary education (ISCED 2A/EQF 2). Only high-school graduates, who were employed in August 2015 (N=146), are used in order to ensure comparability of results. It shows that the share of high-school students with best grades in math decreased by -31.0 % in case of secondary vocational schools, ISCED 3C/EQF 3 (27.4 % of employees and 18.9 % of employed high-school graduates) and by -28.0 % in case of secondary technical schools, ISCED 3A/EQF 4 (66.9 % of employees and 48.2 % of employed high-school graduates).

technical high-school graduates from the Moravian-Silesian Region, Czech Republic (one of most important industrial centres in the country), which avoids the potential problem of causality between independent and dependent variables present in cross-section analyses.

The article is divided into several sections. The next one provides an overview of empirical evidence on the importance of non-cognitive skills and beauty for employment and other labour market outputs. The following section describes data, approaches to the measurement of non-cognitive skills and beauty, as well as models employed in this article. The last section is devoted to the discussion on the importance of non-cognitive skills of young technicians for their employment (compared to professional skills) as well as the importance of beauty.

Relevancy of non-cognitive skills and beauty for labour market success

Economists generally agree on the importance of non-cognitive skills for labour market success, but there is little agreement on their substance. They are understood to be a complement to intelligence or cognitive skills (e.g. Humphries/Kosse 2017; Thiel/Thomsen 2013) and are usually identified with psychological traits, character, preferences, motivation, goals (e.g. Kautz et al. 2014; Heckman et al. 2006; Heckman/Rubinstein 2001), emotional intelligence (Schuelka et al. 2018) or soft skills (Heckman/Kauts 2013). It shows that 'non-cognitive skills' represent an all-encompassing term for a very broad and heterogonous concept. Moreover, the term 'non-cognitive skills' itself is quite imprecise, as many of its components are at least partly cognitive (e.g. Zhou 2017; Thiel/Thomsen 2013). From this perspective, it is necessary to note that this article focuses only on personality and psychological traits (e.g. openness, sociability, dominance, grid or locus of control) and work-related soft skills (e.g. efficiency, cooperation, problem solving, planning and organising or leadership), and further uses the term 'non-cognitive skills' in accordance with this focus.

Measuring personality, psychological traits and work-related soft skills is far from straightforward, as Heckman and Rubinstein (2001) noted. Psychological traits are most often measured by personality inventories (e.g. Big Five Personality Test, Freiburg Personality Inventory), low-dimensional scores assessing specific traits (e.g. Rotter's Locus of Control Scale, Rosenberg Self-Esteem Scale, Self-Control Rating Scale) or self-assessment. Measuring soft skills is even more difficult as they are more complex and context-specific than psychological traits. Empirical literature approximates them by questioning individuals on their past behaviour (e.g. Weinberger 2014; Kuhn/Weinberger 2005), performed job tasks (e.g. Bacolod/Blum 2010; Borghans et al. 2014 and 2008; Black/Spitz-Oener 2010) or job requirements on particular soft skills (Balcar

2016). Another option, applied also in this article, is to focus on attitudes behind the soft skills, not the skills themselves.

Extensive empirical body confirms a statistically significant relationship between psychological traits and different educational and labour market outputs, such as school results (Wolfe/Johnson 1995), educational dropout (Coneus et al. 2008), occupational attainment (Cobb-Clark/Tan 2011), job performance (Judge/Erez 2007; Barrick/Mount 1991), job satisfaction (Judge et al. 2002) and wages (Furnham/Cheng 2013; Drago 2011; Heineck/Anger 2010). In addition, there is also a number of empirical studies highly relevant to the topic of this article as they provide evidence on the importance of psychological traits approximated by the Big Five Inventory, locus of control, and positive/negative reciprocity for job search and (un)employment (e.g. Cuesta/Budría 2017; Caliendo et al. 2015; Fletcher 2013; Viinikainen/Kokko 2012; Uysal/ Pohlmeier 2011; Dohmen et al. 2009; Carneiro et al. 2007; Gallo et al. 2003). On the other hand, there are not many empirical studies providing rigorous evidence on returns to work-related soft skills (thereafter 'soft skills'). The most common are studies focused on wage returns to them. For instance, Balcar (2016) quantified wage returns to a set of 15 soft skills (evidence from the Czech Republic), while Weinberger (2014) and Kuhn, Weinberger (2005) focused on returns to leadership skills, and Borghans, Weel, Weinberg (2014) and Bacolod, Blum (2010) to people-oriented job tasks. The importance of soft skills for employment is usually discussed through policy studies (e.g. Karásek et al. 2011) or surveys focused on skills needs (e.g. Gallup Organization 2010). Evidence from 19 surveys published in the period 2004–2018 (see online Appendix 1 at https://cdrive.vsb.cz/index.php/s/pdDfQAYhvgdT8SP for their review) suggests that Efficiency/responsibility/diligence, Communication, Problem solving, Flexibility/adaptability, Life-long learning, and Cooperation represent the six most important soft skills for individuals' employability and work performance in the Czech Republic (the skills are sorted in descending order according to their frequency at 5 highest ranks). Studies dealing exclusively with importance of soft skills for technical high-school graduates, published in the period 2014–2017, showed that Life-long learning, Flexibility/adaptability, Cooperation and Problem solving are considered crucial as they are reported at 5 highest ranks in all reviewed studies (see Table 1).

Table 1: Importance of soft skills for technical high-school graduates in the Czech Republic

Source	Field of education	Soft skills important for technical high-school graduates (in descending order, max. 10 skills)
Doležalová et al. 2017a	Engineering (KKOV 23)	Life-long learning, Flexibility/adaptability, Responsibility, Problem solving, Cooperation, Decision making, Stress resiliency, Exploring and orientation in information, Communication, Customer orientation
Doležalová et al. 2017b	Construction and civil engineering (KKOV 36)	Responsibility, Problem solving, Cooperation, Life-long learning, Flexibility/adaptability, Decision making, Stress resiliency, Customer orientation, Communication, Exploring and orientation in information
Paterová et al. 2015	Transport and communication (KKOV 37)	Flexibility/adaptability, Life-long learning, Cooperation, Problem solving, Decision making, Responsibility, Customer orientation, Stress resiliency, Communication, Exploring and orientation in information
Chomová et al. 2014	Electrical engineering and ICT (KKOV 26)	Life-long learning, Cooperation, Flexibility/adaptability, Problem solving, Responsibility, Decision making, Exploring and orientation in information, Customer orientation, Stress resiliency, Communication

Source: Author

Beauty, or more precisely facial beauty, is another factor potentially influencing hiring discussed in this article. There are two prevailing approaches for its measurement employed in empirical studies: objective measurement of physical facial features (see e.g. Bóo et al. 2013; Pallett et al. 2010) and its subjective assessment by a board of evaluators (see Biddle/Hammermesh 1994 and 1998). The first approach is based on an assumption that some physical proportions in human face are more attractive than others. This approach is consistent with the idea of the 'golden ratio' ($\Phi \approx 1.618$), which is seen as the optimal ratio of facial proportions corresponding to the general perception of beauty (see Meisner 2016 for more information). Despite the tempting possibility of 'exact measuring of beauty', this approach is not as often used in economic empirical literature as the second one based on subjective assessment. This stems from (often unconscious) ability of evaluators to take into consideration many more factors than face features, such as hair style (Dechter 2015; Guéguen 2012), permanent decoration or simply keeping oneself presentable (Guéguen/Jacob 2012). Moreover, even the number of facial proportion and thus the relevancy of beauty approximation can differ between studies (e.g. Pallett et al. 2010 discussed the role of two facial proportions, but Meisner 2016 described 16 face proportions defining facial beauty).

