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ORIGINAL PAPER

Can supporting workplace insertions of unemployed recent graduates improve their long-term employability?

Evidence on the treatment effects of the Contribution for the graduate practice in Slovakia

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Abstract
This paper contributes to the literature with evidence on the effectiveness of a particular active labour market policy programme, whose traditional design allows international comparisons within the family of programmes facilitating workplace insertions of the unemployed youth. Available evidence on the effectiveness of comparable programmes throughout the world is not consensual. We argue and show that it is crucial to inspect the long-term effects of participation in the funded trainee schemes. We demonstrate this by exploring the treatment effects in the case of the most popular active labour market policy programme targeting the unemployed youth in Slovakia. The empirical analysis is based on a detailed administrative dataset applying three alternative methodological approaches: propensity score matching, inverse probability weighting, and two-stage least squares estimations using an instrumental variable. The results of the empirical analysis show that participation in the programme increases the employment chances of participants during the post-participation period. Yielded estimations are consistent across all three applied methodological approaches. Estimated positive, and statistically significant, employment effects increase 30 months following participation. The positive employment effect is in contrast to a negative income effect on employed participants. The potential association between the increase in the measured effects and the hit of the economic crisis is further explored.

Keywords Active labour market policy · Youth unemployment · On-the-job training · Treatment effects · Programme evaluation · Economic crisis

JEL Classification J08 · D04 · C21 · J24 · J68

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1 Introduction

In past decades, unemployment rates in Slovakia have ranked systematically above average compared to both EU and regional (V4[1]) levels. Even though the unemployment rate of the main age group (20–64 years old) in Slovakia remains above the average of EU countries, the youth unemployment rate shows a relatively more successful convergence. It is especially true for the age group 25–29 years old.[2] This age group was strongly benefitting from increased access to active labour market policy (ALMP) programmes provided under the European Commission's initiative of the Youth Guarantee.

In this paper, we present an impact analysis of the ALMP programme "Contribution for the Graduate Practice" (GP), which has been in operation in Slovakia since 2004. GP provides a financial contribution to cover expenses related to the traineeship of young jobseekers, below 25 years of age, registered as unemployed at the public employment service agency (COLSAF). GP-related support is provided during a maximum period of 6 months, based on a three-sided contract between COLSAF, the selected employer and the participant.

GP requires the participant to spend up to 20 h a week in the workplace, gaining relevant work experience. Here we examine participants in the years 2007–2008. During this period, no additional formalised training accompanied the workplace insertion.

More specifically, we inquire as to the treatment effects of participation in GP in a longer period (up to 66 months). Treatment effects of GP have not been explored as of yet in such a long follow-up period. Therefore, we believe in making a contribution to existing literature on Slovak ALMPs. Since our observation period was strongly influenced by the hit of the recent economic crisis, the concluding section provides a discussion surrounding potential biases related to the wider labour market context.

The structure of the following text is straightforward. Firstly, an overview of the relevant literature is provided, which is followed by more detailed information on the programme and the context of the Slovak labour market. In the third section, we describe the data and the empirical strategy. Results are presented in the fourth section, and we conclude with a discussion in the final, fifth section.

2 ALMP targeting unemployed youth

The most troubling aspect of youth unemployment is that it occurs at the beginning of the career and negatively affects also the following stages of individuals' lives (Ellwood 1983, Goldsmith et al. 1997) by worsening not only the material

[1] The Visegrad Four countries (Czech Republic, Hungary, Poland and Slovakia).

[2] A standard EU Labour Force Survey has been carried out in Slovakia since 1998. During this period, the unemployment rates of the age groups 15–24, 15–39 and 25–29 years in Slovakia have remained clearly above the EU average. Only in 2015 did the unemployment rate of the 25–29 age group in Slovakia drop slightly below the EU-28 average (12.2 for SK vs. 12.4 for the EU-28).

conditions but, more importantly, general wellbeing during the life course (Korpi 1997).

In terms of future labour market outcomes, empirical evidence points towards a limited effect of youth unemployment on future employment (Burgess et al. 2003) but towards a much clearer negative income effect (Gregg and Tominey 2005). Although, Burgess et al. (2003) find negative effect of youth unemployment on future employment only for the lower skilled, Schmillen and Umkehrer (2017) show that early youth unemployment increases chances of unemployment in later productive-age periods. Scarring effect of youth unemployment is observable also from the perspective of employers. Shi et al. (2018) show that the incidence of unemployment decreases the perceived suitability of concerned applicant for vacancies.

Specifically for youth unemployment, the future wage penalty, i.e. net negative effect on future earnings was confirmed to be significant (Gregg and Tominey 2005). Arulampalam (2008) confirms permanents scarring of unemployment in terms of future earning, with the first spell of unemployment inflicting the more negative impact. Evidence on the harming effects of youth unemployment justifies public interventions with which to tackle this phenomenon. The youth, indeed, were in special focus of ALMP programmes. In countries of the European Union (EU) this was underlined by the EU-wide initiative of the Youth Guarantee.[3] Increased spending on ALMPs targeting the youth also attracted the attention of social researchers towards this segment.

Caliendo et al. (2011) evaluated a set of German ALMP programmes targeting the youth unemployed. They report positive long-term employment effects of labour market integration types of measures, including job search measures, short-term and further (longer) training programmes, and wage subsidies. Apprenticeships increase participation in education, but fail to increase employment chances. Participation in German public sector job creation schemes is associated with significantly lower employment chances in the medium term (up to 36 months following participation) and no significant employment effect in the long term (36–60 months following participation). The German public sector job creation scheme is the most comparable to GP, as it provides support of a comparable duration and extent, aiming to compensate for the lack of work experience by inserting the unemployed youth in a functioning workplace.

