THE EFFECTS OF THE CROSSROADS PROGRAMME ON EARLY SCHOOL LEAVING AND SECONDARY SCHOOL CHOICE

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Abstract

In our article we examine the effects of the Hungarian Reformed Church Aid's Crossroads Program on the disadvantageous students of Ózd. The complex pilot program helped 120 students between the 7th and 10th grade to get and remain in secondary schools. We show that the treated students on average have a 28 percent higher probability to remain enrolled in a secondary school and a 16 percent higher probability to choose a secondary school that offers the chance of graduation and a gateway to tertiary education. Differences in dropout rates seem to be a more robust to changes in the specification than the effect on the secondary school choice.

Keywords

Disadvantages students; early school leaving; impact assessment.

1. INTRODUCTION

Early school leavers usually have a really hard time to find work: the economic activity rate of those 15-64 years old who only have primary or lower secondary educational attainment level (ISCED 0-2) was only 52.8 percent in 2023 in the European Union which is almost 25 percentage points lower than the activity rate of those who have finished the secondary school (ISCED 3-4). Even if they find work it is in form of low qualified work: poor working conditions, low frequently alternated short periods of unemployment wages, and underemployment (Van Praag and Clycq 2020), sometimes public work (Molnár 2020). It is difficult for them to adapt to the new challenges, and it is also unlikely that they will finish their studies later (Molnár 2020). This can be seen as step to become or remain poor (part of the poverty cycle) as shown in Giancola and Salmier (2021).

Reducing the rate of early school leaving is a long-standing goal of the European Union. On average countries managed to reduce the share of early school leavers to 9.6 percent in 2022 from 13.8 percent in 2010. But Hungary doesn't have the same negative trend, in the same time frame the share of early school leavers rose from 10.8 percent to 12.4 percent, so in Hungary it is still a major problem to be fixed.

In our article we present the first results from the evaluation of a program aiming to help with this challenge, the "Crossroads – A complex digital program for a successful career" Program (EFOP-5.2.1-17-2017-00011) managed by the Hungarian Reformed Church Aid. This pilot program had started in September 2018. In two waves it enrolled more than 120 disadvantaged students from the most deprived areas of Ózd, a former industrial and mining town in the north-eastern part of Hungary. The program has started providing social mentoring, career guidance, tutoring and mental wellbeing services from the start of the 7th grade until the end of the 10th grade. The program organized robotics and 3D printing study groups and an online mentoring subprogram, which chose mentors from a similar age group so it also helped to ease the social exclusion of the participants by showing them positive examples and new behavioural patterns during the online tutoring.

This program accompanied the students through the last two years of the primary school, guided them through the choice of the secondary school and the first two years of the secondary school. This time period critical for students as it includes the decision of the future career, as some secondary schools teach mainly vocational courses without any chance for graduation and higher education. At the time of the evaluation the students of the first wave were already at their third year in the secondary school, and most students from the second wave, who started in September 2019, finished the 10th grade.

By meta-analysing results from 152 studies and 317 independent samples Wilson and Tamara-Smith (2013) showed that programs aiming to increase school completion have a mean effect of 8 percentage points reduction of the dropping out rate. They also found that benefits are usually higher if the program was delivered in a classroom setting as opposed to those delivered strictly in community settings.

One condition for the funding of the Crossroads project was, that the program manager had to cooperate with an evaluator from the start and design the evaluation methodology in the project's planning phase. Our task was to provide the impact assessment of the program. In this article we focus on two outcome variables, the program's effect on early school leaving and the choice of secondary schools.

As a first step we introduce our assessment methodology, then we show the data gathered. After presenting the main results we show the robustness checks we applied. The last section concludes our findings.

