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High-School Students´ Summer Jobs and their Ensuing Labor Market Achievement – the Long Term Effect

By

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Abstract

In part because of high and persistent youth unemployment, adolescent students' transition from school to work is an important policy and research topic. Many countries have implemented public programs offering summer jobs or work while in high-school as measures to smooth the transition. While the immediate effect of the programs on school attendance, school grades, and disposable income is well documented, their effect on the transition to the labor market remains an open question. Observational studies have shown strong positive effects of summer jobs, but also that the estimated effect is highly vulnerable to selection bias. In this paper, some 3700 high-school students applying for summer jobs in the period 1995-2003, via a program, are followed to 30 years of age. A quarter of the applicants were randomly offered a summer job each year. Among the remaining students, 50% had a (non-program related) summer job while in high-school. We find the income, post high-school, for the offered and non-offered groups to be similar and conclude that the effect of summer jobs on the transition to the labor market is inconsequential.

Keywords: natural experiment, work experience, work while in school
JEL-codes: C93, J24, J68

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1 Introduction

Is early contact with the labor market, through for instance summer jobs, beneficial for high school students? The answer carries important implications for labor policy makers worldwide, as it assesses whether early contact with the labor market is an advantage to high school students and therefore whether governments should consider smoothing the transition from school to work for this group.

Most people would like to think that the summer job experience should be beneficial to high school students and their future labor market outcomes. Favorable arguments include the facts that summer jobs help high school students to mature faster than otherwise; provide skills and knowledge which complement in-class education; give high school students feedback on what they have learned and offer hints on what they need to study; enhance their motivation to study; earnings from summer jobs can alleviate poorer high school students financial constraints on future education and human capital investment; and finally, high school students may use summer jobs to smooth the transition from school to work by collecting information and establishing a social network which helps in finding their first regular job (see for example Carling and Larsson, 2005; Geel and Backes-Gellner[2], 2012; Häkkinen, 2003; Ruhm, 1997). However, the empirical foundation in favor of summer job programs is weak since this issue has not received much attention in the literature (exceptions are Hotz, Xu, Tienda, and Ahituv, 2002; Leos-Urbel, 2012; Parent, 2006; Wang, Carling, and Nääs, 2006).

Nevertheless public programs promoting early labor market contacts for high school students are commonplace and they have repeatedly been advocated by the OECD. This study draws on a Swedish example; the federal Summer Youth Employment Training Program (see Leos-Urbel, 2012 and Morisi, 2010) is a US example, and Parent (2006) offers an insight into the Canadian debate. Grossman (1997) reported that summer jobs were increasing in the USA as well as in many European countries, while Morisi (2010) shows a drastic decline in summer jobs in the USA around the year 2000. In Sweden the government commenced subsidizing summer jobs in 1995 continuing until 2007; thereafter there was a temporary reintroduction in 2009 due to the financial crisis at that

[2] Geel and Backes-Gellner (2012) and Häkkinen (2003) focus on working while enrolled at university.

time. The government administers the subsidies via the municipalities which operatively, with a few exceptions, offer summer jobs to high school students.

Research on summer jobs, or more broadly on working while in high school, has primarily focused on school attendance, school grades, and disposable income in part emphasizing potential negative consequences of summer job experiences (Ruhm, 1997). For instance, summer jobs with heavy commitment may make students too exhausted and less fit for the new semester; the perception of 'easy' money from summer jobs may detract students' from seemingly "boring" and "unproductive" in-class education; premature contacts with society may negatively affect high school students if they are not well protected from bad social behavior (see Lee and Orazem, 2010; Weller, Kelder, Cooper, Basen-Engquist, and Tortolero , 2003 and references therein).

Previous arguments aside, the effect of a summer job experience still needs to be empirically analyzed which is a rather difficult task. First, there are few datasets suitable for this purpose; information about summer jobs and their holders are rarely documented. Second, the methodology to analyze this question faces some challenges; the biggest one being the issue of selection bias. A summer job is the result of an active job-searching process, and any correlation between a summer job experience and later outcomes may be due to unobserved individual abilities rather than being a causal relationship. In principle, this problem could be overcome by the appropriate conditioning of confounding variables. However access to and knowledge about such variables is often lacking. Hotz et al (2002) illustrate the methodological challenge for observational data and conclude that appropriate accounting for selection bias is of crucial importance to obtain a robust estimation of the effect of work experience on the transition from school to work.