In the programme covering practice in firms, on-the-job training is provided in Germany also to all registered jobseekers without an age restriction. The aim and design of this ALMP programme are comparable to those of GP; moreover, it has been evaluated by several authors. Lechner et al. (2011) use a matching-based estimator. In comparison with non-participation, they report positive and statistically significant effects on employment practically for the entire period from the 10th to beyond the 90th month following participation. In comparison to other training programmes, relying more on formal (classroom) training, on-the-job training appeared to be related to a relatively smaller employment effect. In contrast, Fitzenberger et al. (2016) estimate the local average treatment effects of the programme using

[3] http://ec.europa.eu/social/main.jsp?catId=1079.

an identification strategy based on an instrumental variable, and report a negative impact on employment in the short, medium and long terms.

A combination of a workplace insertion and a more formal (classroom) training element is often identified as the source of the positive impact on post-participation employment (Kluwe et al. 2012; Pessoa e Costa S and Robin 2009).

The most recent meta-analysis (Card et al. 2015, p. 13) shows that ALMP programmes, in general, show more positive effects in the medium and long terms. The increase in positive effects in time during the post-participation period is driven mostly by the training programmes. A slightly different picture is drawn in a study from Slovenia, where in terms of economic and social environments as well as geographical proximity, experience could be more comparable to that of the Slovak situation. Juznik-Rotar (2012) confirms the overall findings on the positive effect of training schemes for the unemployed youth on employment. However, Juznik-Rotar's results draw a slightly different pattern in the development of the effects in the post-participation period. She reports that the short-term effects on employment are positive and more significant than the long-term effects, which are also positive but smaller. In the short term, treatment effects of ALMP participation are negatively influenced by the, empirically well-documented,[4] "lock-in" effect (Calmfors 1994).[5]

Another area of our interest is the effectiveness of the GP programme in a wider labour market context, strongly affected by the hit of the economic crisis. Available empirical literature reaches a rare consensus regarding the relation between the ALMP programme's impact and the wider labour market context. ALMP programmes should be related to higher effectiveness in a labour market situation influenced by the economic crisis, wherein the unemployment rate is higher (Kluwe 2010; Lechner and Wunsch 2009; Forslund et al. 2011).[6]

3 The context of the Slovak labour market

Slovakia is a small, open economy which experienced a strong labour market reaction upon the hit of the recent world economic crisis. Before the hit of the economic crisis in 2008, GDP, as well as employment growth in Slovakia, was one of the highest among the EU member states. Unemployment rates leaped between 2008 and 2010, from 9.5 to 14.4% for the main age group[7] and from 14.1 to 23.4% for the youth.[8] Slovak ALMPs are underfinanced,[9] resulting in low accessibility of ALMP programmes to the registered unemployed. The accessibility increased for the unemployed youth following the adoption of the Youth Guarantee.

[4] For an overview see Van Ours (2004).

[5] Out of the rather scarce evidence on the impact of training oriented ALMPs in the V4 region, see for example Potluka et al. (2016).

[6] The same finding was confirmed also by the meta-analysis of Card et al. (2015).

[7] 15–64.

[8] 15–29.

[9] Based on the LMP-Eurostat methodology, spending on LMP type 2–7 was 0.205% of GDP in 2016; and 0.114% of GDP in 2007.

3.1 Implementation of GP

GP was introduced in 2004 by the Central Office of Labour, Social Affairs and Family (COLSAF) and has remained in place, with minor changes, until today. The programme was developed as an active labour market policy (ALMP) measure, and was integrated into the EU Youth Guarantee Programme after its implementation in Slovakia was launched in 2014 (Table 1).[10] The objective of the programme is that its participants acquire professional skills and practical experience for future employment, relevant to their respective education. From that viewpoint, the main benefits of programme participation are related to the potential acquisition of: (1) working habits and working discipline, (2) professional skills, (3) practical experience, and (4) professional contacts.

During the evaluation period,[11] all of the unemployed registered at COLSAF, below 25 years of age, were eligible for the programme.[12] Employers' costs related to participation in the programme were covered up to a level of approx. 30 EUR monthly. The GP participant received remuneration of approx. 60 EUR[13] from COLSAF. The employer has no labour-related costs linked to the GP participant. Support was provided for the period of 3 to 6 months, based on a three-sided contract between COLSAF, the employer and the participant. Repeated participation in GP was possible after 12 months.

Local COLSAF offices usually have a list of employers in the region who are willing to accept a GP participant in their workplaces. Based on anecdotal evidence, most of the participation takes place in public sector institutions, such as libraries or public administration. Potential GP "jobs" are offered by caseworkers, leaving substantial discretion in the decision at the level of the caseworker. During the evaluation period, GP provision was obligatory for COLSAF. If an eligible jobseeker found a potential GP employer based on his own initiative, COLSAF had to provide GP. Such cases happened rather occasionally.

Nevertheless, participants are inserted into a real, functioning workplace, unlike in an alternative (parallel) programme of public works which was organised by the

[10] Since 2015 the measure has been accompanied by a job creation subsidy for the employer wherein GP took place.

[11] From January 2007 to the end of April 2008.

[12] Today the implementation rules and the eligibility criteria are slightly different: < 26 years old, graduates from secondary and tertiary education levels, graduated no more than 2 years before enrolling in the programme, has not had a regular paid job since graduation, and registered for unemployment for at least a month. Participants receive social security payments and an allowance amounting to 65% of the minimum income. The duration of the internship/apprenticeship is strictly 3–6 months, with 20 working hours a week. The participant remains registered as unemployed.