2. METHODOLOGY

The key to prepare an impact assessment is to create the right control group (Cameron and Triverdi 2005). As a minimal condition before the intervention the control group shouldn't differ significantly from the treated group in any major characteristics that is influencing the outcome. In our case several characteristics of the program made it difficult to form the right control group:

- The program was voluntary so students who applied were already more motivated than their peers and this difference in motivation could affect any measured difference in the outcomes as well.
- The social workers used primary schools to recruit the students but students are not usually randomly distributed between a city's primary schools.
- The program came with visible and tangible advantages, e.g. participant received tablets with internet access so it is possible that their classmates, who can feel left out wouldn't make good control group.

We tried to decrease the selection bias caused by these characteristics in two steps:

- In the first step, we formed three groups from the primary schools in Ózd using clustering methods. For this we used the schools' data from the National Assessment of Basic Competencies (NBAC) Database for the period 2013–2017. We used more than 87 variables to describe the primary schools, among them the composition of the students, the mean results achieved in the assessments, the equipment available in the school etc. With this we tried to achieve that the difference between treated and the control schools became as small as possible.
- In the second step, we took advantage of the fact that the students were recruited in two waves, which created the opportunity to alternate the treated and control schools between the waves within the group formed in the first step. This means that the school from which the treated students volunteered in the first wave became the school from which the control group was recruited in the second wave. This method should have taken care of the school's unobservable differences, as those should cancel each other out by averaging out the treatment effects.

Along these lines we proposed the recruitment pattern shown in the Table 1. below. In the first wave and in the first group, the treated students should have been recruited from the II. János Pál Catholic Primary School, and the members of the control group from the Petőfi Sándor Primary School. In the second group, we chose Apáczai Csere János Primary School as the treated school and Sajóvárkonyi Primary School as the control. According to the plans, the treated and control schools would have been swapped in the second wave. In both groups, we had one reserve school left: in the first group, this school was the Csépány Primary School, and the Árpád Vezér Primary and Vocational School in the second cluster.

		1	0			
		Wave 1.		Wave 2.		Pocorra
			control	treated	control	Reserve
	II. János Pál Catholic Primary School	x			x	
Group 1.	Ózdi Petőfi Sándor Primary School		x	x		
	Csépányi Primary School					x
Group 2.	Ózdi Apáczai Csere János Primary School	x			x	
	Sajóvárkonyi Primary School		x	x		
	Árpád Vezér Primary and Vocational School					x

 Table no 1. Proposed treated and control schools in for different waves of the

 Crossroads program

Source: own collection

During the program we collected data from different sources. At the beginning of each wave every (treated and control) student's family filled out a family background questionnaire. Additionally, we used the administrative data from schools (as the social workers were in daily touch with the schools and teachers) and from the National Assessment of Basic Competences Database. We interviewed teachers and principals in primary and secondary schools, and conducted interviews with the social workers and other members of the team managing the program. The treated students also filled out online questionnaires at the beginning, halftime and the end of the program. Our results reported in this article are based mainly on the administrative data.

3. RESULTS

In the following paragraph we present the main descriptive statistics of the sample we collected data from. Then after the estimated main results we show our robustness checks.

3.1. Data

We have more or less managed to follow the recruitment plan presented in the previous paragraph, but sometimes we had to deviate. The deviation mostly occurred because there were insufficient volunteers from the designated schools (either control or treated group), so we had to widen the sample of the of schools (e.g. use the reserve schools) or recruited treated and control participants from the same school.¹ The final sample is shown in Table 2. We ended up with 122 students in the treated and in the control group. But we even had to include a student from a primary school from the third group of schools (Bolyki Tamás Primary School) and in most cases we have students both in the treated and in the control group from the same school within the wave.

	program										
		Wave 1.		Wave 2.		Total					
			treated	control	treated	control	treated	control			
Group	II. János Pál Primary School	Catholic	29	9	11	14	40	23			
1.	Ózdi Petőfi Primary School	Sándor	0	16	8	9	8	25			

Table no 2. Final sample of students in for different waves of the Crossroads

¹ As the number of the treated students was a main indicator of the project, the recruitment of control group could only begin after enough students volunteered to be in the treated group.