The bulk of empirical literature suggests that facial beauty is significantly connected with labour market outputs as more attractive people are perceived as more intelligent (Jackson et al. 1995), trustworthy (Wilson/Eckel 2006), socially

skilled (Feingold 1992) and productive (Mobius/Rosenblat 2006) even in the situation of no real differences between them and their less attractive peers. There is considerable evidence that attractive people get more job interviews (Galarza/Yamada 2017; Ruffle/Shtudiner 2015; Baert/Decuypere 2014; Bóo et al. 2013), are more likely to be employed (Gehrsitz 2014; Borland/Leigh 2014; Pfeifer 2012) and are better paid (Fletcher 2009; French 2002; Harper 2000; Biddle/Hammermesh 1994 and 1998; for evidence from the Czech Republic see Anýžová/Matějů 2018). Therefore, it is not surprising that these people are more satisfied with their lives than others are (Hammermesh/Abrevaya 2013). The empirical literature suggests that beauty premium or penalty is often relevant only to specific gender or level of individual's attractiveness (Liu/Sierminska 2014). It can be expected that the returns to beauty are also occupation-specific, but this topic is still understudied, as was pointed out by Liu and Sierminska (2014). For instance, Caki and Solmaz (2013) showed no statistically significant relationship between facial beauty and employment in the case of Turkish blue-collar workers in the retail sector. This article aims to examine the relevancy of beauty for hiring of Czech technicians.

Data and model

Data from a longitudinal survey of technical high-school graduates from Moravian-Silesian Region, Czech Republic, i.e. one of the most important industrial centres in the country, are used in this article. They were gathered in two waves: January-March 2015 (individuals who were to graduate in 2015 were still students) and August-September 2015. Data on individual characteristics (level and field of education, work experience, non-cognitive skills and physical traits) were gathered in the first wave by computer-assisted questionnaire in the presence of a survey designer, who was ready to explain questions or assist respondents in other ways (it took circa 50–55 minutes to complete a questionnaire). The second wave of the survey, done through phone interviews, gathered data on actual status of respondents on the labour market (employed vs. unemployed) and match of their education and occupation in the case of employment. Measuring of respondents' characteristics and labour market outcome in different time periods solved a potential problem of causality between independent and dependent variables present in cross-section analyses.

The survey focused only on high-school graduates who simultaneously satisfy the following conditions:

- live, studied and graduated in Moravian-Silesian Region, Czech Republic (NUTS 3),
- graduated in years 2014 or 2015,
- their field of study was information technology (KKOV 18), engineering (KKOV 23), electrical engineering and ICT (KKOV 26), food processing

and food chemistry (KKOV 29), wood processing (KKOV 33), construction and civil engineering (KKOV 36) or interdisciplinary technical studies (KKOV 39)[2],
- age under 21 years,
- had no employment in 1Q/2015,
- had no interest in further studies.

Respondents were invited to take part in the survey in cooperation with public employment services (respondents graduated in 2014) and the seven biggest high schools providing technical education in the region (respondents graduated in 2015). Employment services invited to take part in the survey all registered high-school graduates, who matched above stated conditions (N=224) and 48.7 % of them took part in it. As the invitation was connected with the possibility of joining special individualized employment counselling and job mediation services, it can be assumed that non-participating individuals either already had some undeclared work or were not interested in having a paid job. In that case, the self-selection would lead to a more precise specification of the sample of unemployed high school graduates. Cooperating high schools, selected according to their size and location (at least one high school in each NUTS 4 region), ensured the participation of all students in the last grade (N=399, i.e. 9.8 % of students in selected fields of study in Moravian-Silesian Region), but not all met the required characteristics (e.g. more than third of them planned to continue in studies). The dataset, after discarding participants not meeting the required criteria, having invalid results of psychological diagnostics and not participating in the second wave of the survey, consists of 243 responses (representing more than 5.7 % of relevant population)[3]. The sample of 243 technical high-school graduates is representative according to sex, level and field of education to unemployed high-school graduates with technical education in the Moravian-Silesian Region, Czech Republic (MPSV 2014).

As the sample size might be considered a limitation for the analysis presented below, the robustness of its results is supported by different operationalisation of variables of interest. Non-cognitive skills, representing the main area of interest,

2 A selection of fields of studies (according to the Czech classification KKOV) was based on data on unemployment of high-school graduates. Those with above stated fields of education represented majority (89.6 %) of all unemployed high-school graduates with technical education in April 2014 (MPSV 2014). The combination of high unemployment of graduates from these fields of studies with unsatisfied demand for technically educated labour suggests that graduates considered in this article face structurally deformed labour market.

3 The share of 5.7 % corresponds to the assumption that all of 4,069 technical high-school students in last grades (only selected fields of study are considered) in school year 2014/2015 meet also other criteria required in the article. However, it is not true for conditions of no interest in further studies, age under 21 years and living in Moravian-Silesian Region, which decrease the size of relevant population by unknown magnitude. Author considers the share of 7.5 % as being estimation that is more relevant.

were approximated in three different ways: First, respondents were asked to express their agreement with four statements using 4-point Likert scale, where each statement approximates one psychological trait. They were: need to excel (i.e. '*presence of feeling of a really strong need to excel, be better than others*'), persistence in following difficult goals (i.e. '*tendency to leave the goal, when its reaching is difficult*'), self-esteem (i.e. '*being proud of myself*') and locus of control ('*persuasion that events in respondent's life are a consequence of respondent's decisions and actions or fortune and coincidence*'). Employing of these psychological traits self-assessment, including statements wording, was inspired by its successful application in research on wage determinants in the Czech Republic by Pytlikova et al. (2012). Second, Freiburg Personality Inventory (thereafter FPI) was used for measuring 12 personality dimensions (Psychosomatic disturbance, Spontaneous aggressiveness and emotional immaturity, Tendency towards depression and life dissatisfaction, Excitability and sensitivity to instigation, Sociability, Low strain and self-confidence, Dominance, reactive aggressiveness and assertiveness, Inhibition and avoiding contacts, Frankness and self-criticism, Extraversion, Emotional instability, Masculinity) on a scale of 1 to 9. It represents a standard and proven psychological test based on a 76-item questionnaire. It can be noted that FPI is not usually used for economic research, but rather for research in medicine and psychology (e.g. Bilsky/Schwartz 1994; Merikangas et al. 1993; Richter et al. 1993). Third, Soft Competencies Colour Association Diagnostics (thereafter SCCAD), provided by the company DAP Services a.s. (see http://www.dap-services.com), was used for measuring readiness of consciousness for activation of 15 soft skills (Cooperation, Entrepreneurship, Flexibility, Efficiency, Independency, Problem solving, Planning and organizing, Life-long learning, Proactive approach, Stress resiliency, Exploring and orientation in information, Leadership and Influencing others; Communication and Consumer orientation were added into the SCCAD after 1Q/2015, when data for this article were gathered, and thus these soft skills are not included in the article)[4] on a scale of 0 to 100 corresponding to the percentile of population with given level of skill. Skills measured by SCCAD were identified as the most relevant soft skills for employers in the Czech Republic (RPIC-ViP 2006) and recognized by the National System of Occupations, Czech Republic (see http://nsp.cz). SCCAD is 134-item psychological diagnostics based on the Colour-Association Method[5] (thereafter CA Method), which is a combined projective technique using calibrated sets of words and a palette of eight colours. A word pro-

4 See online Appendix 2 at https://cdrive.vsb.cz/index.php/s/pdDfQAYhvgdT8SP for definitions of soft skills measured by SCCAD.