In this paper, we estimate the effect of high school students' summer job experience on the transition to work by using experimental data (cf Leos-Urbel, 2012). This data was collected in Falun, a mid-size town in central Sweden, and its surrounding district. The Falun Council randomly allocated the publicly-provided summer jobs to high school student applicants on a lottery basis for the period 1995-2003. The random allocation of the applicants to summer jobs provides a unique setting in which there is good control of the potential selection bias. Furthermore, we have good quality data providing detailed background information about the applicants who were offered a

summer job as well as for those who were not; variables included age, gender, grades, income from work, etc. Wang et al (2006) studied the same experimental data and found no short-term effect. However an intriguing large, positive long-term effect was discovered, albeit statistically insignificant due to too few students with a sufficiently long follow-up period. Now with the progression of time, we are able to assess the long-term effect since the students are now followed till the end of 2009.

This paper is organized as follows. In section 2 we describe the data and the processing thereof. In the third section we compare students with and without summer job experience abstracting from any selection bias. In the fourth section we exploit the experimental data and estimate the causal effect of summer job experience on future incomes until the age of 30 years. The fifth section provides a sensitivity analysis and the sixth concludes with a discussion of our findings and how they relate to current literature on the topic.

2 Data Description

The data comes from two sources. The first source is the Falun Council from which we received data pertaining to all applicants for the years 1995 to 2003[3]. The data contains the name and contact address as well as civil registration number for all applicants, with the exception of 1995 when only dates of birth were stored. However, with the help of the tax authorities we could retrieve the civil registration number for almost all applicants from 1995 by matching name, address and date of birth.

The random allocation of summer jobs among the applicants was in the form of an electronic lottery carried out by a Council official using an Excel spreadsheet. The data also contains information on who was offered a summer job based on the lottery as well as whether he/she accepted the offer. Only a modest fraction of students rejected the offer and that particular summer job re-entered the lottery.

The summer jobs were within the Council such as elderly care, gardening, cleaning, and tutoring[4]. The number of summer jobs offered each year was pre-set by the Council and the jobs lasted for a period of three weeks. To be eligible, the student needed to be

[3] Data for applicants for 1996 was missing.
[4] Older students tutoring younger ones in core subjects during the summer vacation.

between the ages of 15-18 years[5] as well as a resident in the Falun district. Approximately 800 high school students, of 2800 eligible, applied for a summer job at the Council each year. The number of available places each year varied between 82 and 342 with an average of 188 (details in Table 1).

Table 1 Number of High-school Students in the Age Range 15-18 years in the District of Falun, Applicants and Offered each year by Gender

	High-school students 15-18 years			**Applicants**			**Offered**		
Year	**Male**	**Female**	**Sum**	**Male**	**Female**	**Sum**	**Male**	**Female**	**Sum**
1995	1397	1354	2751	78	80	158	36	46	82
1997	1369	1395	2764	236	330	566	29	55	84
1998	1420	1466	2886	351	513	864	147	195	342
1999	1421	1383	2804	338	481	819	85	155	240
2000	1416	1375	2791	372	451	823	55	103	158
2001	1493	1415	2908	440	433	873	130	139	269
2002	1541	1420	2961	318	372	690	58	98	156
2003	1570	1488	3058	393	429	822	77	99	176
Sum	**1167**	**11296**	**22923**	**2526**	**3089**	**5615**	**617**	**890**	**1507**

The second source of data comes from Statistics Sweden (Statistiska centralbyrån, SCB). They provided data on all individuals in Sweden at the high-school age of 15-18 years in the period 1995-2003. The data contains background information such as gender, parental socioeconomic status, and school grades as well as outcome data in the form of yearly incomes up to a maximum of 33 years[6] of age (limited by data only being available up to end of 2009 at the start of our research). For the summer jobs applicants, the SCB data was merged with the Council data using the civil registration number as the key variable.

It was possible to repeatedly apply for summer jobs while in high-school and consequently the 5615 applicants does not imply the same number of students. Table 2 shows by gender the number of students who received and those who did not receive an offer of a summer job. For the analysis we have a total of 1396 students who were

[5] The typical Swedish high-school runs for three years and the student commences the high school the year he/she turns 16 years. We do not have the exact age of the students, only their birth-year. We approximate age by year minus one and minus birth-year.