	Csépányi Primary School	0	0	3	7	3	7
	Ózdi Apáczai Csere János	20	0	4	14	24	14
	Primary School	-	-				
Group	Sajóvárkonyi Primary	0	36	20	4	20	40
2.	School	0	50	55	4	39	40
	Árpád Vezér Primary and	0	2	0	0	0	10
	Vocational School		5	0	9	0	12
Group	Bolyki Tamás Primary	0	0	0	1	0	1
3.	School	0	0	0	1	0	1
Total		57	64	65	58	122	122

Source: own collection Note: italics shows recruitment along initial plan

We compare the different groups' characteristics by using age distribution, the share of boys, the family background index and their results in the 6th grade national mathematics and literacy assessments. The family background index used in this article measures the families' socioeconomic background, it is calculated by the Hungarian Education Authority as part of the National Assessment of Basic Competencies Database. The index is based on the family background questionnaire of the assessment and calculated using the following attributes: number of books in the household; parents' highest education, the student's computer ownership, the student's (not school) books ownership and the student's disadvantageous status.

Comparing these characteristics of the treated and control (Table 3.) group we have found that, in the first wave treated students had better family background and better results in their 6th grade national assessment tests. In the second wave members of the control group were significantly older at the beginning of the program, and had better assessment result (negative t-scores), but the difference wasn't significantly different from zero.

But if we analysed the two waves together, then the only significant difference that remained was that the students in the control group tend to be older; in case of other attributes like the family background index and 6th grader national assessment results (mathematics, reading comprehension), the two groups (treated and control) were indistinguishable. This shows that (even our small scale) swapping the treated and control schools between the waves helped to some extent reduce the uneven distribution of student between schools.

			,	,	
Treat vs.	Age	Sex	Family	6 th grade	6 th grade
control			background	mathematical	reading
			index a,	literacy score	comprehension
					score
Wave 1.	-1.76	1.15	2.15	2.55	2.57
Wave 2.	-2.93	-0.01	0.22	-1.44	-1.41
Total	-3.26	0.83	1.60	0.51	0.91

 Table no 3. Difference between of treated and control groups in main characteristics (t-scores)

Source: own collection

^{*a*}, Family background index is a measure of the families' social-economic status. calculated by the Hungarian Education Authority as part of the National Assessment of Basic Competencies Database. The index is based on the family background questionnaire and calculated using the following attributes: number of books in the household; parents' highest education, the student's computer ownership, the student's (not school) books ownership, student's disadvantageous status.

Note: italics means difference is significantly different from zero at a 5 percent significance level.

We have also analysed the characteristics of the 21 students who dropped out of the program as a separate subgroup. To do this we estimated linear probability models where the dependent variable is the fact whether or not a student dropped out of the program, the explanatory variables come from the characteristics above. Among all the different specifications shown in Table 4., sex seems to be the only truly significant coefficient in specification 2 (and almost significant in some of the other specifications). Based on this, boys might have a higher chance of dropping out than girls (the negative sign shows that if the student is a girl, the probability of dropping out of the program decreases). In addition, the coefficient of age and family background index is almost significant: older students are more likely to drop out, and the family background index has negative coefficient which indicates that a lower (more negative)¹ family background index also increases the probability of dropping out. It can also be seen that these results are not robust across specification, nevertheless we recommended to the managing party to pay special attention to older boys with worse family background, as they are most likely to drop out.

	1	2	3	4	5
Age at beginning of the	0.09	0.09	0.04	0.03	0.10
program	(0.09)	(0.09)	(0.58)	(0.71)	(0.09)
Student is a girl	-0.13	-0.17*	-0.14	-0.11	-0.10
Student 15 a gill	(0.09)	(0.03)	(0.16)	(0.30)	(0.22)
Student from the first	0.05	0.05	0.07	0.04	0.1
wave	(0.47)	(0.71)	(0.70)	(0.84)	(0.25)
Family background			-0.09	-0.2	
index			(0.25)	(0.15)	
Primary schools		yes	yes	yes	
Parent's highest education				yes	
6 th grade assessment results					yes
Constant	-0.89	-1.02	-0.77	-0.94	-1.32
Constant	(0.18)	(0.19)	(0.44)	(0.39)	(0.17)
R-square	0.06	0.12	0.11	0.14	0.08
N	110	110	74	74	94

 Table no 4. Characteristics affecting the probability of dropping out of the program

Source: own calculations

¹ The Hungarian Educational Authority normalizes the values of the family background index, so its mean is zero and the standard deviation is 1. All the students in our sample have negative (below average) family background indices.