5 The Colour-Association Method is already successfully used in management (Fialová et al. 2017; Malcik/Kantor 2014), HR development (Bysenkova et al. 2017), sport psychology (Mladenović 2019, 2016a and 2016b), clinical psychology (Orel et al. 2009), medicine (Boyd et al. 2017), marketing, education etc. However, the SCCAD represents its first application in soft skills assessment.

vokes an immediate association, i.e. activation of particular neuronal junctions and synapses, to which the person is instructed to react via colours. Evaluations of these word-colour associations and their comparison with the corresponding norm enables categorisation of the psychological characteristics of an individual's associations quite precisely.[6] As the associations cannot be rationally influenced or disrupted, CA Method is a method focused on measuring and evaluating 'authentic uncensored associations' (see https://camethod.com for details). It should be emphasized that the above-described tools measure different, but complementary, aspects of non-cognitive skills.

Physical traits, as the second area of interest, can play an extremely important role for employment of technicians, especially in case of some occupations as motor-vehicle mechanic or bricklayer. Therefore, variables for health limitation, gender, height and body mass index (thereafter BMI) were employed. Besides the physical capacity to perform a job, a facial beauty variable was introduced into the model as attractiveness of a job applicant can also play some role in recruitment decision. Facial beauty was approximated, in accordance with Biddle and Hammermesh (1994 and 1998), by a subjective feeling evoked by a look at an individual intermediated by his/her photograph (head and shoulders were visible; photographs were taken in the same style by one photographer in order to avoid biases in assessment caused by their different qualitative aspects). The feeling evoked by each respondent was assessed by a panel of eight evaluators at a 5-point scale (very negative, negative, neutral, positive and very positive). As its impact on probability of getting a job was tested, the panel consisted of six employees of HR departments of different industrial companies and two employees of recruitment agencies (each gender was represented by four panel members with similar age distribution). It is noteworthy that ordinal Cronbach's alpha at the value of 0.8671 (and 0.8057 for original Cronbach's alpha) suggests that the board of evaluators provides reliable measurement of facial beauty. The second approach to facial beauty approximation, used in this article, was inspired by Pallett et al. (2010), who identified two face proportions connected with beauty. They found that horizontal distance between eyes related to face width at the level of 46 % and vertical distance between eyes and mouth related to face length at the level of 36 % are considered as most attractive in case of females. Therefore, these face proportions were used as an alternative approximation of beauty.

6 Computation of particular parameters is described at https://camethod.com/files/patent-application.pdf.

Table 2: Facial proportions as determinants of perceived facial beauty in case of male high-school graduates

VARIABLES	(1) Facial beauty	(2) Facial beauty	(3) Facial beauty	(4) Facial beauty	(5) Facial beauty	(6) Facial beauty
HP (interocular distance / face width)	0.194*			0.196**		0.171*
	(0.101)			(0.083)		(0.088)
HP squared	-0.002*			-0.003**		-0.002**
	(0.001)			(0.001)		(0.001)
VP (eyes-to-mouth / hairline-to-chin distance)		1.106**			0.732	0.695
		(0.485)			(0.489)	(0.484)
VP squared		-0.015**			-0.010	-0.010
		(0.007)			(0.007)	(0.007)
BMI			0.130**	0.118**	0.091	0.083
			(0.060)	(0.058)	(0.066)	(0.065)
BMI squared			-0.003***	-0.003***	-0.002*	-0.002*
			(0.001)	(0.001)	(0.001)	(0.001)
Constant	-0.881	-16.774*	1.781**	-1.631	-10.444	-12.879
	(2.045)	(8.928)	(0.769)	(1.804)	(8.649)	(8.655)
Observations	225	225	225	225	225	225
R^2	0.013	0.032	0.054	0.078	0.083	0.101
Adjusted R^2	0.004	0.023	0.045	0.061	0.066	0.076

Source: Author
Note 1: Robust standard errors in parentheses
Note 2: *** p<0.01, ** p<0.05, * p<0.1
Note 3: All model estimations were checked for specification errors (Ramsey RESET test and link test), multicollinearity (VIF test), homoscedasticity (Breusch-Pagan test) and independence of residuals (run test). No violation of OLS assumptions was identified.

Availability of two approximations of beauty, i.e. facial beauty assessed by a panel of evaluators and physical face proportions identified by Pallett et al. (2010), enabled validation of the expected relationship between the face proportions and perceived beauty (using data for male graduates, who represent 92.59 % of the sample). Models 1 and 2 show that both horizontal proportion (defined as interocular distance to face width) and vertical proportion (defined as eyes-to-mouth distance to hairline-to-chin distance) in male face are statistically significant predictor of its attractiveness ($P_{HP} = 0.055$, $P_{HP\ squared} = 0.062$;

$P_{VP} = 0.023$, $P_{VP\ squared} = 0.021$), although each proportion is able to explain only very small part of variation in perceived beauty. The results suggest that ratio of 41.6 % in the case of horizontal proportion and 36.1 % in the case of vertical proportion are the most attractive facial proportions in the case of male high-school graduates. It can be noted that an additional vertical face proportion, defined as eyes-to-mouth distance to eyes-to-chin distance (see Meisner 2016), was quantified in order to capture more features of human face. However, re-estimation of Models 2 and 5 with this variable (not reported here) does not confirm its statistical significance for explaining face attractiveness and thus it is not considered further in the analysis. Not only face proportions, but also individual's weight affects perception of beauty (faces of males with BMI 21.4 are perceived as most attractive according to Model 3). Models 4–6 reveal that controlling for BMI increases statistical significance of horizontal face proportion as beauty predictor, but has the opposite effect on the vertical face proportion as it became statistically insignificant. These results confirmed that the above defined face proportions represent a valid approximation of beauty.

This survey data (see online Appendix 3 at https://cdrive.vsb.cz/index.php/s/pdDfQAYhvgdT8SP for definitions and descriptive statistics of all variables) was used for an estimation of the probability of being employed (at the beginning of September 2015) on the grounds of *m* explanatory variables (*x*) for Non-cognitive skills, Education, cognitive skills and work experience, Job preferences, Physical traits and some other Control variables (all measured in 1Q/2015); see Equation 1, where CDF represents cumulative distribution function corresponding to binomial probit and logit estimators used in this article. As both methods provided practically identical results for all base models (i.e. Models 7–8, 11–12 and 15–16), which was confirmed also by a comparison of their estimations based on Akaike information criteria, AIC, and Bayesian information criteria, BIC (see online Appendix 4 at https://cdrive.vsb.cz/index.php/s/pdDfQAYhvgdT8SP for full results), the results of binomial probit models are discussed further in this article.

$$P\left(employed = 1 \,\middle|\, x_1, \ldots, x_m\right) = CDF\left(\beta_0 + \sum_{j=1}^{m} \beta_j \bullet x_j\right) \tag{1}$$

Although specification of models was primarily based on theoretical assumptions and empirical evidence on employment determinants, inclusion of variables into the models was influenced also by a check for empty or small cells by developing crosstabs between categorical predictors and the outcome variable in order to support model stability and check for potential problem of multicollinearity. Based on this check some non-cognitive variables were not included in the model as they were correlated with others. In the case of SCCAD, they

were Life-long learning (correlated with Exploring and orientation in information, Person correlation coefficient 0.861, and Problem solving, PCC 0.855), Stress resiliency (correlated with Problem solving, PCC 0.751), and Proactive approach, Independency and Entrepreneurship, which were all correlated with Influencing others (PPC 0.827, 0.786 and 0.723 respectively). Pearson correlation coefficients between soft skills used for the model estimation did not exceed a level of 0.65 and VIF statistics for each soft skill did not exceed 2.15 (Model 7). It should be noted that the mutual dependence of particular soft skills is very natural as the same behaviour (subskills) can be necessary for different soft skills monitored by employers. In the case of Freiburg personality inventory, the excluded variables were Sociability (correlated with Extraversion, PCC 0.737), and Depressivity/life dissatisfaction, Psychosomatic disturbance, Masculinity, Excitability and Inhibition/avoiding contacts, which were all correlated with Emotional lability (PPC ranged from 0.436 to 0.836). Pearson correlation coefficients between psychological traits used for the model estimation did not exceed a level of 0.40 and VIF statistics for each soft skills did not exceed 1.33 (Model 11). No psychological trait measured by self-assessment was excluded from the analysis (Pearson correlation coefficients among them did not exceed a level of 0.35, VIF statistics for each trait did not exceed 1.15; Model 15). Subsequently, all models (incl. logit models in online Appendix 4) were tested for goodness-of-fit (Hosmer-Lemeshow test), specification error (link test) and multicollinearity (VIF test). No test identified any violation of probit/logit model assumptions.