[6] The number of applicants observed at the age of 31 and above was around 50 and less, and in the interest of statistical precision we therefore restrict the presentation of results to at the most 30 years.

offered a summer job at least once and a total of 2325 students who were never offered a job by the Council. This gives a total of 3721 individuals.[7]

Table 2 Number of Offered and Non-offered High-school Students by Gender

Offer			Non offer			
Male	**Female**	**Total**	**Male**	**Female**	**Total**	**Total**
579	817	1396	1105	1220	2325	3721

The age distribution among applicants for the period 1995-2002 is provided in Wang et al (2006). Table 3 shows the age distribution of applicants for 2003 which is similar to the preceding years, albeit the share of 15 years old was somewhat lower.

Table 3 Age Distribution of Applicants 2003

Age	15	16	17	18
Number of applicants	254	270	248	50

As a final description of the high-school students in Falun, we show the proportion of students with a summer job as well as the quantity of this job measured by income. For the offered it was generally assumed that they had a summer job experience whether by accepting the Council position or one from a private employer. However, for non-offered applicants as well as non-applicants we cannot readily consult the Council data to find out if they had had a summer job or not. We choose to define a student as a summer worker in a given year if he/she had a yearly income of at least 2500 SEK[8] (2009 price level) when aged between 15-18 years. The value corresponds to about one week of full-time work for the students in Council jobs. It is quite implausible to suppose that work experience of less than a week would have any measurable impact on future labor market achievement.

Figure 1 shows the proportion of summer workers among offered, non-offered, and non-applicant students for the period 1995-2003, omitting 1996. Morisi (2010) shows the proportion of summer workers aged 16-19 years to be about 50-60% in the USA from 1950-2000; thereafter this drastically decreased to somewhat more than 30% in 2009. In Falun, about 50% of the high-school students have summer jobs in each of the years with a fractional difference between non-offered and non-applicants. Economic

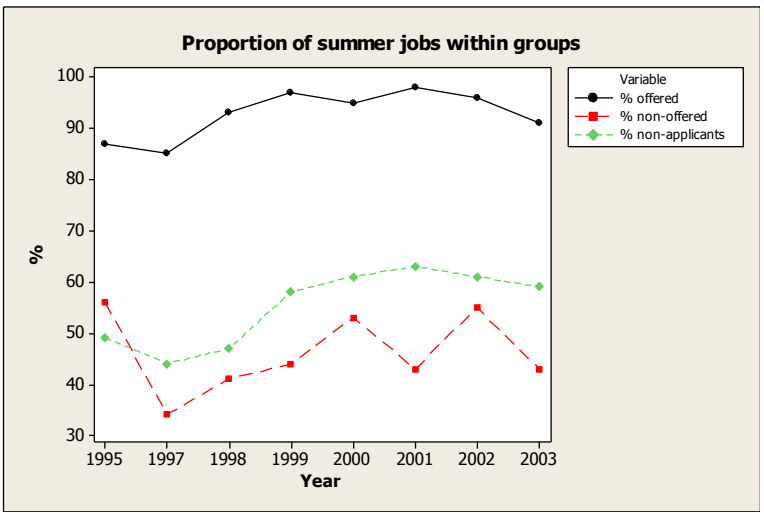
[7] We have checked that the lottery was fair by computing the probabilities of one, two, and three offers conditional on applying and confirmed that the outcome of the lottery was independent over the years.

[8] To check whether this somewhat arbitrarily threshold could have some impact on the ensuing analysis we also considered the thresholds SEK 1000 and SEK 5000. The consequences on the results were minor.

activity does not appear to affect the uptake of summer jobs much considering the weakness of the economy in 1995 and 2001 and the strength of it in 1999.

The fact that the non-offered and non-applicants have a similar rate of summer working is not surprising. There was no hindrance for the applicants to apply for summer jobs with other employers while being in the lottery. Presumably, the applicants considered the summer job program offered by the Council as just one of many opportunities for finding work. Why some 70% of the students did not bother to apply for the jobs with the Council is unknown to us. In the early years, there is some anecdotal evidence that knowledge of the existence of the program was limited among students. Another possible explanation may be that many students had limited interest in the categories of work offered by the Council. Furthermore, the district of Falun is geographically extensive with some communities being more than 40 km from the town center; this resulted in students from rural areas applying proportionally less than other students.

Figure 1 Proportion of Summer Workers among Offered, Non-offered, and Non-applicant Students in Falun



Offered students, for obvious reasons, have a high uptake of summer jobs with a rate of approximately 95%. Wang et al (2006) examined the summer work uptake rates for two age groups, 16-17 years old and 18-19 years old[9], and found no difference between offered students and the uptake. However, the summer work rates for non-offered and

[9] In that analysis both birth-year and birth-month was available allowing for a more precise estimation of the applicant's age. For this reason, that age-definition and our definition of age differs somewhat making the former, on average, higher.

non-applicants were about 70% for 18-19 years old students and about 50% for the younger ones.