Note: linear probability estimation, p score in parenthesis, * p < 0.05, ** p < 0.01, *** p < 0.001

Estimating the effect of the program on the outcome variables we don't measure the program participation with a simple dummy variable, we use the number of personal contacts with the social mentors as a participation intensity variable.¹ In the case of the (non-dropout) treated group the number of contacts varies between 31 and 177, which represents almost 64 occasions on average and more than 6,000 in total. In the case of program dropouts, the number of contacts is lower, but there are also those whose intensity almost reaches the average of those treated. In order to make this variable more useable in regressions, we normalized the variable, i.e. divided it by the maximum value, Table 5. contains the descriptive statistics of this normalized variable.

	Number of	Mean	Standard deviation	Minimum	Maximum
	observations				
Treated (non-	89	0.35	0.12	0.18	1
dropouts)					
Program	21	0.21	0.05	0.17	0.33
dropouts					

Table no 5. Number of personal contacts with the social mentors (normalized)

Source: own calculations

Note: linear probability estimation, p score in parenthesis, * p < 0.05, ** p < 0.01, *** p < 0.001

¹ According our surveys with the treated group, social mentoring/care is by far the most important part of the program for the students, more than 91 percent answered that it is important or very important part of the program. The next most important part (holidays and events) only got 73 percent.

3.2. Main results

First, we show the program's effects on the choice of secondary schools. If we group the chosen secondary schools by whether they prepare the students for graduation, we see that 32 percent of the treated group still enrolled in secondary school chose one with the possibility of graduation, meanwhile in the control group this rate was only 19 percent. So there was difference at the descriptive level.

Table 6. shows linear probability estimations where the dependent variable is whether the student is enrolled at the end of the program in a secondary school where students can graduate (grammar school, vocational grammar school, technical school), which creates the opportunity for tertiary education. As shown before we use the student's participation intensity as measure of being treated.

There are two variables that affect the chances of graduation across specification. One is the participation intensity. As we have already stated before, this variable tries to capture the extent of the program's impact on the students through the relative number of personal contacts with social mentors. Estimation results show that participation increases the chances and the value of the coefficients varies between 0.43 and 0.53, depending on the specification. This means that if the level of participation in the program is 1 (that was the maximal intensity), then the chance of the young person going to a secondary school with possibility of graduation can be up to 50 percentage points higher, with an average level of participation (0.35), the probability increases between 16.5-18.5 percentage points. It is not reported but in the last specification, the better ability to understand text in the sixth grade takes over partly the effect of participation in the program (but the effect of the program is still significant). The other significant variable is the case of dropping out of the program. These dropouts have about 20 percentage points lower probability to be enrolled in a secondary school where students can graduate.

secondary school with possibility of graduation at the end of the program						
	1	2	3	4	5	
Participation intensity	0.43*	0.51**	0.53**	0.48**	0.42*	
1 articipation intensity	(0.01)	(0.00)	(0.00)	(0.01)	(0.05)	
Student is a girl	0.02	0.02	0.01	0.00	-0.01	
Student is a gill	(0.81)	(0.80)	(0.93)	(0.96)	(0.93)	
Participation intensity	-0.18	-0.22	-0.17	-0.18	-0.07	
of girls	(0.48)	(0.39)	(0.52)	(0.48)	(0.81)	
Student from the first	-0.01	-0.02	-0.03	-0.05	-0.02	
wave	(0.77)	(0.70)	(0.54)	(0.37)	(0.67)	
Student dropped out		-0.19*	-0.17*	-0.21*	-0.22*	
of the program		(0.02)	(0.04)	(0.01)	(0.02)	
Schools			yes			
Parent's highest				MOS		
education				yes		
6 th grade assessment					VAS	
results					yes	
Constant	0.10*	0.10*	-0.01	0.17	-0.77*	
	(0.05)	(0.04)	(0.99)	(0.31)	(0.02)	
R-square	0.03	0.06	0.08	0.1	0.12	
N	232	232	232	227	190	