Results and discussion

55.1 % of technical high school graduates in the sample were employed in September 2015. Although the share seems low, it is necessary to mention that 42.8 % of the sample consists of graduates from the year 2014 who have not found a stable job since their graduation and the rest of respondents graduated in May/June 2015, which means that they had 3 months for finding a job. It raises a few interesting questions: Why nearly half of technical high school graduates were unemployed on the labour market suffering from a long-term lack of workers with technical education? What skills/characteristics lead to employment? Do non-cognitive skills play an important role in whether technicians are employed or do only technical skills matter?

Non-cognitive and cognitive skills

Non-cognitive skills, as Table 3 clearly shows, represent a statistically significant determinant of technicians' employment even under the condition of their long-term lack on the labour market. This conclusion is supported by models employing psychological tests (i.e. SCCAD and FPI), but not self-assessed psychological traits. The insignificancy of self-assessed psychological traits can be

explained by their irrelevancy for employment, although some of them were found to be statistically significant wage determinants in the Czech Republic (Balcar/Hedija, 2019), or more likely by inability of respondents to self-assess the traits reliably (Pearson correlation coefficients between self-assessed traits and traits measured by SCCAD and FPI not exceed a level of 0.20 and 0.35 respectively). Models using Soft Competencies Colour Association Diagnostics, SCCAD (Models 7–10) found that the probability of getting a job was closely related to individual's Efficiency, Cooperation and Leadership. The 'Influencing others' variable deserves special attention, as it plays a role of suppressor (see e.g. Maassen/Bakker 2001; Lancaster 1999; Thompson/Levine 1997). It means that Efficiency, Cooperation and Leadership represent statistically significant employment determinants only under the condition of well-developed skill to influence others. However, what exactly catalyse the effect of Efficiency, Cooperation and Leadership on employment? Finding the answer requires deconstruction of the parameter 'Influencing others' (see Table 4). It consists of five factors with equal weight: a) Argumentation, as the amount of energy devoted to creating and defending own position, b) Stimulation, as an intensity of internal and external stimuli used to influence opinion or behaviour of others, c) Proactive attitudes, as a volume of attitudes and values leading to obliging behaviour of an individual, d) Restrictive attitudes (their absence), as a volume of attitudes and values leading to conditioning of desirable behaviour by specific conditions, and e) Dissuasive attitudes (their absence), as a volume of attitudes and values leading to refusing to behave desirably based on conviction of failure. The re-estimation of Model 7 with these variables instead of 'Influencing others' (Model 7A) and subsequent estimation of the model without Argumentation (Model 7B), Stimulation (Model 7C) and Proactive, Restrictive and Dissuasive attitudes (Model 7D) showed that the most significant suppressive effect is connected with Stimulation (pseudo R^2 decreased from 0.042 to 0.034) and mutually related 'attitudes leading to the action', i.e. Proactive, Restrictive and Dissuasive attitudes (pseudo R^2 decreased from 0.042 to 0.036). Argumentation had no effect on statistical significance or magnitude of Efficiency, Cooperation and Leadership coefficients. It can be concluded that Efficiency, Cooperation and Leadership skills has a positive effect on employment only in the case of active and persuasive individuals.

Table 3: Non-cognitive and cognitive skills as employment determinants (average marginal effects reported)

	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
VARIABLES	Employed 09/2015	Employed 09/2015	Employed 09/2015	Employed 09/2015	Employed 09/2015	Employed 09/2015	Employed 09/2015	Employed 09/2015	Employed 09/2015	Employed 09/2015	Employed 09/2015	Employed 09/2015
Non-cognitive skills (SCCAD)												
Leadership	0.003*	0.002**	0.003**	0.001								
	(0.001)	(0.001)	(0.001)	(0.001)								
Cooperation	0.003**	0.003**	0.003**	0.003**								
	(0.001)	(0.001)	(0.001)	(0.001)								
Efficiency	0.003**	0.003**	0.003**	0.003**								
	(0.002)	(0.001)	(0.001)	(0.001)								
Flexibility	-0.002	-0.001	-0.001	-0.002								
	(0.001)	(0.001)	(0.001)	(0.001)								
Planning and organizing	-0.001	-0.002	-0.002	-0.001								
	(0.001)	(0.001)	(0.001)	(0.001)								
Problem solving	0.000	0.000	0.000	-0.000								
	(0.001)	(0.001)	(0.001)	(0.001)								
Exploring and orientation in information	0.000	0.001	0.001	0.001								
	(0.002)	(0.001)	(0.001)	(0.001)								
Influencing others	-0.004*	-0.005***	-0.005***	-0.003*								
	(0.002)	(0.002)	(0.002)	(0.002)								

VARIABLES	(7) Employed 09/2015	(8) Employed 09/2015	(9) Employed 09/2015	(10) Employed 09/2015	(11) Employed 09/2015	(12) Employed 09/2015	(13) Employed 09/2015	(14) Employed 09/2015	(15) Employed 09/2015	(16) Employed 09/2015	(17) Employed 09/2015	(18) Employed 09/2015
Non-cognitive skills (FPI)												
Emotional lability					-0.049***	-0.022	-0.024	-0.032**				
					(0.016)	(0.016)	(0.016)	(0.014)				
Dominance, reactive aggressiveness, assertiveness					-0.005	-0.017	-0.019	-0.017				
					(0.019)	(0.017)	(0.017)	(0.016)				
Extraversion					-0.013	-0.007	-0.005	-0.016				
					(0.017)	(0.016)	(0.016)	(0.015)				
Low strain, self-confidence, ability to handle stress					-0.018	-0.029*	-0.029*	-0.029*				
					(0.018)	(0.016)	(0.016)	(0.015)				
Openness, frankness, self-criticalness					0.030	0.011	0.018	0.015				
					(0.019)	(0.017)	(0.018)	(0.017)				
Spontaneous aggressiveness, emotional immaturity					0.001	0.026	0.027	0.024				
					(0.026)	(0.022)	(0.022)	(0.021)				
Non-cognitive skills (self-assessment)												
Strong need to excel, be better than others									0.037	0.041	0.044	0.034
									(0.035)	(0.032)	(0.032)	(0.031)
Persistence in following difficult goals									0.039	0.053	0.042	0.053
									(0.045)	(0.040)	(0.041)	(0.039)
Locus of control									-0.036	-0.031	-0.021	-0.027
									(0.038)	(0.034)	(0.034)	(0.033)
Self-esteem (proudness of myself)									-0.021	-0.059	-0.053	-0.056
									(0.045)	(0.039)	(0.040)	(0.038)