While the rate of summer jobs provides information on how many students acquire work experience, it is uninformative on the magnitude of this experience. We have no direct measure of magnitude, but it can be approximately inferred by examining summer job incomes. As noted above, a typical summer job with the Council would pay about 2500 SEK per week. Table 4 and Table 5 show the median and the average income for the period 1995 to 2003. Summer jobs among students in Falun pay a median total of 15000 SEK which roughly corresponds to six weeks fulltime work, although the non-public jobs might pay a higher salary suggesting the inferred number of weeks potentially slightly over-estimate the actual work experience duration. The students working at the Council obtain less experience since the median income corresponds to (the intended) three weeks.

Table 4 Median incomes among summer workers, applicants, and non-applicants 1995-2003, 2009 price level (SEK ‘000).

Year	1995	1997	1998	1999	2000	2001	2002	2003
All summer workers	11.9	11.1	11.8	13.7	15.0	14.9	15.1	16.4
Offered	6.0	6.2	6.8	6.7	8.2	6.7	7.2	6.8
Non-Offered	4.4	0.0	0.8	1.0	3.5	1.0	4.0	0.5
Non-applicants	1.6	0.5	1.4	6.2	7.1	8.0	7.3	6.8

Table 5 Mean incomes among summer workers, applicants, and non-applicants 1995-2003, 2009 price level (SEK ‘000).

Year	1995	1997	1998	1999	2000	2001	2002	2003
All summer workers	19.9	17.0	19.8	22.2	24.3	25.0	26.9	26.6
Offered	8.0	9.2	13.3	10.1	12.2	11.1	10.8	9.9
Non-Offered	7.1	4.3	6.0	5.0	6.2	4.8	7.3	6.7
Non-applicants	10.0	7.9	10.7	15.4	17.9	19.1	19.2	18.2

The offered students had a higher income than non-offered and non-applicant students, which follows from the difference in uptake of summer jobs. However, our main interest is not about the income for the high-school years. We are interested in the comparison of future incomes between those with work experience (in this case in the

form of summer jobs) and those without. In the next section we will make such a comparison. It is commonplace in this type of comparison to perform a logarithmic transformation of the income variable to make it closer to a normal distribution. We have done this as well as making an analysis based on medians. However for this particular data the comparison of future incomes is fairly well described by the mean and because of the simplicity of the mean we will focus the remaining analysis on this measure.

3 Effect Measure and a Comparison of Observed Summer Workers

The summer job opportunity is open to everyone of high-school age in Falun and it is therefore reasonable to focus on the average treatment effect. We have:

(1) $\Delta_i = E\left[Y_i^S - Y_i^{\bar{S}}\right]$,

being the *i*:th student's expected future income (*Y*) in either of the cases having had the experience of summer job (*S*) or not ($\bar{S}$). Hence, Δ_i is the student's expected gain in future income from a summer job experience. Later we consider heterogeneous effects for the individuals with regard to observable background variables, but for the time being assume that $\Delta_i = \Delta$ for all *i*.

Clearly, it is not possible to observe the same student both with and without a summer job experience as he/she either will or will not have it upon entering the labor market at 20 years of age. A crude estimator would be

(2) $\Delta_{crude} = E[Y^S|T = S] - E\left[Y^{\bar{S}}|T = \bar{S}\right]$,

where *T* is the treatment indicator of a student setting the indicator to *S* if the student had summer job experience; otherwise denoted $\bar{S}$. In the estimation, the expected values are replaced by the sample means.