[13] The average nominal net wage in Slovakia in 2008 was 723 EUR. For a dominant share of GP participants, the 60 EUR remuneration presented their only income. The unemployment benefit was available to registered jobseekers but contingent on at least 12 months of previous employment, while only approx. 18% of participants had some previous employment. Moreover, the unemployment benefit was only available during the first 6 months of unemployment. GP participants were single young individuals, to a large extent, and financially still dependent on their parents. Additionally, registered jobseekers were allowed to work under a part-time working contract up to the income of approx. 100 EUR (Domonkos and König 2015). Nevertheless, part-time working contracts were not as widespread as in the case of western Europe (Fialová 2017).

municipalities. There is a cream-skimming effect observable in favour of GP. Due to caseworkers' discretion, more educated and employable young jobseekers are channelled to GP and the less educated and employable to the public works programme (Table 2). [14]

3.2 Previous evaluations of GP

Previous assessments of the GP scheme agree on a positive effect on participants' employment chances. Štefanik et al. (2014) review the six most important ALMPs in Slovakia, including GP. With respect to programme effectiveness, the authors conclude that compared with other ALMP programmes implemented in the same period, GP is among the more effective ones.[15] They also suggest that the key attribute of the programme's effectiveness remains its regionally specific implementation, more than its design as defined by the Employment Act. This is particularly valid for GP and also explains substantial regional differences in the impact of the measure.

Alternative empirical studies evaluating the impact of ALMP programmes, using survey data (Harvan 2011) or administrative data (Hidas et al. 2016), signal the positive impact of GP. An impact evaluation study conducted by the implementing body[16] also points towards modest but positive effects of GP (Bořík et al. 2015).

In an international comparison, the main advantage of the Slovak GP concerns the low costs related to the programme. This makes the GP one of the most[17] effective measures in the portfolio of Slovak ALMP measures when assessed from a cost–benefit perspective (Štefánik et al. 2016).

4 Identification strategy

Our goal here is the quantification of the impact that participation in the GP programme had on the employment and income of graduates. We are particularly interested in the long-term impact, more than 2 years after the end of participation.

We are tracking outcomes of the GP participants who successfully entered participation between the beginning of January 2007 and the end of April 2008. This period is homogeneous in terms of the implementation rules and provides a sufficient number of observations. The selected timespan, with the consequent period of 66 months, is crucial for the possibility of tracking participants' outcomes during a relatively longer period of time after finishing the programme. Two outcome indicators are constructed: employment rate and average gross monthly income.[18]

[14] Potential deadweight, displacement or substitution effects of GP were not yet analysed by an empirical study. Judging based on the design of the measure; the displacement effect might be limited by the maximum amount of the working hours delivered by the participants.

[15] The same conclusion also in Hidas et al. (2016).

[16] The Ministry of Labour Social Affairs and Family of the Slovak Republic.

[17] Right after the ALMPs supporting spatial mobility of jobseekers (Štefánik and Karasová 2016).

[18] The start of the evaluation period is being imputed for non-participants through the use of a random variable, as in the case of Lechner (2001). Our results are not sensitive to the change of this variable design. The main findings were also confirmed when calendar dates were used.

Table 1 Total resources on GP based on the Eurostat Labour Market Policy Database. *Source*: Eurostat LMP Database (lmp_expme_sk, lmp_partme_sk)

Year	Expenditures		Number of inflowing participants	
	Millions of EUR	% share on ALMP type 2–7	Participants	% share on ALMP type 2–7
2004	2.2	9.03	14,462	4.94
2005	7.05	10.87	25,674	10.94
2006	4.44	6.97	14,032	4.92
2007	2.07	3.24	8880	2.87
2008	3.97	4.10	7451	2.97
2009	5.92	6.26	11,764	7.22
2010	16.08	10.53	21,199	12.20
2011	14.91	9.67	17,368	13.38
2012	15.93	11.74	16,282	15.38
2013	8.8	7.00	9980	9.51
2014	4.43	3.51	9450	8.71
2015	4.48	3.52	7359	5.11
2016	3.45	2.07	5652	3.35

4.1 Data and sample

Our database was created by merging two autonomous administrative data sources. The first is the official register of unemployed jobseekers administrated by the governmental public employment agency—COLSAF. Being registered in this database is a necessary precondition for gaining the status of a jobseeker related to receiving unemployment benefits, state-covered health insurance, and other rights and benefits such as support via ALMP programmes. Information on a wide list of individual characteristics is collected at the moment of entering the database:

- Age
- Local Office of Labour, Social Affairs and Family (region-specific dummies)
- Educational attainment (level)
- Educational attainment (field)
- Nationality
- Citizenship
- Family status
- Children in household
- Date of inclusion in the register of applicants
- The number of registrations before the registration during which one received the measure
- Number of days registered as unemployed before the registration during which one received the measure
- Past unemployment spells
- Participation in other measures of active labour market policies
- Employed/unemployed before registration
- Last job (occupation—ISCO)
- Last job (sector—NACE)
- Last job (self-employed)
- Minutes commuting to last job
- Years of experience in the labour market
- Self-perceived employability barriers—long-term unemployed, graduate or above 50 years old
- Computer skills
- Foreign language skills
- Driving licence
- Outcomes (employment and income) before the current unemployment spell

Information from the COLSAF registers of unemployed jobseekers is complemented by information from the register of persons insured by the Social Insurance Agency in Slovakia. Payment of social insurance contributions is mandatory for all individuals in legal employment or self-employment in Slovakia. Using the database, we are thus able to follow all of the individuals from the COLSAF register on a monthly basis. Based on the link between the two databases, we were able to complement the original COLSAF registers with information on the two outcomes of interest:

- Employment in the post-participation period (outcome).
- Income in the post-participation period, constructed for individuals with non-zero income (outcome).