VARIABLES	(7) Employed 09/2015	(8) Employed 09/2015	(9) Employed 09/2015	(10) Employed 09/2015	(11) Employed 09/2015	(12) Employed 09/2015	(13) Employed 09/2015	(14) Employed 09/2015	(15) Employed 09/2015	(16) Employed 09/2015	(17) Employed 09/2015	(18) Employed 09/2015
Education, cognitive skills and work experience												
Graduation		0.291***	0.329***	0.313***		0.302***	0.344***	0.320***		0.282***	0.328***	0.299***
		(0.074)	(0.073)	(0.073)		(0.074)	(0.072)	(0.072)		(0.072)	(0.070)	(0.071)
Secondary vocational schools (ISCED 3C/EQF 3)		baseline	baseline	baseline		baseline	baseline	baseline		baseline	baseline	baseline
Secondary technical schools (ISCED 3A/EQF 4)		0.040	0.023	-0.031		-0.001	-0.016	-0.085		0.007	-0.009	-0.062
		(0.078)	(0.077)	(0.082)		(0.078)	(0.076)	(0.081)		(0.075)	(0.074)	(0.080)
Field of study		Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes
Grades from math at age 15 (1 best, 5 worst)				0.013				0.010				0.022
				(0.038)				(0.037)				(0.037)
Advanced ICT skills				0.205***				0.217***				0.193***
				(0.067)				(0.064)				(0.064)
Foreign language (level B2 or higher according to CEFR)				0.146				0.261**				0.167
				(0.119)				(0.129)				(0.130)
Driving licence for a car				0.058				0.080				0.114*
				(0.066)				(0.067)				(0.068)
Vacation job (number of months)		0.010**	0.011**	0.008*		0.010**	0.011**	0.008*		0.009*	0.011**	0.008*
		(0.005)	(0.005)	(0.005)		(0.005)	(0.005)	(0.005)		(0.005)	(0.005)	(0.005)
Promise of a job		0.160***		0.158***		0.160**		0.147**		0.182***		0.167***
		(0.060)		(0.059)		(0.062)		(0.060)		(0.063)		(0.062)

VARIABLES	(7) Employed 09/2015	(8) Employed 09/2015	(9) Employed 09/2015	(10) Employed 09/2015	(11) Employed 09/2015	(12) Employed 09/2015	(13) Employed 09/2015	(14) Employed 09/2015	(15) Employed 09/2015	(16) Employed 09/2015	(17) Employed 09/2015	(18) Employed 09/2015
Job preferences [I.]		Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes
Physical traits [II.]		Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes
Control variables [III.]		Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes
Observations	243	243	243	243	243	243	243	243	243	243	243	243
Pseudo R^2	0.0359	0.2262	0.2060	0.2641	0.0313	0.2080	0.1889	0.2653	0.0094	0.2019	0.1770	0.2470

Source: Author
Note 1: Robust standard errors in parentheses
Note 2: *** p<0.01, ** p<0.05, * p<0.1
Note 3: I. Preference of work in field of study, Preference of good working conditions, Net reservation wage (CZK, thousands)
II. Gender, Health limitation, Height, BMI, Facial beauty (photo evaluation)
III. Graduation in 2014, Participation in active employment policy measures (ESF project No. CZ.1.04/2.1.00/E1.00003)

Table 4: Decomposition of 'Influencing others' (average marginal effects reported)

	(7)	(7A)	(7B)	(7C)	(7D)
VARIABLES	Employed 09/2015	Employed 09/2015	Employed 09/2015	Employed 09/2015	Employed 09/2015
Leadership	0.003*	0.003**	0.003**	0.003*	0.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Cooperation	0.003**	0.003**	0.003**	0.003*	0.002*
	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)
Efficiency	0.003**	0.003*	0.003*	0.003*	0.003*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Flexibility	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Planning and organizing	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)
Problem solving	0.000	0.001	0.001	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Exploring and orientation in information	0.000	-0.000	0.000	-0.000	-0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Influencing others	-0.004*				
	(0.002)				
Influencing others – Argumentation		-0.000		-0.001	-0.001
		(0.002)		(0.001)	(0.001)
Influencing others – Stimulation		-0.002	-0.002*		-0.002
		(0.001)	(0.001)		(0.001)
Influencing others – Proactive attitudes		0.005	0.005	0.004	
		(0.006)	(0.006)	(0.006)	
Influencing others – Restrictive attitudes		-0.005	-0.005	-0.004	
		(0.004)	(0.004)	(0.004)	
Influencing others – Dissuasive attitudes		-0.004	-0.004	-0.003	
		(0.004)	(0.004)	(0.004)	
Observations	243	243	243	243	243
Pseudo R^2	0.0359	0.0420	0.0419	0.0343	0.0361

Source: Author
Note 1: Robust standard errors in parentheses
Note 2: *** p<0.01, ** p<0.05, * p<0.1

Models using Freiburg Personality Inventory, FPI (Models 11–14) identified Emotional lability as statistically significant employment predictor. The more emotionally unbalanced an individual is, the lower the probability of employment. This conclusion is valid also for Models 12–14, controlling for education and work experience, job preferences and physical traits, where Low strain and self-confidence play the role of a suppressor. If these models are re-estimated for respondents with below average 'Low strain and self-confidence', the Emotional lability becomes statistically significant at the level 0.05 (not reported here). It means that the Emotional lability negatively affects the probability of employment only for graduates with low self-confidence, who are unable to cope with stress and are irresolute.

Previous research suggests that non-cognitive skills are as productive as cognitive skills in the Czech Republic (Balcar 2016). One could expect equal importance of these skills also for hiring. The following paragraph, therefore, considers education, specific skills and previous work experience as other potential employment determinants. Model estimations revealed that neither level of education nor field of study is a significant predictor of being hired; only graduation matters (see Table 3). This seemingly surprising finding corresponds to the situation on the labour market, where the long-term lack of workers with technical education was combined with a significant economic growth in 2015 (between January and August 2015 the unemployment decreased by -19.0 % and number of vacancies raised by 66.6 %). Under these conditions, employers were willing to hire 'any technician' who finished school successfully. Failure in the final exam (23.9 % of respondents) led to a decrease in the chance to being employed at September 2015 by 29.1 – 34.4 % depending on model specification. This handicap, however, can be assumed to be only temporary as everybody can re-sit the final exam during autumn. As the level and field of formal education were found statistically insignificant, the model was replenished with some specific 'hard skills' required by employers (Models 10, 14 and 18). They were: math skills (highly significant wage determinant in the Czech Republic; see Balcar/Hedija 2019), advanced ICT skills (self-assessed), foreign language at B2 level or higher according to CEFR (self-assessed) and valid driving licence. Only advanced ICT skills were identified as statistically significant employment determinant in all three models; foreign language and driving licence were found statistically significant only in one single model. Having work experience or a job offer in 1Q/2015 increased the probability of being employed at September 2015 significantly (by 0.8 – 1.1 % per month of work experience and 15.8 – 18.2 % in the case of a job offer). Comparison of estimations with and without the promise of future job (Models 8–9, 13–14 and 16–17) show no significant change in either statistical significance or magnitude of regression coefficients of both general work experience and non-cognitive skills. According to expectations, this paragraph confirms that completed technical education, advanced ICT skills and

work experience, representing cognitive skills, belong among statistically significant employment determinants.

However, which skills are more important for hiring young technicians? Are they cognitive or non-cognitive skills? Estimations of Models 10 and 14, containing a set of specific hard skills, are used for answering this question by comparing a change in probability of being employed caused by one standard deviation increase (thereafter +1SD) of explanatory variables. Model 10 reveals that graduation from school, providing an official status of a technician on the labour market, represent the most important employment determinant (+1SD increases the probability of being employed by 13.4 %). The second most important factor is technical ability, approximated by advanced ICT skills (+1SD increases the probability by 9.5 %). On the other hand, soft skills proved to be also very relevant for technicians' employment (+1SD increases the probability by 7.9 % in case of Efficiency and 7.3 % in case of Cooperation). It means that they have similar importance as a job offer from a potential employer (+1SD increases the probability by 7.5 %) and are more important than work experience (+1SD increases the probability by 5.7 %). Leadership skills are not statistically significant in Model 10, but they are in Models 7–9. Therefore, it can be noted that the influence of Leadership on probability of being employed is very similar to work experience (based on Model 8 estimation). Model 14 provides very similar results, where school graduation and advanced ICT skills represent the most important factors (+1SD increases the probability by 13.7 % and 10.1 % respectively). The relevancy of emotional lability for employment (+1SD decrease the probability by -6.4 %) is very similar to other statistically significant factors, i.e. job offer and foreign language at B2 or higher level (+1SD of both variables increases the probability by 6.9 %) and work experience (+1SD increases the probability by 5.7 %). These results suggest that formal qualification and ICT skills play a leading role and non-cognitive skills a secondary role in hiring technicians. This conclusion corresponds well to findings of Karásek et al. (2011), who discussed importance of different kinds of skills for employment on the European labour market.