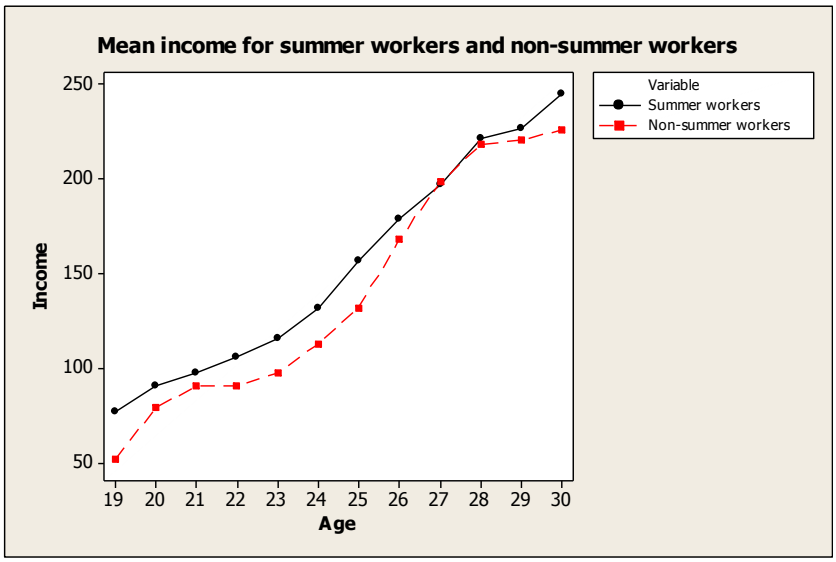
Table 6 shows the evolution of mean incomes for the age range 19-30 years for applicants with and without summer job experience while in high-school. Former summer workers consistently have a higher income after graduation from high-school. The estimated yearly gain ranges from 3500 to 25000 SEK, except for the age of 27, with an overall yearly gain of some 15000 SEK. Table 6 is complemented with Figure 2 which graphically illustrates the evolution of income after graduation from high-school.

Table 6 Mean Income for Summer Workers and Non-summer Workers at Different Ages (SEK '000).

	Applicants					
	Summer workers		Non-summer workers			
Age	N	Mean	N	Mean	Diff	*p*-value
19	3135	76.9	554	51.9	25.0	<0.001
20	3124	90.3	550	79.0	11.3	0.003
21	3170	97.4	547	90.3	7.1	0.098
22	3019	105.8	378	90.7	15.1	0.004
23	2795	115.6	247	97.6	18.0	0.008
24	2394	131.4	184	112.9	18.5	0.026
25	1935	156.4	160	131.8	24.6	0.008
26	1522	178.7	141	168.1	10.6	0.331
27	1116	197.3	120	198.2	-0.9	0.945
28	751	221.7	101	218.2	3.5	0.801
29	429	226.6	75	220.7	5.9	0.741
30	182	244.8	43	225.9	18.9	0.437

The estimator in Eq (2) is susceptible to selection bias as students who obtained a summer job while in high-school may be different in many aspects to those students who did not have a summer job. These differences might explain the difference in income later in life rather than whether they had a summer job or not. Hotz et al (2002) found this estimator to provide positive gains; a gain which was substantially reduced while attempting to render the two groups more comparable by conditioning on some of the potential aspects that influence future incomes.

Figure 2 Evolution of Mean Income for Applicants With and Without Former Summer Job Experience while in High School (SEK '000).



The association between summer job experience and income later in life might therefore be a spurious association. The existence of lurking variables leaves the question of whether summer jobs per se improve future incomes still unanswered. However, we have experimental data rendering it possible to compare future incomes between the two groups not influenced by other aspects: a group who were offered a summer job at the Council and a group who were not offered a summer job at the Council. As the offers were randomly allocated via a lottery other aspects are cancelled out in the two groups thereby eliminating potential selection bias. In the next section offered with non-offered applicants are compared.

4 Estimation of Program and Treatment Effects

In this section we compare applicants who were offered a Council summer job to those not offered. The offer, being based on a random allocation, ought to be independent of other aspects which may influence future incomes. An unbiased experimental estimator would be

(3) $\widehat{\Delta}_{exp} = E[Y|T = O] - E[Y|T = \bar{O}]$,

where the treatment indicator indicates either offered ($T = O$) or not ($T = \bar{O}$).

Table 7 Mean Income for Offered and Non-offered at Different Ages (SEK '000).