Table no 6. Characteristics affecting the probability of being enrolled in a secondary school with possibility of graduation at the end of the program

Source: own calculations

Note: linear probability estimation, p score in parenthesis, * p < 0.05, ** p < 0.01, *** p < 0.001

Table 7. shows the results of the linear probability estimations for the variable of being enrolled in any secondary schools at the end of the program. In this case as well the characteristics were entered into the regression models in different groupings (highest educational attainment of parents, starting primary school, results of the sixth-grade assessment). In the 5 specifications presented in the table, we can see robust results not dependent of the other explanatory variables

included. The fact that someone dropped out of the program increases the chance of dropping out of the secondary school by approximately 47 percentage points (the value of the coefficient is between 44–50 percentage points, depending on the specification). In several specifications, students belonging to the first wave also have a significantly lower chance of being still enrolled in a secondary school by 15–16 percentage points.

Based on the estimated coefficients of the model, if the participation intensity rate takes on a value of 1, the probability that the student attends secondary school can increase by approximately 79 percentage points (between 69 and 91 percent, depending on the specification). However, as previously shown in Table 5. the level of participation intensity within the treated group takes on an average value of 0.35, so the average rate of dropout among those treated is 28 percentage points (79.2*0.3534). As there were several teen pregnancies in the sample it is an interesting question whether the dropout rate is different between boys and girls. According the estimation the values of boys and girls do not differ from each other (for girls participating in the program, the coefficient is not significant).

	1	2	3	4	5
Participation	0.69**	0.78**	0.82***	0.76**	0.91***
intensity	(0.00)	(0.009	(0.00)	(0.00)	(0.00)
Student is a girl	0.11	0.09	0.10	0.07	0.14
Student is a giri	(0.20)	(0.27)	(0.22)	(0.41)	(0.10)
Participation	-0.25	-0.29	-0.47	-0.28	-0.48
intensity of girls	(0.47)	(0.38)	(0.16)	(0.40)	(0.18)
Student from the first	-0.16*	-0.15*	-0.16*	-0.15*	-0.12
wave	(0.01)	(0.02)	(0.02)	(0.02)	(0.09)
Student dropped out		-0.44***	-0.50***	-0.45***	-0.49***
of the program		(0.00)	(0.00)	(0.00)	(0.00)
Schools			yes		

Table no 7. Characteristics affecting the probability of still being enrolled in a secondary school at the end of the program

Parent's highest				yes	
education					
6 th grade assessment					yes
results					
Constant	0.56***	0.59***	-0.10	0.56**	-0.64
Constant	(0.00)	(0.00)	(0.83)	(0.01)	(0.09)
R-square	0.08	0.14	0.19	0.18	0.20
Ν	232	232	232	227	190

Source: own calculations

Note: linear probability estimation, p score in parenthesis, * p < 0.05, ** p < 0.01, *** p < 0.001

3.3. Robustness checks

We checked our result using three different robustness checks:

- a paired-up sample using matching algorithm based on propensity scores,
- weighting the sample to circumvent the age difference between treat and control,
- keeping to the original sampling design (alternate schools) and only those participants, that came from the designated schools.

In the first robustness check we estimated propensity score for participation in the program and used Stata psmatch2 command for pairing up treated and control students (Leuven and Sianesi 2015). Using this paired sample, we estimated how the program affected the probability of the dropping out of secondary school. The results are in second column of the 8. Table (1. specification), and the results are in line with previous results shown in Table 8. We also estimated the probability of being enrolled in a school with graduation possibility, but we don't see any treatment effect in this estimation (4. specification).