Physical traits and beauty

It is rational to consider physical traits to be important employment determinants as technical high-school graduates often work in manual jobs requiring good health condition and physical strength. On the other hand, it is hard to believe that beauty could play any role in this segment of the labour market, although empirical literature provides rich evidence on importance of beauty for the population in general. The following paragraphs examine this interesting topic using Model 8, as a baseline model, and its modifications (Model 19–23 in Table 5). All these models show that neither health limitation nor physical capacity ap-

proximated by an individual's height and BMI have statistically significant effect on probability of being employed. These results suggest that a) jobs performed by technicians are not as physically demanding in general as it was assumed above, or b) the lack of technicians on the labour market enables their easy segregation to jobs according to their physical capacity. It would explain also the statistically insignificant difference in the probability of being employed between male and female technicians, as e.g. female vehicle mechanics are often appreciated for their smaller hands, which make them more dexterous in work with tiny car components or in places that are difficult to access (there are 7.41 % of females in the sample). As the BMI can approximate not only physical strength (in linear form), but can be connected also with body beauty (in quadratic form), Model 19 with quadratic form of BMI was estimated. However, BMI variables remain statistically insignificant.

Facial beauty is a much more interesting factor, as it should play no role in hiring of technicians. Yet the empirical literature suggests that individuals that are more attractive are considered to be also more productive and have higher probability of being hired (see the review above), although there is no real connection between appearance and productivity. It can be noted that the absence of a correlation between facial beauty, approximated by photo evaluation, and cognitive skills was confirmed also for the sample used in this article, because no statistically significant relationship was found between facial beauty and math skills (P=0.7032), successful graduation of students (P=0.7152), advanced ICT skills (P=0.7608) and foreign language skills (P=0.9479). Models 8 and 19 reveal that facial beauty has no statistically significant effect on probability of technical high-school graduates to be employed. As there is no reason to believe that the relationship between facial beauty and employment is linear, Model 20 with dummy variables for least (1st decile) and most (9th decile) attractive individuals was estimated. It shows that striking beauty does not result in any advantage on the technicians' labour market, but ugly individuals face significantly lower probability of being hired (by -20.5 %).

An alternative approximation of beauty by physical face proportions was used in Models 21–23. These models reveal that the horizontal proportion (defined as interocular distance to face width) represents a statistically significant employment determinant, whereas the vertical proportion (defined as eyes-to-mouth distance to hairline-to-chin distance) does not. It can be reminded that the horizontal proportion is correlated with facial beauty measured by photo evaluation (see Models 4 and 6 in Table 2), but not the vertical proportion (see Models 5 and 6). It shows that there are some features in a face that are considered to be attractive, and they increase the probability of being hired even on the technicians' labour market. Unexpectedly, the results presented in this section revealed no effect of health and physical capacity, but statistically significant effect of facial beauty on employment of technicians.

Table 5: Beauty as an employment determinant (average marginal effects reported)

	(8)	(19)	(20)	(21)	(22)	(23)
VARIABLES	Employed 09/2015	Employed 09/2015	Employed 09/2015	Employed 09/2015	Employed 09/2015	Employed 09/2015
Non-cognitive skills (SCCAD) I.	Yes	Yes	Yes	Yes	Yes	Yes
Education, cognitive skills and work experience II.	Yes	Yes	Yes	Yes	Yes	Yes
Job preferences III.	Yes	Yes	Yes	Yes	Yes	Yes
Physical traits						
Gender (female)	-0.143	-0.143	-0.133	-0.084	-0.091	-0.081
	(0.154)	(0.155)	(0.150)	(0.151)	(0.153)	(0.151)
Health limitation	-0.080	-0.087	-0.049	-0.078	-0.058	-0.061
	(0.098)	(0.097)	(0.097)	(0.097)	(0.100)	(0.099)
Height	0.003	0.003	0.003	0.004	0.003	0.003
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
BMI	-0.004	-0.038	-0.004	-0.005	-0.002	-0.002
	(0.008)	(0.064)	(0.008)	(0.008)	(0.008)	(0.009)
BMI squared		0.001				
		(0.001)				
Facial beauty (photo evaluation)	0.090	0.092				
	(0.056)	(0.057)				
Facial beauty, 1st decile			-0.205***			
			(0.079)			
Facial beauty, 2nd – 8th decile			baseline			
Facial beauty, 9th decile			0.014			
			(0.083)			
HP (interocular distance / face width)				0.395**		0.352*
				(0.191)		(0.190)
HP squared				-0.004**		-0.004*
				(0.002)		(0.002)
VP (eyes-to-mouth / hairline-to-chin distance)					0.578	0.509
					(0.362)	(0.350)
VP squared					-0.008	-0.007
					(0.005)	(0.005)
Control variables IV.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	243	243	243	243	243	243
Pseudo R^2	0.2262	0.2268	0.2386	0.2295	0.2281	0.2375

Source: Author

Note 1: Robust standard errors in parentheses
Note 2: *** p<0.01, ** p<0.05, * p<0.1
Note 3: I. Leadership, Cooperation, Efficiency, Flexibility, Planning and organizing, Problem solving, Exploring and orientation in information, Influencing others
II. Graduation, Secondary technical schools (ISCED 3A/EQF 4), Field of study, Vacation job (number of months), Promise of a job
III. Preference of work in field of study, Preference of good working conditions, Net reservation wage (CZK, thousands)
IV. Graduation in 2014, Participation in active employment policy measures (ESF project No. CZ.1.04/2.1.00/E1.00003)

Conclusions

Non-cognitive skills, such as soft skills, emotional intelligence, psychological traits, character, preferences, motivation and goals represent factors, whose impact on labour market success has recently begun to be examined. Although there is an extensive empirical body describing their importance for employment, remuneration, socioeconomic status etc., little is still known about their role under special conditions and on different segments of the labour market. This article employs longitudinal data on a representative sample of technical high-school graduates entering structurally deformed labour market, in order to contribute to the discussion on this important topic. Moreover, the long-term lack of workers with technical education in many developed countries makes the findings presented in this article even more interesting. It can be noted that use of different approximations of examined factors (Soft Competencies Colour Association Diagnostics, Freiburg Personality Inventory, and self-assessment of particular psychological traits in the case of non-cognitive skills; and subjective photo assessment as well as objective measurement of face proportions in the case of facial beauty), different estimators (probit and logit models) and model specifications proved that all presented results are highly robust.

First, the importance of cognitive and non-cognitive skills for employment of young technicians was stressed. The results revealed that neither level of education nor field of study is a significant predictor of being hired. Only school graduation matters, which suggests that employers facing long-term lack of workers with technical education are willing to hire ‘any technician’ who completed their education successfully. However, non-cognitive skills matter even under these conditions. Models measuring non-cognitive skills by Freiburg Personality Inventory (FPI) revealed that Emotional lability negatively affects the probability of employment, especially in the case of graduates with low self-confidence, who are unable to cope with stress and are irresolute. Unclear consequences of Emotional lability and other psychological traits for work behaviour might lead to preference of discussion on work-related soft skills, measured by Soft Competencies Colour Association Diagnostics (SCCAD), which are more closely connected with labour market. The results showed that Efficiency, Cooperation

and Leadership skills have a significant positive effect on employment in the case of active and persuasive individuals. A comparison of relative importance of cognitive and non-cognitive skills suggested that soft skills and psychological traits represent a very important factor in whether young technicians are employed, although graduation is the most important.