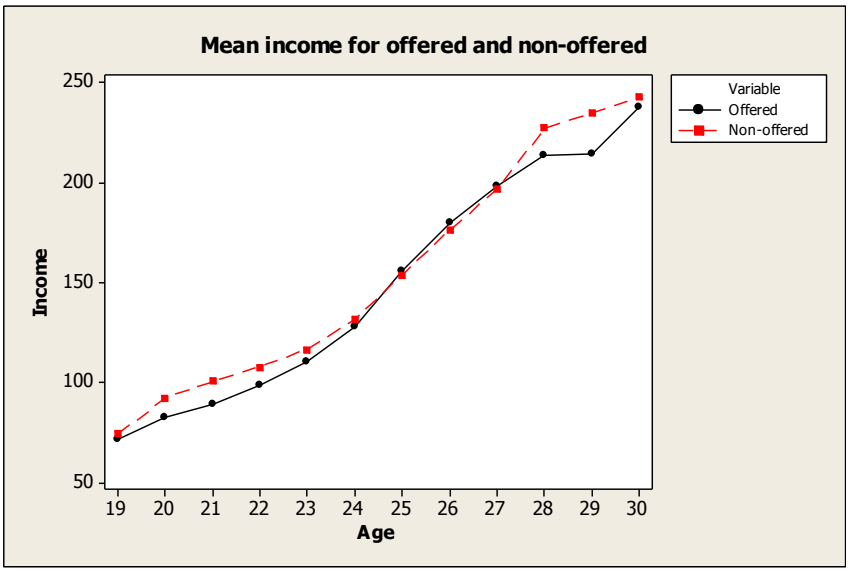
	Applicants							
	Offered		Non-offered				95% CI	
Age	N	Mean	N	Mean	Diff	P-value	Lower	Upper
19	1384	71.5	2306	74.1	-2.6	0.258	-7.0	1.8
20	1379	82.7	2296	92.2	-9.5	0.001	-14.7	-4.3
21	1371	89.3	2284	100.5	-11.2	<0.001	-16.9	-5.4
22	1340	98.5	2058	107.8	-9.3	0.005	-15.8	-2.8
23	1271	110.7	1771	116.6	-5.9	0.114	-13.2	1.4
24	1114	127.9	1464	131.7	-3.8	0.382	-12.2	4.7
25	921	155.7	1174	153.6	2.1	0.683	-8.0	12.2
26	720	179.9	943	176.2	3.7	0.541	-8.1	15.5
27	565	198.2	671	196.7	1.5	0.844	-13.2	16.1
28	382	213.6	470	227.6	-14.0	0.134	-32.4	4.3
29	229	214.7	275	234.8	-20.1	0.124	-45.7	5.5
30	83	237.8	142	243.1	-5.3	0.796	-46.3	35.6

Table 7 shows the mean income for offered and non-offered (2009 price level), number of observations, the difference in group-means as well as the *p*-value from a two-sample

t-test. The point-estimate of the gain is at the most a statistically insignificant 3700 SEK while for most of the years after high-school graduation the point-estimate of the gain is even negative (although also statistically insignificant).

The evolution of mean-income for non-offered resembles the one for the offered students. Figure 3 shows the evolution[10] of mean-income after graduation from high-school for the age range 19 to 30 years old. In Sweden in 2010, the average nominal income per year for 20-64 year olds was about 270000 SEK. The applicants compare roughly with this figure at the age of 30.

Figure 3 Evolution of Mean Yearly Income for Offered and Non-offered (SEK '000).



There seems to be no difference in future income for offered and non-offered applicants implying that there was no effect from the summer job program in the Council. Hence, the program effect is none. As discussed by Angrist, Imbens, and Rubin (1996) however, the program effect is not the same as the treatment effect when a substantial proportion of non-offered applicants still had experience from summer jobs (cf Figure 1). The treatment effect estimator (known as IV-estimator) is

(4) $\Delta_{IV} = \Delta_{exp} \times Pr[\bar{O}]/(Pr[T = S|O] - Pr[T = S])$,

[10] Up to the age of 31 years, the mean-income increases almost linearly which may seem odd. The reason is that the proportion of applicants with a zero-income decreases as they grow older. A large fraction of the applicants are students at a tertiary level in the early years after graduation from high school.

where the denominator is adjusted for the compliers to the intended treatment (see Cobb-Clark and Crossley, 2003). However, in this case with the nominator being somewhere close to zero the treatment effect will also be close to non-existent.

Before claiming the effect on future incomes to be unrelated to summer job experience some additional sensitivity checks are warranted. The first is the possibility that the Council offered summer jobs of poor quality meaning that the offered students were trapped into accepting no skill-enhancing jobs rather than searching for conventional summer jobs. Table 4 and Table 5 show that the Council summer jobs were different to other summer jobs providing less income either due to a lower salary or a shorter duration. Hence, it is possible that the program trapped the students into less skill-enhancing jobs which would bias the estimate of the treatment effect of summer jobs. Often, summer job programs are targeted, for example, to students with social welfare issues. It could be that there is a positive program or treatment effect or both for some sub-groups of students. We examine these two issues in the next section.

5 Sensitivity Analysis

Table 8 shows some key background variables of the high-school students of Falun. We have selected gender, age, school grade of compulsory schooling (final grade usually at the age of 15 years), and household disposable income per capita. The Table gives the values for the year 2000. However, the pattern is comparable in the other years of the program.