For the purpose of the analysis, we consider only participation of one-time participants, flowing into the programme between the start of January 2007 and the end of April 2008. Individuals with multiple participation in GP during the entire observation period (2004–2014) are excluded from the analysis. Furthermore, cases wherein a one-time GP participant is participating in other ALMP programmes are disregarded. No restrictions in terms of the length of participation,[19] or the timing of participation,[20] were applied. Participants younger than 18 years old were excluded.

The group of eligible non-participants, from which the control group observations were selected, consists of individuals, below 25 years of age and above 18 years of age, flowing into registered unemployment before the end of April 2008. All individuals participating in other ALMP programmes have been excluded from the analysis (Table 2).[21]

4.2 Used estimation techniques

Taking advantage of the possibilities provided by the qualities of the available dataset, we seek to quantify the impacts of participation in GP. Our empirical strategy focuses on estimating the average treatment effects on the treated (ATT)[22] using comparisons between participants' outcomes and a counterfactual situation wherein participants had not participated in the programme. No randomised experiments have been organised in order to evaluate the programme of our interest in Slovakia. Therefore, we have to rely on observational data, originally collected as administrative data. Here we impute the missing information on the counterfactual situation of

[19] The usual length of participation was the maximum of 6 months. Only a marginal share of participants did not take up the maximum support. The minimal length allowed by legislation was 3 months, so the variation is rather limited.

[20] Most of the participation takes place in around the 6th month after the start of unemployment.

[21] In our setting, the possible self-selection bias caused by restricting the control group only to individuals not participating in other ALMP programmes is relatively low, as the joint accessibility of any ALMP programme to the unemployed youth was mostly under 15%.

[22] For more information on microeconomic estimation of the treatment effects and the quantification of the ATT, see Caliendo and Hujer (2005).

Table 2 Selected descriptive statistics of participants and eligible non-participants. *Source*: Authors' calculations using the COLSAF database

Variable	Participants	Eligible non-participants (before matching)
Working income at the beginning of the observation period (in EUR[a])	201.5	265.3
Length of the unemployment spell (in days)	323.8	304.8
Travelling time to the nearest COLSAF local office (in minutes)	10.6	12.3
Age (in years)	21.3	21.5
Shares in %		
Male	29.7	54.1
Single	88.3	86.5
Healthy (no disability)	90.4	72.5
Nationality		
Slovak	89.6	91
Hungarian	10.1	8.4
Kids under 10 in the HH	1.6	2.5
Highest education achieved		
Elementary	0.7	7.5
Secondary	80.7	67.1
Tertiary	15.8	5.8
Employed at the beginning of the observation period	16.8	18.9
Region		
Eastern Slovakia	38.5	41.6
Middle Slovakia	20.5	19.4
Western Slovakia	41.1	39
Speaks foreign language	88.7	71.4
Operates a computer	33.4	19.2
Number of observations	5535	58,361

Units in parentheses or shares in %

[a]Counted out of non-zero observations

participants using information on non-participants' outcomes. This requires adopting additional assumptions which differ between various estimation techniques.

A binary treatment is considered; thus, we consider two possible levels of the treatment variable (D): the individual has participated in the programme (D = 1) or the individual has not participated in the measure (D = 0). We aim to quantify the average treatment effect on the treated (ATT), which concerns the difference in the outcomes of participants if they had participated (Y^1) and the outcomes of participants if they had not participated in the programme (Y^0). The average treatment effect on the treated (ATT) can be quantified as follows:

$$\Delta ATT = E(\Delta | D = 1) = E(Y^1 | D = 1) | E(Y^0 | D = 1) \quad (1)$$

Because we are not able to observe the counterfactual situation, which concerns participants' outcomes if they had not participated in the programme ($Y^0|D=1$), we substitute this information with the information on the outcomes of non-participants ($E(Y^0|D=0)$). Such a substitution can be carried out in two alternative ways: by relying on either observed or unobserved characteristics. We rely on techniques using individuals' characteristics observed in our data (propensity score matching, inverse probability weighting) as well as on unobservable characteristics (instrumental variable). Estimation techniques are selected to construct a picture based on alternative estimation strategies, in order to document the robustness of our results.

4.2.1 Estimators relying on observable characteristics (Propensity score matching (PSM) and inverse probability weighting (IPW) estimators)

With the propensity score estimation of the treatment effects, we rely on the so-called Rubin causal model, employing a quasi-experimental setting in respect of observational data. Rosenbaum and Rubin (1983) claim that after assuring a balance between the groups of participants and non-participants, the treatment assignment is strongly ignorable. In later literature, this claim was reformulated into the so-called unconfoundedness assumption.

$$Y_{(i)}(T) \perp D_i | X_i \quad \text{for all T and D} \in [0,1] \text{ and i} \in \text{N} \tag{2}$$

Moreover, when looking for non-participants similar to participants in terms of observable characteristics, an overlap between the two groups is necessary. The second assumption related to propensity score matching is therefore called the assumption of common support.

According to Rosenbaum and Rubin (1983), the best balancing score is the propensity score. If we adopt the assumptions mentioned above, the missing information on participants' outcomes in the counterfactual situation can be substituted by outcomes of non-participants.