As shown before (Table 3.) the only difference between the treated and control group is that control group is significantly older. We also showed that older

boys have a slightly higher probability to dropout from the program and from secondary school as well. This shows that age and dropout rate are connected. To be sure that this don't affects our result we weighted the sample in a way that there is no age difference between the two groups. Results of this estimation is shown in specification 2 and 5. The program effect on the dropout chance is similar to than in the basic estimation, but there is no sign that the program affected the school choice.

In the last robustness check we reduced the sample to the original methodological design and left out additional students (just the students denoted with italics in Table 2.). This change in the sample didn't affect the results, both the program effects the probability of enrolment in any secondary school or in secondary schools with the possibility of graduation to the same extent.

Interesting that although girls didn't have different probabilities to be enrolled in the basic estimations, in the robustness checks there are specifications where sex is a significant variable. Girls were more likely to be enrolled in a secondary school but less likely to be enrolled in one that gives the opportunity to graduate.

	1	2	3	4	5	6
	Enrolment	in any	secondary	Enrolment	in second	ary school
	school			with the po	ossibility gra	aduation
Participation	0.82**	0.90***	0.88***	-0.12	0.4	0.53*
intensity	(0.01)	(0.00)	(0.00)	(0.71)	(0.11)	(0.03)
Student is a	0.27*	0.22*	0.18	-0.26*	-0.01	-0.02
girl	(0.02)	(0.02)	(0.06)	(0.03)	(0.85)	(0.72)
Participation	-0.53	-0.70*	-0.61	0.75	-0.05	-0.22
intensity of	(0, 22)	(0, 0.4)	(0.07)	(0.11)	(0.89)	(0.55)
girls	(0.22)	(0.04)	(0.07)	(0.11)	(0.09)	(0.55)
Student from	-0.11	-0.13	-0.12	-0.03	-0.02	-0.06
the first wave	(0.17)	(0.07)	(0.08)	(0.70)	(0.67)	(0.34)

Table no 8. Results from robustness checks

Student		-0.52***	-0.54***		-0.21***	-0.25***
dropped out of		(0,00)	(0,00)		(0,00)	(0,00)
the program		(0.00)	(0.00)		(0.00)	(0.00)
Schools	yes	yes	yes	yes	yes	yes
Parent's						
highest	yes	yes	yes	yes	yes	yes
education						
6 th grade						
assessment	yes	yes	yes	yes	yes	yes
results						
Constant	-1.02	-0.95	-1.25**	-0.93	-0.58	-0.66
Constant	(0.07)	(0.10)	(0.01)	(0.14)	(0.29)	(0.20)
R-square	0.39	0.28	0.28	0.19	0.17	0.19
Ν	108	186	188	108	186	188

Source: own calculations

Note: linear probability estimation, p score in parenthesis, * p < 0.05, ** p < 0.01, *** p < 0.001

4. CONCLUSIONS

To sum up our results: we have strong evidence that the services the program provided to the participating, disadvantages students helped them stay in secondary school and decreased their dropout rate on the average by almost 30 percentage points, which is almost four times higher than the average of 8 percentage points found by Wilson and Tamara-Smith (2013) despite the fact that it is a community-based program. Our estimation results also show that the treated students have a higher probability to choose a secondary school where they can graduate which opens the door for tertial education, but these results proved not to be very robust as robustness checks eliminated the significance of the program's effect. The question arises, whether it is possible to reproduce these results in other cities, so in other words is it possible to upscale the program. As we have shown earlier the social workers had more than 6,000 personal contacts with participating children during the program (aside all the other programs, tutorial events, study groups, career guidance etc,), which is a lot of work for four people. Aside this part of the program is the most important for the students. On the one hand based on our interviews we can say that most of the results came from this kind of dedication of the program's team (e.g. there were hardly any staff changes). On the other hand, this also limits the possibility of expansion of the program, as one would need similar dedicated team to reproduce the results.

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