A comparison between offered and non-offered shows little difference between the groups as expected, with one exception being gender. That girls are more prone to apply for and accept the summer job program is perhaps understandable considering that the Council offers public jobs and that females in Sweden are over-represented in this sector on the labor market overall. Potentially, this difference might indicate a difference in program effect for boys and girls, i.e. heterogeneous program effects.

A comparison between applicants and non-applicants also indicate similarity in age and family status as measured by household per capita disposable income. However,

applicants have somewhat better grades from the compulsory school compared with non-applicants.[11]

Table 8 Comparison of Background Variables for Offered, Non-offered and Non-applicants in the year 2000.

	Male	Female	Mean age	Mean ranked grades[a]	Mean household income[b]
Offered	35%	65%	16.4	61.3	88,2
Non-offered	48%	52%	15.9	60,1	82,0
Applicants	45%	55%	16.0	60,3	83,2
Non-applicants	53%	47%	16.7	53,3	87,2

Note: (a) Instead of original grades from compulsory school which are in different scales before and after 1998 we used the ranked scores between 0-100 to enable a comparison over the years. (b) Household disposable income per capita at the age of 15.

To check for the presence of heterogeneous effects of the program we did as follows. We regressed post high-school incomes on an indicator variable for offered or not as well as on a variable representing the age of the applicant for each year of income. In the regression, we gave due account to the fact that we have repeated measures of income of the applicants (Gelman and Hill, 2007 and Littell, Milliken, Stroup, and Wolfinger, 1996).

The regression gave an insignificant estimate of program effect of SEK -2300. Thereafter we only kept applicants with ranked grades below 50 and repeated the regression. We found no change in the estimate of the program effect from this action. Neither did selecting on household income affect the estimate of program effect. However, an interaction between offer and gender indicated a weakly significant difference between males and females. Because of this, we repeated the regression for females only and found a positive estimate of the program effect although small and statistically insignificant.

In conclusion, there is no clear indication of a positive program effect for some identifiable sub-group. Parenthetically, the Council (or the government) has not considered targeting the program to some particular group of students.

We now turn to the seemingly nonexistent treatment effect of summer jobs. The summer jobs at the Council were used to estimate the treatment effect although they

[11] It is useful to know that the standard deviation in grades is about 27 when assessing whether this is a noteworthy difference between applicants and non-applicants.

implied less income than other student summer jobs. It could be that other summer jobs were more skill-enhancing and thereby bias the estimate of the treatment effect. To rule out this possibility we will compare offered with *only* summer job experience from the Council with applicants without summer job experience. If these groups have similar incomes after high-school graduation, we can deduce that summer job experience at the Council is comparable to experience gained from other employers.

Figure 4 Income at the Age of 25 and Ratio of Council Summer jobs (SEK '000)

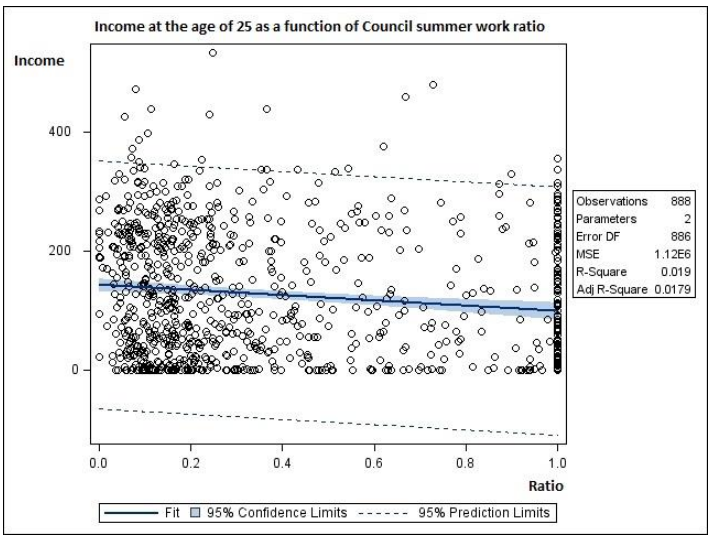


Figure 4 shows the offered applicants' income at the age of 25 as a function of a ratio. The ratio is the proportion of total income from summer jobs provided by the Council while in high-school. A ratio of one means that the student only worked at the Council during their high-school years, whereas a ratio near to zero means that the student acquired almost all summer job experience from other employers. As can be seen from Figure 4, there is a substantial variation in the ratio of the offered applicants where many offered applicants had exclusively experience from the Council. We select the ones with a ratio of at least 0.85 and claim that unless offered by the Council they would not have had any summer job experience.