To balance the groups of participants and the quasi-control group of non-participants, we estimated a propensity score variable (PSV) using a probit equation in order to predict the probability of participating in the programme with regard to all of those who are eligible (registered jobseekers below 25 years of age). The probit estimation can be formalised as a regression-based equation:

$$\Pr(I = 1|X) = \beta_0 + \beta_1 X + \mu \tag{3}$$

where I refers to participation in the programme and X represents the list of explanatory variables. The complete list of explanatory variables (X) covered all of the information available in the dataset.[23]

The distribution of the PSV is different between non-participants and participants in the programme, with the mean values of the PSV for participants being significantly higher than those of non-participants. Despite these differences, the

[23] Listed in the previous section, dealing with data.

Table 3 Summary statistics of the propensity score variable. *Source*: Authors' calculations using the COLSAF database

	Number of observations	Propensity score				Median bias of covariates	*t* test on the balance of covariates ($p > \chi^2$)
		Mean	SD	Min	Max		
Participants	5535	0.211	0.132	0.000	0.688	NA	NA
Non-participants							
Before matching	58,361	0.075	0.089	0.000	0.677	16.3	0.000
Nearest neighbour matching	30,815	0.197	0.127	0.001	0.610	0.7	0.995
Kernel matching	58,361	0.209	0.146	0.000	0.728	0.7	0.235

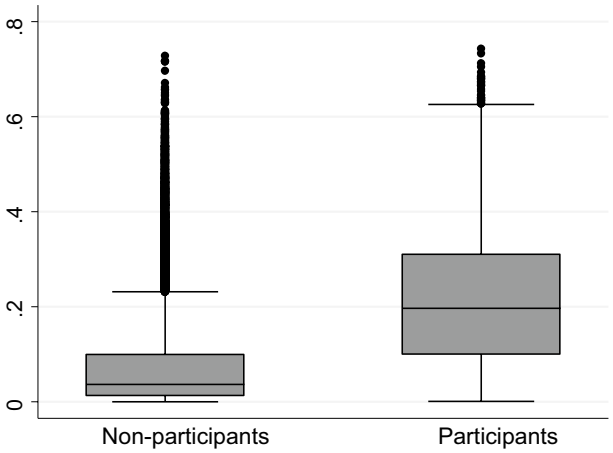

Fig. 1 Propensity score variable distribution for participants and non-participants in the programme. *Source*: Authors' calculations using the COLSAF database

distribution of the PSV of non-participants covers practically the entire distribution of the PSV of participants (Table 3).

The group of non-participants is more than 10 times more numerous than the group of participants. Therefore, outliers from the group of non-participants can be sufficient to cover those participants with higher PSV values (Fig. 1).

After we estimated the PSV, we used two algorithms to construct the quasi-control group. Firstly, we used the intuitive nearest-neighbour algorithm, selecting up to 20 neighbours if they were available within the radius of a 0.0001 distance measured on the PSV. Secondly, we used the kernel matching algorithm (Heckman et al. 1998a, b), using an Epanechnikov kernel with a bandwidth of 0.06.[24]

[24] For more detailed results on the IV estimation, see http://ekonom.sav.sk/uploads/work/Annex_NN.txt http://ekonom.sav.sk/uploads/work/Annex_KERNEL.txt.

The following graphs show the standardised bias calculated from the mean difference between the participants' group and the control group in respect of observable characteristics used in the PSV estimation. For the nearest-neighbour matching and kernel matching, we may follow the bias improvement as a result of matching when comparing the figures before and after matching. The achieved balance can be considered satisfactory when kernel matching provides slightly better results with respect to balance (Fig. 2).

The estimator based on inverse probability weighting works under a principle similar to the propensity score estimator. The PSV is used to weight non-participants' observations in the computation of the weighted average value of the outcome to be compared to the average outcome of the participants (Cattaneo 2010).[25]

4.2.2 Methods relying on unobservable characteristics (Instrumental variable estimator)

In contrast to methods relying on observable characteristics, the instrumental variable estimator uses the unexplained variance to estimate the treatment effect of the policy intervention, i.e. GP. This approach depends heavily on the availability of a suitable instrumental variable. Such a variable needs to be correlated with the treatment assignment, but not with the outcome of interest. In programme evaluation practice, researchers are most often looking for exclusion characteristics, an observable feature based on which individuals, otherwise eligible, are excluded from participating in the programme. Nevertheless, an instrument works in both ways in the case of a negative, as well as a positive, correlation with the treatment assignment. Based on this correlation, the treatment assignment is predicted to be a product of the first equation. In the next step, the product is used in a regression equation estimating the treatments' contribution to the outcome variable. These two equations are estimated using the two-stage estimator.[26]

Blundell and Costa Dias (2000) show that in the case of the heterogeneous treatment effects of a programme, estimates obtained under the instrumental variable are referring only to the segment of individuals who are induced to change their behaviour because of a change in the instrument—the compliers (Caliendo and Hujer 2005). In such a case, the so-called Local Average Treatment Effect (LATE) is estimated.

The travelling time to the nearest COLSAF regional office, measured in minutes, was used as the instrument variable in our case.[27] The correlation coefficient between the minutes of travelling time to the nearest COLSAF regional office and the programme assignment is rather small (0.077), albeit statistically significant. Its correlation with the outcomes is insignificant or relatively weaker. Testing the instrument after being used with other covariates in a regression equation, using the

[25] For more detailed results on the IPW estimation, see http://ekonom.sav.sk/uploads/work/Annex_IPW.txt.