Second, controlling for cognitive and non-cognitive skills provided a perfect opportunity for assessing the importance of beauty on this specific labour market. One could expect irrelevancy of beauty for employment in the case of technicians, especially under the conditions of their long-term lack. Model estimations showed that the most beautiful technicians do not experience any advantage in hiring, whereas the ugly ones face employment penalty. They also revealed that some face proportions, connected with individual's attractiveness, affect their probability of being employed.

These conclusions suggest that non-cognitive skills represent a very important employment determinant even under specific conditions, i.e. on structurally deformed labour market of technicians in this case. Surprisingly, also facial beauty was found to be relevant for technicians' employment to some degree. However, further research on the role of non-cognitive skills, as well as beauty, is necessary to reveal whether they are always beneficial or there are some segments of labour market or conditions where they are rendered irrelevant.

Acknowledgements

This research was supported by the European Social Fund (project number CZ.1.04/2.1.00/E1.00003) and SGS grant from the VSB – Technical University of Ostrava (grant number SP2020/116). I would like to thank Simon Johnson for a detailed proofread.

References

Anýžová, P. / Matějů, P. (2018). Beauty still matters: The role of attractiveness in labour market outcomes. International Sociology, 33(3), 269–291.

Bacolod, M. P. / Blum, B. S. (2010). Two Sides of the Same Coin: U.S. "Residual" Inequality and the Gender Gap. The Journal of Human Resources, 45(1), 197–242.

Baert, S. / Decuypere, L. (2014). Better sexy than flexy? A lab experiment assessing the impact of perceived attractiveness and personality traits on hiring decisions. Applied Economics Letters, 21(9), 597–601.

Balcar, J. / Hedija, V. (2019). Influence of female managers on gender wage gap and returns to cognitive and non-cognitive skills. Gender, Work & Organization, 26(5), 722–737.

Balcar, J. (2016). Is it better to invest in hard or soft skills? The Economic and Labour Relations Review, 27(4), 453–470.

Barrick, M. R. / Mount, M. K. (1991). The Big Five personality dimensions and job performance: A meta- analysis. Personnel Psychology, 44(1), 1–26.

Biddle, J. E. / Hamermesh, D. S. (1994). Beauty and the Labor Market. American Economic Review, 84(5), 1174–94.

Biddle, J. E. / Hamermesh, D. S. (1998). Beauty, Productivity, and Discrimination: Lawyers' Looks and Lucre. Journal of Labor Economics, 16(1), 172–201.

Bilsky, W. / Schwartz, S. H. (1994). Values and personality. European Journal of Personality, 8(3), 163–181.

Black, S. E. / Spitz-Oener, A. (2010). Explaining Women's Success: Technological Change and the Skill Content of Women's Work. The Review of Economics and Statistics, 92(1), 187–194.

Bóo, F. L. / Rossi, M. A., Urzúa, S. S. (2013). The labor market return to an attractive face: Evidence from a field experiment. Economics Letters, 118(1), 170–172.

Boyd, A. / Synnott, J. / Nugent, Ch. / Elliott, D. / Kelly, J. (2017). Community-based trials of mobile solutions for the detection and management of cognitive decline. Healthcare Technology Letters, 4(3), 93–96.

Borghans, L. / Weel, B. ter / Weinberg, B. A. (2014). People Skills and the Labor-Market Outcomes of Underrepresented Groups. Industrial and Labor Relations Review, 67(2).

Borghans, L. / Weel, B. ter / Weinberg, B. A. (2008). Interpersonal Styles and Labor Market Outcomes. Journal of Human Resources, 43(4), 815–858.

Borland, J. / Leigh, A. (2014), Unpacking the Beauty Premium: What Channels Does It Operate Through, and Has It Changed Over Time? Economic Record, 90, 17–32.

Bysenkova, M. / Simonek, G. / Glazunov, V. (2017). Using color-word association technique in the career planning of young people. In The Youth of the 21st Century: Education, Science, Innovations: Proceedings of IV International Conference for Students, Postgraduates and Young Scientists. Vitebsk: Vitebsk State University. ISBN 978–985–517–642–9

Caki, N. / Solmaz, B. (2013). The effects of facial beauty in personnel selection: a field work in retail sector. Procedia – Social and Behavioral Sciences, No. 84, pp. 1203–1206.

Caliendo, M. / Cobb-Clark, D. A. / Uhlendorff, A. (2015). Locus of Control and Job Search Strategies. Review of Economics and Statistics, 97(1), 88–103.

Carneiro, P. / Crawford, C. / Goodman, A. (2007). The Impact of Early Cognitive and Non-Cognitive Skills on Later Outcomes. CEE Discussion Papers, No. 92.

Cedefop (2015). Skill shortages and gaps in European enterprises: striking a balance between vocational education and training and the labour market. Luxembourg: Publications Office.

Chomová, P. / Doležalová, G. / Vojtěch, J. et al. (2014). Absolventi středních škol a trh práce. Odvětví: Elektrotechnika. Prague: Národní ústav odborného vzdělávání.

Cobb-Clark, D. A. / Tan, M. (2011). Noncognitive skills, occupational attainment, and relative wages. Labour Economics, 18(1), 1–13.

Coneus, K. / Gernandt, J. / Saam, M. (2008). Noncognitive Skills, Internet Use and Educational Dropout. ZEW – Centre for European Economic Research Discussion Paper Series, No. 08–044.

Cuesta, M. B. / Budría, S. (2017). Unemployment persistence: How important are non-cognitive skills? Journal of Behavioural and Experimental Economics, 69, 29–37.

Dechter, E. K. (2015). Physical appearance and earnings, hair color matters. Labour Economics, 32, 15–26.

Dohmen, T. / Falk, A. / Huffman, D. / Sunde, U. (2009). Homo Reciprocans: Survey Evidence on Behavioural Outcomes. The Economic Journal, 119(536), 592–612.

Doležalová, G. / Vojtěch, J. et al. (2017a). Absolventi středních škol a trh práce. Odvětví: Strojírenství. Prague: Národní ústav odborného vzdělávání.

Doležalová, G. / Vojtěch, J., et al. (2017b). Absolventi středních škol a trh práce. Odvětví: Stavebnictví. Prague: Národní ústav odborného vzdělávání.

Drago, F. (2011). Self-esteem and earnings. Journal of Economic Psychology, 32(3), 480–488.

European Commission (2018). Labour shortages and surpluses 2017: A comparison of shortage and surplus occupations based on analyses of data from the European Public Employment Services and Labour Force Surveys. Luxembourg: Publications Office of the European Union.

European Commission (2016). Bottleneck Vacancies 2015. Luxembourg: Publications Office of the European Union.

European Commission (2014). Mapping and Analysing Bottleneck Vacancies in EU Labour Markets. Luxembourg: Publications Office of the European Union. Available at http://ec.europa.eu/social/BlobServlet?docId=12626&langId=en

Feingold, A. (1992). Good-looking people are not what we think. Psychological Bulletin, 111(2), 304–341.

Fialová, B. / Šimonek, J. / Šťastná, M. / Pirker-Binder, I. (2017). Mental profile: stress and energy – a diagnostic method: the CA method and its use in practice. In Pirker-Binder, I. (ed.) Mindful Prevention of Burnout in Workplace Health Management. Springer International Publishing AG, e-ISBN 978–3–319–61337–6, ISBN 978–3–319–61336–9.

Fletcher, J. M. (2013). The effects of personality traits on adult labor market outcomes: Evidence from siblings. Journal of Economic Behavior & Organization, 89, 122–135.

Fletcher, J. M. (2009). Beauty vs. brains: Early labor market outcomes of high school graduates. Economics Letters, 105(3), 321–325.

French, M. T. (2002) Physical appearance and earnings: further evidence. Applied Economics, 34(5), 569–572.