By comparing offered and non-offered we observed a measure of

(5) $\Delta_{obs} = E[Y^C|T = O] - E\left[Pr(\bar{P})Y^{\bar{P}} + \left(1 - Pr(\bar{P})\right)Y^P|T = \bar{O}\right]$,

where Y^C, Y^P are the future incomes following a summer job with the Council (*C*) and employers other than the Council (*P*) respectively and we are concerned with the possibility that $Y^P > Y^C$. Recall that the proportion $\left(1 - Pr(\bar{S})\right)$ was about 50% and therefore the bias from assuming $Y^P = Y^C$ may be substantial. The formal testing of

Δ_{obs} can only provide evidence of the existence of an effect; it cannot prove a zero-effect. However, in the following we will set $\Delta_{obs} = 0$ as we were unable to provide evidence of the existence of an effect.

The direct way of verifying the assumption of $Y^P = Y^C$ would be to compare them, for instance by exploiting the fact that offered students differ in the magnitude by which they receive *P*-experience (cf Figure 4). However, a comparison between those with a high and a low ratio would be misleading as the ones with a lower ratio are more likely to obtain summer job experience irrespective of a summer job program and therefore likely to attain a higher future income (cf Figure 2).

Table 9 Income at the Age of 25 years for Non-summer Workers and Those with a High Ratio of Council Experience

		Income at the age of 25	
	N	Mean	Median
Non-summer workers	175	112580	76828
Ratio of above 85% of Council summer job	156	102328	61249
p-value for t-test and Wilcoxon-test		0,377	0,432

Consider instead the offered students who only managed to get a summer job via the Council's program and compare them to non-applicants not having managed to obtain any summer job. The only aspect differing between these groups is that the first applied and were also lucky in the lottery. Presumably, without the summer job program they would have been non-applicants without summer job experience. Comparing the evolution of Y^C and $Y^{\bar{P}}$ of the two groups we find them to be similar. Table 9 provides an example at the age of 25 years where there is an insignificant difference between the two groups both with regard to mean and median income. Consequently, it seems that $Y^C = Y^{\bar{P}}$. Replacing $Y^{\bar{P}}$ with Y^C in Eq. (5) we get

(6) $\Delta_{obs} = Pr(P)E[Y^C - Y^p]$,

which is zero only if $Y^P = Y^C$ (given the existence of private summer jobs). Hence, we have not been able to show the existence of neither a program effect nor a treatment effect. This is a result for applicants in Falun and raises the question of the extent to which the results can extend to high-school students in other areas of Sweden?

Table 8 shows key variables for applicants and non-applicants in Falun. They are comparable and we believe that the results extend to non-applicants in Falun. To further consider the external validity for other settings in Sweden it is useful to know that Falun

ranks number 50 out of some 290 municipalities in Sweden in population size and that the mean per capita income (in the age group 25-64 years) in the Council almost perfectly coincides with the national figure.

6 Conclusion

In this paper we addressed whether early contacts, in the form of summer jobs for high-school students, with the labor market improved the transition from schooling to work. This issue is important since high youth unemployment rates prevail and policies of this kind have been proposed and targeted to high-school students in many countries. The empirical evidence on the issue is hard to find, particularly so because existing studies are plagued by potential selection bias. We used experimental data and found that summer jobs offered by a Swedish Council under the umbrella of a national summer job program show no causal effect on future labor market achievement in the form of future incomes up to the age of 30. This non-effect is found in spite of a substantial difference in income evolution between students with and without summer job experience; selection bias seems to entirely cause this observed difference.

We have checked if the lack of effect of the summer job program transfers to a no causal effect of summer jobs in general and the answer seems to be yes. Furthermore, we have not been able to identify any sub-group of students who might benefit from summer jobs. As a result this conforms to the findings of Hotz el al (2002) and Parent (2006) in US and Canadian settings, while the result is in contrast to older non-experimental studies (see Ruhm, 1997).

The result is surprising to us and we fail to explain it. However, the results of Geel and Backes-Gellner (2012) suggest that employers merit rather specific work experience gained by (university) students. In our study the summer job experience typically was for a three week period with rather unspecific tasks, which are perhaps not highly valued by post-education employers.

Finally, it should be noted that the post-education outcome of summer job programs is merely one rationale for the policy. Many other aspects have been studied in the literature of which most may be found referred to in Ruhm (1997).

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