[26] For more details on the routine, see Blundell and Costa Dias (2000).

[27] Proximity based indicators present a rather common type of source of instrumental variables. For an overview, see Angrist and Krueger (2001). Out of the more recent studies, Eppel (2017) presents an example more comparable in terms of time, space, as well as thematic focus.

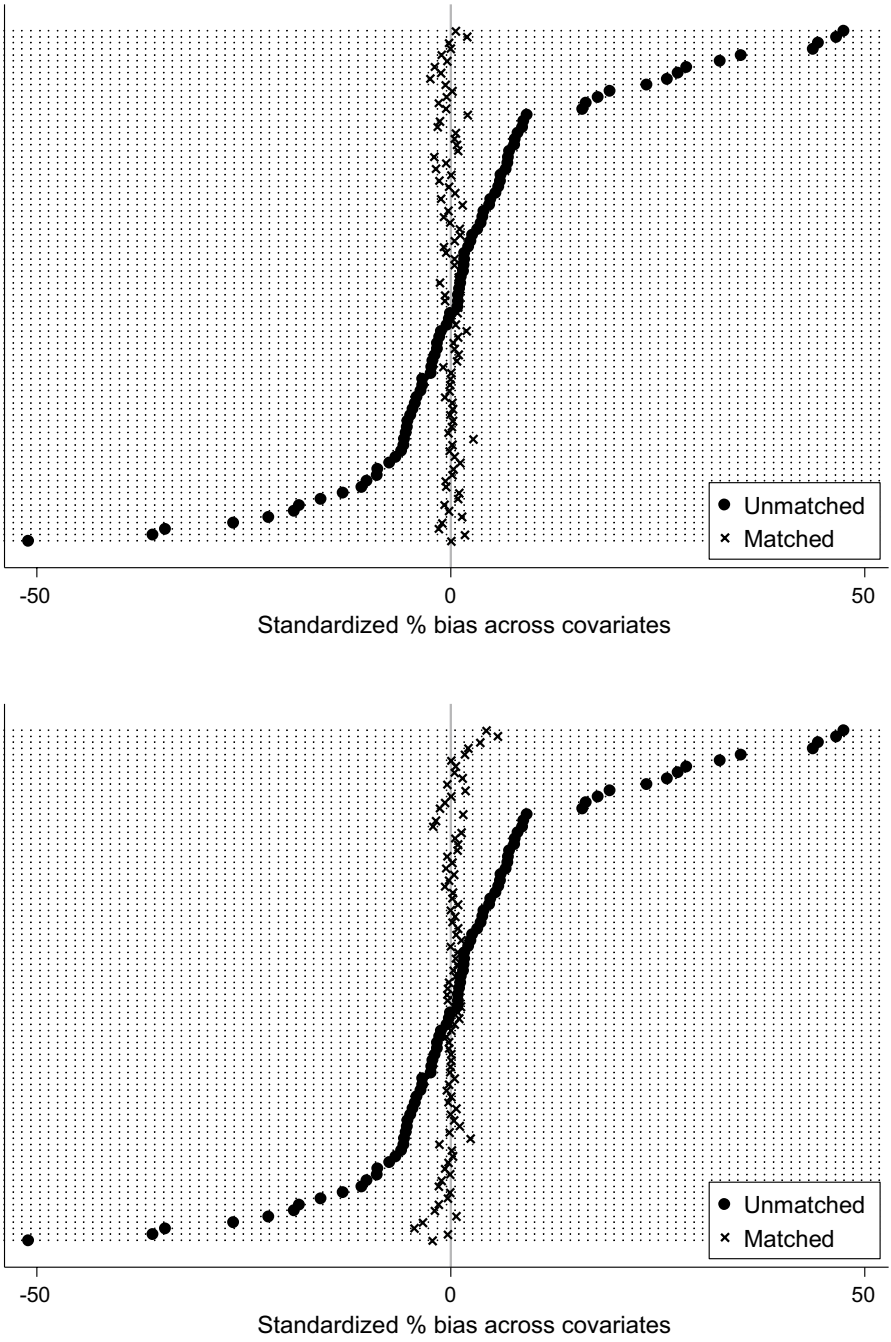

Fig. 2 Standardised bias before and after matching as a result of the nearest-neighbour matching (upper graph) and kernel matching (lower graph). *Source*: Authors' calculations using the COLSAF database

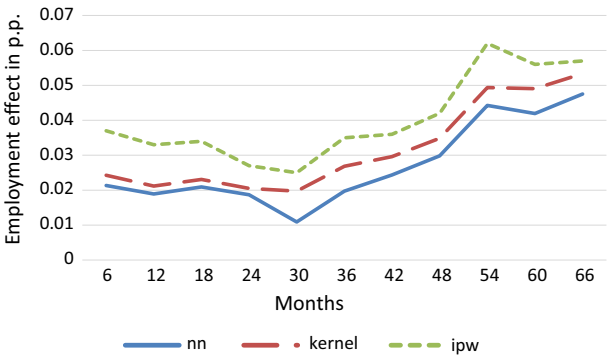

Fig. 3 Estimated treatment effects on employment of participants (estimators based on observables). *Source*: Authors' calculations using the COLSAF database

F-test, brought results that speak more in favour of the instrument. Nevertheless, we can consider this variable to be a weak instrument providing only LATE estimates.[28]

5 Main findings

Estimates produced by the techniques relying on observable characteristics yield positive and statistically significant effects on employment during the entire evaluation period, up to 66 months after the end of participation. The employment effect remains moderate in the first half of the evaluation period (up to 36 months). After 3 years, the employment effect starts to grow to its maximum in the 54th month after the end of participation. Here the difference in the employment rate between participants and the quasi-control group climbs clearly over 4 p.p. (in the case of nearest-neighbour matching). Estimates obtained by the inverse probability weighting estimator provide statistically significant figures over 6 p.p. in terms of the employment rate. All coefficients estimated here are statistically significant at a 0.01 level, except for the nearest-neighbour-based estimate for the 30th month (Fig. 3).