Furnham, A. / Cheng, H. (2013). Factors influencing adult earnings: Findings from a nationally representative sample. The Journal of Socio-Economics, 44, 120–125.

Galarza, F. B. / Yamada, G. (2017). Triple penalty in employment access: The role of beauty, race, and sex. Journal of Applied Economics, 20(1), 29–47.

Gallo, W. T. / Endrass, J. / Bradley, E. H. / Hell, D. / Kasl, S. V. (2003). The influence of internal control on the employment status of German workers. Schmollers Jahrbuch, 123(1), 71–81.

Gallup Organization (2010). Employers' perception of graduate employability. Flash Eurobarometer Series, No. 304.

Gehrsitz, M. (2014). Looks and Labor: Do Attractive People Work More? Labour, 28(3), 269–287.

Guéguen, N. (2012). Hair color and wages: Waitresses with blond hair have more fun. The Journal of Socio-Economics, 41(4), 370–372.

Guéguen, N. / Jacob, C. (2012). Lipstick and tipping behavior: When red lipstick enhance waitresses tips. International Journal of Hospitality Management, 31(4), 1333–1335.

Hamermesh, D. S. / Abrevaya, J. (2013). Beauty is the promise of happiness? European Economic Review, 64, 351–368.

Harper, B. (2000), Beauty, Stature and the Labour Market: A British Cohort Study. Oxford Bulletin of Economics and Statistics, 62, 771–800.

Heckman, J. J. / Kauts, T. (2013). Fostering and Measuring Skills: Interventions That Improve Character and Cognition. NBER Working Paper, No. 19656.

Heckman, J. J. / Rubinstein, Y. (2001). The Importance of Noncognitive Skills: Lessons from the GED Testing Program. The American Economic Review, 91(2), 145–149.

Heckman, J. J. / Stixrud, J. / Urzua, S. (2006). The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior. Journal of Labor Economics, 24(3), 411–482.

Heineck, G. / Anger, S. (2010). The returns to cognitive abilities and personality traits in Germany. Labour Economics, 17(3), 535–546.

Humphries, J. E. / Kosse, F. (2017). On the interpretation of non-cognitive skills – What is being measured and why it matters. Journal of Economic Behavior & Organization, 136, 174–185.

Jackson, L. A. / Hunter, J. E. / Hodge, C. N. (1995). Physical Attractiveness and Intellectual Competence: A Meta-Analytic Review. Social Psychology Quarterly, 58(2), 108–122.

Judge, T. A. / Erez, A. (2007). Interaction and intersection: The constellation of emotional stability and extraversion in predicting performance. Personnel Psychology, 60(3), 573–596.

Judge, T. A. / Heller, D. / Mount, M. K. (2002). Five-factor model of personality and job satisfaction: a meta-analysis. Journal of Applied Psychology, 87(3), 530–541.

Karásek et al. (2011). Transferable competences across economic sectors: Role and importance for Employment at European level. Luxembourg: Publications Office of the European Union. ISBN 978–92–79–20946–8.

Kautz, T. D. / Heckman, J. / Diris, R. / ter Weel, B. / Borghans, L. (2014). Fostering and measuring skills: Improving cognitive and non-cognitive skills to promote lifetime success. NBER Working Paper Series, No. 20749.

Kuhn, P. / Weinberger, C. (2005). Leadership Skills and Wages. Journal of Labor Economics, 23(3), 395–436.

Lancaster, B. P. (1999). Defining and interpreting suppressor effects: Advantages and limitations. In B. Thompson (Ed.), Advances in social science methodology, 5, 139–148, Stamford, CT: JAI.

Liu, X. / Sierminska, E. (2014). Evaluating the Effect of Beauty on Labor Market Outcomes: A Review of the Literature. IZA Discussion Paper series, No. 8526.

Maassen, G. H. / Bakker, A. B. (2001). Suppressor Variables in Path Models: Definitions and Interpretations, Sociological methods & research, 30(2), 241–270.

Malcik, M. / Kantor, C. (2014). Knowmap as a New System in the Assessment and Management of Knowledge, International Journal of Computer and Information Technology, 3(4), 799–804.

Meisner, G. B. (2016). Meisner Beauty Guide for Golden Ratio Facial Analysis. Retrieved June 2019 from https://www.goldennumber.net/meisner-beauty-guide-golden-ratio-facial-analysis/

Merikangas, K. R. / Stevens, D. E. / Angst, J. (1993). Headache and personality: Results of a community sample of young adults. Journal of Psychiatric Research, 27(2), 187–196.

Mladenović, M. (2019). Elite athletes' assessment of mental state for competition in individual and team sports. Sports science and health, 9(2), 102–113.

Mladenović, M. (2016a). Sportska motivacija. Beograd: Zaduzbina Andrejevic. ISBN 978–86–525–0274–5.

Mladenović, M. (2016b). New methods in sports diagnostics: The color association method. SPORT – Science & Practice, 6(1&2), 23–30.

Mobius, M. M. / Rosenblat, T. S. (2006). Why Beauty Matters. The American Economic Review, 96(1), 222–235.

MPSV (2014). Unemployment statistics. Available at https://portal.mpsv.cz/sz/stat

Orel, M. / Facová, V. et al. (2009). Člověk, jeho mozek a svět. 1st ed. Prague: Grada Publishing. ISBN 978–80–247–2617–5.

Pallett, P. M. / Link, S. / Lee, K. (2010). New "golden" ratios for facial beauty. Vision Research, 50(2), 149–154.

Paterová, P. / Doležalová, G. / Vojtěch, J. et al. (2015). Absolventi středních škol a trh práce. Odvětví: Doprava a spoje. Prague: Národní ústav odborného vzdělávání.

Pfeifer, Ch. (2012). Physical attractiveness, employment and earnings. Applied Economics Letters, 19(6), 505–510.

Pytliková, M. et al. (2012). Gender wage gap and discrimination in the Czech Republic. Ostrava: VŠB-TUO, pp. 188 s. ISBN 978–80–248–2940–1.

Richter, P. / Diebold, K. / Schützwohl, M. (1993). The personality of unipolar depressive and bipolar manic-depressive patients. Nervenarzt, 64(9), 572–577.

Ruffle, B. J. / Shtudiner, Z. (2015). Are Good-Looking People More Employable? Management Science, 61(8), 1760–1776.

Schuelka, M. / Sherab, K. / Yangzome Nidup, T. (2018). Gross National Happiness, British values, and non-cognitive skills: The role and perspective of teachers in Bhutan and England. Educational Review, 71(6), 748–766.

Thiel, H. / Thomsen, S. L. (2013). Noncognitive skills in economics: Models, measurement, and empirical evidence. Research in Economics, 67(2), 189–214.

Thompson, F. T. / Levine, D. U. (1997). Examples of easily explainable suppressor variables in multiple regression research. Multiple Linear Regression Viewpoints, 24(1), 11–13.

Uysal, S. D. / Pohlmeier, W. (2011). Unemployment duration and personality. Journal of Economic Psychology, 32(6), 980–992.

Viinikainen, J. / Kokko, K. (2012). Personality traits and unemployment: Evidence from longitudinal data. Journal of Economic Psychology, 33, 1204–1222.

Weinberger, C. J. (2014). The Increasing Complementarity between Cognitive and Social Skills. The Review of Economics and Statistics, 96(5), 849–861.

Wilson, R. K. / Eckel, C. C. (2006). Judging a Book by its Cover: Beauty and Expectations in the Trust Game. Political Research Quarterly, 59(2), 189–202.

Wolfe, R. N. / Johnson, S. D. (1995). Personality as a predictor of college performance. Educational and Psychological Measurement, 55(2), 177–185.

Zhou, K. (2017). Non-cognitive skills: Potential candidates for global measurement. European Journal of Education, 52(4), 487–497.