The value added of this study when compared to previous evaluations of this programme is the prolongation of the observation period. Here we can observe that the employment effect of the programme grows after the usual length of the evaluation period, i.e. after 3 years. The increase arrives after a period of a slight decline in the treatment effects on employment.

If we were to report the ATT in respect of income for all GP participants, the observed pattern would be similar to that in the case of the employment effects. Instead, we decided to show the income effect for employed individuals only. Being aware of the additional sample selection bias and censoring of the observed data [discussed, for example, in Lee (2009)], we believe that reporting the income effect in this way might provide an interesting, missing piece of the picture.

[28] For more detailed results on the IV estimation, see http://ekonom.sav.sk/uploads/work/Annex_IV.txt.

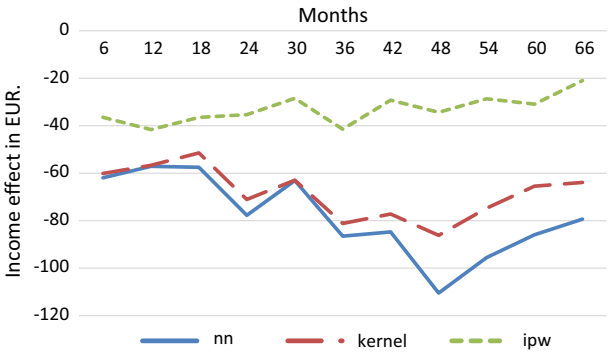

Fig. 4 Estimated treatment effects on income of participants (estimators based on observables). *Source*: Authors' calculations using the COLSAF database

Reported only for employed individuals, the income effect estimations bring negative and statistically significant results for all three estimators which are based on observable characteristics. Absolute figures of the income effect differ among the three estimators. The inverse probability weighting estimator draws a stagnating pattern for the entire evaluation period, with figures being between a −50 and −25 EUR difference between the average income of participants and that of the control group. For the last period (66 months after the end of participation), the estimated effect rises to −21 EUR, with the significance level being only 0.05. The main message is confirmed by all three estimation techniques based on observables. When examining only participants and eligible non-participants in the post-participation period, eligible non-participants earn relatively more (Fig. 4).

Propensity-score-based estimators reveal the results of a higher difference in the average income of participants and that of the control group. Based on these estimates, we may observe a minimum in the 48th month after the end of participation. From this point onwards, the negative income effect of participation in the programme seems to disappear slightly.[29]

A very similar pattern can be observed for the estimates that are obtained by the instrumental variable estimation technique. A positive employment effect with a maximum between the 48th and 60th months after the end of the participation is clearly drawn. A negative income effect estimated by techniques relying on observables was also confirmed by the instrumental-variable-based estimation. The minimum values slightly shifted towards a later post-programme period from the 54th to the 60th month (Fig. 5).

The treatment effects obtained by the instrumental variable estimator are more often not statistically significant. In the case of employment, our instrument is relatively weaker. Treatment effects are statistically significant only at a 0.1 level for

[29] Detailed results can be found at the following addresses: http://ekonom.sav.sk/uploads/work/Annex_NN.txt, http://ekonom.sav.sk/uploads/work/Annex_KERNEL.txt, http://ekonom.sav.sk/uploads/work/Annex_IPW.txt.

Fig. 5 Estimated treatment effects on employment and income of participants (IV estimates based on unobservables). *Source*: Authors' calculations using the COLSAF database

periods between the 48th and 60th months and in the 12th month. Treatment effects on income, where our instrument was performing more effectively, are statistically significant at the 0.001 level for the entire evaluation period, with the exception of the 6th month after the end of participation.[30]

5.1 Interaction with the economic crisis

The change in the observed employment effect of GP starts after the 30th month, when an increase in the magnitude of employment can be observed. Our evaluation is based on the outcomes of participants leaving GP in the second half of 2007 and in the first three quarters of 2008. In most cases, the 30th to 36th months following participation overlap with the first hit of the economic crisis. The question of the association between the economic crisis and the employment impact of GP, therefore, leaps forward. To further explore this association, we use individual ATTs in respect of employment, estimated for all participants using the kernel-based matching technique.[31] To explore their association with a variable referring to a broader labour market context, we use the quarterly unemployment rate of the main age group. Ordinary least squares regression is used to estimate the association between individual ATTs and the unemployment rate after controlling for individual-level characteristics of participants as well as seasonality. Estimates are produced separately for the private and public sectors for each of the reported time points of the post-participation period. Based on the available studies, we expect the unemployment rate to be positively associated with the individual-level ATTs. In which of the identified sectors the association should be more pronounced remains an open question. We estimate OLS regressions for dependent variables of ATTs in respect of employment, estimated from 6 to 66 months following participation (Table 4).

[30] For complete information on the estimated coefficients, see http://ekonom.sav.sk/uploads/work/Annex_IV.txt.

[31] This technique was selected because it produces the "middle" estimates in the middle between the nearest-neighbour and inverse probability weighting estimators.

Table 4 OLS estimates of the association between ATTs regarding employment and the unemployment rate of the age group 20–64 years of age. *Source*: Authors' calculations using the COLSAF database

Month	6	12	18	24	30	36	42	48	54	60	66
Public sector											
b.	0.257	−0.051	**0.372**	**0.496**	0.175	0.088	−0.058	0.164	−0.057	0.176	0.101
s.e.	0.229	0.148	**0.165**	**0.235**	0.199	0.257	0.28	0.278	0.24	0.287	0.291
p.	0.268	0.733	**0.03**	**0.042**	0.386	0.733	0.837	0.56	0.812	0.544	0.731
N	98	98	98	98	98	98	98	98	98	98	98
r2_a	0.042	0.346	0.174	0.078	0.393	0.064	−0.033	−0.018	0.252	−0.083	−0.035
Private sector											
b.	**−0.159**	−0.054	−0.034	0.025	−0.041	−0.038	0.034	−0.055	−0.119	−0.033	−0.011
s.e.	**0.067**	0.059	0.063	0.078	0.08	0.081	0.08	0.08	0.081	0.082	0.085
p.	**0.017**	0.36	0.597	0.747	0.607	0.635	0.668	0.495	0.144	0.684	0.893
N	431	431	431	431	431	431	431	431	431	431	431
r2_a	0.072	0.006	0.001	0.002	0.015	0.02	0.073	0.098	0.086	0.112	0.064

Coefficients significant at the 0.05 level of statistical significance are highlighted in bold

The chosen analysis provides evidence with which to partially support the hypothesis of the positive association between the estimated employment effects of GP and the hit of the economic crisis. Such an association was confirmed only in the public sector for ATTs estimated 18 and 24 months following participation. There is a measurable association between the impact of GP and the unemployment rate measured at the macro-level. Surprisingly, no significant positive coefficients were estimated after the 30th month following participation for either the public or private sector. This suggests that it is the medium-term impact of GP that varies with the overall situation in the labour market.

In the private sector, the unemployment rate shows a significant negative association with the ATTs estimated 6 months following participation. This grasps the moment of some of the GP participants continuing their workplace insertion with employment at the same employer. The share of these cases is likely to be lower if the overall labour market situation (grasped by the unemployment rate) worsens. The association for the private sector is not statistically significantly different from zero for any of the subsequent periods.

6 Conclusion

In summary, our results draw a homogeneous picture of the treatment effects of GP, with satisfactory consistency in the main findings drawn by all four models. In the case of employment, the key message is that after the initial period of approximately 30 months of declining employment effects, the trend changes. From the 30th month after the end of participation, the employment effect of the programme on participants starts to increase. The difference in the employment rate of participants and that of comparable non-participants starts to increase. This is, among other factors, driven by an increase in the employment rate of participants, which is not followed by an increase in the employment rate of the quasi-control group. This speaks in favour of the "career" explanation, i.e. if those young individuals get the chance to gain work-related experience in the early stages of their careers, they gain in terms of higher employment in the later stages of their careers.

The possible association between the estimated impact of GP and the economic crisis was explored at the level of individual ATTs. In the economic crisis, the impact of the programme is higher, but only for those employed in the public sector and only in the medium term (18 and 24 months following participation).

Secondly, our analysis has revealed a negative income effect with regard to employed individuals, which shows some inverse features to the employment effect. In the later part of the evaluation period, when the employment effect grows, the negative income effect deepens. This might be caused by those who participated in the programme in the early stages of their careers, who were then, in the later stages of their careers, more willing to accept a job even for a lower wage. Participants simply did not lose contact with the working environment, which might have pressed their reservation wage in the consequent periods downwards.

Training and internship schemes represent a policy tool widely applied throughout countries in different development stages. Thanks to this fact, a rich empirical

base is available for policy assessments. In this research work, we are presenting an impact evaluation of the Contribution for the Graduate Practice (GP) in Slovakia in a selected 2-year period of its implementation (2007 and 2008). We also follow the impact on employment and earnings of participants for more than 5 years following their participation in the programme.

Overall, we confirm that there are positive long-term effects on participants' employability. Our results are in line with evidence from other impact evaluation studies of similar and relevant training schemes in other countries.

The value added of this study is in providing a picture of long-term development in the impact of the measure. We claim that positive employment gains from GP participation increase 3 years following participation. This is mirrored by a worsening in an already negative income effect on those in employment. Such a drop might be connected with external factors, as the economic crisis was present during the period observed.

Therefore, we additionally explore the association between the economic crisis and the impact of GP on the employment of participants (ATTs). A positive association was confirmed only for participants employed in the public sector and only for medium-term effects. The long-term increase in employment effects, thus, might be caused by the "career" effect, suggesting that assisted work experience provided in the early stages of the career might be linked with an increase in employment chances in the later stages of the career.

No "lock-in" effect was observable, as our first observation period was 6 months following participation. Potentially interesting is the finding that in the private sector, the short-term employment effect of this kind of programme can be higher if the overall labour market situation is more favourable. This might be driven by the participants concluding the workplace insertion with an employment contract at the same employer. Employers use the accessibility of such ALMP support to compensate for the lack of information on the relevance of skills and eventual work experience of young graduates. If the overall labour market situation (measures such as the unemployment rate) is more favourable, the share of those remaining in the workplace after the support dries out is higher.

International experiences show that complementing this type of programme with a more formalised learning element might improve the performance of the programme. Under the umbrella of the Slovak Youth Guarantee, GP was complemented by several related programmes, from supporting the employment of past GP graduates to covering expenses related to workplace tutors for GP participants. Exploring the impact of these add-on programmes might bring about potentially interesting findings.

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